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BOSTON

JOURNAL OF NATURAL HISTORY,

CONTAINING

PAPERS AND COMMUNICATIONS

READ TO THE

BOSTON SOCIETY OF NATURAL HISTORY,

1834—1837.

PUBLISHED BY THEIR DIRECTION.

VOL. I.

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BOTANICAL
GARDEN.

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BOSTON SOCIETY OF NATURAL HISTORY

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INTRODUCTION.

The Society under whose direction the present publication is made, having been established for the purpose of creating a taste for Natural History, and of affording the means of acquiring and diffusing among their fellow-citizens a knowledge of this branch of science, have, in pursuance of the object of their institution, considered it advisable to publish such papers and communications as may come into their hands, possessing sufficient interest to entitle them to be laid before the public. Having but small claims to the character of naturalists, they are nevertheless desirous of contributing something to the common stock of information, and they hope that the succeeding pages will evince the sincerity of their wishes, and the industry and zeal with which they have pursued their attainment.

This Journal which is published in conformity with the views above stated, will be devoted to Natural History solely, and articles on other subjects will not be admitted to its pages ; and a preference will always be given to new and interesting facts relative to the Natural History of

our own country. Descriptions of new objects will be accompanied with coloured illustrations in every case where they are desirable and within the means of the Society, and the mechanical execution of the work will be equal to that of any similar publication. The frequency of its appearance will depend on the abundance of matters prepared for it; and the degree of support accorded to it by the public.

While the Society looks to its own members for the principal part of the materials of the work, its pages will be open to the use of scientific men in every part of the country, and their countenance and aid is respectfully solicited.

The Society does not hold itself responsible for any opinions or facts which the Journal may contain. These must depend on their own merits, and in case they are called in question, their defence will be left to their authors.

Boston, April 1, 1834.

ART. I.—AN ADDRESS DELIVERED BEFORE THE BOSTON SOCIETY OF NATURAL HISTORY, at the opening of their New Hall in Tremont Street. By Rev. F. W. P. Greenwood. Aug. 21, 1833.

With good cause, gentlemen, may we congratulate each other, at this meeting, on our condition and prospects as a Society. This spacious and delightfully situated apartment; these neat and well contrived cases and tables, already exhibiting treasures, the lustre of which is more pleasant to the eyes of science than the shining of silver and gold; this convenient furniture, these ample accommodations, are all indubitable evidences of our improved, established and promising state. Every thing wears a congratulatory aspect. Our countenances are full of animation. Even the mute representatives from the several kingdoms of nature, which here in new order surround us, seem to participate in our pleasure, and, rejoicing in their own deliverance from the damp and obscure region in which they had been hidden, to bid us welcome to upper air, and the comforts of our present abode.

On taking this new step in our progress, it is proper that we should look back on the ground over which we have passed. I will therefore offer a sketch of our history, short and uneventful as it is, principally drawn from minutes which have been furnished me by our worthy and faithful Secretary.

Our Society cannot boast of having been the first ever formed in this city, expressly for the purpose of attending to the pursuit and advancing the knowledge of natural history. Most of us can remember, and some of us, I be-

lieve, belonged to the Linnean Society, which was instituted here, about fifteen years ago, with the same design. This Society made some valuable collections, and for a while was conducted with spirit; but, from various causes, this spirit languished, the Society became inert, it was finally dissolved, and its collections were dispersed.

Though a few years elapsed, during which there was no united and systematic attention given to the great objects of natural science, it was impossible, that in a community like ours, this should long be the case. Accordingly, on the evening of the 9th of February, 1830, a meeting of gentlemen desirous of forming a Society for the study of natural history, was held at the rooms of Dr. Walter Channing, at which meeting, Dr. Channing having been chosen Chairman, and Simon E. Greene, Esq. Secretary, the subject was discussed, and it was voted that a committee of five be appointed to consider the purposes of the meeting, and to recommend at a future day such measures as they should think advisable in order to the formation of a Society, and the best means of interesting the public in its favor; and that the committee report at a meeting to be called by them at such time as they may appoint. The gentlemen chosen on this committee, were Dr. George Hayward, Dr. John Ware, Edward Brooks, Esq., Dr. Amos Binney, and George B. Emerson, Esq. At a meeting called by them the same month, a report was presented by the Chairman, which was accepted, and it was voted, that a Society on the plan proposed be now formed, and that Simon E. Greene and Amos Binney, Jr. be a committee to call upon gentlemen favorably disposed to the objects of the meeting for their signatures, and when a sufficient number have subscribed, to notify said subscribers of a meeting to be held for organizing the Society.

A meeting was held, according to notification, on the 28th of April, 1830. Dr. Channing having been chosen Moderator, and Theophilus Parsons, Esq. Secretary of the same, and the committee to obtain names having reported thereon, it was resolved, that the name of the society be THE BOSTON SOCIETY OF NATURAL HISTORY. At this meeting, also, a committee was chosen to draft a constitution and by-laws.

On the 6th of May a meeting was held, at which the committee reported a constitution and by-laws, which were unanimously adopted. On the 13th of the same month, officers were chosen.

About this time a room was obtained on the ground floor of the Athenæum building, in which collections were occasionally deposited, and the statute meetings were regularly held. But so early as October, 1830, we find a committee appointed to obtain a "more suitable room," —a proof that the Society were soon dissatisfied with their accommodations. In truth, the apartment which we lately occupied, and endeavored to improve, was wholly unsuitable for our purposes, being unfit, from its damp and sunless situation, for the reception of a cabinet. For a time, it was hoped that a room might be obtained in the Masonic Temple, then about to be erected; but this hope was disappointed. We were more than consoled, however, on learning, in February, 1832, that a hall might probably be procured for us, in an edifice proposed to be built by the proprietors of the Savings Bank. Our expectations in this quarter were happily fulfilled. Though we have been in existence as a Society but three years, we have had three courses of public lectures; two in the Athenæum lecture room, and one in the Masonic Temple. Owing partly to the central situation of the Temple, and partly to the zealous exertions of our mem-

bers to induce the public to give their attendance, the last course received so much favor, that the profits accruing from the sale of tickets, encouraged, and mainly enabled the Society to take a lease of the hall which we now occupy, and to fit it up with its appropriate furniture.

The possession of this hall has acted as a fresh stimulus to our exertions. In looking round on our riches, we cannot but feel grateful to the committee who have, I may venture to say, surpassed our expectations, though highly raised, in the superintendence of our interests, and also to those individuals of our number, whose liberality has so suddenly increased our stores. The collection of fishes and serpents, made with so much care and industry by Dr. Smith, is now, by purchase, the property of the Society. Dr. Charles T. Jackson has deposited with us a cabinet of minerals, which would any where be called a most valuable one. Dr. Binney has placed here his beautiful collection of shells. Dr. Lewis has sent us, beside other presents, a perfect ligamentary skeleton of the rhinoceros, which can speak for itself, being probably the best in this country. From other members we have received, and are constantly receiving acceptable donations. Our library is yet small; but when it is considered that more than a third part of its present number of volumes has been added within the last two months, we are encouraged to hope that it will ere long correspond in extent and value with other departments.

But flourishing as our condition is, it may yet be much improved; and indeed the effect of successful accomplishment on generous spirits, is only to prompt them to strive on, and do better and more. There is a plenty of room left in our cases, drawers, tables, for more minerals, insects, birds, shells—more contributions from every division of nature's wide domain. Though we should

not, even now, be ashamed to exhibit our hall to a scientific stranger, we must yet be aware that we have only made a beginning, an excellent one, it is true, but still a beginning—and that several departments must be much nearer to completeness than they are, before we can throw open our doors to the most learned and critical visiter, with a feeling of satisfaction and honorable pride, convinced that we are showing him what he will be gratified to see. It should be our object, in this regard, to attend particularly to the formation or completion of such collections as may give a good idea of the natural features of our own country, and of our own section of our country. If I were travelling in Spain or Persia, I should desire especially, to examine some depository of the natural productions of Spain or Persia. If I were travelling in our Western States, I should prefer seeing a museum well stocked with their own curiosities, to one well stocked with all curiosities but their own. And so too, I presume, a traveller in New England, fond of natural history, will first of all desire to see those objects which illustrate the natural history of New England. For our own instruction and gratification, indeed, and for the advancement of natural science among us, we shall gladly collect from every quarter and every coast and corner of the globe, from every sea and lake and river, whatever can be furnished to our purposes; and yet, for own sakes too, we shall least of all choose to be ignorant of the beings and things with which Providence has surrounded our own dwellings; of the plants which spring from our native soil, the birds which fly in our own heavens, and whatsoever passeth through the paths of our own seas.

It will also greatly conduce to our improvement, and to the cultivation of a taste for natural history in our community, that we should prosecute our intention of publish-

ing a Journal, in which the observations and discoveries of members and correspondents may be saved from oblivion, and contributed to the general fund of scientific knowledge, and through which we may be brought into useful and pleasant fellowship with other scientific societies, at home and abroad. Though such a work ought not to be undertaken, until after a mature consideration of the whole ground of the enterprise, there is no doubt that it would, if well conducted, meet with encouragement and be rewarded with honor.

And by what means are we to secure the desirable objects which have been specified? What is it which will enable us to store our hall with the beautiful and wonderful works of nature, fill our library with the needed volumes, and take a stand among the promoters of science and useful learning? It must be that zeal, without which no enterprise of any importance ever did or ever can succeed. It must be that true interest in our professed purposes, which will prompt us to devote, according to our ability, labor or means to their advancement. It must be that noble sentiment, flowing from the great fount of charity, which impels a man to give up something of that which he calls his own, something which he legally might, and which the selfish man always does devote to his strictly personal interests and pleasures —to give up something of this to the cause which he has espoused, to the good of others, to the common weal. It is very true that most of us are so connected, in our several professions, with those to whom our first and chief attention is due, that we cannot lawfully be absorbed in pursuits which are extraneous to our immediate obligations;—but we can take a little from our leisure, and a little from our indulgences, and a little from our rest, and make our very amusement and healthful recreation con-

tribute to the welfare and growth of this Society. This we can do, and ought to do, if we mean that our connexion with the Society should be any thing more than nominal. Some of our members have already given animating examples to the rest of us. The public will in time second our efforts, and regard us with favor as those who are working for the public benefit, and seeking to raise yet higher the literary reputation, already eminent, of our fair city.

As I have congratulated you, therefore, gentlemen, on the bright prospects of our Society, permit me to commend those prospects and all its future interests to your untiring attention, to your love of good learning, to your love of country. Nor would you excuse me—I could not excuse myself—were I not reverently to commend them to yet higher regards, to the blessing of Him, the Eternal Author of Nature, and Source of being,

> "Who fosters with a parent's care
> The tribes of earth, and sea, and air."

APPENDIX.

Since the opening of the Society's Hall, a new spirit has been excited. Semi-monthly meetings, well attended, have succeeded to those interviews, at which a few zealous members only, could be collected, once a month. Written communications on subjects connected with the different branches of Natural History, or reports upon objects previously presented to the Cabinet, or both, have been liberally offered at each meeting; and the initiation of sixty-two members since our first meeting in the Hall, is the best evidence that the interest in Natural History is becoming deep and extensive.

Valuable additions have been made to each department

of the Cabinet. Many perfect skeletons of animals have been presented and deposited. Among these, deserve to be mentioned, those of the *Hydrochærus Capybara*, *Mustela Canadensis*, *Cervus Virginianus*, *Iguana tuberculata*, *Emys serpentina*. The Crania of the *Felis tigris*, *Sus scropha*, *Sus babirussa*, *Lacerta Crocodilus* and *Cervus Virginianus*, should not be passed unnoticed.

About forty species of Birds now enrich our cases, among which is a magnificent specimen of the Sea Eagle, (*Falco fulvus*) and seven other species of *Falco*—nine species of Duck, the *Strix nebulosa*, *Quiscalus versicolor*, *Tetrao cupido*, *Scolopax borealis*, *Sterna arctica*, *Uria alle*, *Uria troile*, *Ardea virescens*, &c.

Large additions have been made to the Entomological Cabinet, which now contains about 3000 species, well arranged; the majority of which are natives of New England.

Numerous specimens have been added to the Cabinet of Minerals, of which, a collection of Lavas and Sulphurs from St. Vincents, Montserrat, and St. Lucia, and Petrifactions from Antigua, and a magnificent Beryl from Ackworth, N. H., by far the largest known in the world, measuring 3 feet 4 inches in circumference, are worthy of mention.

A valuable collection of Reptiles has been received from Surinam.

The contributions of a few individuals have laid the foundation of a collection of Crustacea, and have filled a case with Corals and Madrepores.

The Botanical department has not been forgotten. To this belong about 900 species of plants, mostly from our own vicinity.

The Library is rapidly increasing. Upwards of 70 volumes, many of which are rare and valuable, have been added by donation, since August last. D. H. S.

ART. II.—REMARKS IN DEFENCE OF THE AUTHOR OF THE "BIRDS OF AMERICA." By the Rev. John Bachman, Charleston, South Carolina. Read before the Boston Society of Natural History, Feb. 5, 1834.*

Sir:

I have observed in your interesting and valuable Journal a number of remarks calculated to impeach the veracity of Mr. Audubon as a traveller and naturalist, and to injure him in the estimation of the community as an author. Although from my profession and habits I feel no disposition to enter into controversy, yet having had opportunities which few others possess, of becoming acquainted with the occupations and literary acquirements of that gentleman, and being prompted, not by feelings of private friendship alone, but by a desire that full justice should be awarded him for those expenses, sacrifices and privations which he has undergone, I take the liberty of stating what I know on this subject, and I have reason to believe, from the characters of the writers, who have doubted his

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* This article was originally written for Loudon's Magazine, in order that the attacks upon the veracity of Mr. Audubon might be met, in the land where it was first questioned. It was, at the same time, communicated to this Society, with permission to make such use of it as we should think proper. It has been thought desirable to publish it in our own country; for although the naked fact, that Mr. Audubon's statements have been questioned by the learned in foreign lands, may easily gain extensive currency, the experiments, by which his statements and views have been so triumphantly vindicated, may not be so readily brought to public knowledge by means of an English Journal. We have confined ourselves almost entirely to what is valuable in a scientific point of view, omitting several portions of the original paper, of a personal nature, which would be superfluous to an American reader. (*Pub. Comm.*)

veracity and the authenticity of his works, that with that generosity of feeling so distinctive of those who are engaged in liberal and kindred pursuits, they will be gratified to assign him the meed of praise which he so undoubtedly merits.

It appears that exception has been taken to two articles by Mr. Audubon,— one on the habits of the rattle snake (*Crotalus*,) and the other on the habits of the turkey buzzard (*Cathartes aura*, Illig.). The latter publication is now lying before me, the former I have not had an opportunity of seeing; but from what I gather from some communications in your Journal, it appears that he ascribed to the rattle snake some of the habits of the common black snake (*Coluber constrictor*, Linn.) such as ascending trees in search of game, feeding on squirrels, &c. He also mentioned the remarkable fact of its living a considerable length of time in confinement without food, and of its being found in the water, at a considerable distance from the shore.

I do not wish either to defend or perpetuate error, and acknowledge that the rattle snake appears to be a heavy and sluggish reptile; yet it will be recollected that there are now found in this extensive country at least *five* well defined species of rattle snake, and that the habits of some of these are very little known to naturalists. The fact is now pretty well established, and is generally admitted by naturalists in this country, that one or more of our species of rattle snakes in the South and West have been seen on fences and on trees to a considerable height. The letters of Col. Abert of the U. S. Topographical Engineers and others who have had the best means of ascertaining these facts, published in the American Journals, go far to prove that the observations of Audubon in this respect have not been exaggerated. Under an impression that some of these statements

may be new to your readers, I take the liberty of sending you the following extract from the letters of Col. Abert published in the Monthly American Journal of Geology and Natural Science, Nov. 1831, page 221.

"I have been informed that some of our learned city gentlemen have doubted the truth of his (Audubon's) representation of the rattle snake attacking a mocking bird's nest (*Turdus polyglottus*, LINN.) from an opinion that the rattle snake does not climb; an opinion by the way, more common in our cities, than with the hunters in the wilds in which this reptile is generally found. But as I am possessed of some facts on this subject, which prove that the rattle snake does climb, I will in justice to Mr. Audubon relate them to you."

"1st. When Lieut. Swift of our army was engaged on the survey in Florida in 1826, his attention was suddenly called to a group of his men within about one hundred feet from where he stood. They had just killed a snake, which the men assured him they had seen seize a grey squirrel on the limb of a tree, about fifteen feet from the ground and fall to the earth with it. When Lieut. Swift had arrived at the place, the snake was already dead and much mangled. He did not examine it for the rattles, but his Florida hunters, who are as familiar with the appearance of the rattle snake as we are with that of the chicken, told him that it was a rattle snake."

"2d. General Jessup, the Quarter Master General of our army, assured me in conversation a day or two since, that he had seen the rattle snake upon bushes, and particularly stated one case in which he had seen a snake of that kind up a Paupau tree (*Porcelia triloba*, PURSH). He added that in one of his excursions in the woods of the West he had actually witnessed a scene similar to that of Mr. Audubon, of birds defending their nests against a snake.

But he does not recollect whether in this instance it was a rattle snake or not."

3d. General Gibson, the Commissary General of our army has also assured me that he has seen the rattle snake upon bushes and upon the top rail of fences. He likewise stated a case in which he saw a rattle snake in the fork of a tree about eight feet from the ground, coiled and at rest. The tree stood by itself and the diameter of its trunk was upwards of one foot. He knocked the snake out of the fork and killed it. I could cite many other cases, "but I prefer limiting myself to these, as I am personally acquainted with the gentlemen named, and received their stories from their own mouths."

"Now after these facts I cannot suppose that any reasonable man will doubt the ability of the rattle snake to climb. Both Generals Jessup and Gibson are well acquainted with this snake, and good observers and fond of the woods. The latter particularly so, being now one of our most expert sportsmen, and has been during his life stationed in almost every State of our Union. He is also particularly attentive to the habits of the animals which in the course of his amusement, he seeks either to obtain or to destroy."

I am in possession of unpublished certificates (of a similar character with the above,) from Dr. Cooper, recently President of the South Carolina College, and others.

That the rattle snake sometimes takes to the water, and is found a considerable distance from the shore in salt water is a fact now fully established. Dr. Leitner, a German botanist, now residing in this city, and on whose veracity the fullest reliance can be placed, authorizes me to state, that in exploring the Floridas during the last summer, he met with a rattle snake crossing Tampa

Bay, on the western coast of Florida, a mile from the shore. This was also witnessed by Dr. Randolph and Mr. Hackley who were in company.

How long this reptile can subsist without food I am unable to say. I have seen a rattle snake eat in confinement; but of four or five that were kept in the Charleston Museum during the whole of the last summer, not one of them tasted a morsel of food, although rats and other living animals were placed in their cage. That the rattle snake in its native woods feeds on squirrels as well as on rabbits (*Lepus Americanus*, GMEL.) and rats is well known. I have myself seen the largest of our squirrels (*Sciurus vulpinus*, GMEL.) cut out from the body of a rattle snake, as well as a Florida rat (*Arvicola Floridana*, ORD) and the latter animal (a circumstance not generally known) occasionally breeds on trees as well as the former. In what manner these quadrupeds were captured, whether by stratagem, or by being seized in their nests at night, or by being run down in the manner of the black snake, no one is able positively to state or to contradict. Possibly, rattle snakes may yet be discovered to be nocturnal in their habits, possessing a degree of activity at night which is not exhibited by day, unless hard pressed by hunger. The hunters of Carolina who go in pursuit of deer by torch-light, speak of their frequently meeting the rattle snake in their nightly walks, actively engaged in search of prey. On a subject, then, where there exists such a diversity of opinion, let us not too hastily condemn a man who describes what he asserts he has seen, since so many of his statements which at first appeared somewhat incredible, have been corroborated by the recent observations of naturalists.

With regard to the experiments of Audubon on the power of smelling usually ascribed to the turkey buzzard,

(*Cathartes aura*, ILLIG.) I acknowledge that he has adopted views opposed to the long established opinions of naturalists. But no one who will read his paper on the subject, containing a full detail of a number of experiments on the habits of this vulture, can deny, that if he intended to deceive the world, he certainly chose a subject where detection of error was easy and certain. In our southern cities, these birds, with a kindred species (*Cathartes iota*, BONAP.) commonly called the carrion crow, are so abundant in our streets and on our house-tops as to have become a nuisance. Mr. Audubon, in his frequent visits to this city, has fearlessly invited investigation on this subject. During his absence, he has written to me on several occasions, urging me to make farther experiments.

On the 16th of December, during a visit of Mr. Audubon to this city, I commenced a series of experiments on the habits of the vultures (*C. aura et C. iota*) particularly as regards their powers of smell and sight, which continued with little intermission till the 31st. Written invitations were sent to all the Professors of the two Medical Colleges in this city; to the officers and some of the members of the Philosophical Society, and such other individuals as we believed might take an interest in the subject. Although Mr. Audubon was present during most of this time, and was willing to render any assistance required of him, yet he desired that we might make the experiments ourselves; that we might adopt any mode that the ingenuity or experience of others could suggest for arriving at the most correct conclusions. The manner in which these experiments were made, together with the result, I now proceed to detail.

There were three points on which the veracity of Audubon had been assailed. 1. Whether is the Vulture gregarious? 2. Whether he feeds on *fresh* as well as

putrid flesh? 3. Whether he is attracted to his food by the eye or the scent?

I. Whether the vultures of this country are gregarious?

That vultures during the breeding season, and occasionally at other times, fly singly, is well known; but such is also the case with all our birds that usually keep in flocks, witness the wild pigeon (*Columba migratoria*, LIN.) and the robin (*Turdus migratoria*, LIN.) and many of our water birds. But that our vultures are in the true sense of the word gregarious, is a fact well established. In most cases, in the interior of our State, as well as in the environs of this city, considerable numbers are found in company, from three or four to forty or fifty. They hunt for their prey in company; they feed together on the same carrion; they perform their gyrations in great numbers together, and they roost together.

I have visited their roosting places, a sight well worth travelling many miles to observe. In some deep swamp or occasionally on high ground, surrounded by a thicket of vines and thorny shrubs usually composed of *Zizyphus volubilis*, ELLIOTT, and several species of the *Smilax* and *Rubus*, the buzzards resort for years together to spend their nights. Here, on some dead tree, and frequently on several that may be standing near each other, they are crowded so close together, that one or two hundred may be counted on a tree, and frequently thirty or forty on a single branch. The ground and bushes within a certain extent are covered with the excrements, which by their acidity, have destroyed the whole undergrowth of shrubs and plants, and every blade of grass, so that the surface presents an appearance of having received several thick coatings of whitewash.

II. Whether our vultures subsist on fresh, as well as putrid food? On this head it was unnecessary to make

experiments, it being a subject with which even the most casual observer amongst us is well acquainted. The roof of our market house is covered with these birds every morning, waiting for any little scrap of fresh meat that may be thrown to them by the butchers. At our slaughter-pens, the offal is quickly devoured by our vultures whilst it is yet warm from the recent death of the slaughtered animal. I have seen the Cathartes aura a hundred miles in the interior of this country, where he may be said to be altogether in a state of nature, regaling himself on the entrails of a deer which had been killed not an hour before. Two years ago, Mr. H. Ward, (who is now in London, and who was in the employ of the Philosophical Society of this city) was in the habit of depositing at the foot of my garden in the suburbs of Charleston, the fresh carcasses of the birds he had skinned; and in the course of half an hour both species of vulture, and particularly the Cathartes aura, came and devoured the whole. Nay, we discovered that vultures fed on the bodies of those of their own species that had been thus exposed. A few days ago, a vulture that had been killed by some boys in the neighborhood, and had fallen near the place where we were performing our experiments, attracted, on the following morning, the sight of a Cathartes aura, who commenced pulling off its feathers and feeding upon it. This brought down two of the black vultures who joined him in the repast. In this instance, the former chased away the two latter to some distance, an unusual occurrence, as the black vulture is the strongest bird and generally keeps off the other species. We had the dead bird lightly covered with some rice chaff where it still remains undiscovered by the vultures.

III. Is the vulture attracted to its food by the sense of smell, or of sight? A number of experiments were tried

to satisfy us on this head, and all led to the same result. A few of these I shall proceed to detail.

1. A dead hare, (*Lepus timidus*, LIN.) a pheasant, (*Phasianus Colchicus*, LIN.) a kestrel, (*Falco tinnunculus*, LIN.) from a recent importation, together with a wheelbarrow full of offal from the slaughter-pens, were deposited on the ground in a retired situation at the foot of my garden. A frame was raised above it at the distance of twelve inches from the earth. This was covered with brush wood, allowing the air to pass freely beneath it, so as to convey the effluvium far and wide, and although fifteen days have now gone by, and the flesh has become offensive, not a single vulture appears to have observed it, though hundreds have passed over it, and some very near it, in search of their daily food. Although the vultures did not discover this dainty mess, the dogs in the vicinity, who appeared to have better olfactory organs, frequently visited the place, and gave us much trouble in the prosecution of our experiments.

2. I now suggested an experiment which would enable us to test the inquiry: whether the vulture could be attracted to an object by the sight alone? A course painting on canvass was made, representing a sheep skinned and cut open. This proved very amusing; no sooner was this picture placed on the ground than the vultures observed it, alighted near, walked over it, and some of them commenced tugging at the painting. They seemed much disappointed and surprised, and after having satisfied their curiosity, flew away.

This experiment was repeated more than fifty times with the same result. The painting was then placed within ten feet of the place where our offal was deposited. They came as usual, walked around it, but in no instance evinced the slightest symptom of their having scented the offal which was so near them.

3. The most offensive portions of the offal were now placed on the earth; these were covered over by a thin canvass cloth. On this were strewed several small pieces of fresh beef; the vultures came, ate the flesh that was in sight; and although they were standing on a quantity beneath them, and although their bills were frequently within the eighth of an inch of this putrid matter, they did not discover it. We made a small rent in the canvass and they at once discovered the flesh, and began to devour it. We drove them away, replaced the canvass with a piece that was entire; again they commenced eating the fresh pieces exhibited to their view, without discovering the hidden food they were trampling upon.

4. The medical gentlemen who were present, now made a number of experiments which showed also incidentally, the absurdity of a story widely circulated in the United States through the newspapers, that the eye of a vulture when perforated, and the sight extinguished, would in a few moments be restored, in consequence of his placing his head under his wing; the *down* of which was said to restore the sight. The eyes were perforated; I need not add that although the eye refilled, and the ball became of its natural rotundity, the bird became blind; and that it was beyond the power of the healing art to restore his lost sight. His life was, however preserved, by occasionally putting food in his mouth. In this condition they placed him in a small out-house, hung the flesh of the hare (that was now become offensive) within his reach; nay, they frequently placed it within an inch of his nostrils, but the bird gave no evidence of any knowledge that his favorite food was so near him. This was repeated for several days in succession, with the same results.

I did not consider this last experiment so conclusive as others did, who witnessed it. The bird might not

have been wholly free from the pain inflicted by the operation, nor could he have been so soon reconciled to the new situation into which he had been thrown by the loss of sight; but in connexion with other experiments it strengthened us in the opinions we had formed.

After having resorted to the means detailed above, to satisfy myself of the accuracy of the statements of Audubon as regards the habits of the turkey buzzard, referred to in Jameson's Journal, I once more carefully read over his remarks on the subject, and now feel bound to declare, that every statement contained in that communication is in accordance with my own experience, after a residence of twenty years in a country where the vultures are more abundant than any other birds.

We were not aware that any other experiments could be made to enable us to arrive at more satisfactory results, and as we feared, if continued, they might become offensive to the neighbors, we abandoned them.

I have thought proper to obtain the signatures of the following gentlemen who aided me in, or witnessed these experiments; and I must also add that there was not an individual, among the crowd of persons who came to judge for themselves, who did not coincide with those who have given their names as coinciding in my conclusions.

ROBERT HENRY, A. M.
President of the College of South Carolina.

JOHN WAGNER, M. D.
Prof. of Surgery of the Med. College of S. Carolina.

HENRY FROST, M. D.
Prof. Materia Medica, Med. Coll. of S. Carolina.

C. F. LEITNER,
Lecturer on Botany and Natural History.

B. B. STROBEL, M. D.

MARTIN STROBEL.

It now remains for naturalists to account for the errors which have for so many ages existed, with regard to the power of scent ascribed to our vultures. Indeed it is highly probable that the facts elicited from the experiments of Audubon on our two species of vulture, strengthened by those instituted on this occasion, may apply to all the rest of the genus. Without having had many opportunities of observation, I am inclined to doubt the extraordinary powers of smell ascribed to the Condor of the Andes, (*C. gryphus*, LIN.) and it would be advisable to make farther experiments on the vultures of southern Europe and Africa. Perhaps it may yet be discovered that all the birds belonging to this genus are altogether indebted to the eye in their search after food. Indeed I am of opinion that whilst in quadrupeds (particularly carnivorous ones) the faculty of scent is their peculiar province, this organ is but imperfectly developed in birds. As it does however exist, though in an inferior degree, I am not disposed to deny to birds the power of smell altogether, nor would I wish to advance the opinion that the vulture does not possess the faculty of smelling in the slightest degree, although it has not been manifested by our experiments. All that I contend for is, that he is not assisted by this faculty in procuring his food. That he cannot smell better, for instance, than hawks or owls, who it is known are indebted to their sight altogether, in discovering their prey. If our vultures had to depend on their olfactory powers alone, in procuring food, what would become of them in cold winters? In Kentucky, for instance, where they remain all the year, and where the earth is bound up with frost for months at a time, and where consequently, during that period, putridity does not take place. If they had to depend alone on tainted meat for food, how soon would the whole race (at least in our temperate climates) die of hunger.

How easily error may be perpetuated from age to age, we may learn from a thousand other visionary notions, which the more careful observations of recent travellers and naturalists have exploded. At this day, the belief is very general in this country, that immediately after a deer (*Cervus virginiànus*, GMEL.) has been killed, the vultures at the distance of many miles are seen coming in a direct line against the wind, scenting the slaughtered animal. This may be accounted for with a little observation, upon rational principles. When a deer is killed, the entrails are immediately taken out; these, and perhaps the blood which covers the earth to some extent, are seen by some passing bird. He directly commences sailing around the the neighborhood. He is observed by those at a distance. The peculiar motions of his wings, well known to those of his own species, communicate to them the intelligence that something good for them is perceived: these hastening to the place, give information to those who are still farther off, and in the course of an hour, a great number are guided to the spot. But it will scarcely be argued that this great concourse of vultures has been attracted by the effluvium of putrid flesh, since the animal has been killed but an hour before.

"In the prosecution of our experiments, we discovered that the powers of sight in our vultures, were not as great as those possessed by the falcon tribe. A dead fowl was discovered by them at the distance of 70 or 80 yards; a sheep at 100 or 120 yards. These however were stationary objects, lying on the ground. One of their own species however, flying in the air, is no doubt observed by them at a much greater distance. It may easily be conceived why the sight of the vulture is less acute than that of hawks or eagles. The latter prey upon birds, quadrupeds, &c. for which they have to hunt: the former feed

chiefly upon dead birds, quadrupeds or reptiles, and frequently those of large size, which it requires no extraordinary powers of vision to discover. An argument much relied upon by those who advocate the doctrine of the olfactory powers of vultures, is the circumstance of their usually flying against the wind, as if to discover and follow some current of tainted air. This practice it may easily be perceived, is not more common to the vulture than to any other bird. It is a mistaken idea that birds in their migrations, or on any other occasion, prefer flying with the wind. This is inconvenient and uncomfortable to them, and the careful observer of the flight of birds, is well convinced that all birds — the vulture among the rest, prefer facing the wind, not to enable them to smell their food, but to render their flight more easy and pleasant.

It may next be enquired, for what purpose are the wide nostrils, and the olfactory nerves given to the vultures, if they are not intended to assist them in procuring their food? To this, I answer, that the olfactory nerves of our vultures, are not larger than those of many other birds, and their nostrils are less even, than those of the hooping crane, (*Grus Americàna Temm.*) which discovers its food, (as I strongly suspect every bird does,) by the eye alone. The wide orifice in the beaks of vultures, and which is generally considered as the nostril, is probably a wise provision of nature to enable a bird which, from its filthy habits of feeding, is continually exposed to have its nostrils closed up — to blow out any substance calculated to obstruct them. The same may be said of the hooping crane, which from the manner of its digging for roots in the earth is liable to the same inconveniences. Several heads of the vultures are now in the hands of individuals connected with our Medical Colleges for dissection. A satisfactory elucidation of the subject

will require time, patience and an extensive knowledge of comparative anatomy in regard to the various species of birds. The result of these investigations, will probably be communicated to the public in the course of a few months.

No naturalist in this country has ever bestowed so much of his time, industry and wealth, or made so many sacrifices to a favorite pursuit, as Audubon. To this he has devoted the most active portions of his life. To accomplish this he has traversed this wide extended country from the Atlantic to the very foot of the Rocky Mountains; from the swamps of Florida and Louisiana to the snows of Michigan and the rugged rocks of Labrador, and if he is supported by the approbation and the smiles of the generous and the just, he is desirous of extending his researches along the Gulf of Mexico, the borders of Texas, and even of crossing the Rocky Mountains, and exploring the rivers and valleys along the Pacific Ocean.

For the last two years and a half I have been intimately acquainted with Mr Audubon. He has resided in my family for months in succession. From a similarity of disposition and pursuits, he was my companion in my rambles through the woods and fields, and the enlivener of my evening hours. During his absence we were constant correspondents, and his letters, amounting to nearly a hundred, are now lying before me. His journals have been regularly submitted to my inspection. His notes and observations were made in my presence, and a considerable portion of the second volume of his Ornithological Biography was written under my roof. I have carefully compared his first volume with the forthcoming one, and from all these opportunities which I have enjoyed of making a decision, I do not hesitate to state that the second volume will not fall short of the first in purity, vigor, and originality of style, and that it will contain the additional experience

and observation of three of the most active years of his life.

The additions already made to American Ornithology by the labors of Audubon are immense; suffice it to say, that he has already added upwards of one hundred species, not figured by Wilson. Some of these have been described in the valuable continuation of Wilson's work by Bonaparte; still, with these deductions, there will be an immense number of new birds published in the Work of Audubon, for a knowledge of which, the public will be solely indebted to his zeal, industry and experience. Amongst the other interesting discoveries made by him, may be noticed a new heron and an eagle, (*Falco Washingtònii*, AUD.) the largest in the United States. Two species of pigeon, a humming bird, and a considerable number of the genera of the *Muscicapa*, *Troglodytes and Fringílla*.

His services alone, in correcting the errors into which his predecessors had fallen, from the want of opportunities such as he has enjoyed, are invaluable, and will be duly appreciated by the lovers of Natural History. It may not be uninteresting to your readers to notice a few of these. In his recent visit to Labrador, to which inhospitable region he was led solely by his ardent zeal for the advancement of science, he has ascertained that the *Larus marìnus*, LIN. and the *Larus argentatoides*, BONAP. are the same bird, in different stages of plumage. In the *Larus minùtus*, BONAP. and *capistrátus*, BONAP. a similar mistake had occurred. The *Ardea Pealii* of Bonaparte, proves to be the young of the *Ardea rufescens* as ascertained by Audubon, in the highly interesting and ornithological region of Florida. The figure of Wilson of the *Rallus crépitans* given as the adult bird, proves to be that of a new species, found in the fresh water marshes of our southern country; and the *Falco lagòpus*, LIN. is

only the immature bird of the *Falco Sancti Johannis*, Gmel.

In addition to this, the visits of Audubon to the breeding places of many other of our rare birds in the extreme North and South of our country, enabled him to investigate their habits more fully, and to describe them more correctly, than has ever been done before.

If the inquiry be made, what prospect there will be for the continuation of this work, in case the author should not live to complete it, I am happy to say, that its publication is secured, beyond the fear of accidents. The drawings of the birds for the whole work are nearly completed, the materials for their history are collected and recorded, and there exists sufficient acquirement, in the members of his interesting and talented family, to carry on the work.

Let the literary world but award to Audubon the justice which he merits, let the public continue to be indulgent and liberal, and this work cannot fail to prove a very important acquisition to the Natural History of America, nor to reflect the highest credit on the liberality of the British public, that has hitherto so efficiently aided him in the publication of it, nor to establish an abiding monument to the fame of its author; whilst it must continue to be selected as the chosen companion of those who delight in the contemplation and investigation of the phenomena of nature, in one of the most interesting departments of her works.

ART. III.—DESCRIPTION OF A GIBBON.

By Winslow Lewis, Jr. M. D.

These animals have been placed, by recent systematic naturalists, as a sub-genus of the Ourangs, with which they were confounded by the earlier writers. But their organization demonstrates much more recession from the great standard, man, than the latter, more especially in the elongation of the anterior extremities, and their dental peculiarities. Illiger, a Prussian anatomist, has designated them under the term Hylobates, to express their habits as inhabitants of the forests, and some remarkable additions have been made to the genus, so that five species have been described by Lesson in his supplement to Buffon,* viz.

H. Syndáctylus, *the Siamang.*
H. Lar, *the Great or Black Gibbon.*
H. Leuciscus, *Moloch or Cinereous Gibbon.*
H. Variegàtus, *Little Gibbon or Wouwou.*
H. Unko, *the Ounko.*

To which number Dr. Harlan, of Philadelphia, added another which he termed *Cóncolor.*†

A Gibbon which I had an opportunity of dissecting, presenting differences from any of the above, I have been induced to detail the results of my investigation. And as we possess in our cabinet, a finely prepared skeleton of

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* Histoire Naturelle Générale et Particulière des Mammifères et des Oiseaux découvèrts depuis 1788, jusqu' à nos jours. Par R. P. Lesson, Vol. III. p. 362.

† Journal of the Academy of Nat. Sciences of Philadelphia, Vol. v. p. 229.

what Dr. Jeffries, of this city has described as an ourang-outang,* and as I have lately made a dissection of another ourang which has been exhibited in this country alive; such advantages as these, have given a fair opportunity for more correct deductions by comparison.

This animal, a female, was purchased at the same time with a male, from the menagerie of a Rajah at Calcutta, who said that they were obtained from the vicinity of the Himmalay Mountains, and had not long been in his possession. They were held in great estimation by him for their rarity. Both were purchased by the same gentleman. The female died in forty days after leaving Calcutta, from a bowel complaint, and the male, being similarly affected, survived her but a fortnight. These animals were reserved, very gentle, and uncommonly cleanly as to their bodies and their food. They evinced great attachment for each other, as particularly appeared during the sickness of the female; the other holding her in his arms as a parent does her infant! and after her death he immediately refused sustenance, and, as before stated, shortly died. The body of the female was preserved in arrack, but the other, unfortunately, was thrown away. Their food was rice. Their only manner of walking was on their posterior or inferior extremities; the others being raised upwards to preserve their equilibrium, as rope-dancers are assisted by long poles in their feats. Their progression was not by placing one foot before the other, but by simultaneously using both, as in jumping. The

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* Geoffroy St. Hilaire regards the animal described by Dr. Jeffries as a young individual of the Pongo of Wurmb, and the great length of the spinous processes of the cervical vertebræ, the want of the flat nails on the extremities, the length of the arms, and the same "habitat," seem to justify his opinion.

animal arrived in a good state of preservation, and was dissected as minutely as was practicable, in the warm month of July.

The hair was uniformly of a dirty brown color over the whole body and extremities. None on the face, ears, palms of the hands, soles of the feet, or on the callosities of the buttocks. Face and hands were black. The back very straight and flat, the bases of the scapulæ approximating closely. The abdomen not protuberant. Two pectoral mammæ, terminated by long nipples. The thoracic and abdominal cavities corresponded to the human organization. The right lung had its three lobes. This is here particularly mentioned, because in the one examined by Daubenton he found four lobes in the right lung. The *appendix vermiformis* was as in man. The pathological appearances were, enlargement of the mesenteric glands, and ulcerations on the mucous surface of the intestines.

The facial angle of Camper was 60°. No cheek pouches. The ears were very similar to the human, being furnished with the helix, or outer border. *Callosities* small. This animal was well advanced in age, as indicated by the obliteration of the sutures, and by the existence of the whole series of teeth. The os frontis is nearly on a line drawn horizontally from the superciliary arches, which arches are largely developed. The cavities of the orbit are very deep and round, and the external orbitar processes project very much laterally. No mastoid or styloid processes. No traces of the existence of an intermaxillary bone.

The teeth are thirty-two. The upper incisors rather oblique, but the lower perpendicular. The four superior are of about an equal size, the edges blunt. The external incisors are worn down by the action of the lower canines on their outer edges. The upper canines are enormously

projecting, extending nearly to the mental foramina when the jaws are closed; their anterior edges worn by the lower canines. No lateral or grinding motion of the jaws can be effected by bringing them together, in consequence of the length of these upper canines. The two next are false molars. All the molars small. The four inferior incisors are small, of an uniform size, and have sharp, cutting edges. The canines project upwards as far as the alveolar processes of the upper jaw. The first false molars are worn away externally by the upper canines, and terminate in single points.

There are twenty-five vertebræ. The six lower cervical are peculiar as to their transverse processes, which do not extend as far as the articulating processes laterally, and they also project downwards. The atlas is by much the widest. The spinous processes are short, (as seen in the second plate,) and do not bifurcate; and these processes throughout the whole column, from the atlas to the coccyx, form a perfectly straight line. Thirteen dorsal vertebræ. The lumbar have some peculiarities. The superior articulating processes project upwards, especially the first, which terminates in a very sharp point. The transverse processes of the fourth and fifth are large, flat, and extend outwards. (See plate I.) Only one bone to the coccyx. The sacrum consists at present of but one piece, though some faint traces remain of a former division of this bone into three. The ribs are thirteen in number, very convex. The chest capacious and round. The first and second ribs are articulated to the manubrium of the sternum. The five next to the second piece. Six false ribs, four of which are floating. The sternum has three bones. The two first receive the cartilaginous terminations of the seven superior ribs, while the third, which is an inch in length, is unconnected with the ribs, and has affixed to it, a broad, ensiform appendix.

The clavicle is very long; four inches: humerus, eight and a quarter. Radius, ten, and, commencing at its tubercle, is flexed outward like the bow of a violin. Ulna same length, but straight and triangular. Carpus narrow, the pisiform and unciform bones large and projecting, and, by affording a point of attachment to the flexors of the hand, perform the same office as the os calcis. From the fore-arm to the end of the phalanges six inches. Metacarpus very narrow at the carpal extremity. Thumbs extend to a very little beyond the articulation of the first phalanx of the indicator with the metacarpus. Both the thumbs have very minute sesamoid bones between the first and second bones. The nails on the thumbs are short and flat, while the others are rounded, narrow, and like claws.

The ilia are flat, and nearly on the same plane with the vertebræ. The superior opening of the basin of the pelvis is of an oval shape from sacrum to pubis, and very large, being three inches in that direction, and two and a quarter inches across. The pubis sharp, its symphysis one and a half inches deep. Thyroid foramen large and round. Tuberosity of the ischium one and a half inches wide. Femur seven and a half inches long, having a ligamentum teres. Tibia six and a half inches in length, and a little curved forwards. Fibula straight. Os calcis projecting but very little backwards. Whole length of the foot five and three quarter inches. Thumb of the foot extends to the union of the first and second phalanges. There are many sesamoid bones. Nails same as in the hand. The whole skeleton has a very delicate appearance, the bones being smooth, without any lineæ asperæ. Height of the skeleton thirty-one inches.

As my object in these minute details is, to establish a sufficient number of specific distinctions observable in this animal, and to endeavor to indicate differences

which are not described as belonging to those already detailed by naturalists, I will proceed to compare these with the five varieties already known, only remarking previously, that the osseous structure may be considered the best standard of distinction, better than height or color. The bones do not present so many anomalies as the other tissues of the animal fabric, and in all that regards Natural History, the *constancy* of the phenomena should be the only test of the truth. And therefore I have based my proofs of this being an undescribed species chiefly on the peculiarities of the skeleton.

The first species named by Lesson, is the *Siamang* or *H. Syndáctylus*; readily recognised by the indicator and middle toes being united as far as the middle of the second phalanx. It cannot be mistaken. The second is the *Hylobàtes Lar*, or the *Great Gibbon* of Buffon, with white hands, "le gibbon aux mains blanches." The face is also of a greyish white. The third is the *H. Leucíscus* "le gibbon cendré ou *Moloch*." This is the white variety of Shaw, the *Wou-wou* of Camper. The hair is long and woolly, and covers both the hands and fingers as far as the nails.* The fourth, or *H. Variegàtus*, is the *Little Gibbon* of Buffon. This species has the hair variegated with gray, brown, and deep gray. The face is surrounded with gray hair, forming a circle, which passes over the forehead, the cheeks and under the lower jaw. The four extremities are equally gray. Lesson, in a previous work,† says, that this species only differs from the *H. Lar* in being a third less in height. The fifth and last, described by the French naturalists, is the *H. Unko*, and a curious fact in their organization is, that the females only of this

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* Lesson. Op. cit. vol. iii. p. 390.

† Manuel de Mammologie, p. 31.

species have the same consolidation of the bones of the foot, as was observed to be always the case in the first species, or Siamang. And the same applies to the female of the fourth species. As the one now under consideration was a female, and had not this peculiarity, it cannot belong to either the fourth or fifth species. Lesson regards Dr. Harlan's animal as the Unko.*

The Ourang which I have recently had an opportunity of dissecting, and which is the same that has been exhibited alive in most of the cities of the United States, appears to be a young animal, of the same species as that described by Dr. Jeffries. Its dentition had not been completed, having only twenty-four teeth. It walked upright, but with an appearance of difficulty, as it limped in so doing; from which circumstance, many were disposed to deny that this was its natural manner of progression; but on dissection, it was found that this awkwardness arose from the right femur having been fractured; the bones had overshot each other, and this limb was consequently about two inches shorter than the other. This skeleton now belongs to Dr. J. C. Warren.

As before stated, this Gibbon was of an uniform, dirty brown color; but the peculiarities are mostly seen in the skeleton, which I shall now examine, and may deduce from them such proofs of aberration from the Gibbons already described, as may entitle this animal to be considered as a distinct species.

1. There is no intermaxillary bone. Camper has mentioned, as one of the grand characteristics of man, his want of it. Even the ourang has it, and he is so figured

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* Nous ne pouvons pas dispenser de regarder comme une femelle du gibbon ounko, l'animal décrit & figuré par le Docteur Harlan. Cependant, la description de cet auteur est si vague, qu'on ne peut affirmer cette identité d'une manière précise. Op. Cit. p. 404.

by Camper and Blumenbach. Vicq d'Azyr says, the intermaxillary bone is well detached from the superior maxillary in the ourang. It is quite distinct in the skeleton prepared by Dr. Jeffries. Though in Dr. Warren's, whose skeleton corresponds with the last mentioned in every other respect, there is no trace of one.

2. None of the *Simiæ* whose skeletons have been represented, exhibit such truly carnivorous, canine teeth, which in this case prevent any lateral movement of the jaw. The incisors also, have a more perpendicular direction than any other of the ourangs or gibbons.

3. The transverse processes of the cervical vertebræ are sharp-pointed, and are directed downwards; and that of the sixth projects forwards, to beyond the body of the bone. It resembles all other *Quadrumana* by not having the foramina, for the transmission of the vertebral artery, in the transverse processes of the seventh cervical vertebra. The spinous processes are very small (as seen in plate II.) This I consider an important fact; as Cuvier and Vicq d'Azyr make the length of these bony projections an essential distinction between man and the *Simiæ*.

4. There are thirteen dorsal, six lumbar, one sacral, and one coccygeal vertebræ. Cuvier gives, as belonging to the Gibbon, fourteen dorsal, three lumbar, six sacral, and five coccygeal. Vicq d'Azyr remarks, that the coccyx is always longer, and composed of more pieces than in man.

5. In this there are thirteen ribs; in Dr. Harlan's, fourteen; Latreille says they have always twelve.

6. The sternum is made up of three pieces, but the third has no connexion with the ribs. Vicq d'Azyr* says, that in the apes it is formed of eight pieces. Meckel,†

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* Œuvres de Vicq d'Azyr, vol. vi. p. 298. *Anatomie des Singes.*

† Anatomie Comparée, vol. iii. p. 468.

that in the Gibbon the first, second, and third pairs of ribs are articulated with the first piece of the sternum, that then follows a smaller piece which is situated between the third and fourth pairs of ribs, and that after this is a large portion which receives the ribs, reckoning from the fourth to the seventh. But in the animal under consideration, the first six ribs are united to the two upper pieces, and then comes a bony prolongation, which I have never seen in any drawing of the skeletons of the *Simiæ*. The Ourang which I have recently dissected has the sternum composed of four pieces. Dr. Jeffries' has four.

7. I consider the nails of this animal as deviating *in a remarkable degree from the descriptions given by authors whom I have consulted*, viz.

Latreille* observes, that the apes of the old continent have their nails always flat, and instances the Gibbon. Lesson, in the work already quoted, p. 243, in his remarks on the *Simiæ* in general, adds, that the last phalanges are covered with flat nails, the *Ouistitis* making the sole exception. Stark, in his Natural History, in his sub-genus Ourangs, makes the nails similar to man in shape.

If this Gibbon should prove to be an hitherto undescribed species, it might be named the *Hylobàtes Fuscus*, from its being throughout of a uniform, brown color.

Plate I. is a very accurate representation of the skeleton; a front view.

Plate II. gives a side view of the head, and below, one of the feet, to exhibit the form of the nails.

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* Familles Naturelles du Regne Animale, p. 42.

ART. IV.—ON THE CICINDELÆ OF MASSACHUSETTS.

By Augustus A. Gould, M. D. Read March 19, 1834.

It is my purpose, in presenting this paper, to communicate such facts as I have collected in regard to the Cicindelæ inhabiting this region. Though it professes to embrace only those of Massachusetts, yet, so far as I can learn, no other species have been found in New England, nor indeed have any others of the family Cicindeliadæ. I am aware that I have no new species to add to those already described by Fabricius, Olivier, Dejean, Say, Hentz, and Harris. Count Dejean, in his *Species des Coléoptères*, has in some instances created confusion and uncertainty by giving new names to species described by American entomologists. In many instances, also, important characteristics have been omitted, and the descriptions we now have, have been left not a little vague and imperfect, for want of a sufficient number of specimens, or specimens of both sexes, from which to describe. The work of Count Dejean being rare in this country, and accessible to but few, I have translated his descriptions of new species, and have endeavored to supply those portions which to us are defective, because they consist of comparisons with other, foreign species, which the American entomologist may perhaps never see.

For many of the facts here embodied, I am indebted to Dr. T. W. Harris, who has kindly furnished me with his MSS. with permission to make use of them. He has divided the Cicíndelæ of our State into three groups, distinguished by very obvious, and indeed striking characters. These divisions I have adopted. The first group com-

prises such as have three teeth on the edge of the labrum, and the thorax contracted behind. In the second are placed those which have one prominent tooth only, on the labrum; the thorax almost square and flattened above, but slightly widened behind, especially at the angles. They live in places where salt water occasionally reaches them. In the third group are placed the other species with only one tooth on the labrum, and with the thorax nearly cylindrical, sometimes elongated.

† *Labrum with three teeth, thorax contracted behind.*

1. Cicindela generosa.

C. above, obscure cupreous; elytra, bright subviolaceous; lateral margin, entire humeral and terminal lunule, and intermediate refracted, inflexed band, white.

Length five eighths, breadth one fourth of an inch.

Plate III. Fig. 2.

Dejean, *Spec. des Coléopt.* V. 231.

C. latecincta, Leconte, *MSS.*

Head cupreous, varied with violet; anterior margin and base of antennæ brighter; front with cinereous hair, prostrated to each side; very distinct rugæ encircling the eyes, and a few transverse ones between them; *antennæ*, four basal joints violaceous green, the rest dusky green; *labrum* white, with three prominent black teeth on its anterior edge, and five punctures bearing hairs, one at the base of each tooth, and one near each posterior angle; *mandibles* black, with two thirds of the anterior and lateral portions white; *palpi* dark green; second joint of the labials white, in the male.

Trunk cupreous, varied with violet; bright cupreous and hairy at the sides; *thorax* quadrate, somewhat narrowed behind; submarginal, impressed lines brassy; ele-

vated portions rugose; *elytra* bright subviolaceous or blackish, deeply punctured with green, with sometimes two longitudinal series of deeper punctures, the outer one bifurcated near the humerus; suture and margins cupreous green; white margin entire, with a very broad humeral and terminal lunule and intermediate refracted band, white; anterior lunule directed obliquely backwards towards the middle of the suture and attaining half the distance; intermediate band refracted at a right angle about the centre of the elytron, its dilated extremity incurved and reaching the suture; *feet* and thighs bright green; above brassy.

ABDOMEN greenish blue; very hairy; tail purple.

This species received the name of *latecincta* from Major Leconte in letters to Dr. T. W. Harris, and others, under which name he intended to describe it, but was anticipated by Dejean. It is our largest, and one of our finest species. It is found, not in roads, but in sandy localities both on the seabeach and inland, in company with several of the other species. The first brood appears in May and June, the second in August and September. Its legs are short, its breadth great in proportion to its length, and its general aspect is heavy. It varies much in color, from brilliant violaceous coppery to nearly black, apparently from age. Dejean compares this insect in his description to the *albohirta*, which last he described from two male specimens, by comparing it with the *trisignàta* of Europe; so that his description is of very little service to the American entomologist.

2. CICINDELA VULGARIS.

C. obscure, on each elytron three whitish bands, two of which are curved, and the intermediate one refracted.

Length of male $\frac{20}{40}$, of the female $\frac{24}{40}$ of an inch; breadth $\frac{9}{40}$ to $\frac{11}{40}$ of an inch.

Say, *Trans. Amer. Philos. Soc. New Series*, I. 409, Pl. XIII. Fig. 1.

C. obliquàta, Dejean, *Spec. des Coléopt.* I. 72.

This species is one of the harbingers of spring. The first brood appears in April and disappears by the first of June; the second appears in August and continues till the end of September and even later. It inhabits dry and dusty places in roads.

3. Cicindela purpurea.

C. head, impressed lines and margins of elytra, green, the latter with a central, reclivate, oblique, abbreviated band, terminal line and intermediate dot white.

Length $\frac{20}{40}$ to $\frac{23}{40}$ inch, breadth $\frac{7}{40}$ to $\frac{9}{40}$ inch.

Olivier, II. 33, *fig.* 34.

C. marginàlis, Fab.

Dej. *Spec. des Coléopt.* I. 55.

Say, *Trans. Amer. Philos. Soc. New Series*, I. 55. Pl. XIII. fig. 8.

The *C. spléndida* of Hentz, *Trans. Amer. Philos. Soc. N. Series*, III. 254. Pl. II. Fig. 3, is a southern species closely allied to this. It inhabits dry paths in woods and fields, appears very early, often before snow is gone, and again in August and September.

4. Cicindela patruela.

C. green, elytra with an interrupted humeral and terminal lunule, and an intermediate narrow, sinuated and abbreviated band, white.

Length eleven twentieths, breadth one fourth of an inch.

Pl. III. Fig. 4.

Dejean, *Spec. des Coléopt. I.* 62.

Head bright green with bluish reflections, destitute of hairs; finely granulated; *labrum* dingy white, with three small teeth and six marginal punctures; *mandibles* bronzed, with a white spot at base; *antennæ* with the four basal joints green, terminal joints rufous.

Trunk. *Thorax* as large as the head, convex, slightly narrowed behind, minutely granulated; humeral and terminal lunules interrupted, anterior half of the latter, rounded,—the posterior, transverse and triangular; intermediate band composed of a triangular portion based on the margin, surmounted by a comma.

Beneath, bluish green. *Legs* green, *trochanters* purple.

The range and habitat of this species is somewhat singular. It has been found at Burlington, Vt. on the shores of Lake Champlain, about Cape Cod, (Sandwich and Martha's Vineyard,) on sandy hills at Wilkesbarre, Pa. and on Pilot Mountain, N. C.

5. Cicindela sexguttata.

C. greenish blue, polished; each elytron with three marginal, white dots, the two first nearly equal, the last transverse and terminal.

Length $\frac{19}{40}$ to $\frac{22}{40}$, breadth $\frac{8}{40}$ of an inch.

Fab. *Syst. Eleut.* I. 241.

Olivier II. 33.

Dejean, *Cat.* 1. *Spec. des Coléopt.* I. 53.

Say, *Trans. Amer. Philos. Soc. N. Series*, I. 414. Pl. XIII. fig. 4.

This species is seen in the hot days of May, June, and July, usually on rocks, basking in the sun; sometimes, but rarely, on gravel walks, and dry paths in woods.

6. Cicindela rugifrons.

C. bright green; mandibles slender, longer than the head; elytra with a subsutural series of punctures, two marginal dots and terminal lunule white.

Length $\frac{17}{40}$ to $\frac{20}{40}$, breadth $\frac{8}{40}$ to $\frac{9}{40}$ of an inch.

Dejean, *Cat.* 1. *Spec. des Coléopt.* I. 51.

C. denticulàta, Hentz, *Trans. Am. Philos. Soc. N. Series*, III. 254. *Pl. II. Fig.* 1.

Harris, *N. E. Farmer, VII.* 90.

The whole insect is polished, bright green, reflecting bright blue in a certain light.

Head, front conspicuously corrugated, hairy in the male only; *antennæ* short, four basal joints bright green; terminal ones dusky; *labrum* transverse, narrow, white in the male, purple in the female, with three black teeth and six submarginal punctures; *mandibles* very long and slender, purple, with a white spot at base; *palpi* green in the male, greenish black in the female.

Trunk. *Thorax* the size of the head, rounded, slightly rugose; *elytra* broad and short, rounded behind; nearly impunctured, except a subsutural series of punctures, with elevated centres; a minute marginal spot near the humerus, a large triangular one about the middle, and a terminal lunule, white.

The *C. obscùra* of Say, so nearly corresponds to this, in every respect, that it must be merely a black variety. The *C. unicolor* of Dejean, is also merely an immaculate variety. In fact, every possible variety, which could be made from the presence or absence of its spots, are found. The anterior dot is generally wanting; in twenty-five specimens, now before me, it exists in only one. In one specimen, the only marking is a trace of the terminal lunule; in

another, a vestige of the triangular spot. Mr. Hentz has thus designated six varieties. They live on sands in great multitudes, in company with *generòsa* and *vulgàris*. I have them from Mount Auburn, in Cambridge, and Martha's Vineyard.

†† *Labrum with only one tooth; thorax quadrangular, flattened above, dilated behind.*

7. Cicindela dorsalis.

C. bronzed; elytra white, each with two curved lines on the disc, suture and curved branch near the base, green; tail testaceous.

Length of male $\frac{12}{20}$, of female $\frac{13}{20}$, breadth of male $\frac{5}{20}$, of female $\frac{6}{20}$ of an inch.

Say, *Journ. Acad. Nat. Sciences*, I. 20.

Trans. Amer. Philos. Soc. N. Series, I. 415. *Pl.* XIII. *Fig.* 5.

C. signàta, Dejean, *Cat.* 1. *Spec. des Coléopt.* I. 124.

This well marked and beautiful species has, as yet, been found nowhere in this region except at Martha's Vineyard, whence, with other valuable insects, I have received numerous specimens through the kindness of Dr. L. M. Yale, who informs me that they are very abundant on the sandy shores of the ocean. They may doubtless be found at Nantucket and many similar localities about Cape Cod. The dilatation of the elytra in the female is very remarkable; so that while in the male the margins are nearly parallel, their terminations rounded, and their outline curvelinear, their extremities are apparently truncated, and their outline is altogether angular in the female. Mr. Say's figure in the Philos. Transactions represents the male. The same difference

between the male and female is also very conspicuous in the *hirticóllis* and *albohírta*. The markings in many specimens are obsolete, or have become effaced by age.

8. Cicindela marginata.

C. olivaceous, obscure, sometimes with cupreous reflections; cheeks, sides of the trunk and abdomen with short, dense hair; each elytron with a whitish margin, two abbreviated branches, an intermediate refracted one and two dots at base.

Length $\frac{19}{40}$ to $\frac{21}{40}$, breadth of male $\frac{9}{40}$, of female $\frac{10}{40}$ of an inch.

Fab. *Syst. Eleut. I.* 241.

Say, *Trans. Amer. Philos. Soc. N. Series, I.* 417. *Pl. XIII. Fig.* 6.

C. variegàta, Dejean, *Spec. des Coléopt. I.* 84.

This species is remarkable for the length of its legs and antennæ. The thorax, in the female at least, resembles in shape that of *dorsàlis*. The elevated white spots at the base of the elytra distinguish it at once from all other species. This species inhabits barren patches of earth on salt marshes, where the tide occasionally flows, sometimes in company with the *hirticóllis* and *albohírta*. When disturbed, they betake themselves to the high grass, which they sometimes climb, to escape the rising tide, instead of flying before its approach. The markings, as observed by Mr. Say, are in many specimens nearly or quite obsolete, and they seem to disappear after death in many cases. They more nearly resemble those of *albohírta* than those of *hirticóllis*, to which Mr. Say compares them. In the female, the elytra are somewhat widened in the middle, and have a remarkable, oblique deflection at the tips, which gives the appearance of a deep and wide emargination.

Two or three varieties may be designated. *Var.* α. Elytra purplish or bronzed, and all the markings obsolete, except the terminal lunule. *Var.* β. Elytra greenish brassy, immaculate.

The *C. blanda* of Dejean, seems to be a variety with a predominance of white.

††† *Labrum with one tooth; thorax nearly cylindrical, sometimes elongated.*

9. Cicindela hirticollis.

C. obscure cupreous, beneath bluish green, trunk each side brilliant cupreous, hairy; elytra with two lunules, intermediate refracted band, and outer margin, white.

Length of male $\frac{18}{40}$, of female $\frac{20}{40}$, breadth $\frac{8}{40}$ to $\frac{9}{40}$ of an inch.

Say, *Journ. Acad. Nat. Sc.* I. 20. *Trans. Amer. Philos. Soc. N. Series*, I. 411. *Pl.* XIII. *Fig.* 2.

C. repánda, Dej. *Spec. des. Coléopt.* I. 74.

Generally found in roads, sometimes on the sea beach.

10. Cicindela albohirta.

C. head and thorax brassy green, hirsute with erect, white hairs; sides brilliant cupreous; elytra subviolaceous bronzed; lateral margin, humeral and dentated terminal lunule and intermediate recurved band, white.

Length of male $\frac{10}{20}$, of female $\frac{12}{20}$, breadth of male $\frac{9}{40}$, of female $\frac{11}{40}$ of an inch.

Plate III. Fig. 1.

Dejean, *Spec. des Coléopt.* II. 425.

Head cupreous varied with blue and green, densely covered with long, hoary hairs, except behind the eyes; *antennæ*, basal joints bright green in the male, brassy green in the female; terminal joints dusky; *labrum* white,

MISSOURI BOTANICAL GARDEN.

with a single tooth and ten submarginal punctures bearing hairs; *mandibles* long, dark green, tips and teeth black, with a white spot at base; *palpi* yellowish white, terminal joints green.

Trunk brilliant cupreous at the sides; *thorax* quadrate, brassy green, hairy; submarginal impressed lines blue; *elytra* dark bronze, with violet reflections; densely punctured, generally with a subsutural series of larger punctures; external margins subparallel in the male, dilated a little past the middle in the female; tips finely serrate, rounded in the male, subacute in the female, mucronate; marginal white line entire or but slightly interrupted near the terminal lunule; anterior lunule originating on the humerus, continuing along the margin and abruptly curved towards the scutel, terminating half way; the intermediate band directed obliquely forwards is refracted at an acute angle near the middle of the elytron, and continuing nearly parallel with the suture, is incurved and somewhat dilated at tip, which attains the sutural line; *feet* cupreous red; trochanters purple.

Abdomen greenish blue; tail purple.

I have concluded that the insect here described is the *albohírta* of Dejean, though it would be difficult to make it out as such, from his description, because he has given us no independent characteristics. On referring to his description of *generòsa*, however, which he compares with *albohírta*, the doubt is greatly removed. It appears to be confined to the sea beach near the open sea, in company with the *generòsa*, and sometimes the *hirticóllis*, with which last it has probably been confounded, and from which it differs very little, except in size. It seems to bear the same relation to *hirticóllis* that the *generòsa* does to *vulgàris*. In this species, the anterior lunule and intermediate band are parallel and directed a

little forwards; in *hirticóllis* they are parallel and transverse; in *vulgàris* they are parallel and directed backwards, and in *generòsa* they converge and form a triangle. By these marks alone, the four species may always be readily distinguished. The markings are generally more or less effaced, and sometimes obsolete, especially in the male; and as in the *marginàta*, it is much more common to find the markings defective than perfect. In the male, the green color seems to predominate over the cupreous. It is a very active insect, and not easily captured. They have been taken in Massachusetts on Ipswich Beach, Chelsea Beach, and Martha's Vineyard.

11. Cicindela duodecimguttata.

C. obscure bronze above; elytra with the interrupted humeral and terminal lunule, and the flexuose, abbreviated, interrupted band white.

Length $\frac{19}{40}$ to $\frac{21}{40}$, breadth $\frac{17}{80}$ of an inch.

Plate III. fig. 3.

Dejean, *Spec. des Coléopt.* I. 73.

Head obscure bronze, somewhat brassy; front pubescent with cinereous hairs; antennæ with the basal joints bronzed green, terminal joints dusky; *labrum* white, narrow, somewhat sinuate anteriorly, with six or eight marginal punctures bearing hairs; *mandibles*, which are nearly twice as long in the male as the female, dark green, with a large, white spot at base anteriorly; *palpi* dark green, second joint of the labials white in the male.

Trunk. *Thorax* quadrate, sides somewhat curvelinear, hairy at margin; impressed lines greenish blue; *feet* green; thighs cupreous; *elytra* obscure bronze, sub-parallel, convex, rounded and finely serrated at tip; densely punctured, with traces of two longitudinal series of larger

punctures; exterior and sutural margins cupreous; a white spot at the basal angle, another further back, replacing the termination of a humeral lunule; a short, narrow band, slightly sinuate in the middle, recurved at tip towards a white dot near the suture; a posterior lunule, sometimes entire, but generally interrupted, leaving its anterior termination disjoined in form of a dot. *Beneath* brilliant greenish or metallic blue; sides of thorax and breast cupreous.

This is a common species. It loves the vicinity of salt water, and appears in March, April and May, and again in September.

12. Cicindela hemorrhoidalis.

C. above, obscure cupreous or bluish black; elytra with the entire humeral lunule, the recurved, sub-interrupted terminal one, the sinuate, abbreviated, intermediate band and marginal dot, white; abdomen ferruginous.

Length $\frac{17}{40}$ to $\frac{18}{40}$, breadth $\frac{7}{40}$ to $\frac{8}{40}$ of an inch.

Plate III. fig. 5.

Hentz, *Trans. Amer. Philos. Soc. N. Series, III.* 254. Plate II. fig. 2.

Harris, *New England Farmer, VII.* 91.

C. Heutzii, Dejean, *Spec. des Coléopt. V.* 1.

Head cupreous, with two lines between the eyes, anterior margin and cheeks, greenish blue; *eyes* large, prominent, brown, with fine striæ around them; basal joints of *antennæ* bronzed green, the others obscure brown; *labrum* dingy white, somewhat rounded before, with six marginal punctures bearing hairs; *mandibles* short, dark green, second joint of labials whitish.

Trunk. *Thorax* quadrate, somewhat narrowed behind, as long as broad; obscure cupreous, marginal impressed

lines greenish blue; minutely wrinkled transversely, sides hairy; *elytra* bluish black or obscure cupreous, somewhat widened behind, rounded and mucronate at tip; a faint, subsutural line of punctures; marginal and sutural edges narrow, bluish green; humeral lunule short, almost or quite interrupted in the middle and dilated at extremities; a transverse band, composed of two half crescents united at their tips, of which the lower is much the largest and points backwards, the other forwards; behind this a rounded, marginal dot, united, in perfect specimens, to the transverse band; anterior extremity of the terminal lunule nearly or quite disjoined; *legs* long, bluish green; trochanters purple. *Beneath*, head and thorax metallic blue, breast green, sides hairy.

ABDOMEN ferruginous red, sanguineous in the living insect.

This very interesting species was first discovered by Dr. T. W. Harris on the summit of Blue Hill, in Milton. It does not prefer the sand and the plain, as do most of its kindred species, but its habit is, to bask on the broad, flat masses of granite which rise above the soil, retiring to the patches of moss and lichen which vegetate in the cavities and crevices. So far as I have been able to learn, it has hitherto been found only in the above-mentioned locality and one other in its vicinity, though it may probably be found throughout the whole Blue Hill range, extending to Quincy, and in similar localities. When flying in the sunshine, its crimson and nearly transparent abdomen appears like a drop of blood suspended to its tail. On this account the very appropriate name *hemorrhoidàlis* was indicated by Dr. Harris to Mr. Hentz, both of whom published descriptions of it about the same time. Under this name it was sent by Mr. Hentz to Count Dejean, who also described it, under the uncouth and distorted

name of *Heutzii* (which he undoubtedly meant for *Hentzii*) instead of the descriptive one of *hemorrhoidàlis* which we choose to retain. It greatly resembles *duodècim-guttàta*, especially in those specimens where the extremities of the lunules and fascia are disjoined, as they frequently are. The markings are, however, broader and more distinct, and it is a more slender and lively insect. The solitary tooth on the edge of the labrum is very minute, and situated in the middle of a slight emargination; it is nearly obsolete in the male, and quite wanting in the female. This is a northern species, and bears the same relation to the *punctulàta* in the north, as do the *abdominàlis* and *rufivéntris* (if they be indeed different), to the same insect in the south. Dr. Harris remarks that he has never found it except between the 1st and 20th of August, though he has often sought it at other seasons.

13. Cicindela punctulata.

C. obscure cupreous; beneath, varied with blue and purple; each elytron with a few white points and terminal lunule, white; an undulated line of distant, green punctures near the suture.

Length of male $\frac{15}{40}$, of female $\frac{20}{40}$, breadth of male $\frac{6}{40}$, of female $\frac{8}{40}$ of an inch.

Olivier, *II.* 33.

Fab. *Syst. Eleut. I.* 241.

Dejean, *Cat.* 1. *Spec. des Coléopt. I.* 101.

Say, *Trans. Amer. Philos. Soc. N. Series, I.* 420. Pl. II. fig. 2.

Like the *hemorrhoidàlis*, this species has but one brood in a season, which appears from the middle of July to September. They frequent dry paths in fields, seldom in roads.

The two last species, together with the *rufivéntris* and *abdominàlis*, are so nearly allied, that they might with propriety form a subdivision of the third group.

ART. V.—AN ACCOUNT OF THE CHIASTOLITE OR MACLE OF LANCASTER. By Charles T. Jackson, M. D.

Read April 2, 1834.

Among the singular forms assumed by crystals, none, perhaps, are more curious than those of the mineral called Chiastolite, or Macle. This mineral occurs abundantly in the town of Lancaster, upon an eminence called George Hill. It is imbedded in clay slate passing into mica slate. The whole mountain is composed of clay slate, but only a bed, of about ten feet in thickness, is charged with the *Mácle*. This bed may be examined upon the road side, where the boundary line divides the towns of Sterling and Lancaster. Besides this bed of *Mácles*, there exists an immense abundance of erratic blocks or boulder-stones which are scattered in great profusion upon the south east side of the hill, none being found on the north west. This fact I consider of value in geology, as it concurs with so many others, to prove, that at some period since the creation, there has been a powerful current of water rushing over our continent from the north west towards the south east: — a current of such mighty power as to carry away with it enormous quantities of large, rounded boulders, and deposit them many miles from their original localities. It is highly probable that this was effected by that last grand cataclysm which overwhelmed the world, and to which the traditions and religious belief of every nation give ample testimony.

The curious and beautiful forms of these crystals cannot

fail to attract the attention of every intelligent observer who may have an opportunity of viewing them. It was by endeavoring to ascertain how these crystals were formed, that the author of this article was first led to investigate the structure of minerals, and to read some of those interesting sermons that are written in every stone. If the same feeling of curiosity is excited in those who may read this short and imperfect essay, and any one is induced to study the subject which has afforded him so much pleasure, he will consider his labor of some value, since it may be the means of bringing new and more efficient laborers into this comparatively little explored field of science.

The name *Chiástolite* or *Crucite* was given to this mineral by Karsten, and adopted by Jameson in his System of Mineralogy. The first of these names was derived from the resemblance which the dark lines of the crystals bore to the Greek letter X. *Crucite* signifies a stone like a cross. Haüy gave the name *Macle* now generally adopted for the mineral. Previous to this, Romé de Lisle had used this term for those crystals now called *Hémitrope*, or half turned round sections of crystals. Haüy defines the term *Macle* to signify a prismatic crystal, whose interior is hollowed out. For my own part, if the mineral were to be considered a distinct species, I should prefer the old name *Chiástolite*, as more descriptive of the specimens met with in this country. The name *Macle*, as used by Haüy, is more appropriate to the French and German varieties, which are generally very small, and have the exterior crust very thin, and difficult to study by itself. From a long and attentive examination of the forms assumed by this mineral, I came to the conclusion that it is identical with *Andalùsite*, from which it differs only in respect to the arrangement of the crys-

talline groups. Ten years since I prepared fac simile drawings of the principal crystals upon which this opinion is founded. These figures were freely circulated among the various mineralogists who visited me at Lancaster. Among others, they were shown to President Cooper, of Columbia College, S. C. who urged me to publish them, which I promised to do in the Boston Journal of Science and Arts; but that publication having soon after ceased to appear, I never laid them before the public. I mention this to account for the fact, if my notions on this subject should now be found wanting in novelty. I observe Mons. Beudant, in his Mineralogy, published two years since, advances as his opinion, that *Macle* is only a variety of *Andalùsite* filled in its interior with clay slate, in which it had crystallized while that rock was in a gelatinous state. He differs from me in some of his views, especially in considering each *Macle* as one crystal, while I maintain, that they are mostly groups of crystals, assembled together by the law of *groupment*, and prevented, in some instances, from coming in contact, by the argillaceous paste in which they were formed. The drawings and specimens I have given will prove the correctness of my views. Plate IV. Fig. 1st, *a b* represents the two extremities of a crystal two inches long. It will be observed, that the black substance in the interior of the group has a pyramidal form, the base being represented by *a* and the summit by *b*. Fig. 2d, *c d*, a crystal three inches in length, which shows the separate individual crystals constituting a group or *Macle*. The form is perceived to be generally that of a right square or rectangular prism, some of them having been rendered a little rhombic, by unequal pressure during crystallization. Fig. 3d, *e f* represents the two extremities of a crystal two inches long, having on its transverse section the perfect figure of

a rectangular cross, the entering angles being truncated. Fig. 4th represents a group of crystals arranged in the form of a true cross, but having a small, solid crystal in the centre. Fig. 5th represents a section of a very hard and compact crystal, which has a black rhomb in the centre, from which lines diverge to the solid angles, dividing the crystal into four parts, the lines being in the diagonal of a square. Fig. 6th, *i k* represents a very curiously complicated group of crystals; the whole being two inches long from the extremity *i* to *k*. A very remarkable difference is observable between the figures of the base and summit. Fig. 7th represents two crystals intersecting each other at angles of 60° and 120°. Fig. 8th, 9th, 10th, and 11th are views of extremely hard crystals which are found in micaceous argillite; their forms are peculiar. Fig. 10th shows an emarginate crystal. Fig. 12th, a twin group. Fig. 13th, a crystal having a little quadrangle in the centre, surrounded by a crust of red colored Macle and the whole exterior of the crystal is enclosed in a pearly crust which may be easily cleaved from the enclosed crystal. Fig. 14th represents a soft decomposing crystal of a greenish grey color. Fig. 15th represents a very delicate line of the Macle arranged in the shape of a rhomb. Fig. 16th, a very hard crystal, having all the characters of the common Andalùsite, excepting the minute rhomb in the centre. Fig. 17th, a singular group of separate crystals. Figs. 18th, 19th, 20th, and 21st, other varieties of form assumed by this curious mineral.

From measurement of more than a hundred specimens I find the form of the white or reddish substance of the Macle to be a right square, or rectangular prism, sometimes a little rhombic. The form of the Andalùsite is, according to Phillips, 91° 20′ which nearly coincides

with our mineral, the difference not being more than could be easily accounted for by disturbing causes during crystallization, to which all the varied and beautiful forms under which this mineral appears must be referred. Haüy thought from observation of the natural joints of this mineral, that it had an octaedron with a rectangular base for its primitive form. This I am disposed to doubt, and refer it at once to the form of Andalùsite, which is a right square, or slightly rhombic prism. It is singular that this mineral should have remained so long without having been analyzed, and can only be accounted for by the imperfection of foreign specimens, and the difficulty chemists anticipated in its attack.

Berzelius examined Macle before the blow-pipe, and gave his opinion that it was probably a *subsilicate of Alumina*, a result which I have since proved by the analysis accompanying this article.

After waiting in vain a long time for some chemist to make an examination of this stone, I at last determined to set the question of its composition and nature at rest, by analyzing it. Having enjoyed opportunities of procuring fine and perfect specimens of the mineral during my residence of three years in the country where almost every rock in the fields contained them, I made a plentiful collection of all the varieties which this mineral presents.

For analysis I took a Macle from a dark, bluish-black, micaceous clay slate from Lancaster, similar to fig. 9, and having carefully freed it from the surrounding matrix, I dissected out the black, rhombic prism from its centre, as foreign to the crystal. The specific gravity was found to be equal to 3.03. Hardness equal to that of Andalusite, or = 7.5 of the scale Mohs. Before the blow-pipe it is infusible and becomes white. It dissolves with great difficulty in glass of borax, and the glass had a yellowish

tinge when exposed to the oxidating flame. With carbonate of soda it swells and decomposes, but does not melt. Moistened with nitrate of cobalt and exposed to the blowpipe it acquires a fine blue color. It dissolves slowly in phosphate of soda.

ANALYSIS.

The mineral was broken into fragments in a steel mortar, and reduced to impalpable powder in one of agate. The powder was of a greyish white color.

Process A. To determine the quantity of water it contained, fifty grains of the powdered mineral were subjected to a red heat for fifteen minutes in a platina capsule. It became of a brownish color, and when weighed was found to have lost 0,75 gr. The change of color was owing to the conversion of *prot* into *per* oxide of iron.

Process B. To separate the oxide of iron the powder was digested with muriatic acid for six hours, and when thrown on a filter, washed, dried, and ignited, was found to have lost three grains. The filtered liquid was now treated to excess with liquid ammonia, and the precipitated oxide of iron collected on the filter, washed, dried and ignited with a little wax to reduce it to the state of protoxide. It was entirely taken up by the magnet, and when weighed amounted to 2 grs.

Process C. The powder from which the iron had been separated was now attacked by three times its weight of pure caustic soda, to which sufficient water was added to form a thin paste with the powdered mineral. The whole in a platina crucible was first heated carefully, to expel cautiously the excess of water, the cover being nearly close over the crucible. It was then covered and subjected to a full red heat in the furnace for an hour.

The mass was completely fused, and being softened with water, was entirely dissolved in dilute muriatic acid. The solution was now evaporated to dryness and heated to render the silicic acid insoluble. The mass was then moistened with muriatic acid, and the soluble muriates dissolved in water, leaving the silicic acid, which, collected on a filter, washed, dried and ignited, weighed sixteen grains.

Process D. The solution and washes were reduced in bulk by evaporation, and then treated with a solution of carbonate of ammonia in excess, to precipitate the alumina. The whole was then thrown on a filter of known weight, and the alumina separated by the filter was thoroughly washed with hot water for thirty-six hours, until the water came away pure. The alumina being dried and ignited weighed thirty grains. Filter, when burned, gave 0.5 gr. alumina to be added to the above.

Process E. The alumina redissolved in sulphuric acid left 0.5 gr. silicic acid to be added to that obtained by process C. To determine if potash was contained in the mineral, I examined the filtered solution and washes, by means of the muriate of platina, but found no trace of its presence.

This mineral consists then,

			in 50 parts, or,	in 100 parts,
Process C & E,	Silicic acid,		16.5	33.0
" D,	Alumina,		30.5	61.0
" B,	Prot-oxide of iron,		2.0	4.0
" A,	Water,		.75	1.5
		loss	.25	loss .5
			50.00	100.0

According to Bucholz and Vauquelin, *Andalusite* consists of

Bucholz.		Vauquelin.	
Si.	36.5	Si.	32.16
Al.	60.5	Al.	52.24
Ox. Iron	4.0	Potass.	8.1
		Ox. Iron	2.
		loss	6.
	101.0		100.50

The similarity in composition between the specimen of Andalùsite analyzed by Bucholz and that of the above mineral is obvious, and is sufficiently near to prove their identity as mineral species. By adding up Bucholz's analysis we perceive there is a gain of one grain in a hundred. The potash obtained in the analysis by Vauquelin may have been derived from the materials which he employed; but as we have not the details of his analysis it is impossible to discover the sources of error.

Macle must now be considered as a variety of Andalùsite which, from disturbing causes and crystallization in a gelatinous medium, has assumed the curious forms of natural mosaic work.

ART. VI.—OBSERVATIONS ON A SHELL IN THE CABINET OF THE BOSTON SOCIETY OF NATURAL HISTORY, SUPPOSED TO BE IDENTICAL WITH THE MUREX ARUANUS OF LINNÆUS AND THE FUSUS PROBOSCIDIFERUS OF LAMARCK. Read Dec. 18, 1833. By A. Binney.

The systematic works on Conchology contain many descriptions of shells, made up from reading and copying rather than observation, in which error is so blended with truth, that it is difficult to distinguish the species intended to be referred to. This happens sometimes in consequence of the great rarity of the shell, which cannot be obtained for comparison with former descriptions, and sometimes from the carelessness of the compiler, who takes upon trust, what has been copied from author to author, instead of seeking the original sources for correct information. A remarkable instance, in which probably both of these causes have combined to produce error, occurs in the descriptions of the shell to which Linnæus gave the name of *Murex Aruànus*. This species is extremely rare in this country; the specimen under consideration being the only one which has come under my observation in the principal cabinets; and as the most recent conchological works only copy the description, and refer to the figures of the early authors, which would not be the case if it could be found in the public collections, it may be considered equally uncommon in Europe. It is the largest and heaviest of the univalve shells, and its characters are so distinct and well marked, that it could not have escaped the attention of conchologists, had it been more common. How far they have noticed it, will appear in the following remarks.

The earliest description which I find in the books to which we have access, is in the work of Buonanni, entitled "Recreazione del' Occhio et della Mente," in which there is also a figure, intended doubtless for this shell. His description is as follows: "Trocho che per antonomasia si può dir *Magno* e *Doppio*, perchè si trova grande quanto è la figura quí posta; *Doppio* poi, perchè sembra éssere di due turbine composto; è solcato con ottima divisione da capo a piede, e dove le volute si congiungono raggiorasi un cordone, che gratissamente sporgendo in fuori, le distingue." In a Latin translation of the same work, which was published a few years later, under the title of "Musæum Kircherianum etc." the same figure appears again, with the following description: "Antonomasticé *Magnus* et *Duplex* appellandus. Superat enim cæteros magnitudine, et ex duplici turbine in basi simul coeuntibus, videtur compositus. Pulchro striarum transversarum dispositione sulcata. Qua spirarum turbines coaptuntur, rotundæ striæ circumferunter, alterum ab altero discriminantes."

These are evidently descriptions of the same shell, with only such slight differences as would naturally occur in describing the same object at different times, with this exception, that in the Italian description, the shell is said to be called *great* because it is of the size of the figure annexed, which is only four or five inches long; while in the Latin description, it is stated to exceed all others in magnitude, and hence to be called emphatically *great*. This discrepancy was doubtless accidental, and may be explained on the supposition that the author intended in the first instance to have annexed a figure of the natural size, or to have accompanied it with a scale, or some other mode of indicating it. This oversight is worth notice, as the correction of the error, and the indication of the great size of the shell, have been overlooked, while the length

of the figure seems to have been referred to by most authors as the correct standard.

Rumphius, in his "Thesaurus imaginum Piscium, Testaceorum," etc., gives a figure probably intended for the same shell. I have not seen the text of his work, but notice through quotations in other works, that he states its habitat to be the Island of Aru. Figures are also to be found in the work of Martini and Chemnitz, and in Favanne's Dictionary; but as there are no copies of these works in this city, I have not been able to refer to them.

The shell figured by these authors, was described by Linnæus under the name of *Murex Aruànus*. His description is compounded from the figures of preceding authors, and is so remarkably meagre, as to induce me to believe that he had never seen the species to which he was giving a name. It is probable indeed, that he never saw many of the shells which he described. The cabinets to which he had access must have been poor and uninteresting, formed more for display than for scientific utility, and in his great desire to give a place to every created object, he was often obliged to satisfy himself with inaccurate representations. His descriptions of course partook of, and probably increased their errors, and hence, some of his species cannot now be identified, even in the most complete and ample collections. His description, as given in the 12th edition of his "Systema" is, "Testa patulo-caudata; spira spinoso-coronata. Habitat ad Novam Guineam, Chinam. Testa ponderosa, rudis, sæpe nigra, seu sub-cœrulea."

The next systematic work in which our shell is noticed is that of Bosc, which forms a part of the continuation of Deterville's edition of Buffon's works. He contents himself with a simple translation of the above description into French, and is equally silent as to the size of the shell.

Dillwyn, in his descriptive catalogue, thus characterizes it: "Shell ventricose, with the spire conical, and coronated with spines; aperture dilated, with the beak long, and the pillar flexuous." "Chemnitz's figure is five and one quarter inches long, of which the beak occupies two inches. It is coarse and ponderous, and slightly ribbed transversely." From these remarks of Dillwyn, it is apparent that he had no specimen before him, and that he only repeated what had been said by others, referring to Chemnitz's figure, as if that indicated the size of the shell.

Wood, in his "Index Testaceologicus," gives an uncolored figure, and states its length to be five and a half inches; both of which circumstances prove that he merely followed the path of preceding authors.

Lastly comes Lamarck; and on his descriptions we may rely with confidence, as they were written from specimens actually before him. He describes a shell under the name of *Fusus proboscidíferus* as follows: "testa fusiformi, ventricosa, transversim sulcata, fulvo-rufescente; anfractibus angulatis, supra planulatis; angulo tuberculis nodiformibus coronato; spira, parte superiore cylindracea, proboscidiforme, apice mamillari, labro intus lævigato." "I received this shell," says Lamarck, "under the name of '*trompe d' Aru*,' but the characters and synonymes of Linnæus and Gmelin do not correspond with it. This Fusus is very remarkable on account of the superior part of the spire, which resembles a straight trunk or proboscis, as it were inserted and terminal. Length 3 inches 11 lines."

On examination of this description, I believe it will be manifest that ours is the same shell; the only obscure character being that relating to the end of the spire, which is said to resemble a proboscis. In what this fancied resemblance consists I cannot say, but I am not surprised

that he could not identify his shell with the descriptions of preceding authors, these being so vague and loose as to give a very imperfect idea of the shell intended to be represented. It is possible that some deformity caused the remarkable appearance noticed by him in his specimen.

On reviewing the preceding descriptions, I think I am justificed in concluding, that since the time of Buonanni this shell has been rarely seen, and that the descriptions in the books are mere copies, one from another, down to Lamarck, who possessed a small specimen. The great size and beauty of this species induced me to suppose that conchologists would be gratified to see a new and correct figure, (see plates V. & VI.) and a more perfect description, which I now add.

Fusus Aruanus. Pl. V. and VI.

Shell fusiform, ventricose, large and ponderous, of a uniform light yellow color externally, and pale flesh color within; transversely striate, the striæ gradually becoming larger from the summit to the body whorl, where they are distinct furrows. Spire conical, crowned at its summit with nodular tubercles, which gradually decrease and become obsolete as the whorls increase in size. Whorls prominently angulated, uniting with each other a little below the angle. Body-whorl large and ventricose, its angular carina about equidistant from the tip of the spire and extremity of the canal. Beak long and somewhat flexuous. Pillar lip so far dilated as to leave a considerable umbilical opening. Outer lip entire and trenchant, within smooth and polished. Epidermis dark brown.

Murex Aruànus, Linnaeus. Sytema etc. ed. 12. No. 556. p. 1222. Mus. Reg. Ulr: No. 322. p. 641.

Fusus proboscidiferus. Lamarck. Vol. VII. p. 126.

Buonanni Rec. et Kirch: III. f. 101.
Rumphius Tab. XXVIII. fig. A.
Martini IV. vign. 39.

The length of the shell is 22 inches, and its circumference round the body whorl 28 inches; it is supposed to have been brought from the East Indies.

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ART. VII.—ON CERTAIN CAUSES OF GEOLOGICAL CHANGE NOW IN OPERATION IN MASSACHUSETTS.

By EDWARD HITCHCOCK, A. M., Professor of Chemistry and Natural History in Amherst College. Communicated March 5, 1835.

THE object of this communication is, to call the attention of the Society to certain causes that are at work to modify the surface of this State, but which seem hitherto to have been almost entirely overlooked by our geologists. Some of them do, indeed, exert only a very limited influence. But at a time when every fact illustrative of the dynamics of causes now in action is eagerly sought after, none, however feeble, should be overlooked. I do not mean that these causes (except perhaps one or two of them) are not described in the treatises on geology; but merely that their operation has not been noticed on this side of the Atlantic. In describing them I hope so to avoid technical obscurity, that my statements will be intelligible to every man of good sense, whether a geologist or not; so that, should the Society make them public, many may be led to observe similar phenomena and to describe them, and thus the facts on the subject be multiplied.

SUBMARINE FORESTS.

Although these are not uncommon in Europe, according to geological writers, they seem to have been unnoticed in this country. But I am inclined to believe them common enough along our coast. They consist of the remains of ancient lowland forests, now submerged a few feet below the sea, though sometimes laid bare at low water. The vegetables found in them are such as now grow in swamps along the coast; and peat is not uncommonly found. This is the case, according to Lt. Jonathan Prescott, in the harbor of Nantucket, where was found one of these forests, when it was dredged, under the direction of that gentleman, a few years since. The stumps and masses of wood discovered there were maple, oak, beech and cedar. (*Cupréssus thuyoides.*) These were very much decayed, except the cedar, which was nearly as sound as ever. These relics were buried by four feet of sand, and lay about eight feet beneath low water mark.

I have ascertained the existence of similar submarine forests at Holmes' Hole, on Martha's Vineyard, near the southwest extremity of that island, on the north shore; on the north side of Cape Cod, extending several miles into Barnstable Bay; and on the shore of Provincetown harbor, opposite the village. But as I have not been able to give these places much examination, I hope this slight notice will excite the attention of gentlemen favorably situated along our coast for observing these and other cases of the same geological phenomenon.

Submarine forests must have resulted either from the elevation or subsidence of the land or the ocean. And since they generally occur under similar circumstances,

and at about the same depth (a few feet) beneath the ocean, it would seem as if the same cause had produced them all. But geologists have not discovered any cause which elevates or depresses either land or sea so uniformly as this effect seems to require. The draining of a swamp on the coast, by the bursting of its sandy barrier, whereby the loose materials settle down into a more compact state, will explain some cases of this kind. Earthquakes, also, do sometimes cause the land to subside. But no such agency has been known to produce a submarine forest. Nor is there any decisive evidence that the waters of the ocean are subject to a slow elevation. So that, upon the whole, although we can explain the origin of submarine forests in particular places, it seems difficult to account for the great similarity of circumstances under which they occur all over the globe.

ACTION OF ATMOSPHERIC AGENTS UPON HARD QUARTZ ROCK.

Those numerous rounded and smoothed boulders of quartz, so common in the western part of Massachusetts, appear to have bid defiance to all decomposing agencies in past ages, and to be destined to endure unchanged for ages to come. But I examined lately a curious and instructive example of these boulders, in the fruit-tree nursery of Mr. Tracy, in Norwich, which seems to indicate that decomposition may be going on where we scarcely suspect it. This boulder was several feet in diameter; and though not as smooth as some boulders of this rock, yet I should not have suspected that it had suffered the least waste, were it not for an inscription upon its surface. The name of John Gilpin is marked

upon it in a large fair hand, except that a few of the letters are incomplete. These letters are not cut in the stone, nor do they consist of any foreign substance, like ink, or paint, spread over it. But they are rendered visible simply by the lighter color of the surface, where they were originally written, probably with some sort of paint, which for a time prevented the rock beneath it from decaying, while the decomposing process went on gradually on the other parts of the stone. By passing the fingers over the letters we perceive that they project a little, though scarcely enough to be visible to the eye. Now as this inscription must have been made since the settlement of that part of the State by the whites, we cannot suppose that more than one hundred and fifty years, at the longest, have since elapsed; and probably the period is much less. We have here, then, an imperfect measure of the rate at which hard quartz rock will decay by atmospherical agencies; though we cannot say but it may have been many years since the paint, with which the letters were made, was so worn off that these, as well as the other parts of the surface of the stone, have been subject to decomposition.

ALLUVIUM OF DEGRADATION.

In mountain ridges, where one or both sides are nearly perpendicular naked rock, especially trap rock, frost commences the work of crumbling them down. Water, penetrating the fissures of these rocks, expands by freezing, and forces them slightly asunder. This makes room for a larger portion of water the succeeding winter; and thus the process goes on, until the columnar masses of rock are urged downward by the force of gravity and

powerful rains. This is the origin of those extensive slopes of fragments of rocks, or *débris*, which arrest the attention on the mural faces of the greenstone ridges in the valley of the Connecticut. Generally these fragments rise only about one half or two thirds the height of the ridge; though sometimes they extend to the very summit.

Instances of this kind are sometimes regarded by geologists as a sort of natural chronometer, demonstrating the recent origin of the present state of the globe. It is difficult, however, if not impossible, to compare this levelling process with historical records.

When the three causes of degradation above mentioned,—frost, gravity and rains,—combine their maximum energy on the sides of steep and lofty mountains, they sometimes produce the well known and often terrific phenomenon of *land slips*, or *mountain slides*. The only place worthy of notice, where these have occurred in Massachusetts, is on Saddle Mountain. Let a person follow out that spur of this mountain called Bald Mountain, and from its barren summit he can look directly down into that vast gulf called the Hopper, whose steep sides are covered with trees of various species, with occasional patches of evergreen. On the northeast slope he will perceive several traces of these slides, whereby the trees and loose soil, of considerable weight, have been swept down, sometimes from the height of sixteen hundred feet above the bottom of the valley. It is not more than six or eight years since one or two of these slides took place; and the paths which they made are still almost destitute of vegetation; while, in other instances, we see traces of an earlier avalanche in the stinted growth, or peculiar character, of the trees that have sprung up. It is said that one of the most remarkable of

these slides took place in 1784; and that it swept away one dwelling house, though the inmates escaped.

POWER OF ICE IN REMOVING BOULDERS FROM PONDS.

It is well known that water, by an apparent exception to a general law, expands with great force when freezing, and even for several degrees above and below the freezing point. Over a large surface this effect may be considerable; and when boulder stones, lying in shallow ponds, become partially enveloped in ice, they must feel the effect of this expansion, and be forced towards the shore; since the expansive force must always act in that direction. As no antagonist force exists to drive the rock back again to its original position, the ultimate result of the freezing, during successive winters, must be, to crowd it entirely out of the pond. And may we not in this way explain the fact, that sometimes we see the margin of a pond lined with a ridge of boulders, while the bottom is comparatively free from them?

This curious fact has yet been noticed in but a few places in New England, probably because the attention of observing men has not been directed to it.

ENCROACHMENT OF THE SEA UPON THE LAND.

Boston harbor furnishes a striking example of this kind of action. The numerous islands in this harbor, as far outward as the Great Brewster, consist chiefly of diluvial sand and gravel, resting upon slaty, sienitic, and conglomerate rocks. Beyond the Great Brewster, however, this diluvium is wanting; and the islands consist almost entirely of naked rock. It would be reasonable to infer

that the diluvium had been washed away from these islands, did we not actually detect the process. But at the Great Brewster, the work is going on before our eyes. Its eastern or outer side is a nearly perpendicular bank of diluvium, obviously wasting away by the action of the waves, that roll in upon it from the wide Atlantic; while the extensive beach, stretching away from its southern point in a westerly direction, is composed of materials swept from its eastern shore. Several other islands exhibit a similar process on their Atlantic shores. Can we doubt, then, that all the outer and rocky islands have been deprived of their coat of gravel and sand by a similar process? Whether the whole space between the Great Brewster and the outermost of the Graves, which is not less than two and a half miles, was once occupied by diluvium, cannot be certainly determined; though very probable. Indeed, when one passes along the south shore of Massachusetts Bay, and finds nearly the whole of Plymouth and Barnstable counties made up mostly of the fragments of such rocks as are found in Essex and Suffolk counties, will he not be led to ask whether the whole of Boston harbor, and even most of Massachusetts Bay, may not have been produced by the long continued action of the waves, urged on by a northeast wind, and accelerated, perhaps, by diluvial agency? True, the mind is staggered in attempting to conceive of the immense period requisite for such a work by existing agencies, operating with no greater intensity than at present. But the geologist, who means correctly to appreciate the changes which our globe has undergone, must prepare himself to admit many such periods for their accomplishment, even if he admit an occasional increase of intensity in their causes.

I apprehend, however, that the dynamics of the northeast storms that prevail upon our coasts, is usually underrated. One has only to look at the naked sienitic rocks of Cape Ann, to be satisfied that they have been subject to a very powerful and long continued aqueous agency. But from the statements of several intelligent gentlemen, I am satisfied that one cannot justly appreciate the power of these storms without witnessing them. I am informed by Mr. Benjamin Haskell, who resides at Sandy Bay, on the northeast side of Cape Ann, that on Flat Point, in that vicinity, where the slope of the shore is very small, at the distance of nearly one hundred feet inward from high water mark, there lies "what a farmer would call a winnow of boulders," evidently thrown up by the waves; and some of them weighing from fifteen to twenty tons. One of them, which weighs twenty-eight tons, has been driven southwesterly one hundred and six feet, across a considerable depression; so that it must have been elevated in its course not less than ten feet.

In the great hardness and unstratified structure of the rocks of Cape Ann, (and the same may be said of those of Cohasset and Scituate,) we see the reasons why they have so successfully resisted this powerful agency, while the softer and stratified rocks that once occupied Boston harbor have given way before it.

PURGATORIES.

I find the name Purgatory applied, in their vicinity, to several extensive perpendicular excavations in the rocks of New England. The most extensive one occurs in Sutton, Massachusetts. It is a vast chasm nearly half a mile long, in gneiss; and its walls are for the most part

perpendicular, sometimes seventy feet high. Its width is upon an average, about fifty feet; though for a considerable part of its course, large fragments of gneiss occupy much of the fissure. The dip and directions of the slate that form its sides, correspond with those of the rocks generally, in that vicinity; and hence it is difficult to impute its origin to a subterranean upheaving force; for had the sides of the fissure been removed by such a force, we should expect the strata to have somewhat of a *quaquaversal* dip; or at least, that the fissure would coincide with our anticlinal axis; which is so far from being the case, that the basset edges of the strata cross the fissure nearly at right angles; and they dip in only one direction.

In the southeast part of Newport, Rhode Island, (or perhaps in the southwest part of Middleton,) the coarse conglomerate rock contains numerous fissures, crossing the seams of stratification nearly at right angles, running parallel to one another, as well as perpendicular to the horizon. In a high rocky bluff on the coast at the spot above named, two of these fissures occur, not more than six or eight feet apart; and in the course of ages, the waves have worn away the intervening rocks, so as to form a chasm about seven rods in length, and sixty or seventy feet deep; the sides being almost exactly perpendicular. This is called Purgatory; and the sea still continues its slow work of extending the chasm farther into the cliff.

On the south shore of Newport is a similar fissure, in granite. It is not so extensive as that in the conglomerate, being about twenty feet deep. During a southerly wind, the waves are forced into it with great violence; and on reaching its extremity, are driven upwards in spray to the height sometimes of thirty feet above the

rock. Hence this fissure is called the Spouting Cave. Even the hard and unstratified granite yields slowly under this violent and everlasting concussion.

Was not the Sutton Purgatory produced in the same manner, during some period of the past, when the spot constituted the shore or the bottom of the ocean?

What strange fancy has applied this whimsical name to such fissures, I know not. But whether imposed originally by Catholic or Protestant, it will now be no easy matter to change it.

FORMATION OF BEACHES ALONG THE COAST.

Chatham Beach is perhaps the most remarkable formation of this sort in Massachusetts. It forms the south-eastern extremity of Cape Cod; all of which was probably produced in this manner. Twenty years ago this beach was an island, and a good harbor existed at its northern extremity, which is now so entirely filled up, that no indentation appears along the coast. Webb's island, also, formerly situated near this harbor, is entirely washed away. Chatham harbor, once excellent, is now nearly ruined by these changes. According to Des Barres, who constructed a chart of this coast in 1772, Chatham Beach had extended for thirty years previous to that time, at the rate of a mile every twelve years. The impression in the vicinity is, that it advances southerly about a mile in eight years. But a respectable writer in the Barnstable Journal says, that it has extended only three miles in seventy years.

According to the same writer, Nauset Beach, which connects with the mainland at Eastham, has extended a mile southerly in the last fifty years. Around Nauset

harbor the salt marsh has so much increased, that three hundred tons of hay are now cut annually, where only flats existed forty years ago.

Monomoy Beach extends southerly from Chatham towards Nantucket, and was formed by increments at its southern extremity. A few years since the sea made a breach across its northern part, so that it is now an island.

Sandy Neck extends eastward nearly across Barnstable harbor, and continues to advance in an easterly direction.

Smith's Point, which forms the southeastern extremity of Nantucket, was nearly in the same situation when Des Barres constructed his chart, as at present. But since that time it has been shortened a mile or two, and again extended.

Details of this kind might be multiplied were it necessary; but they are not of much use to geology, unless the precise rate of advancement and retrogression can be ascertained.

Such facts make one feel as if such low sandy islands as Nantucket were sliding beneath his feet. But that no large island on our coast has been very essentially changed since man was placed on the globe, is evident from the fact, that their shores often exhibit cliffs of clay and sand in regular layers, constituting a distinct tertiary formation, whose period of deposition must be placed earlier than the creation of man.

DUNES, OR DOWNS.

Frequently on the coast, the sand is carried up so far upon the land by the waves and spray, that the reflux

waves do not force it back. After it is dried, the sea breezes force it still further inland; and in the course of time, ridges of considerable elevation are formed. These constitute those moving sand hills, which, on the eastern continent, especially on the banks of the Nile, are so famous under the name of *dunes* or *downs*. On the shores of Cape Cod they are very common, and are sometimes as much as sixty or seventy feet high. At the eastern extremity of the Cape they move westward; and they threaten at present the village and harbor of Provincetown, if not arrested by the beach grass, which has recently been transplanted to their summits by order of government. I cannot learn that any of the dunes of Cape Cod have yet produced much injury to farms or villages, as they have done on the eastern continent. The sands of Africa, it is well known, have advanced as far as the Nile, burying cities and fertile regions of great extent. And it would be strange if the future history of the southeast part of Massachusetts should not contain catastrophes of a similar kind, though of far more limited extent.

But few dunes occur in the interior of Massachusetts. In the valley of the Connecticut I have noticed them on a small scale in Montague, Hadley, and Enfield, Ct. These, in consequence of the prevalence of northwest and westerly winds, are slowly advancing towards the southeast.

ICE FLOODS.

Whoever has not witnessed the breaking up of a river in a mountainous region, after a severe winter, when its surface has been covered by ice, several feet thick, can

form but a faint idea of the force exerted by a stream in such circumstances. The ice, towards the source of the river, is generally first broken in pieces by the swollen waters. Large masses are thus thrown up edgewise, and forced underneath the unbroken sheet, and the whole bed of the stream is blocked up; perhaps too where the banks are high and rocky. The water accumulates behind the obstruction until the resistance is overcome; and the huge mass of ice and water urges on its way, crushing and jamming together the ice which it meets, and thus gains new strength at every step. Often, for miles, the stream, prodigiously swollen, is literally crammed with ice, so that the water disappears; and a slowly moving column of ice is all that is seen. This presses with such force against the bottom and sides of the stream, as like heavy thunder, to cause the earth to tremble for miles around. Sometimes the body of ice becomes so large, and the friction so great, that the waters are unable to keep it in motion, and it stops; while the river is turned out of its channel, and is compelled to flow for weeks, and even months, in a new bed.

It is impossible that such floods should not operate powerfully to modify the surface in alluvial regions, and to excavate the beds of rivers. I am confident that no other agent in the mountainous parts of this state is so energetic. Though its effects are not small in alluvial regions, yet I apprehend that its maximum power is seen in those rocky ravines, through which such rivers as the Deerfield and the Westfield pass, among the mountains. Masses of rocks of various sizes, some ten, fifteen, or twenty feet in diameter, may here be seen, some of them torn up from their beds and removed a considerable distance, strewing the bottom of the streams, and at low

water almost covering the surface; and others only partially lifted from the parent rock, waiting for another convulsive effort of the torrent to detach them and give them an erratic character. In short, one sees in such streams, a cause fully adequate to the production of those numerous boulder stones that are scattered over the country: I mean a cause sufficient to detach and round them. Probably, however, the expansive agency of water, frozen in the seams of rocks, contributes not a little to lift them out of their original beds.

ART. VIII.—ENUMERATION OF PLANTS GROWING SPONTANEOUSLY AROUND WILMINGTON, NORTH CAROLINA, WITH REMARKS ON SOME NEW AND OBSCURE SPECIES. By Moses A. Curtis, A. M. Communicated, September 3, 1834.*

The desirableness of local catalogues of Plants as directories to the collector, and their importance to the interesting subject of Botanical Geography, need not be urged upon those for whom this paper is written. It is hoped their value will become still more appreciated, and that they will be multiplied until definite localities are established for all the American species. The only Catalogues including local Floras, of which I have any knowledge, are the following:

1. Flora of West Chester County, Penn., by Dr. Darlington.—2. Florula Bostoniensis, by Dr. Bigelow.—3.

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* Most of the original impression of Vol. I, No. 2, was accidentally burnt. In this reprint, many additions and emendations, the results of further research, have been made to this article, by the author. *Pub. Com.*

Flora Philadelphia, by Barton.—4. Flora Columbiana, Dr. Brereton.—5. Florula Louisvillensis, McMurtrie.—6. Florula Ludoviciana, Rafinesque.—7. Catalogue of Plants about Plandome, L. I., (vid. Medical Repository,) by C. W. Eddy.—8. Do. of the island of New York, Leconte. (Vid. Medical and Philosophical Register, Vol. II.).—9. Do. in the vicinity of New York, Torrey.—10. Do. of Cincinnati, Ohio, Dr. Drake.—11. Do. of Amherst, Mass., Professor Hitchcock.—12. Do. of Berkshire County, Mass., Professor Dewey.—13. Do. of the State of Massachusetts, Professor Hitchcock.—14. Do. of Kentucky, Professor Shortt.—15. Do. of Newbern, N. C., by Croom and Loomis.—16. Do. of the vicinity of Yale College; Prof. Ives.—17. Do. of Charleston, S. C. and vicinity, Rev. J. Bachman.—18. Do. of Columbia, S. C. and vicinity, Mr. Gibbes.

A first essay of this kind is almost necessarily incomplete, and that in proportion to the extent of the examination. The present is the result of a collection made in little more than two seasons at intervals from other engagements, and much ground still remains unexamined. Still it embraces over a thousand species, about two hundred less than are reckoned as belonging to the state of Massachusetts, more than half the number described in Elliott's Botany of South Carolina and Georgia,* and about a fourth of the phenogamous Flora of the United States. It is confidently believed, that no section of the Union, of equal extent, contains such a rich and extensive

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* Mr. Elliott's work is by no means a complete Flora of these two States. He seems to have been dependent upon the contributions of a few scattered correspondents more than upon his own researches. There are many plants in the neighborhood of Charleston not included in the sketch, or referred to the middle and upper districts of country.

variety of plants as are to be found about Wilmington; and many more, doubtless remain to be discovered, as I detected several at the last examination made there.

Most of the species enumerated inhabit a circle around this place of about two miles radius. A number collected at Smithville, at the mouth of the river, are also included, which have not been found at Wilmington. These are principally maritime species, and are found within ten miles of Wilmington, in an easterly direction. Several are furnished by Dr. McRee, from his plantation, at Rocky Point, a few miles north of Wilmington, which are marked R. P. in the catalogue, and rest entirely on his authority.

Wilmington is situated in latitude 34° 17′, and longitude 78° 10′, about thirty miles from the mouth of Cape Fear river, on which it stands, and ten or twelve miles from the sea, in an easterly direction. Its precise elevation above the ocean I have not learned, but it is so small as to deserve little or no consideration in regard to botanical geography. Indeed much of the low land in the vicinity is but little above the level of the ocean. The climate may be pretty well determined from the following table of temperature, made from observations taken in 1832.

The thermometer was placed in the shade on the north side of a house. Observations taken six times a day, from 8 and 9 o'clock A. M. to 11 P. M. Fractions omitted.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Maximum.	72	75	80	87		97	86	83	85	82	77	68
Minimum.	18	32	25	42		60	68	66	63	40	36	27
Medium.	46	55	56	65		77	72	79	75	66	57	50
Rainy Days.	4	8	4	8		5	9	14	12	4	6	5

Hail 1. Snow 0.

Medium temperature of the year, 64° Fahr.

I have not materials for forming an accurate Floral Calendar for Wilmington, but the following notices show the flowering time of a few plants in the spring of 1832.

Daffodils in flower,	. .	February 1st.
Red Cedar and Elm,	. .	" "
Red Maple,	. . .	" 8th.
Jonquils,	. . . .	" 10th.
Peach and Plum,	. . .	" 12th.
Cercis Canadénsis,	. .	" 26th.
Flowering Almond,	. .	" "
Epigæa repens,	. . .	" "
Phlox subulàta,	. . .	" 27th.
Luzula campéstris,	. .	" "
Vaccínium corymbòsum,	.	March 1st.
Viola cucullàta and canceolàta,		" 6th.
Cardámine Virgínica,	. .	" "
Thlaspi bursa-pastòris,	. .	" 10th.
Bayberry (Myrica.)	. .	" "

In 1831, Daffodils blossomed January 1st, and the white Hyacinth at Christmas, which is about their usual period of flowering.

By a paper from Dr. Bigelow, in the Memoirs of the American Academy, Vol. IV., there appears to be a difference of about two months in the flowering time of some of these plants at Wilmington, and the same at Boston and Albany; but this is true only of early flowering species which are ready to expand in the first warm day of Spring. As a general rule, plants blossom at Wilmington, from four to six weeks earlier than in Massachusetts. The Draba verna and Poa ánnua open as early as December, so that there is no month in which vegetation is not going on, though Spring does not commence until February. I think that Mr. Elliott has generally given the periods of

flowering with sufficient accuracy for the latitude of Wilmington, though I have noticed a few that are earlier than he gives them.

The Catalogue is arranged according to the Natural Orders of Professor Lindley, as applied to our Flora, by Dr. Torrey, in his Appendix to Lindley's work. The nomenclature is intended to be that of Eaton's Manual, (fifth edition), that work being in more general use, and containing more plants than any other to which I could refer. The popular names in use at Wilmington, as far as they are known, and the localities of a few rare species, are given for the benefit of such as may have occasion to refer to the catalogue on the spot. Most of the plants are abundant.

It has occurred to me while preparing this paper, but too late to profit by the suggestion any farther than to offer it to others, that a classification of the soils peculiar to the district, to which the several species may be referred by appropriate characters, is a desirable appendage to Catalogues of this kind. The botanist, and especially the florist, would find it interesting and profitable to know the habits of the plants, as indicated by their choice of soils. The terms wet, dry, shady, &c., suggest ideas as different as the features of the country we inhabit, and are too indefinite for general application.

In preparing the Catalogue I have been kindly assisted by Dr. Torrey, whose name will at once ensure confidence in its general accuracy. To him have been communicated nearly all the doubtful and new species, and they have received numerous corrections and references. The most difficult species may, therefore, be regarded as the most accurately referred. In my own part of the labor,

it is not unlikely that mistakes and oversights have been committed, which, if discovered, will be rectified hereafter. Some species remain undetermined and may form the subject of another paper.

To Dr. James F. McRee, of Wilmington, an accomplished Botanist and Florist, I am particularly indebted for numerous contributions of plants, which escaped my own observation. To his labor and research no small part of the Catalogue should be ascribed. Situated in such an extensive and inviting field for the prosecution of the study of Natural History, it is much to be hoped that he will hereafter find ample time for investigating the subjects of his favorite departments, for which his refined taste and accurate observation so eminently qualify him.

ARALIACEÆ.

Aràlia spinòsa.

UMBELLIFERÆ.

Hydrocótyle vulgàris,
repánda,
umbellàta.
Angélica atropurpùrea. (R. P.)
Cicùta maculàta.
Daucus pusíllus ? (Smithville).
Eryngium aquáticum, *Button Snake Root.*
ovalifòlium,
Virginiànum.
Œnánthe filifórmis,
longifòlia ; (Sium rigídius *Ell !* S. tricuspidàtum, *Ell !* S. denticulàtum, *Ell.*)
Sanícula Marilándica.
Sison capillàceus.
Smyrnium cordàtum. (R. P.)
Uraspérmum Canadénse.

RANUNCULACEÆ.

Anemòne thalictroídes,
Virginiàna.
Clématis cylíndrica ? *Bell flower.*
Virgínica. (R. P.)
Hepática Americàna. (R. P.)
Ranúnculus ábortìvus,
bulbòsus, var. (apparently introduced).
nítidus,
pusíllus,
recurvàtus,
trachyspérma,
Aquilègia Canadénsis,
Thalíctrum revolùtum.

PAPAVERACEÆ.

Argemòne Mexicàna.
Papàver rheas. (R. P. in cornfields; introduced?)
Sanguinària Canadénsis. *Blood root.*

NYMPHEACEÆ.

Nuphar sagittæfòlia. *Yellow water lily.*
Nymphæa odoràta. *Pond lily.*

HYDROPELTIDEÆ.

Hydropéltis purpùrea.
Nectris aquática. (Ditches in Potter's rice field).

PODOPHYLLEÆ.

Podophyllum peltàtum. *May apple.*

CRUCIFERÆ.

Arabis rhomboídea. (Cardámine rotundifòlia, *Mx.*) (R. P.)
Cakile Americàna ? *Sea kale.* (Not seen).
Cardámine Virgínica. (C. Pennsylvánica, *W.*) *Water cress.*
Coronòpus dídyma.
Draba verna.
Erysimum palústre,
Wálteri. (Nastúrtium tanacetifòlium, *Hk.*—N. palústre δ? tanacetifòlium, *D. C.* Sysímbrium tanacetifòlium, *Walt.*)

Lepídium Virgínicum. *Wild peppergrass.*
Sisymbrium canéscens,
officinàle.
Thlaspi bursa-pastòris.

FUMARIACEÆ.

Corydàlis aúrea.

CAPPARIDEÆ.

Cleòme pentaphylla. (1) (Across the ferry. Introd.)

ANNONACEÆ.

Porcèlia parviflòra tríloba. *Fetid shrub.*

MAGNOLIACEÆ.

Magnòlia tripètala,
glauca, *Bay tree.*
grandiflòra. *Laurel. Large magnolia.*
Liriodéndron tulipífera. *Tulip tree. Poplar.*

LAURINEÆ.

Laurus álbida, (2) *White sassafras.*
benzòin, *Spice bush.*
Carolinénsis, *Red bay.*
Catesbyàna ?
geniculàta,
melissæfòlia, (3)
sássafras. *Red sassafras.*

MENISPERMEÆ.

Cócculus Carolìnus, (4) D. C. (Wendlándia populifòlia. W.)
Menispérmum Canadénse. (R. P.)

MALVACEÆ.

Hibíscus moscheùtos,
scaber, (Brunswick).
Virgínicus.
Malva rotundifòlia.
Sida abutìlon,
spinòsa.

TILIACEÆ.

Tilia glabra. *Bass wood.* (Rocky Run).

TERNSTRŒMIACEÆ.

Gordònia lasiánthus.
Stewártia Virgínica.

HYPERICINEÆ.

Ascyrum amplexicaúle,
crux-ándreæ.
Hypéricum angulòsum,
corymbòsum,
fasciculàtum,
nudiflòrum,
parviflòrum,
rosmarinifòlium,
simplex,
Virgínicum.
Saróthra gentianoídes.

SAXIFRAGEÆ.

Heuchera Americàna.
Itĕa Virgínica.
Parnássia Caroliniàna.
Saxífraga Virginiénsis.

HAMAMELIDIÆ.

Fothergílla alnifòlia.
Hamamèlis Virgínica. *Witch-hazel.*

PHILADELPHEÆ.

Decumària sarmentòsa.

CACTEÆ.

Cactus opúntia. *Prickly pear.*

ONAGRARIÆ.

Gaura augustifòlia.
Isnárdia palústris.
Ludwígia alternifòlia,
capitàta,
decúrrens,
lineàris,
mollis,
virgàta.

Œnothèra biénnis, (Green's lower field).
fructicòsa,
lineàris ?
riparia,
sinuàta,
" var: mínima.

HALORAGEÆ.

Proserpinàca palústris,
pectinàta.

SALICARIÆ.

Lythrum lineàre, (5)
verticillàtum.

MELASTOMACEÆ.

Rhéxia angustifòlia, (6)
ciliòsa,
glabélla, *Deer grass.*
lùtea,
mariàna,
Virgínica.

ARISTOLOCHIÆ.

Aristolòchia serpentària.
Asărum arifòlium,
Canadénse. (R. P.)

SANTALACEÆ.

Nyssa aquática. *Sour gum.*

ROSACEÆ.

Agrimònia eupatòria,
suavèolens.
Fragària Virginiàna. *Strawberry. Rare.*
Geum Virginiànum. (R. P.)
Potentílla Norwègica, (Rare; introduced?)
Canadénsis *W.* (sarmentòsa, *W.* simplex, *Mx.*)
Rosa Carolìna, *Wild Rose.*
parviflòra.
Rubus villòsus, *Blackberry.*
Rubus triviàlis, *Creeping blackberry.*
cuneifòlius.

POMACEÆ.

Arònia arbutifòlia,
" var: glabra,
botryàpium,
Cratægus apiifòlia,
coccínea,
flava,
parvifòlia,
spathulàta,
Pyrus angustifòlia.

AMYGDALEÆ.

Prunus Americàna,
Chícasa,
Virginiàna. *Wild cherry.*

LEGUMINOSÆ.

Amórpha fruticòsa,
pubéscens.
Amphicárpa monoíca.
Apios tuberòsa.
Astrágalus glaber, *Mx. Ell!*
Baptísia alba,
lanceolàta?
tinctòria.
Cássia chamœcrísta,
Marilándica,
níctitans,
occidentàlis, (1)
Tora.
Cercis Canadénsis.
Crotalària ovàlis,
parviflòra, (7)
sagittàlis.
Ervum tetraspèrmum.
Galáctia glabélla,
Macrèei, *Nobis.* mollis, *N. and Ph?* pilòsa,
Ell. (8)
mollis, *Mx.* pilòsa, *Nutt.*
Galèga ambígua, (9) *Nobis.* hispídula, *Ph. Ell.*
hispídula, *Mx.* grácilis, *Nutt.* (10)
paucifòlia, *Nutt.* villòsa, *Mx. non L.* (11)

Gleditschia triacánthos. *Honey locust.*
Glycine erécta,
simplicifòlia,
tomentòsa.
Hedysărum Bóotii, *Tor. MS.* Marilándicum, *Auctt.*
bracteòsum,
lineàtum,
Marilándicum, "*of Herbb. Lin. et Gron. obtùsum. Auctt.*" *Tor.*
nudiflòrum,
obtùsum, *Ph.* non *Lin.*
paniculàtum; glabéllum, *Ell.?*
" var: fol. angust; paniculàtum, *Ell.?*
rígidum,
rotundifòlium,
sessilifòlium, var: angustifòlium, *Tor. Ms.* (12)
stríctum,
viridiflòrum, *Ell.!* "et herb. Lin. secund. Boott." *Tor.*
Indigófera Caroliniàna.
Láthyrus palústris.
Lespedèza angustifòlia,
capitàta,
polystàchya,
violàcea.
Lupìnus diffùsus,
perénnis, *Lúpine.*
" var: flor; albis,
villòsus.
Medicàgo lupulìna. (Introduced).
Phasèolus perénnis. (R. P.)
Psoràlea melilotoides.
Robínia Pseudacàcia, *Locust.*
híspida.
Strophostyles angulòsa,
pedunculàris.
Stylosánthes elàtior.
Thyrsánthus frutéscens. *Virgin's bower.*
Trifolium arvénse,
Caroliniànum? (R. P.)

Trifolium praténse, *Red clover.*
repens. *White clover.*
Vexillària (Clitòria L.) mariána,
Virgínica.
Vícia cracca,
satìva.
Zórnia tetraphylla.

URTICEÆ.

Bœhmèria cylíndrica.
Urtĭca capitàta,
pùmila,
urens.

ULMACEÆ.

Ulmus alàta,
Americàna,
fulva.

ARTOCARPEÆ.

Morus rubra. *Red mulberry.*

CUPULIFERÆ.

Quercus alba, *White oak.*
aquática, *Water oak.*
Catesbæi, *Scrub oak.*
cinèrea,
coccìnea,
falcàta,
nigra, *Black jack.*
obtusíloba, *Post oak.*
phellos,
prinos,
pùmila,
virens. *Live oak.* (Sea coast).
Castànea pùmila, *Chinquapin.*
Fagus sylvática. *Beach.*

BETULINÆ.

Alnus serrulàta.
Bétula rubra.
Carpìnus Americàna.

SALICINEÆ.

Salix nigra,
vitellìna ? (Little Bridge).
Pópulus angulàta. *Cotton tree.*
heterophylla, *Ph. Ell.* (argéntea, *Mx. Icon.*)

PLATANEÆ.

Liquidámbar styracíflua. *Sweet gum.*
Plátanus occidentàlis. *Button wood. Sycamore.*

MYRICEÆ.

Myrìca Carolinénsis,
cerífera, *Myrtle.*
" var : pùmila.

JUGLANDEÆ.

Carya tomentòsa, *Hickory.*
amàra,
squamòsa.
Juglans nigra. *Black Walnut.* (Introduced).

EUPHORBIACEÆ.

Acálypha Caroliniàna, (13)
Virgínica.
Croton marítimum. (Sea Coast).
Euphórbia corollàta,
cyathóphora,
ipecacuánhæ,
" var : fol. lineàribus,
maculàta,
obtusàta, (Flowers in May).
polygonifôlia. (Sea beach).
Játropha stimulòsa.
Styllíngia sylvática.
Tràgia urens,
" var : linearis.

CELASTRINEÆ.

Euónymus Americànus. *Strawberry tree.*

RHAMNEÆ.

Ceanòthus Americànus.
Zízyphus volùbilis.

HIPPOCASTANEÆ.

Æscŭlus pàvia. *Buck eye.*

ACERINEÆ.

Acer Negúndo, (R. P.)
rubrum, *Red Maple.*
saccharìnum ? (Rock Spring).

VITES.

Ampelópsis bipinnàta,
quinquefòlia. *Creeper.*
Vitis æstivàlis, *Summer grape.*
" var : sinuàta,
rotundifòlia, *Bullet grape.*
vulpìna.

MELIACEÆ.

Mèlia azedarách. *Pride of China.*

ANACARDIACEÆ.

Rhus copallìnum, *Sumach.*
toxicodéndron. *Poison oak.*
" var : quercifòlium,
" " rádicans, *Poison vine.*
vernix, *R.* (venenàta, *D. C.*)

XANTHOXYLEÆ.

Ptèlea trifoliàta.
Xanthóxylon tricàrpum. *Tooth ache tree.*

ZYGOPHYLLEÆ.

Tríbulus cistoídes. (1)

GERANIACEÆ.

Gerànium Caroliniànum,
maculàtum.

OXALIDEÆ.

Oxális stricta,
violácea. (R. P.)

BALSAMINEÆ.

Impàtiens fulva.

POLYGALEÆ.

Polygála corymbòsa,
cruciàta,

incarnàta,
lùtea, *Bachelor's button.*
ramòsa.
Polygăla sanguínea,
verticillàta.

VIOLACEÆ.

Vìola blanda ?
cucullàta,
lanceolàta,
palmàta,
pedàta,
primulifòlia,
soròria,
tenélla.

PASSIFLOREÆ.

Passiflòra incarnàta, *May pop.*
lùtea.

CISTINEÆ.

Cistus Canadénsis,
Caroliniànus,
corymbòsus,
rosmarinifòlius.
Lechèa major,
racemulòsa.

SARRACENIÆ.

Sarracénia flava, *Trumpets. Watches.*
purpùrea.

DROSERACEÆ.

Dionæa muscípula, (14) *Fly trap.*
Drósera longifòlia, (foliòsa, *Ell!*)
rotundifòlia.

LINEÆ.

Linum Virginiànum.

CARYOPHYLLEÆ.

Arenària Canadénsis,
diffusa, *Ell!* (Stellària elongàta, N.) (15)
serpyllifòlia,
squarròsa.

Cerástium hirsùtum.
Mollùgo verticillàta.
Saponària officinàlis. (Not common. Introduced).
Silène antirrhìna,
Virgínica.
Spèrgula decúmbens.
Stellària mèdia. *Chickweed.*

PORTULACEÆ.

Claytònia Virgínica. (R. P.)
Portulàcca oleràcea, *Purslane*, vulg. *Pusley.*

CRASSULACEÆ.

Penthòrum sedoìdes. (R. P.)

FICOIDEÆ.

Sesùvium pedunculàtum. (Smithville).

ILLECEBREÆ.

Quèria Canadénsis.
Stipulicìda setàcea.

AMARANTHACEÆ.

Achyránthes repens. (Rocky Run).
Amaránthus hybrĭdus,
lívidus,
spinòsus.

CHENOPODEÆ.

Acnìda cannabìna.
Chenopòdium album, *Pigweed.*
anthelmìnticum, *Worm seed.*
marítimum. (Masonborough).
Salicórnia ambígua, herbàcea. } *Samphire.*
Salsòla Caroliniàna.

PHYTOLACCEÆ.

Phytolácca decándra. *Poke root.*

POLYGONEÆ.

Polygŏnum arifŏlium, *Scratch grass.*
aviculàre,
maritimum,
mite,

Polygŏnum Pennsylvánicum,
Persicària,
polygămum,
punctàtum,
sagittàtum,
scandens,
Virginiànum.
Rumex Acetosélla, *Sorrel.*
Brittánnicus,
crispus, *Dock root.*
obtusifŏlius.
persicarioídes (divaricàta, *Ell?*)

SAURUREÆ.

Saurùrus cérnuus.

CALLITRICHINEÆ.

Callítriche verna.

CERATOPHYLLEÆ.

Ceratŏphyllum demérsum? (v. v. sine fl.)

ILICINEÆ.

Ilex ligustrìna, *Ell!*
opàca, *Holly.*
vomitòria, *Yopon* or *Yâpon.* (16)
Prinos coriàceus,
glaber, *Gall berry.*
verticillàtus.

STYRACEÆ.

Hàlesia tetráptera. *Snow drop.*
Hòpea tinctória.
Styrax grandifŏlium,
glabrum, *Herb. Ell!*

SAPOTEÆ.

Bumèlia lyciöìdes, *Buck thorn.*

ERICEÆ.

Andrómeda axillàris,
caliculàta,
mariàna,
nítida,

Andrómeda paniculàta. (17) (A. ligustrìna, *Ell.*)
racemòsa,
speciòsa,
" var : pulverulénta.
Azàlea nudiflòra, *Honeysuckle.*
viscòsa.
Clethra alnifòlia.
Cyrílla racemiflòra.
Epigæa repens.
Kálmia angustifòlia, *Wicky.*
" var : ovàta,
cuneàta, (18)
latifòlia, (R. P.)
Leiophyllum buxifòlium, (Brunswick).

VACCINEÆ.

Oxycóccus macrocárpus, (19) *Cranberry.*
Vaccínium arbòreum, *Sparkleberry.*
corymbòsum,
dumòsum,
frondòsum,
myrtifòlium,
stamíneum,
tenéllum. (galèzans, *Ell.*)

PYROLACEÆ.

Chimáphila maculàta.
Monótropa uniflòra.

CAMPANULACEÆ.

Campánula amplexicáulis.

LOBELIACEÆ.

Lobèlia cardinàlis,
Kàlmii,
" var : grácilis,
pubérula,
syphilítica.

CUCURBITACEÆ.

Melóthria péndula.

PLANTAGINEÆ.

Plantàgo interrúpta ?
lanceolàta,
major, *Plantain.*
Virgínica.

PLUMBAGINEÆ.

Státice Limònium ? (Masonborough).

COMPOSITÆ.

Achillèa millefòlium.
Ambròsia elàtior.
Anthĕmis cótula. (F. Waddell's).
Aster cóncolor,
conyzoídes,
diversifòlius,
dumòsus,
flexuòsus, *Nutt.*
paludòsus,
puníceus,
rígidus,
solidaginoídes,
squarròsus,
tortifòlius,
undulàtus.
Bàccharis halimifòlia,
sessiliflòra.
Balduìna uniflòra. (Brunswick).
Bidens bipinnàta,
chrysanthemoídes,
frondòsa.
Boltònia glastifòlia.
Borkhaúsia Caroliniàna.
Buphthàlmum frutéscens.
Chaptàlia integrifòlia.
Chrysánthemum leucánthemum.
Chrysócoma nudàta.
Chrysógonum Virginiànum.
Chrysópsis dentàta,
falcàta,

Chrysópsis gossypína,
graminifòlia,
mariána.
Cnicus altíssimus,
horrídulus, (Between the ferries).
repándus,
Virgínicus.
Conyza Marilándica,
bifrons.
Coreópsis dichótoma,
lanceolàta,
mitis,
tenuifòlia,
Eclípta procúmbens.
Elephantòpus Caroliniànus,
nudicáulis.
Erígeron bellidifòlium,
Canadénse,
nervòsum,
nudicaúle,
Philadélphicum.
Eupatòrium album,
aromáticum, (ceanothifòlium, *Ell.*)
cœlestìnum,
coronopifòlium, *Dog fennel.*
fœniculàceum,
incarnàtum, (R. P.)
linearifòlium,
maculàtum,
perfoliàtum, *Boneset.*
pubéscens, *Ell.* (scábridum, *Ell?*)
rotundifòlium,
verbenæfòlium,
" var: fol. ternatis,
serotìnum.
Gnaphàlium plantagíneum,
polycéphalum,
purpùreum.
Helènium autumnàle.
Heliánthus altissimus,
angustifòlius,

Heliánthus atrorùbens,
sparsifòlius. *Ell!*
Hieràcium Gronòvii,
Iva frutéscens,
imbricàta.
Krígia Caroliniàna,
Virgínica.
Kùhnia critònia.
Lactùca elongàta,
graminifòlia.
Leóntodon Taráxacum. (Rare. Introduced).
Leptòpoda fimbriàta, (pubérula, *Ell!*)
Liàtris bellidifòlia,
odoratíssima, *Vanilla.*
paniculàta,
" var: floribus albis,
secúnda,
spicàta,
squarròsa,
tomentòsa. *Mx.* non *Ell!* (Walteri, *Ell!*) (20)
Marshállia angustifòlia,
lanceolàta.
Mikània pubéscens.
Polymnia uvedàlia.
Prenánthes alba, (P. serpentària, *Ph. Icon.*)
virgàta.
Pterocaúlon pycnostàchya.
Rudbéckia hirta.
Senècio hieracifòlius,
lobàtus,
tomentòsus.
Sílphium Canadénsis, (S. compositum, *Ell!*)
terebinthinàceum, var: sinuatum; (21)
Solidàgo cœsia,
ellíptica, *Ell?*
erécta, *Nutt.* (elàta, *Ell!*)
graminifòlia,
limonifòlia, *Nutt.*
odòra,
pyramidàta,

Solidàgo rugòsa ?
sempervìrens, *Nutt.*
tenuifòlia,
tortifòlia,
virgàta.
Sonchus acuminàtus, (Floridànus).
Caroliniànus, *Wr.* (spinulòsus, *Bw.*)
oleràceus.
Vernònia angustifòlia,
Novæboracénsis.
Xánthium strumàrium.

STELLATÆ.

Gàlium pilòsum,
trífidum.

CINCHONEÆ.

Cephalánthus occidentàlis.
Diòdia tetrágona.
Hedyòtis glomeràta.
Mitchélla repens.
Spermacòce diodìna.

CAPRIFOLIACEÆ.

Cornus flórida, *Dog wood.*
seríicea,
stricta.
Hydrángea vulgàris. (Rocky Run).
Lonicèra sempervìrens. *Honeysuckle vine.*
Sambùcus Canadénsis, *Elder.*
Vibúrnum dentàtum,
nudum, *'Possum haw.*
prunifòlium.

LORANTHEÆ.

Viscum verticillàtum, *Misletoe.*

ASCLEPIADEÆ.

Aceràtes longifòlia.
Asclèpias amplexicaúlis,
obtusifòlia,
paupércula,
periplocæfòlia.

Asclèpias tuberòsa,
variegàta,
verticillàta.
Cynànchum angustifòlium. (Lyònia, *Ell.*) (Mink Isl'd.)
Gonólobus hirsùtus,
macrophyllus.
Podostígma pubèscens. (22)

APOCYNEÆ.

Amsònia latifòlia.
Apócynum cannabìnum. (R. P.)
Echìtes diffórmis.
Gelsémium sempervìrens, (23) *Carolina jessamine.*

GENTIANEÆ.

Bartònia paniculàta.
Centaurélla verna.
Gentiàna angustifòlia,
Catesbœi, (24)
saponària.
Houstònia cœrùlea,
purpùrea.
Obolària Virgínica. (Rocky Run).
Ophiorhìza lanceolàta,
mitrèola.
Polyprĕmum procúmbens.
Sabbátia angulàris,
brachiàta,
calycòsa,
corymbòsa,
gentianoides,
stellàris.
Villársia lacunòsa.

CONVOLVULACEÆ.

Convólvulus panduràtus,
repens,
sagittæfòlius *Mx.* (Smithville). (25)
tenéllus,
Pickeríngii. *Tor.* (26)
Cuscùta Americàna.
Dichóndra Carolinénsis.

Ipomæa trichocárpa. (27) *Ell.'s Sk.*

POLEMONIACEÆ.

Phlox paniculàta, (Near Eden's mill).
setàcea, (Mr. Hunt).
subulàta. *Wild pink.*

HYDROLEACEÆ.

Diapénsia cuneifòlia.
Hydròlea quadriválvis.

EBENACEÆ.

Diŏspyros Virgíniana. *Persimon.*

OLEACEÆ.

Chionánthus Virgínica. *Fringe tree.*
Fráxinus platycárpa, *Ash.*
Olĕa Americàna.

PRIMULACEÆ.

Anagâllis arvénsis. (Rare. Introduced).
Lysimàchia ciliàta, (R. P.)
stricta. (Walker's causeway).
Micránthemum orbiculàtum.
Samòlus valeràndi.

LENTIBULARIÆ.

Pinguícula elàtior,
" var: flor: albis,
lùtea.
Utriculària ceratŏphylla,
longiróstris,
personàta,
purpùrea,
setàcea,
striàta.

OROBANCHEÆ.

Epiphègus Virginiànus. (Mr. Hunt).
Orobánche Americàna. (R. P.)

SCROPHULARINEÆ.

Antirrhìnum Canadénse.
Chelòne glabra,
" var: purpùrea,
Lyòni. (28)

Gerárdia ăphylla,
fasciculàta,
flava,
pectinàta, *Tor.* (G. pedicularìa, *Ell.*)
Plukenétii,
purpùrea,
linifòlia.
Gratìola acuminàta, (29) *Ell!*
Carolinénsis; sphærocárpa, *Ell.*
pilòsa.
Herpéstis cuneifòlia. (30)
Lindérnia attenuàta; (Gratìola tetrágona, *Ell!*)
Mímulus ringens.
Penstèmon lævigàtum,
pubéscens.
Schwàlbea Americàna.
Scrophulària Marilándica.
Seymèria tenuifòlia.
Verónica arvénsis,
peregrìna,
serpyllifòlia.

SOLANEÆ.

Datùra métel, (1)
stramònium, *Jimson weed.*
tátula.
Physàlis lanceolàta, obscùra, pubéscens? } *Ground cherry.*
Solànum Carolinénse, *Horse nettle.*
nigrum.
Verbàscum blattària,
thapsus, *Mullein.*

ACANTHACEÆ.

Justícia hùmilis.
Ruéllia strepens.

PEDALINEÆ.

Martynia proboscídea. *Martino.*

BIGNONIACEÆ.

Bignònia capreolàta,

Bignònia rádicans.
Catálpa cordifòlia, *Catalpa.*

VERBENACEÆ.

Callicàrpa Americàna.
Verbèna Caroliniàna,
spùria,
urticifòlia. (Rocky Run).
Zapània lanceolàta, (R. P.)
nodiflòra.

LABIATÆ.

Calamintha grandiflòra. (Mr. Hunt).
Collinsònia punctàta. var: of Canadensis?
Dracocéphalum obovàtum, *Ell.* (Mr. Hunt).
Virginiànum.
Gléchoma hederàcea.
Hyptis radiàta.
Làmium amplexicaúle.
Leonùrus cardíaca.
Lycòpus Europæus, (exaltàtus, *Ell!* angustifòlius, *Ell!*)
Virgínicus.
Macbrìdea pulchra. (31)
Marrùbium vulgàre. *Hoarhound.*
Mentha rotundifòlia, (36)
ténuis.
Monárda punctàta. *Rignum.*
Prunélla vulgàris.
Pycnánthemum aristàtum,
incànum,
linifòlium, (R. P.)
verticillàtum.
Sàlvia lyràta,
" var. floribus albis.
Scutellària integrifòlia,
pilòsa,
serràta.
Stachys áspera.
Teúcrium Canadénse.
Trichostéma dichótoma,
lineàris.

BORAGINEÆ.

Lithospérmum arvénse. (Belvidere).
Myosòtis arvénsis.
Onosmòdium híspidum.

HELIOTROPICEÆ.

Heliotròpium curassávicum, (1)
Indicum.

CONIFERÆ.

Cupréssus dísticha, *Cypress.*
" var: imbricària,
thuyoídes. *Juniper.*
Juníperus Virginiàna. *Cedar.*
Pìnus mitis,
palústris, *Long leaved pine. Pitch pine.*
tæda. *Old field pine. Loblolly pine.*

ALISMACEÆ.

Alísma plantàgo.
Sagittària acutifòlia ?
lancifòlia,
pubéscens,
pusílla, *N!* (Alísma subulàta, *Ell!*) Upper Ferry.
sagittæfòlia.

COMMELINEÆ.

Commelìna angustifòlia,
Virgínica.
Tradescántia ròsea,
Virgínica.

XYRIDEÆ.

Xyris brevifòlia,
Caroliniàna.

BROMELIACEÆ.

Tillándsia usneoídes. *Long moss.*

HYPOXIDEÆ.

Hypóxis erécta.

BURMANNIEÆ.

Tripterélla capitàta,
cœrùlea.

HÆMODORACEÆ.

Dilàtris tinctòria.

AMARYLLIDEÆ.

Amaryllis Atamásco.
Pancràtium Mexicànum.

IRIDEÆ.

Iris Virgínica, *Herb. lin. sec: Torr.* (I. prismática, *Ph.*)
tripétala,
verna, (33)
versícolor.
Sisyrínchium Bermudiànum. (34)

ORCHIDEÆ.

Blètia aphylla. (35) (R. P.)
Cranìchis? multiflòra; (Ophrys pùbera, *Mx.*)
Cymbídium pulchéllum,
" var: graminifòlium. (36)
Habenària blephariglóttis,
ciliàris,
cristàta,
repens,
herbìola; (Orchis bidentàta, *Ell.*)
Listèra cordàta, *Mx. N.*
Neóttia cérnua,
tórtilis.
Pogònia divaricàta,
ophioglossoides.
Tipulària discolor.

JUNCEÆ.

Juncus acuminàtus; " var: of polycéphalus?" *Tor.*
acùtus,
dichótomus; non bulbòsus,
megacéphalus, *Nobis.* (37)
effùsus,
marginàtus; (biflorus, *Ell!*)
polycéphalus,
repens,
setàceus,
ténuis.
Lùzula campéstris.
Pleèa tenuifòlia.

MELANTHACEÆ.

Helònias angustifòlia,
dioíca.
Melànthium Virgínicum. (Virgínicum and hybridum *Ell?*) (Smithville).
Tofiéldia glabérrima ; (T. glabra, *N.*) (38)
pubens.
Zigadènus glabérrimus.

PONTEDEREÆ.

Pontedèria cordàta.

ASPHODELEÆ.

Alètris aùrea, (R. P.)
farinòsa.
Allium vineàle,
striàtum. *Wild onion.*
Convallària multiflòra.
Aspáragus officinàlis. *Asparagus.* (R. P.)

SMILACEÆ.

Gyròmia Virgínica.
Smilax alba,
bona nox,
hastàta,
lanceolàta,
laurifòlia,
pedunculàris,
pseudochìna,
rotundifòlia. *Bamboo.*
Tríllium pusíllum. (R. P.)
Uvulària sessilifòlia.

DIOSCOREÆ.

Dioscórea villòsa.

LILIACEÆ.

Erythrònium Americànum. (R. P.)
Lílium Catesbœi.
Yucca alöifòlia, *Spanish bayonet.*
filamentòsa, *Bear grass.*
gloriòsa. (Sea beach).

PALMÆ.

Chamærops palmétto. *Cabbage tree.* (Sea coast).

Sabal pùmila. *Dwarf palmetto.*

RESTIACEÆ.

Eriocaúlon decangulàre,
flavídulum ? (39)
villòsum.

TYPHACEÆ.

Spargànium ramòsum.
Typha latifòlia.

AROIDEÆ.

Acŏrus cálamus. *Sweet flag ; Calamus.*
Arum triphyllum. *Wild turnip. Indian do.*
Calàdium glaucum. *Spoon flower.*
Oróntium aquáticum.
Lecóntia Virgínica.

FLUVIALES.

Potamogèton gramíneum, (v. v. sine fl.)
lucens.
Zostèra marìna. (Sea shore).

JUNCAGINEÆ.

Tríglochin triándrum. (Brackish marshes).

PISTIACEÆ.

Lemna minor.

GRAMINEÆ.

Agróstis alba,
clandestìna,
Indica,
júncea,
trichópodes.
Alopecùrus geniculàtus.
Andropògon argentèus, *Ell !*
avenàceus, *Mx.* (A. ciliàtus, *Ell !*)
furcàtus,
macroúrus, *Broom grass.*
" var : glaucòpsis,
nutans,
scoparius,
tetrastàchyus, *Ell !*
vaginàtus, *Ell !* (40)
Virgínicus.

Anthoxánthum odoràtum, (Introduced).
Aristìda lanàta (41) *Poiret.* lanòsa, *Muhl.*
purpuráscens, *Poir.* (oligántha, *M.* stricta, *Ell!*)
stricta, *Mich.* *Wire grass.* (42)
virgàta, *Trinius.* (43)
Aulaxánthus ciliàtus.
Calamagróstis Canadénsis.
Cenchrus echinàtus, var: tribuloídes. *Sand spur.*
incértus. *Nobis.* (echinàtus, *Herb. Ell!*) (44)
Chloris petræa. (Brackish soil. Smithville).
Cinna arundinàcea.
Cynŏdon dáctylon.
Danthònia glumòsa.
Digitària filiformis,
paspaloídes,
sanguinàlis,
villòsa.
Eleusìne cruciàta,
Indica.
Elymus Virgínicus.
Eriánthus alopecuroídes.
Festùca duriúscula? (45) (Mink island).
elàtior, (do.)
fasciculàris,
myùrus,
nutans,
tenélla.
Gymnopògon racemòsum.
Hydrochlòa flùitans.
Kœléria Pennsylvánica.
Leérsia oryzoídes,
Virgínica.
Limnètis glabra, *Marsh grass.*
júncea, v: monógyna; (júncea, *Herb. Ell!*) (46)
polystàchya.
Mèlica speciòsa.
Miégia macrospérma. *Reed.*
Monócera aromática.
Muhlenbérgia diffùsa.
Orthopògon hirtéllum. (47) *(Bald head).*

Pánicum anceps,
carinàtum, *Tor. MS.* (Wálteri, *Ell!*) (48)
Pánicum crus-galli,
dichótomum ; and several var: (ciliàtum, *Ell?*)
proliferum, *Lk.* (geniculàtum, *E.*)
striàtum, *Lk.* (gibbum, *Ell!*)
hians, *Ell!*
híspidum,
nervòsum ; (scopàrium, *Ell?*)
nítidum ; several varieties.
rectum ; (depauperàtum, *M.*)
scabriúsculum, *Ell!* (49)
verrucòsum ; débile, *Ell!*
virgàtum,
víscidum, *Ell!*
Páspalum ciliatifòlium ; (setàceum, *Mx.* débile, *Mx.* dasyphyllum, *Ell!*)
dístichum,
floridànum,
læve,
præcox,
plicátulum, *Mx.* (purpuráscens, *Ell.*) (50)
vaginàtum.
Pennisètum glaucum,
Itálicum,
pungens. (R. P. *McRee.*)
Phálaris Americàna. *May grass.*
Phleum praténse. *W.* non *Ell!* (Rare. Introduced).
Poa ánnua,
autumnàlis, *Ell!* (51)
eragróstis,
hirsùta,
nervàta, (parviflòra, *Ell!*)
praténsis, (P. vìridis, *Ell.* angustifòlia, *Ell?*)
refrácta,
tenélla, (P. eragróstis, *Ell.*)
ténuis.
Stipa avenàcea.
Trichóchloa capillàris.
Trichòdium elàtum,

Trichòdium laxiflòrum.
Tripsacum dactyloides, *Gama grass.*
Trisétum palústre.
Uniola grácilis,
paniculàta, (Sandy beach).
spicàta. (Brackish marshes).
Uralépsis cornùta,
purpùrea.
Windsòria seslerioides.
Zizània aquàtica, *Wild oats.*
miliàcea.

CYPERACEÆ.

Carex acùta,
" var: sparsiflòra,
anceps, var: (tetánica, *Ell!* conoidea, *Ell!*)
Elliottii, *Tor.* (castànea, *Ell!* Baldwinia, *D!*)
bromoides,
crinìta,
flexuòsa,
fœnèa,
verrucòsa, *M. Ell!* (glaucéscens, *Ell!*)
granuláris,
Hálseyi, *Dewey*, (polymórpha, *Muhl.* bullàta, *Ell?*)
lacústris, W. (ripària, *Ell.*)
lupulina,
Muhlenbérgii,
multiflòra,
polytrichoides,
pseudocypèrus, (C. furcàtus, *Ell.*)
retrofléxa,
scirpoides; (stellulàta),
stipàta,
stramínea,
tentaculàta.
triceps,
vària,
viréscens,
xanthophysa, *Wahl.* (folliculàta, *Ell!*) (52)
Cypèrus compréssus,
flavéscens; var:

Cypèrus Gàtesii, *Tor.* in Ann. N. Y. Lyc., III.
leptos, *Schultes*; (grácilis, *M. Ell!*)
hydra, *Nut grass.*
mariscoides,
Michauxiànus, *Schultes.* (erythrorhizos, *Tor. H.*)
Nuttállii, *Tor.* ("C. flavéscens, *Ell?*" *Tor.*)
phymatòdes,
speciòsus,
stenolèpis, *Tor.*
strigòsus, "*of Herb. Muhl. non Ell.*" *Tor.*
tetrágonus, *Ell!*
vegètus, (5-6 ft. high).
virens, (4-5 ft. high).
Dichromèna latifòlia,
leucocéphala.
Dulíchium spathàceum.
Erióphorum Virgínicum.
Fuiréna squarròsa, (53) *Mich.*
Maríscus cylíndricus,
retrofràctus.
Psilocarya rhynchosporoides, *Tor.*
scirpoides, *Tor.* in Ann. N. Y. Lyc. III.
Rhynchóspora alba, (54)
Baldwinii,
caduca, *Ell!*
ciliàta,
cephalántha, (capitellàta, *Ell!*)
corniculàta, (laxa, *Vahl.*)
distans,
Ellióttii, (distans, *Ell!*)
fasciculàris,
filifòlia, *Tor.* in Ann. N. Y. Lyc. III.
inexpánsa,
megalocárpa, (pycnocárpa *G.*)
miliàcea, (sparsa, *Mx.*)
oligántha,
plumòsa.
Scirpus Americànus, *Sword grass.*
autumnàlis,
capitàtus,

Scirpus castáneus,
capillàris,
ciliatifòlius, *Ell.*
erióphorum,
ferrugíneus,
lacùstris,
marítimus,
palùstris,
proliferus, *Tor.* in Ann. N. Y. Lyc. III.
quadrangulàtus,
simplex, (55)
stenophyllus,
ténuis,
tuberculàtus.
Schœnus effùsus,
mariscoídes.
Sclèria hirtélla,
pauciflòra,
reticulàta,
triglomeràta.

FILICES.

Aspídium acrostichoides.
Asplénium ebenèum.
Onòclea sensíbilis.
Osmúnda cinnamòmea,
regàlis.
Polypòdium incànum.
Pteris aquilìna.
Woodwárdia onocleoìdes,
Virgínica.

LYCOPODIACEÆ.

Lycopòdium albídulum,
alopecuroídes,
rupéstre. (On arid sand hills).

REMARKS ON SEVERAL PLANTS IN THE CATALOGUE.

(1) *Cleòme pentaphylla*, *Cássia occidentàlis*, *Heliotròpium curassávicum*, *Datùra metel*, and *Tríbulus cis-*

toides, have sprung up near the ferry opposite Wilmington, and seem to have been introduced among ballast thrown out from vessels, as I do not know that any of them have ever been cultivated in the place. Being of spontaneous occurrence, and bidding fair to become naturalized, it was thought proper to include them in the enumeration, and to give descriptions of such as are not found in our Floras, for the benefit of those who may happen to meet with them. They are all communicated by Dr. McRee.

Datùra metel. "Leaves cordate, nearly entire, pubescent; Pericarps prickly, globose, nodding." Loudon. Flowers large, white. Plant much larger than D. stramònium. A native of Asia. I observe in Gibbes' Catalogue that this plant is naturalized about Columbia, S. C.

Tribulus cistoides. "Leaflets in 8 pairs, nearly equal." Loudon. Plant very pubescent, with yellow flowers. A native of South America.

Both these plants are cultivated in several gardens in the United States, perhaps extensively.

(2) *Laurus álbida.* Does not appear to me to present characters sufficiently distinct from L. sàssafras, its color being the principal one. Superior virtues are ascribed to the latter, probably because it is rarer than the white variety.

(3) *Laurus melissæfòlia.* Transplanted by Dr. McRee into his garden some years ago, from a near locality, but he has not since been able to find it.

(4) *Cócculus Carolìnus.* Menispérmum Caroliniànum, Mx.

Leaves ovate, cordate, sometimes 3 lobed, the younger acute, older obtuse, short, mucronate, smooth above, tomentose beneath.

"Stem woody, twining around shrubs and trees to the height of ten or fifteen feet, older ones green, mottled with brown, unarmed and pubescent. Racemes supra-axillary and terminal, longer or shorter than the leaves. Flowers small and inconspicuous: Masc; Fl. calyx 6 leaved, 3 outer ones much smaller, orbicular, concave, greenish-white; corol 6 petalled, succulent, petals erect, acute, narrow, orange yellow, each embracing a filament at the base; filament long as the corol, broad at base; anthers 4 lobed, yellow. Fem: Fl. have a roundish germ with 6 rectilineal short styles, producing a round drupe, enclosing a single flat, umbilicated or lunate seed, of a hard, stony texture. Sepals 6; Petals 6." *McRee in Lit.*

A part of Decandolle's description may be acceptable to those who have not his work.

"Pedunculi axillares; Masc: racemosi simplices petiolo vix breviores, interdum longiores, ab ipsa basi florifera; Fem: a basi tripartiti aut trifidi, ramulis brevibus 1 floris; sepala sex, extus 2-3 squamis munita; petala 6; Masc: stam. 6 petalis opposita; Fem: ovaria 3; baccæ 1-3, maturæ rubræ (Mich.); flores interdum hermaphroditi (Wend.) et staminum numero varii (Ph.).

Hab. In sylvis et sepibus Carolinæ (Lin.) Geo. et Flor. (Mx.) Car. to Flor. (Ph.)." D. C. Syst. Nat.

Found at Smithville in sandy soil among scrub oaks; more vigorous at Wilmington on the borders of damp shady woods; also at Rocky point by Dr. McRee. Flowers in June and July.

Sir J. E. Smith objects to the genus Cócculus, but I find it in Torrey's Appendix to Lindley, whence I suppose it will enter into the American Flora. Our plant has not the 6 capsules of Wendlándia, but in every other particular, it harmonizes so exactly with Wildenow's de-

scription, that I cannot but believe them the same. It is doubtless the Wendlándia of Pursh, and I presume of the Encyclopédie Methodique.

The miniature figure of Wendlándia sine fl. in Loudon's Encyclopedia represents our plant; also, Catesby Tab. 51. in fruit. He remarks that "it bears red berries about the bigness of small peas, which grow in clusters."

(5) *Lythrum linèare.* Besides the characters usually noticed as separating this plant from L. byssopifòlium, (L. lanceolàtum, *Ell!*) I observe, in all my specimens of the latter, that its peduncles are adnate to the stem as far as the bracteas, making them supra-axillary, which is not the case in L. lineàre.

(6) *Rhéxia angustifòlia.* Agrees minutely with a specimen collected at Savannah, Ga. sine fl. In plants collected at Wilmington the flowers are red.

(7) *Crotallària parviflòra.* A variety of C. sagittàlis? In Pursh's descriptions of these plants the only difference is in the leaves and stipules, both of which are very variable, even in the same individual. In one of my specimens, which I call C. parviflòra, some of the leaves are 3 inches long and 1-2 lines wide, others 2 inches long and 4 lines wide, the stipules half an inch long. They vary also in pubescence. I have never seen a specimen so hirsute as represented in Plukenet, Tab. 169, f. 6, referred to by Linnæus under C. sagittàlis.

C. lævigàtum, *Ph.* C. Purshii *D. C.* (Pluk. T. 277, f. 2, also referred to by Linnæus under C. sagittàlis) is probably no more than a smooth variety of the same. Its only distinguishing characters are "*glabrous*" and "*simple*," too unimportant to found a species upon, in this genus.

(8) ***Galáctia Macreèi.*** Stem twining, slender, pubes-

cent; leaves ternate, mostly oval, sometimes ovate and oblong ovate, obtuse, emarginate at each end, mucronate, smooth above, pubescent and paler beneath; peduncles elongated, six to twelve inches long, often filiform; flowers scattered on pedicels 1—2 lines long; calyx acuminate; legume pubescent, with a subulate point.

Allied to G. glabélla, but more slender and delicate in all its parts, with smaller flowers and longer peduncles, leaves proportionally broader and paler underneath. Specimens gathered in the upper districts of the State agree better with Nuttall's description of G. mollis, if indeed this be his plant, in being much more villous than the plant above described. I am induced to believe that this is Nuttall's G. mollis, principally from the fact that he found his plant confounded with G. glabélla in Muhlenberg's herbarium.

That Mr. Nuttall's G. pilòsa is the G. mollis, Mx. I think can admit of very little question.

(9) *Galèga ambìgua.* Stem decumbent, pubescent, angled; leaves five to six inches long, the petiole naked about a third of its length; leaflets four to seven pairs, with a terminal one, truly cuneate, obovate or oblong, truncately obtuse, younger ones rounded, emarginate, with a short, rigid mucro, smooth above, pubescent beneath, very strongly veined, and somewhat ribbed beneath with red veins; Peduncles large, flattened, somewhat two edged, about the length of the leaves, partial ones three to four lines long; Legume with a short, but thick, whitish pubescence, mostly falcate, ten to twelve seeded.

Hab. sandy woods. Flowers in June.

Repeated examinations of this plant for two seasons have led me to the conclusion, that it is distinct from the following. It is not impossible, that in other localities, it

may be found to vary in the form and length of its peduncle, but I have never found it varying from the characters given above.

(10) *Galèga hispídula*, Mx. G. grácilis, Nutt.

Erect or decumbent; stem nearly round, pubescent. Leaves 3—5 inches long, subsessile, distant; leaflets 6—10 pairs with an odd one, oblong elliptic, very acute and mucronate, 5—10 lines long, 1—4 wide, smooth above, slightly pubescent beneath; peduncles 2—3 times longer than the leaves, partial ones slender; legumes hispid, nearly straight, 8—10 seeded.

Hab. like the preceding. Flowers in June.

Every way more slender and less pubescent than G. ambígua, legume straighter and more hispid. The plants are readily distinguished at sight.

This is doubtless the G. grácilis, Nutt. though that plant is described with a peduncle about as long as the leaves, the only character I can discover in Mr. Nuttall's description upon which he could have separated it from G. hispídula, Mx. For instead of differing "in too many particulars," the descriptions may be easily reconciled. The "foliolis parvulis" of Michaux' description cannot apply to any other of our species.

(11) *Galèga paucifòlia*, N. Leaflets usually 6 pairs, 10—15 lines long, 5—6 broad. Peduncles 2—3 times longer than the leaves ("about the length of the leaves" Nutt.); calyx larger, and with longer segments than the other species; legume nearly straight, about ten seeded. Well described by Elliott. The number of its leaves varies, according to its situation as to dampness, shade, &c.; no dependence can be put on the length of the peduncle in this genus.

De Candolle has described a G. hispida from Carolina,

which is evidently G. villòsa, Mx. I am uncertain whether my G. ambígua is not G. paucifòlia, N. but it cannot be G. villòsa, Mx.

Galèga chrysophylla, Ph. I collected a single specimen of this at Savannah, sine fl. one of the leaves of which has *seven* leaflets.

(12) *Hedysarum sessilifòlium*, var : angustifòlium. Tor.

Stem 2—3 feet high, pubescent, scabrous, particularly in the panicle; leaves subsessile; leaflets linear, 12—18 lines long, 2—3 wide, minutely pubescent, but smooth; stipules subulate; panicle terminal, large, expanding, branches simple. Loment 2—3 jointed, very hispid.

Hab. sandy shaded soils.

(13) *Acalypha Caroliniàna*. Not having seen Walter's description, I do not know if this is his plant, though it is the one passing among botanists under the above name, and is that of the Flora Céstrica. It is not the A. Caroliniàna of Elliott.

A. Virginica is the same with Elliott's, and Bigelow's, and is that of Linnæus secund. Pluk. Phyt. T. 99, f. 4.

(14) *Dionæa muscípula*. This plant is found as far north as Newbern N. C. and from the mouth of Cape Fear river nearly to Fayetteville. Elliott says, on the authority of Gen. Pinckney, that it grows along the lower branches of the Santee in S. Carolina. Dr. Bachman has received it from Georgetown, S. C.; and Mr. Audubon informed me, with the plant before us, that he has seen it in Florida, of enormous size. I think it not improbable, therefore, that it inhabits the savannahs, more or less abundantly, from the latter place to Newbern. It is found in great abundance for many miles around Wilmington, in every direction. I venture a short notice of

this interesting plant, as I am not aware that any popular description of it has been published in this country.

The leaf, which is the only curious part, springs from the root, spreading upon the ground, or at a little elevation above it. It is composed of a petiole or stem with broad margins, like the leaf of the orange tree, two to four inches long, which at the end, suddenly expands into a thick and somewhat rigid leaf, the two sides of which are semicircular, about two thirds of an inch across, and fringed around their edges with somewhat rigid ciliæ or long hairs like eyelashes. It is very aptly compared to two upper eyelids joined at their bases. Each side of the leaf is a little concave on the inner side, where are placed three delicate, hairlike organs, in such an order, that an insect can hardly traverse it, without interfering with one of them, when the two sides suddenly collapse and enclose the prey with a force surpassing an insect's efforts to escape. The fringe or hairs of the opposite sides of the leaf interlace, like the fingers of the two hands clasped together. The sensitiveness resides only in these hairlike processes on the inside, as the leaf may be touched or pressed in any other part, without sensible effects. The little prisoner is not crushed and suddenly destroyed, as is sometimes supposed; for I have often liberated captive flies and spiders, which sped away as fast as fear or joy could hasten them. At other times I have found them enveloped in a fluid of a mucilaginous consistence, which seems to act as a solvent, the insects being more or less consumed in it. This circumstance has suggested the possibility of their being made subservient to the nourishment of the plant, through an apparatus of absorbent vessels in the leaves. But as I have not examined sufficiently to pronounce on the universality of this

result, it will require further observation and experiment on the spot, to ascertain its nature and importance. It is not to be supposed, however, that such food is necessary to the existence of the plant, but like compost, may increase its growth and vigor. But however obscure and uncertain may be the final purpose of such a singular organization, if it were a problem to construct a plant with reference to entrapping insects, I cannot conceive of a form and organization better adapted to secure that end than are found in the Dionæa muscipula. I therefore deem it no credulous inference, that its leaves are constructed for that specific object, whether insects subserve the purpose of nourishment to the plant or not. It is no objection to this view that they are subject to blind accident, and sometimes close upon straws as well as insects. It would be a curious vegetable indeed, that had a faculty of distinguishing bodies, and recoiled at the touch of one, while it quietly submitted to violence from another. Such capricious sensitiveness is not a property of the vegetable kingdom. The spider's net is spread to ensnare flies, yet it catches whatever falls upon it; and the ant lion is roused from his hiding place by the fall of a pebble; so much are insects also, subject to the blindness of accident. Therefore the web of the one, and the pitfall of the other are not designed to catch insects! Nor is it in point to refer to other plants of entirely different structure and habit which sometimes entangle and imprison insects. As well might we reason against a spider's web, because a fly is drowned in a honey pot; or against a steel trap because some poor animal has lost its life in a cider barrel.

(15) *Arenària diffùsa*, Ell! Stellària elongàta, *N.* I formerly described this plant under Nuttall's name. I have since discovered it with petals, which are linear,

obtuse, *undivided*, equalling the calyx, and find it to be an Arenaria. The petals are generally wanting, and I have never found it with more than three. Elliott's account of the size of the petals differs from mine, but the plant in his Herbarium is the same with mine. There is no specimen of Stellària prostràta in Herb. Ell.

(16) *Ilex vomitòria.* The popular designation of this shrub is *Yopon*, a name of Indian origin, which I give as I have heard it pronounced. I have never seen the word in print, except in an amusing relic of the last century, called a Natural History of N. Carolina. The writer, one John Brickell, M. D., spells it Yaupan, and saith it is the plant "whereof the tea is made, so very much in request among both the Indians and the Christians." It is still used, and is said to make, if well cured, a very pleasant beverage. Its specific name indicates no very agreeable properties.

(17) *Andrómeda paniculàta.* The plant so called by botanists; but the A. ligustrìna, Ell. and Vaccínium ligustrìnum Lin. A. ligustrìna, Eat. Man. is, I suppose, the same. The following is a description of a plant closely allied to the above, and perhaps no more than a variety. The flowers I have not seen.

Ten or twelve feet high, young branches red and smooth; leaves ovate lanceolate, acute, coriaceous, glabrous, minutely serrulate, revolute, dark green and shining above, paler, somewhat ferruginous and furfuraceous beneath; panicle long, branches short, with two or three small leaves; calyx segments ovate, acute; Accessary valvules very distinct. Capsule ovate, obtuse, hardly angled.

(18) *Kálmia cuneàta.* This plant does not properly fall within the range of the catalogue, but I have introduced it because a rare species, of which few localities

are known. It was detected by Rev. T. P. Hunt about thirty miles N: E. of Wilmington, I think near Beattie's Mills. I am indebted to the same gentleman for several other species of rare occurrence.

(19) *Oxicóccus macrocárpus.* Introduced on the authority of popular report. I have never visited the locality where it is said to grow.

(20) *Liàtris tomentòsa.* (L. Walteri, *Ell!*) Stem two feet high, simple, tomentose; leaves at the base of the stem cuneate lanceolate, the lowest with a long attenuated base, but dilating at their junction with the stem; upper leaves lanceolate, closely sessile, all terminated by a whitish gland; flowers in a terminal corymb, branches 2—4 flowered, peduncles about an inch long, thickening upward; calyx about 20 flowered, scales acute, tomentose. Hab. savannahs. Flowers in September.

This is the true L. tomentòsa, Mx. Elliott's plant of this name is the L. corymbòsa, Nutt. which, though closely allied, appears to be a distinct species.

(21) *Si'phium terebinthinàceum;* var: *sinuàtum.* Stem naked, 4—6 ft. high, smooth and glaucous. Leaves radical, pinnatifid, segments mostly toothed, somewhat scabrous, having scattered hairs, margin very rough; petioles 3—6 inches long, smooth. On the stem are three or four distant leaflets 2—3 lines long. Flowers small, in corymbose panicles; outer scales of the involucrum roundish oval, inner ones longer, obtuse, minutely ciliate; florets of the ray 4—6, irregularly inserted, half an inch long, twice as long as the involucrum; of the disk numerous, having exserted, clavate, simple styles, pubescent at the summit; seeds winged, obovate, emarginate, two toothed when young, those of the disk abortive. Chaff of the receptacle shorter than the florets of the ray, obtuse, pubescent at the summit.

Hab. sandy, open woods. Flowers in June?

I have traced this plant through the lower part of this State into Virginia and S. Carolina, and find it constantly preserving its character. The S. terebinthinàceum with undivided leaves does not appear within one hundred miles of the sea coast, but is abundant in the upper districts. In company with it is found a variety with divided leaves like that above described, differing from it only in its more perfect flowers and larger size. I can discover no characters in these plants sufficient to constitute separate species. The outline of the leaves is the same in all. In other parts of the plants I can see no difference.

(22) *Podostigma pubéscens.* Usually described as having *linear* leaves, but I have not often found it with that character. The lower pair are always spatulate or obovate, and only the uppermost ones linear. I have a specimen a foot and a half high, with leaves more than two inches long, and over half an inch wide. This is above the common size of the plant, but its proportions are preserved.

(23) *Gelsèmium sempervírens.* This beautiful climber is possessed of very deleterious properties. Its odor, though very agreeable, sometimes induces headache, particularly in a close room, and death has ensued from sucking the flowers. A negro empiric administered a portion of the root to two patients in Wilmington, one of whom soon died under its effects, and the other was only saved by the timely aid of a physician.

(24) *Gentiàna Catesbœi.* This species is readily distinguished from G. saponària, by the long linear segments of the calyx and its open corolla. It is finely delineated in Bigelow's Medical Botany. Tab. 70. of Catesby's Carolina, represents it.

(25) *Convólvulus sagittifòlius*, Mx. non Smith. Ipomæa sagittifòlia, Ker. Icon. Catesby Nat. Hist. Car. vol. i. Tab. 35. Quoted under C. arvénsis Eat. Man.!

All over very smooth. Leaves sagittate, oblong and linear; auricles often expanding into a hastate form, acuminate. Peduncles shorter than the petioles, with the bractes above the middle; flowers rose colored, large as C. panduràtus. Calyx leaves rounded, mucronate. Flowers in August.

Grows on the borders of saline marshes at Smithville, prostrate, or twining on other plants. I have met with it in one instance in woods, half a mile from the tide water, where other saline plants are not found.

Michaux, under this plant, refers to Pluk. T. 85, f. 3, (referred to by Linnæus under C. Wheèleri,) which has an evident resemblance to it; but the flower is too small, not so open, the border more entire? calyx not mucronate, auricles of the leaves obtuse, and the leaves appear to be slightly peltate. Ipomæa sagittàta, Poir. is referred to the same figure in Plukenet, and C. Wheèleri quoted as a synonyme. That author expresses a doubt whether Michaux's plant is the same, and leaves it undetermined, on account of a deficiency in the description. But Poiret's plant being an Ipomæa, it is to be inferred, that he found a single stigma, and the capsule is 5 valved. Michaux' plant has two globose stigmas and a capsule 2-3 valved according to Mr. Elliott.

Smith has a C. sagittifòlius in the Flor. Græc. of later date than Michaux' name.

(26) *Convólvulus Pickeríngii.* Prostrate, villous; Leaves linear, 12-15 lines long, one line wide, obtuse, not mucronate; Peduncles longer than the leaves, 3 flowered; Flowers aggregate at the summit, two of

them pedicelled in the axils of leaves that exceed the flowers, with linear bracts at the base of the calyx which equal the flowers, the other sessile and without bracts. The upper peduncles become 2 and 1 flowered. Calyx very villous. Corol hairy, white; style 2 cleft a little below the summit, the parts unequal; Stigmas capitate. Hab. sandy barrens. Flowers June.

Allied to C. patens, but clearly distinct. First noticed by Dr. Pickering, to whom it is dedicated.

(27) *Ipomæa trichocárpa*. Differs from Elliott's in a few particulars. Peduncles not half the length of the petioles, 1 flowered; Bracteas about the middle of the peduncle; Corol near an inch long, pink or white; Filaments half the length of the corol, style a little longer. Hab. rice fields. Flowers July.

(28) *Chelòne Lyòni*. Introduced on the authority of Nuttall, as I know of no other who has seen it. Had I not so much confidence in the general accuracy of his observation, I should mistrust he had mistaken the purple variety of C. glabra for it. I have never seen it except on the high mountains of this State.

(29) *Gratìola acuminàta*. Stem 12-18 inches high, erect, square, angles slightly winged, branching, and with the whole plant smooth; Leaves opposite, lanceolate, wedge attenuate at base; the lowest oblong, revolute at the margin, obtuse, the upper half serrate; Flowers numerous, opposite, axillary; Peduncles an inch long, slender, twice the length of the leaves, standing between two small linear leafets in the axils; Calyx leaves 5, linear or linear-lanceolate, equalling the tube of the corol, one a little larger and broader than the rest, nerved; Bracts none or deciduous; Capsule ovate, somewhat acute; Stamens 4, all fertile. I describe from dried

specimens, and cannot tell the color of the flower. Plant becomes black by drying.

This is Elliott's plant, but I do not know that it is described by any other author. It will doubtless be removed from this genus. In Leconte's Monograph of this genus in the Annals of the New York Lyceum, this plant is said to be the Herpéstis cuneifòlia, but without offering any evidence. See next note.

(30) *Herpéstis cuneifòlia.* This is also Mr. Elliott's plant, and is referred by Leconte to H. Brownei. This author has some evidence of error in Elliott's references, unknown to myself, or he must have overlooked some important facts in the case. The plant appears to coincide minutely with Michaux' description, while the Gratiòla acuminàta does not, and has a different habitat. The H. Brownei, too, is not found in the eastern district, but was discovered by Nuttall at New Orleans, and does not correspond with the present plant.

Eaton quotes Pursh for H. Brownei, but I do not find the plant in his Flora. Nuttall has a mark of discovery with it, in his Catalogue, though he gives no description.

(31) *Macbrìdea pulchra.* Stem hairy and slightly scabrous; Leaves denticulate, not serrate, the upper ones entire, nerves hairy, both sides covered with glandular dots; Whorls 5-10 flowered; Bracteas obtuse; Large segment of the calyx deeply emarginate; Style equalling the longer stamens. This differs somewhat from Elliott's description, but the plants are not distinct.

For numerous specimens I am indebted to Dr. McRee, who collected them on the causeway leading from Potter's rice field.

(32) *Mentha rotundifòlia.* Hoary, spikes oblong, interrupted, somewhat hairy. Leaves roundish, rugose,

crenate, sessile. Bracteas lanceolate. Vid. Smith's Eng. Flora. Unpleasantly scented.

Found in Green's lower rice field, and elsewhere—hardly naturalized? Probably introduced by the early English settlers.

(33) *Iris verna.* The plant described by Nuttall. Is it I. cristàta, Hort. Kew.? The description of Pursh appears to have been made from young specimens.

(34) *Sisyrínchium Bermudiànum.* Elliott's plant doubtless, but I can discover no difference between it and S. anceps of the Northern States.

(35) *Blètia aphylla.* "Superior every way to B. Tankervíllii, with the odor of Iris verna." *McRee in Lit.*

(36) *Cymbìdium graminifòlium.* If size, different shaped leaves, and different period of flowering can constitute specific character, this is distinct from the C. pulchéllum. The narrow leaved one, flowers the last of April, the other about the first of June, when the former has nearly or quite disappeared.

(37) *Juncus megacéphalus.* J. echinàtus, E. non M.

Stem 3 feet high, leafy, smooth, and like the leaves, interrupted by valves. Leaves terete, acute; Sheath 3-4 inches long, open; Stipule bifid; Panicle terminal, dichotomously branched; Heads 10-15, large, globose, 70-90 flowered, one sessile in each fork of the panicle; Bracts (exterior calyx, M.) mucronate; Calyx valves equal in length, linear, the exterior broadest, pungently acute, shorter than the acuminate capsule.

Hab. rice fields. Flowers June.

It is difficult to find characters which will clearly distinguish this plant from J. polycéphalus, except in the large, globose heads, which give it an aspect very different

from any variety of J. polycéphalus I have ever seen. The plant is more robust, and the florets considerably larger.

(38) *Tofieldia glabérrima.* This plant is abundant in the savannahs around Wilmington, where Nuttall discovered his T. glabra, which offers a presumption of their being the same species; and Mr. N., in Vol. V. of the American Academy, suggests, that they are probably not distinct. If identical, and I have no doubt they are, he has described from specimens such as I have not seen, as his description is inapplicable to our plant.

T. glabra, N.	T. glabérrima, Ell.
Scape (?) 8-10 inches high; Spike 10-15 lines long; Flowers 30 or more; Bracts extremely minute; Filaments equal to the petals and germ; Styles none; Capsules 3, distinct to the base.	Stem 18-30 inches high; Spike 2-3 inches long; Flowers 40-60; Bracts half as long as the pedicels; Filaments shorter than the petals and germ; Styles short; Capsules divaricate at the summit.

(39) *Eriocáulon flavidulum?* Stem pubescent, 5 grooved; Leaves short, 1-2 inches long; Scales of the involucrum oblong oval, obtuse, lucid.

This appears to be Michaux' plant, but I am not certain that it is Elliott's.

(40) *Andropògon vaginàtus*, Ell! I have a variety of this plant with the spikes 4 parted, like A. tetrastàchyus, and the peduncles much exserted like A. argenteus. The peduncles, however, are not uncommonly exserted in this species, though Elliott represents them as enclosed.

(41) *Aristìda lanàta*, Poir. "Leaves very long,

scabrous; sheaths woolly; branches of the panicle elongated, subverticillate; peduncle pilose at the base, awns subequal." Poir.

Leaves sheathing the base of the stem, 12-15 inches long, flat, rigid, scabrous above, attenuated to a point; Lower valve of the calyx much the longest, the interior about equalling the corol, narrower; Intermediate awn more than a third longer than the lateral, and more than twice the length of the corol.

"Awns as long as the corolla, the intermediate somewhat the longest." Ell.

"Awns nearly equal, about twice as long as the flower." Poiret.

"Intermediate awn 2-3 times longest." Tor. in Lit.

The tendency of this plant to vary in the length and proportion of its awns is fully established by the above observations.

I have a variety of this plant, with a panicle more slender, destitute of the tomentum, and the interior valve of the calyx apparently narrower.

(42) *Aristìda strictà*, Mx. Culm 2 feet high, round and smooth, leafy; Leaves convolute, pubescent on the margin, lower ones 12-18 inches long, stiff and wiry; Panicle appressed; Calyx longer than the corol, valves unequal and subequal, awned, lower one shortest; Corol distinctly pedicellate, pubescent at the base; Awns expanding, intermediate one a fourth longest, and about twice the length of the corol.

Hab. sandy barrens, where it appears in scattered tussocks a foot thick, and very compact, with its matted, fibrous roots, sending up numerous erect, wiry, filiform leaves and a few stems. Well known under the name of *wire grass*. This plant is abundant in the lower districts

of S. Carolina; but there is no specimen of it in Elliott's Herbarium.

Aristìda stricta, Muhl. Gram. appears to be A. spiciformis, Ell. It may be proper to add that A. grácilis, Ell. is A. longespìca, Poir.

(43) *Aristìda virgàta*, Trin. Culm 2-4 feet high, leafy to half its height, simple, glabrous, slightly compressed; Leaves 5-8 inches long, linear, flat, 1-2 lines wide, scabrous on the upper surface, attenuated to a point; Sheaths short, smooth, striate; Panicle appressed; Calyx longer than the corol, valves acute, subequal, the lower shortest by position, scabrous on the keel; Awns expanding, the middle one a third or one half longest, and three times as long as the corol.

The sides of the calyx valves split with age, which gives them the appearance of being 3 awned. Flowers twice as large as A. stricta, to which this has a general resemblance, but does not grow in tufts like that. A. purpurascens and A. lanòsa have the *upper* valve of the calyx *shortest*; in A. stricta and A. virgàta it is longest.

Hab. sandy barrens. Flowers August and September.

I have had this in manuscript for two years, when, just on the eve of its publication, Dr. Torrey has found it already taken up by Trinius, Diss. Gram. &c. who received it from North America.

(44) *Cenchrus incértus*. Stem 2-3 feet high, branching at every joint, erect, or decumbent at base, rooting from the lower joints; Sheaths open, longer than the joints; Spikes exceeding the sheaths, 10-20 flowered; Involucres pubescent, about 10 spined, containing 2 spikelets; Spikelets 2 flowered, one hermaphrodite, the other staminate; Calyx glumes unequal, shorter than the

corol, the exterior half the size of the other, very acute, nerveless except the midrib, the interior 6 nerved (5-7 nerved?); Sterile flower of two nearly equal valves, acute, pubescent under a lens, exterior 5 nerved, interior 2 nerved, enclosing three filaments; valves of the perfect flower rigid, outer one longest, enclosing the inner, obscurely 5 nerved, inner one enclosing the seed, obscurely 3 nerved; Styles 2; seed obovate, obtuse.

In a careful comparison of this plant with C. echinàtus and tribulòides I find no difference in their flowers. The involucrum is less spiny, naked at the base, spines shorter, and the plant more robust. I found it preserving its character through two seasons, and for distinction's sake have imposed a trivial name upon it, but am far from being certain that it is more than a variety of C. echinàtus.

Found at Smithville in cultivated fields. It approaches nearer to C. tribulòides than C. echinàtus.

(45) *Festùca duriúscula?* Stem $2\frac{1}{2}$ feet high, round, very smooth; Lower leaves 18 inches long, 1-2 lines wide, carinate, slightly scabrous, and with elevated nerves on the upper surface; Sheaths not half as long as the joints; Panicle erect, secund, with short, racemose branches; Spikelets linear lanceolate, compressed, 9-12 flowered; Calyx unequal; Exterior valve of the corol 3 nerved, acute or with a short awn, interior valve emarginate.

Flowers May. Found on Mink Island, Masonborough with F. elàtior. Neither of them are found on the main, to my knowledge.

(46) *Limnètis júncea*, var: monógyna. Stem about 3 feet high; Leaves 8-12 inches long; Spikes 3-6, about their length distant from each other; Style 2 cleft like L. cynosuróides. In every other particular agreeing

exactly with L. júncea. Grows abundantly on the sandy beach at the mouth of Cape Fear river. L. júncea has not been found there.

(47) *Orthopògon hirtéllum.* Calyx 3-4 valved, usually 3, the exterior shortest, with an awn 3 times as long as the flower, second valve half the length of the corol, with an awn equal to the valve, interior one equal to the corol and merely mucronate; valves all hairy. Found near the Light House.

(48) *Pánicum carinàtum, Tor. MS.* P. Walteri, *Ell!* Stem 3 feet high, round, smooth, hollow; Leaves rigid, glabrous, strongly nerved, 8-10 inches long; Panicle with one-sided spikes, appressed, when old expanding, buds 3-4 flowered; Cor; valves acute, carinate, compressed at the summit, keel ciliate at the tip; exterior valve half the length of the others, ovate, 3 nerved; the other two subequal, lanceolate, 5 nerved; second valve enclosing the germ: flower; third valve forming with the neutral valve a staminiferous, triandrous, floret.

In the form of its flowers this is closely allied to P. hians.

Hab. swamps. Flowers July, August.

(49) *Pánicum scabriúsculum, Ell!* Leaves 6-18 inches long; Flowers ovate, acute, glabrous; accessory valve of the calyx small; proper valves nerved, acute; neutral valve half the length of the corol, lanceolate; corol oval, smaller than the calyx;—varies in the pubescence of stem, sheaths, and leaves.

Hab. Rice fields; flowers June, July.

(50) *Páspalum plicátulum.* The flat valve of the calyx is marked by a longitudinal and a transverse fold in the form of a cross. This character disappears in drying, and is clearly accidental, though observed in numerous instances.

Under P. setàceum is a slender variety, presenting the characters of P. débile, Mx. found on the sandy sea coast, but evidently a stinted P. setàceum.

Is P. setàceum more than a variety of P. ciliatifòlium?

(51) *Poa autumnàlis*, Ell. Very distinct, it appears to me, from P. pungens, Tor. Culm 1-2 feet high, very slender; Leaves 6-10 inches long, 1 line broad, flat, smooth except on the margin towards the summit, 3-5 nerved, slightly glaucous beneath; the upper ones distant and shorter; Sheaths short, smooth; Stipules membranous and lacerate, sometimes wanting; Panicle 3-4 inches long, slender, branches solitary or the lowest in pairs, erect, scabrous, simply racemed, rarely subdivided; Spikelets 1-3 near the ends of the branches, pedicelled, 3-5 flowered; Florets loose, tomentose at base; Calyx glumes acutish, shorter than a floret, superior one a third longest, 3 nerved, with a membranous margin; Corol lanceolate, acute, lower valve longest, 5 nerved, acutely carinated, keel ciliated with a conspicuous white pubescence at the base, upper valve membranaceous, 2 nerved.

Hab. damp woods. Fl. May. Collected also in South Carolina, and seen in the herbarium of the Society, in a collection made around Charleston, S. C. by B. D. Greene, Esq.

The panicle and flowers are similar to those of P. pungens, but smaller, and the whole plant more delicate and slender. The peculiar leaves of P. pungens, if invariable, are alone a sufficient distinction.

(52) *Carex xanthophysa*. Specimens of this plant collected at Wilmington and in South Carolina differ from the northern plant in being smaller, the scales only half as long as the fruit and without the filiform point.

(53) ***Fuirèna squarròsa,*** **Mx.** Stem 12-20 inches high, angled, furrowed, hairy at the summit, whole plant very hairy and pubescent when young; Leaves 2-4 inches long, ciliate, pubescent above, smooth beneath; Sheaths short, closed, smooth, the lowest leafless; Scales of the ament obovate, hairy or pubescent, with 3 central combined nerves extending into an awn from below the summit, which is shorter than the scale, ciliate and recurved; Setæ 3, alternating with the involucels, about as long as the pedicel of the seed; Involucels pedicellate, oval or oblong, unawned, sometimes abruptly acute, longer than the seed; Stamens twice as long as the involucels; Seed triangular, pedicelled.

Hab. open swamps. Flowers July—September.

This is certainly the aspect of the plant in which Michaux has described it. "Paleis pistillinis petiolato-spathulatis, *muticis*; interjectis totidem setulis *brevibus*," Mx. I have not seen it described thus any where else, except in the Encyc. Methodique, "les écailles de la corolle oblongues, sans arête." I have been disposed to consider the plant described by other botanists under this name a distinct species. Specimens collected in Massachusetts differ as follows: Setæ equalling the involucels, hispid; Involucels lanceolate, acuminated into a long awn, acute at base, twice as long as the seed; Stamens longer than the involucels, equal to the style with the stigmas. This is F. hispida, *Ell!* Still the plant is so variously described by authors as to excite a doubt if it is not subject to considerable variety. Our plant, I have never found having an awned involucel, in any stage of its growth.

(54) ***Rhynchospòra triflòra.*** Stem 10-18 inches high, setaceous, triangular, leafy at base, glabrous; Leaves

setaceous, erect, 5-6 inches long, triangular, channeled on the inside towards the base; Sheath about an inch long, closed; Panicle terminal, with 1-3 pedicelled spikelets, subtended by an erect leaf about an inch long, which, with a ferruginous, lanceolate bract, resembling the glumes, encloses the bases of the peduncles; Glumes 6-7, ovate, outer ones smallest and mucronate, containing two flowers, one of them abortive; Bristles 6, unequal, shorter than the seed, plumose, naked at the summit; Stamens 3, as long as the style; Style 3-4 times longer than the seed; Seed oval, rugose; Tubercle short, conic.

Hab. wet savannahs. Flowers April, May.

Intermediate between R. rariflòra and plumòsa. Closely allied to the former, judging from the description, but differing at least by the plumose setæ, in which it resembles the latter.

(55) *Scirpus simplex.* Stem triangular; Spikes with the aspect of S. tuberculàtus; Seed longitudinally striate and regularly punctate between the ridges, presenting a beautiful appearance under a lens. Bristles 6.

To these I now add the following new species, not mentioned in the Catalogue.

(56) *Amórpha cyanostàchya.* Leaflets oblong, emarginate, obtuse at each end, smooth; Rachis pubescent; Flowers subsessile; Calyx with the margin villous, two of the teeth short, obtuse, and three acuminate, subaristate, nearly equal; Vexillum obcordate, more than twice the length of the calyx.

Obs. Leaflets 10-15 pairs, 6-9 lines long, 3-4 wide, glandular, occupying the petiole nearly to the stem. Flowers blue, darker at the summit of the vexillum, and becoming lighter towards the base. This species is dis-

tinguished from A. furticosa, by its different colored flowers; shorter pedicels; spikes shorter, more pubescent, and less attenuated; a calyx at base; shorter stamens: and smaller and more numerous leaflets.

ART. IX.—UPON THE ECONOMY OF SOME AMERICAN SPECIES OF HISPA. By T. W. Harris, M. D. Read Feb. 18, 1835.

It is the peculiar province of the naturalist to investigate the habits and economy of animals. The discovery of these does infinitely more towards the advancement of a science founded wholly upon observation, than the mere description of new species. This is more especially true in entomology, in which, such has been the cupidity and vanity of collectors, that the legitimate objects of the science, the habits, uses, and stations of insects in the system of nature, have been neglected for the acquisition and description of species, the indication of new genera, and the coining of an immense number of new and pedantic terms, in a science whose nomenclature is already overburdened. If the foregoing remarks be founded in fact, no apology will be necessary for the appearance of the present paper in the pages of this journal.

Hitherto the larva and pupa of Hispa, and their manner of living, have been unknown; after they have been described, it will remain for the makers of systems to assign to this genus of insects its proper place.

Mr. Kirby, in treating of that fanciful theory abounding in hard names, the supposed analogy or correspondence between the forms of larvæ and those of other ani-

mals, says that "Cassida seems to belong to a peculiar type;" that "at present he knows of no analogous form amongst the apterous tribes, and must therefore leave this without a denomination;" and that "perhaps the larva of Hispa or Alurnus, when known, will throw light upon this subject."* The larva of Hispa has not the most distant resemblance to that of Cassida, or to any other now known among the genera with which it has been artificially associated. So far as mere form is concerned, it is related to the wood-eating larvæ of the Capricorn beetles, particularly of the genus Callidium; while its habits are those of the leaf-mining caterpillars of certain moths.

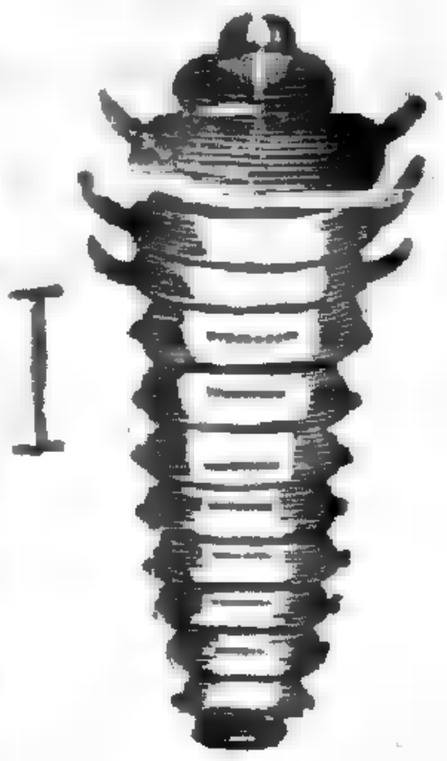
Towards the end of July, 1820, I perceived upon an apple-tree several leaves which had large brownish spots upon them. These spots were not occasioned by disease, but by the destruction of the internal pulpy substance or parenchyma of the leaf, while the cuticle or skin, both above and below, remained entire. When a leaf was held between the eye and the light, there could be seen, through the discolored but semi-transparent cuticle, a little whitish flattened grub, which had devoured the parenchyma, and lay enclosed in the cavity thus formed between the two layers of skin. On being disturbed, this insect moved with a wriggling motion from one part of its retreat to another, backwards quite as readily as forwards. The shape of the spots was irregular, and they varied somewhat in size; but on an average each one might have been about an inch square. Several leaves containing larvæ, among which was one that had already passed into the pupa or chrysalis state, were shut

* Kirby & Spence, Introduction to Entomology, III. p. 166.

up in a box. Soon afterwards the insects passed through their transformation, and, leaving the cast-off pupa-skin nearly entire, within the cavities which they had occupied, they made irregular perforations through the dried cuticle, and came out upon the surface of the leaves. The insects, thus disclosed in the perfect or winged state, proved to be little beetles belonging to the genus Hispa; but as they were subsequently lost, it is not in my power positively to identify them with any of the species now in my collection.

In June, 1827, I discovered a leaf of the poplar-tree which contained a small dead larva, very closely resembling that of the Hispa of the apple-tree; but it was not till the 17th of July, 1829, that an opportunity of observing in detail the habits of these insects again presented itself. Upon this day I found larvæ, like those of the apple-tree, feeding, in the same manner, upon the parenchyma of the leaves of the white oak. Each one of these insects, when fully grown, measured from 20 to 27 hundredths of an inch in length. [Fig.1.]

[Fig. 1.]



The head was horny and of a brownish black color; the body, consisting of 11 segments, flattened and broad near the head, gradually narrower behind, was yellowish white, except the greater part of the upper side of the first segment, a spot in the middle of the under side of the same, and the upper part of the tip of the last segment, which were dark brown or nearly black. The head was small in proportion to the size of the first segment, and partially drawn within it. Minute antennæ were perceptible, and the jaws were short, strong, somewhat triangular, and simple, or scarcely in-

dented within. The legs were six, short, and of a brown color, a pair beneath the first, second, and third segments. The other segments were dilated at the sides, and terminated by small brown tubercles. Above these lateral mammillary projections was a series of 7 smaller ones each bearing a spiracle or aperture for respiration. The second segment, at the sides, near its anterior edge, was furnished with two large spiracles, and two, still larger, were situated upon the upper part of the terminal segment, near its tip. The fourth and remaining segments, except the last, had, both above and below, a transverse callous spot, covered with minute projections like a rasp, which appeared to be designed to aid the insect in its motions.

On the fifth of August five of these larvæ were transformed to pupæ, four of which assumed the perfect state on the eleventh, and the fifth on the twelfth of the same month; from which it appears that the pupa state lasts only between six and seven days.

The color of the pupa was of a yellowish white, but, as it approached the period of its final change, the body became reddish, and the wing-sheaths brown. Its body was rather shorter and broader than that of the larva; the abdominal segments were tuberculated at the sides, and were furnished, both above and beneath, in the centre of each segment, with a transverse series of elevations, much larger and more prominent than those of the larva, and tipped with short bristles. The sheaths of the wings and legs were folded on the breast, and those of the antennæ under the lateral margins of the first and second segments. When disturbed, the pupa moved about in its habitation, by means of the rasps upon its body which served instead of feet.

This insect, in its perfect form, resembles Hispa *rosea*

of Weber in sculpture, size, and shape, and indeed offers no character by which it may be distinguished from that common insect, except its dull yellow color, and the much deeper crimson tint of the lines with which it is adorned: possibly it is merely a variety arising from a difference of food, or from other causes of an accidental nature. The *habitat* of the larva of the *ròsea* is, as yet, unknown to me; in its winged state it occurs in abundance, during the latter part of May and beginning of June, upon the young leaves of Aronia *arbutifòlia*.

Mr. Say has re-described the Hispa *ròsea* of Weber under the name of *marginàta*, and it is highly probable that the Hispa *quadràta* of Fabricius is also identical. Weber's specific name, however, having the priority, in point of time, both over that of Fabricius and of Say, must be retained. Fabricius has erroneously cited the *ròsea* of Weber as synonymous with his Hispa *suturàlis*.

The following descriptions will serve to point out the difference between Hispa *ròsea* and the variety (if it be such) which inhabits the oak.

Hispa *ròsea*. Fulvous red, lineated with blood red: elytra truncated, sulcated, and punctured in double rows; breast and belly black; feet testaceous.

Length from twenty to twenty-five hundredths of an inch.

Antennæ brownish, paler at tip. Thorax covered with close and deep punctures; anterior and lateral edges blood red, and two very faint reddish lines on the disk. The coleoptra form an oblong square, of a fine fulvous red color, darker toward the tip, serrated on the outer edge, which, with the suture, is elevated. Four elevated lines on each elytron, the first one, next the suture, forked at the base, and the third interrupted in the middle. These ridges and the margin are ornamented with dark purplish

red lines, and the furrows between them have double series of large transverse punctures. The body beneath except at the sides, is black, and the feet are testaceous yellow.

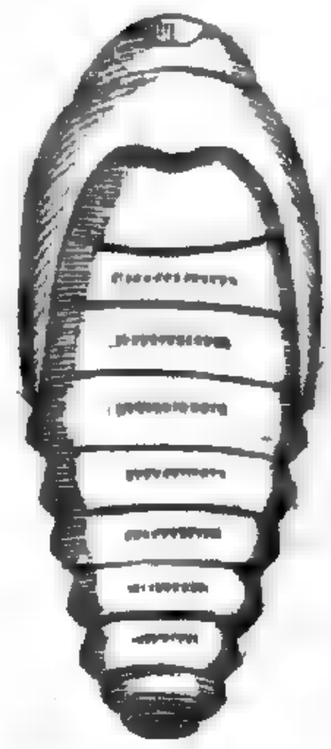
Variety, (H. *quercifòliæ*). Testaceous or ochreous yellow; sides of the thorax, two lines on the disk, and about eleven short lines on the elevated ridges and margins of the elytra blackish red. Body beneath testaceous; feet pale ochreous yellow.

Differs from the H. *ròsea* in being paler, with much darker lines. The anterior margin of the thorax is immaculate; the dorsal lines are as deeply colored as the sides; and the breast and abdomen are not black.

Towards the end of July, 1829, I discovered some larvæ within the leaves of the Robinia *pseudacàcia*, which differed in appearance so much from those of the oak leaf that I had no doubt of their belonging to different species. In form they were more elongated and not so much depressed; the body was not so broad before, and the lateral tubercles were more acuminated and directed backwards, so as to give the sides of the body a serrated appearance. In other respects they agreed with the previously discovered species.

The pupæ [Fig. 2.] were exceedingly active, and moved about, when disturbed in their cavities, backwards and forwards, by an upward and downward action of the abdominal segments. The pupa state lasted seven days, and on the twelfth of August I had the pleasure of seeing the perfect insects in the box in which they had been raised. They proved to be the Hispa *suturàlis* of Fabricius, which may be thus described.

[Fig. 2.]



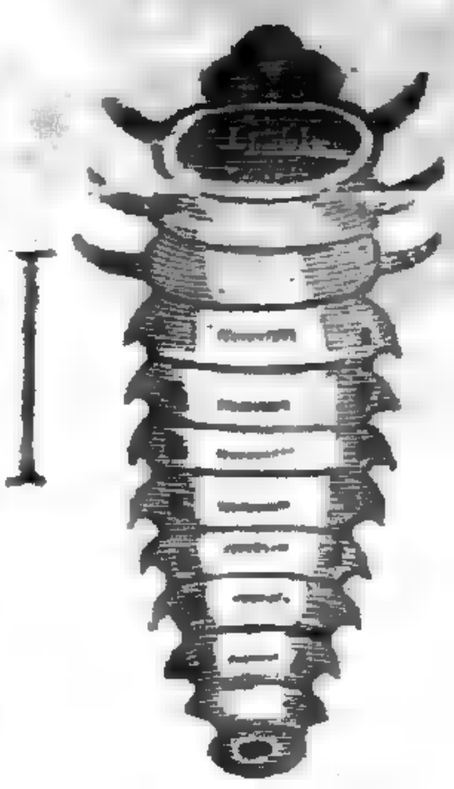
Hispa *suturàlis.* Thorax and elytra dusky orange or tawny yellow; the latter with a black sutural line widening towards the tip: head, antennæ, body and legs black.

Length from 25 to 28 hundredths of an inch.

Thorax rough, with deep and dense punctures; scutel black, impunctured; elytra rounded behind and serrated; the suture, lateral margin, and three longitudinal lines elevated; the vestige of another elevated line behind the middle within the submarginal line; furrows with double rows of deep, transverse punctures, separated by slender longitudinal lines.

On the 14th of July, 1833, I found full grown larvæ of a Hispa in the leaves of Solidago *lævigàta,* a plant abounding upon the margins of our salt marshes, where I was led to look for these larvæ in consequence of having discovered Hispa *vittàta,* in the perfect state, in the axils of the leaves, during the month of September, 1832. These larvæ [Fig. 3.] measured 40 hundredths of an inch in length: they were more elongated than the two preceding species, more acuminated before and behind, and the lateral tubercles were much more prominent. The body was whitish, the head and feet dusky or blackish; the disk of the first or thoracic segment was marked with a transversely oval brown spot, near the anterior part of which were two black dots. The last segment was brownish above. The sides of the rings were prominent, tooth-like, pointing backwards, and tipped with small, acuminated black points on the sides of each segment except the first, third, and last. There were tubercular rasps on the body as in other species. The pupæ bore a gen-

[Fig. 3.]



eral resemblance to those of Hispa *suturàlis*, and in the course of about a week disclosed the Hispa *vittàta* of Fabricius. This species, as has been remarked by Mr. Say,* varies much in its colors; but it may generally be recognised by the following description.

Hispa *vittàta*. Greenish black, bronzed; thorax and a longitudinal stripe on each elytron of a dull red or rufous color.

Length from 24 to 29 hundredths of an inch.

Thorax punctured, the disk sometimes brassy black; elytra striato-punctate in a double series, rounded behind, the outer margin entire and slightly rufous. Body generally greenish black, sometimes very dark steel blue or bluish black.

This insect I first saw on the marsh golden-rod, in September, 1829; again in September, 1832, in great numbers in the axils of the leaves of the same plant; and, upon the tenth of June, 1834, I found it celebrating its nuptials, and discovered on the leaves of the plants, frequented by it, little black grains which, I presume, were the eggs of the insect. These granular bodies were about 7 hundredths of an inch long, somewhat elliptical, flattened upon the side which was glued to the leaf, and covered upon the rest of the surface with a rough, black substance. They were in clusters of four or five, placed side by side, and adhered closely together, and to the leaf on which they were fixed. Upon the leaves of the plants inhabited by the other species of Hispa, I have often observed somewhat similar eggs, not however in clusters, but placed singly, and of a more

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* Appendix to Keating's Narrative of Long's Expedition, page 292.

irregular or angulated shape. Never having traced the development of these eggs, I cannot positively affirm them to belong to the Hispæ, though I have but little doubt on the subject.

I am, by no means, certain whether or how the Hispæ pass the winter, but presume that they hybernate, in the perfect state, among the roots of herbage; for there does not seem to be more than one brood in the season, and the perfect insects of the different species appear, at their proper times, during the spring or summer, before the larvæ are to be found. It may be well to remark, that the habits of these insects, in their natural state, are precisely the same as those which they exhibit when reared in confinement, and that I have repeatedly observed larvæ, pupæ, and perfect insects within the subcutaneous retreats where they pass through all their transformations, and which they leave only when they are about to provide for a continuation of their race.

Secure as they may seem to be, while in the larva state, they are not without their enemies; for a small Ichneumon is endued with the faculty of discovering them, and is furnished with a long piercer with which it perforates the cuticle of the leaf and the skin of their tender bodies, into which it conveys its eggs, committing only one to a single larva. The grub hatched from the egg of this parasitic insect lives within the body of its victim, which has barely sufficient strength to undergo the change to a pupa, when it dies, exhausted by the remorseless gnawings of its intestine foe. The latter completes, in a few days, its own transformations within the empty pupa-skin of the Hispa, from which it eventually emerges in the winged state. Those which I obtained came out during the month of August, 1829, from

the pupæ of HISPA *ròsea? (quercifòliæ)* and H. *suturàlis.* The following description will serve to identify this parasitic insect.

ICHNEUMON *Hispæ.* Black, polished; abdomen, above, rough with deep confluent punctures; piercer as long as the abdomen; legs honey yellow, the hinder tibiæ and tarsi white, annulated with black; wings transparent, with a black carpal spot.

Length of the body to the base of the piercer, 29 hundredths of an inch.

Expansion of the wings 59 hundredths of an inch.

The body of this species is black and highly polished; the antennæ and piercer, however, though black, are opaque. The abdomen is slender, almost sessile, densely punctured above, and with impunctured incisures, and the first segment is deeply concave before. The upper side of the anterior and intermediate tarsi are sometimes dusky. The hindmost tibiæ are white, with a broad, black ring at both extremities. The 1st, 2d, and 3d of the hindmost tarsal joints are tipped with black, and the two last joints are entirely black above.

The Baron DeGeer, in the 5th volume of his "Mémoires pour servir à l'histoire des Insectes,"* has given an account of the proceedings of "some kinds of larvæ, whose transformations are unknown, but which appear to belong to the class of coleopterous insects." Two of these larvæ, in size, form, and habits, are much like those of Hispa; his insects, however, left the leaves where they had been feeding, went into the earth, and there perished without completing their transformations. Un-

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* 8e Mémoire, page 402, &c. plate XII. figures 13—20.

fortunately, no person has thought proper to follow up the observations of DeGeer upon the subcutaneous larvæ of the European alder and elm, and consequently the history of these interesting insects remains imperfect.

ART. X.—DESCRIPTIONS OF NEW NORTH AMERICAN COLEOPTEROUS INSECTS, AND OBSERVATIONS ON SOME ALREADY DESCRIBED. By Thomas Say. Communicated Feb. 1835.

In this number, we present to our readers a part of the hitherto unpublished entomological papers of the late Thomas Say. This distinguished and lamented American naturalist was engaged in preparing them for publication in the Boston Journal of Natural History, when his labors were prematurely arrested by the disease which proved fatal to him, on the tenth of October 1834. In justice to his memory, it becomes our duty, without delay, to publish these posthumous papers, and thereby to secure to his names, as far as possible, the right of priority.

These papers consist of descriptions of new American Coleopterous and Hymenopterous insects, and remarks upon some already described. The Hymenoptera will appear in our next number. *(Pub. Com.)*

Brachinus, Weber.

B. *álternans* ? Dej. A specimen occurred near New Orleans, which, so far as I have been able to compare

the characters, nearly corresponds with this species; but as the head is deficient in the specimen, I cannot determine positively; and, furthermore, the circumstance of the 2d and 4th elytral costæ not being obviously elevated, leads to a doubt.

Sandalus, Knoch.

1. S. *petrophya*, Knoch. I observed this insect, frequently, on the flowers of a resinous plant common in the prairies of Missouri.

2. S.? *brúnneus*. Blackish-brown; antennæ sericeous-brown; thorax with two indentations on the disk.

Inhabits Indiana.

Body blackish-brown, punctured, oblong: *head* with small punctures, rather prominent between the antennæ, above which it is somewhat indented: *antennæ* as long as the thorax or rather longer, brown sericeous: *thorax* with small punctures, anterior and posterior angles denti-form; disk with a small orbicular indentation each side behind the middle, and an irregular one on the basal middle; posterior margin each side of the middle a little concave: *scutel* orbicular: *elytra* with numerous somewhat large punctures, not in striæ, with four slightly elevated lines or nervures, the inner one abbreviated before the tip, the others confluent near the tips.

Length from two fifths to three fifths of an inch.

This insect approaches, in character, nearer to Sándalus than to any other genus. In that genus the mandibles are remarkably falcate, and the tooth is on the inner side, towards the base; they are also covered to the middle by a membrane or coriaceous process; the tibiæ are quadrilateral and denticulate, and the tarsi beneath, are

clothed with very dense hairs. In our insect the conformation of the antennæ is the same as in the female of Sándalus, excepting that they are much more elongated; the mandibles are less prominent, and have the tooth on the superior side near the tip, which is therefore emarginate, or rather bifid, and are destitute of any membranous covering at base; the tibiæ are not quadrangular, the tarsi are simple beneath, and the mentum is somewhat transversely oval, with a robust dentiform process before. It can be separated under the name of ZENOA.

I have found it under the bark of decaying trees.

Vid. Gen. ANALESTES, Leach, or CEBRIO. Probably C. *bicolor*, but it does not appear to agree with Fabricius's description.

LYCUS, Fabr.

1. L. *modéstus*. Black; Thorax fulvous, with a black disk.

Inhab. Ohio.

Body black, opake: *antennæ*, second joint minute, nearly half the size of the third: *mandibles?* rufous: *palpi*, terminal joint rather oval than securiform: *thorax* broader than long, as wide as the base of the elytra, reddish-fulvous, with a black disk extending to the base, disk a little convex, without any carinate line, each side a little concave, lateral edge nearly rectilinear, the posterior angles not excurved, and not very acute at tip, anterior edge regularly arcuated: *elytra* black, with elevated, longitudinal lines, and in the intervening spaces are numerous transverse, elevated lines, and a small longitudinal one; *wings* black, tinged with rufous on the costal base.

The insect was lost before the measure of its length was taken.

2. L. *obliquus*. Black; margin of the thorax and basal margin of the elytra fulvous.

Inhab. Mexico.

Body rather slender, black; *antennæ* compressed, serrate: *palpi* white, terminal joint black: *thorax* with a wide lateral fulvous margin and an elevated fulvous line in the middle, posterior angles rather prominent and acute; *elytra* with elevated longitudinal lines and transverse ones in the intervening spaces, forming large subquadrate punctures; a dilated fulvous margin at base, occupying the surface to the sutural stria, before the middle becoming narrower until it terminates on the costal edge beyond the middle: *coxæ* white.

Length seven twentieths of an inch.

Allied to *dimidiàtus*, Fabr. but the antennæ are not flabellate.

3. L. *canaliculàtus*. Black; thorax with a yellowish margin and an impressed line on the basal margin.

Inhab. Missouri.

Mandibles pale; *antennæ* serrate, third joint rather shorter than the fourth; *thorax* yellowish-rufous, a large, black, subquadrate spot on the disk, anterior edge very prominently arcuated; basal margin with an abbreviated impressed longitudinal groove: *elytra* with elevated longitudinal lines and intermediate transverse ones.

Length one fourth of an inch.

Omalisus, Geoffr. F.

1. O. *marginéllus*, Fabr. (Lycus) Syst. Eleuth.

Inhab. Pennsylvania; Massachusetts, Harris.

2. O. *coccinàtus.* Sanguineous; head and beneath black.

Inhab. Pennsylvania and Indiana.

Body sanguineous; *head* black; *mandibles* pale reddish; *thorax* darker than the elytra, its depressions dusky; two longitudinal elevated lines, distant in the middle, and meeting on the anterior and posterior edges of the thorax, enclosing a rhomboidal space; from their middle an elevated line proceeds to the lateral edge; the margin elevated: *scutel* blackish: *elytra* with four elevated lines; interstitial spaces with a longitudinal slightly elevated line, and transverse ones about the distance of their own length from each other; *wings* blackish: *beneath* black.

Length over two fifths of an inch.

3. O. *mundus.* Bright sanguineous; antennæ black.

Inhab. Indiana.

Body entirely bright sanguineous: *antennæ*, excepting the three basal joints, black: *eyes* black: *thorax* with two longitudinal elevated lines, distant in the middle and meeting before the anterior and posterior edges of the thorax, enclosing a rhomboidal space; from their middle an elevated line passes to the lateral edge, and an elevated abbreviated line on the posterior submargin: *elytra* with four elevated lines; interstitial spaces with a longitudinal, very slightly elevated line, and transverse ones, about the distance of their own length apart; *venter* black: *tarsi* dusky.

Length one fourth of an inch.

Much like the preceding, but is only half as large, and its colors are differently arranged.

4. O. *humeràlis*, F. (Lycus.) Syst. Eleuth.

Inhabits also Indiana; Massachusetts, Harris.

It varies in having the humeral margin obsolete.

5. O. *sculptilis*. Piceous; thorax with elevated lines, yellowish each side.

O. *pleurites*? Knoch. in Melsh. Catal.

Inhab. Missouri and Pennsylvania.

Antennæ black, second joint minute; third joint as long as the others: *head* black; *clypeus* anteriorly a little produced, impressed in the middle; *thorax* with three elevated, parallel lines before the middle, and two behind the middle, a lateral somewhat oblique line proceeding to the lateral edge, which is obtusely a little contracted in that part: *elytra* with four elevated lines, interstitial spaces with transverse, elevated, somewhat irregular lines, nearer to each other than their own length.

Length about one fourth of an inch.

6. O. *obliquus*. Black; base of the elytra and each side of the thorax yellowish.

Inhabits Indiana.

Body black: *antennæ*, second joint more than half as long as the third: *front* tinged with ferruginous: *thorax* reddish-yellow, with elevated lines enclosing a turbinate space in the middle, with an elevated line extending from its centre to the anterior edge, and an oblique one each side, extending to the lateral edge; edge elevated; disk black, extending to the base: *elytra* reddish-yellow on the basal half, terminated obliquely at the middle; elevated longitudinal lines and intermediate transverse ones; a quadrate black spot, including the black scutel.

Length less than two fifths of an inch.

Phengodes, Hoffm.

P. *plumòsa*, Oliv.

P. testàceus, Leach, Zool. Journ. 1824.

Not uncommon for a short period in the autumn. Attracted by the candle, they enter the house in the evening, and fly repeatedly against the ceiling in their efforts to escape.

Lampyris, Lin.

1. L. *trilineàta*. Grayish-brown; elytra with the margin and three lines yellowish.

Inhab. Mexico.

Head on the front, pale carneous or yellowish: *antennæ* black-cinereous, basal joint whitish: *thorax* varied with dull yellowish, blackish and rosaceous, sometimes a blackish vitta trilobate at base, and a lateral marginal spot: *scutel* blackish: *elytra* gray-brown, the edge and sometimes the margin all around, and two or three lines on each elytron, yellowish: *beneath* blackish, generally varied with rosaceous and yellowish.

Length over half an inch.

Var. α. An oblong-subquadrate, marginal, yellowish spot behind the humerus.

A large species, wider and shorter than L. *versicolor*, Fabr. which it somewhat resembles in the character of the elytra, as it does L. *angulàta*, Nob. in that of the thorax.

2. L. *bifāria*. Antennæ with two processes from the base of each joint.

Inhab. North Carolina, Harris.

Body black, densely punctured: *head* with a carinate

line: *antennæ* at the base of each joint, excepting the first, second and ultimate ones, with two, opposite processes at least as long as the joint and nearly as thick: *thorax* fulvous, with a dilated black vitta not reaching the anterior edge; an impressed line; *elytra* confluently punctured, appearing granulated.

Length nearly seven twentieths of an inch.

Remarkable by the form of the antennæ.

Cantharis, Lin.

1. C. *tricostàtus*. Elytra widened and rounded laterally, with three elevated lines.

Inhabits Pennsylvania; Massachusetts, Harris.

Body black, with small dull yellowish hairs: *head* piceous at base; front yellow, oral margin blackish; before the eyes and base of the mandibles yellow: *antennæ*, second joint nearly equal to the third, which is obviously shorter than the following ones: *maxillary palpi* much longer than the labials, black: *thorax* transverse, yellow; disk fuscous; each side widely concave; anteriorly widely truncate; posteriorly widely emarginate: *elytra* laterally roundedly dilated; three prominent lines; humerus prominent: *feet* dark piceous; knees paler.

Length nearly half an inch.

Var. Thoracic margin rufous; front obscure.

The width of the elytra and the form of the elevated lines, are like some species of Lampyris; but although the palpi are very unequal, yet those of the maxillæ are not acute at tip, and the antennæ are distant.

2. C. *invàlida*. Blackish; sides of the front of the thorax, and margins of the elytra, yellowish.

Inhab. Indiana.

Body brown-black, covered with short hairs: *head* each side beneath the antennæ yellowish: *mandibles* yellowish at base: *antennæ*, first and second joints yellowish beneath: *thorax* margined, black, each side yellowish; disk rather unequal: *elytra* rather rough irregularly, with three or four obsolete nervures; base of the exterior margin of the suture and elevated humerus, yellowish: *pectus* each side and before, yellow: *venter*, segments laterally margined with yellow.

Length less than one fourth of an inch.

Var. α. Margin and suture of the elytra yellowish to the tip.

It differs from *rùfipes*, Nob. and *scítula*, Nob. in being more robust and hairy; from *angulàta*, Nob., which it most resembles, by the entirely black feet, yellowish humerus and basal elytral margins, yellow lateral ventral margins, somewhat more dilated terminal joints of the palpi, &c.

3. C. *percòmis*. Black, thorax rufous, immaculate.

Inhabits Massachusetts, Harris.

Body black, somewhat polished: *antennæ* with the basal joint tinged with piceous; second joint less than one third the length of the third, which is a little shorter than the fourth: *thorax* transversely oval, bright rufous, the edge a little elevated and dusky: *elytra* with a slightly uneven appearance, not amounting to punctures or granulations.

Length nearly one fifth of an inch.

I have seen but one specimen which was presented to me by Dr. Harris.

4. C. *bidentàta*, Nob. Journ. A. N. S. may prove to be a Silis, Meg. but as my specimen is imperfect, I cannot determine.

Malthinus.

M. *marginàlis*, Nob. (Molórchus) Journ. A. N. S. 1824, read to the Society the preceding year. Malthìnus *latipénnis?* Germar Spec. Novæ, p. 72. 1824.

Dasytes, Payk. Fabr.

To this genus, as I now understand it, belong several species, which I published under the genus Malàchius; such as *terminàlis*, Nob., &c.

Tillus, Fab.

T.? *terminàtus*. Black; terminal joint of the antennæ as long as the head and thorax.

Inhab. United States.

Body black, densely punctured and with numerous cinereous hairs: *eyes* reniform, emargination very profound: *antennæ*, radical joint suboval; second joint globular; 3d, 4th, 5th and 6th very short, transverse, approximated; 7th, 8th and 9th rather larger, serrate; terminal one greatly elongated, longer than the head and thorax, and about three times as long as all the preceding joints conjunctly, much compressed, linear, with dense minute black hairs, tip and base rounded: *labrum* rounded at tip: *mandibles* bifid at tip: *thorax* cylindrical, hardly narrowed at base, margin rufous: *tarsi* distinctly five articulate; first joint longer than the second; penultimate one bilobate: *nails* dentated: *abdomen* sanguineous; terminal segment black.

Length rather more than one fourth of an inch.

I obtained two specimens of this curious insect, at the

cantonment of Major Long's party near Council Bluff on the Missouri river. It occurs also in Indiana and Pennsylvania.

By the form of the tarsi, palpi and thorax, it approaches the present genus; but the extraordinary conformation of the antennæ seems to require a separation from the other species, at least in a distinct subgenus.

It varies in having the rufous thoracic margin very narrow, and even interrupted on the lateral margin.

Priocera, Kirby.

P. *inornàta*. Black-piceous; antennæ and palpi yellowish; maxillary palpi with the last joint rather small.

Inhab. Indiana.

Body elongated, blackish-piceous, with pale hairs, punctured: *head*, punctures somewhat confluent, so as to present a rather granulated appearance: *antennæ* honey-yellow, terminal joint hardly larger than the preceding one: *labrum* piceous, obtusely emarginate: *mandibles* piceous at base: *maxillary palpi* with the terminal joint small: *thorax* with an obtuse tubercle each side of the middle, on which is an indentation; an impressed, transverse line before the middle and a contraction behind the middle; an indentation on the basal margin; punctures not profound, transversely confluent: *elytra* with deeply punctured striæ: *coxæ* and *tarsi* honey-yellow.

Length two fifths of an inch.

This species agrees with all the characters of the present genus, as laid down by Kirby, with the exception of the magnitude of the terminal joint of the maxillary palpi, which is much smaller than that of the type of the genus. It is rare.

To this genus, which was separated from Tillus by Kirby, the following species appear to belong.

Tillus bicolor, Nob. Journ. A. N. S. vol. 5, p. 174.

Tillus undulàtus, Nob. ibid. p. 174.

Clerus, Fab.

1. C. *quadrisignàtus*. Posterior two thirds of the elytra black, with two broad whitish bands.

Inhabits North Carolina. Harris.

Body rufous, somewhat hairy: *antennæ* black: *palpi* rufous, dusky at base: *thorax* with an angulated impressed line: *elytra* black, basal third rufous; a broad yellowish-white band on the middle and a narrower one near the tip; more obviously and densely punctured at base: *feet* black.

Length two fifths of an inch.

Very different from C. *ichneumonéus*, F. and *trifasciàtus*, S. by the bands of the elytra. The middle one of the latter is rufous or fulvous, and of the former black, and as long as wide, whilst in the present species the middle band is not so long as the width of the elytra, and the posterior band is at least half its size and of the same color.

2. C. *sanguíneus*. Elytra sanguineous; head and thorax dusky.

Inhabits United States.

Body dark piceous: *antennæ*, terminal joint paler: *thorax* with a longitudinal dorsal, and lateral rounded indentations: *scutel* dark piceous: *elytra* with numerous, obvious, profound, irregularly disposed punctures: *venter* and *feet* somewhat paler.

Length about one fifth of an inch.

Found in most parts of the Union. Dr. Harris sent me an individual from Massachusetts.

3. C. *oculàtus*. Thorax and margin of the elytra yellowish, the former with two black dots.

Inhabits Massachusetts.

Head black: *antennæ* yellowish: *thorax* yellowish, cylindrical, with a black dot on each side of the middle: *elytra* black, with the suture, exterior and terminal margins yellowish; regular series of large punctures: *feet* yellowish.

Length over one fifth of an inch.

Sent to me for examination by Dr. Harris.

4. C. *undàtulus*. Elytra black, with a zigzag cinereous band near the middle, and a simple one behind.

Inhabits New Hampshire.

Body sanguineous, punctured, hairy: *head* blackish; labrum, antennæ and palpi rufous: *thorax* with an angulated, deeply impressed line on the anterior submargin; anterior margin blackish: *elytra* black, with a very small rufous portion at base; before the middle a deeply zigzag narrow cinereous band in the form of a W, the middle angle pointing anteriorly, wider on the lateral margin; anterior to the band are large punctures in regular striæ; posterior band broader, cinereous, not undulated: *postpectus* with a black middle.

Length one fifth of an inch.

May be distinguished from *nìgrifrons*, S. and *nìgripes*, S. by the intermediate angle of the anterior band pointing forward, and from *dùbius*, F., which it closely resembles, by its blackish head, middle of the postpectus, and by the form of the posterior band, which is not undulated as in that species. It was sent to me for examination by Dr. Harris.

5. C. *humeràlis*. S. Journ. Acad. Nat. Sc. vol. 3, pt. 1, 1823.

C. humeràlis, Germar, Sp. Novæ. 1824.

Trichodes, Fab.

1. T. *Nuttálli*, Kirby, Trans. Linn. Soc. vol. 12.

T. apìvorus, Germar. Sp. Novæ. p. 81.

It has also received a name in Dejean's Catalogue.

2. T. *verticàlis*. Blackish; head yellow, with a black vitta; feet and base of the elytra yellowish.

Inhabits United States.

Blackish, somewhat bronzed: *head* yellowish, with a black vitta on the vertex: *thorax* somewhat cylindric, a little larger in the middle: *elytra* shorter than the abdomen, not meeting at the suture, a little narrowed to the tip, which is rounded, densely and irregularly punctured, punctures rather large; a large, yellowish spot extends from the base nearly to the middle: *feet* yellowish.

Length three twentieths of an inch.

Var. *α*, *tenéllus*. Thorax dusky: elytra entirely pale yellowish white, at tip only a little dusky.

Var. *β*. Thorax with a lateral abbreviated vitta on the anterior margin: spot of the elytra slender, and nearer the suture.

Dr. Harris sent me a specimen from Massachusetts. I have obtained it on the common Hickory (Carya) in June.

Enoplium, Latr.

1. E. *laticórnis*. Black; front and each side of the thorax fulvous.

Inhabits North Carolina.

Body black, punctured: *head* fulvous: *mouth*, *eyes* and *antennæ* black; the latter, with the three ultimate joints as broad as long, subquadrate, narrowed at base, the last one oval: *thorax* fulvous, of nearly equal width; a transverse rectilinear, indented line on the anterior submargin, and indented points each side: *elytra* with regular striæ of large punctures, much wider than the interstitial lines.

Length less than one fourth of an inch.

The only specimen I have seen was sent to me by Dr. Harris for examination.

2. E. *damicórne*, F. (Tillus.) In his description Fabricius says, "Antennarum articulis duobus ultimis dilato-compressis, acutis," but there are, of course, three dilated ultimate joints.

Ptinus, L.

P. *humerâlis*. Reddish-brown; thorax quadrituberculate; elytra with two bands widely interrupted by the suture.

Inhabits Pennsylvania; Massachusetts, Harris.

Head pale reddish-brown, with incumbent pale ferruginous hair; vertex glabrous: *thorax* reddish-brown, with incumbent, pale ferruginous hair; an acute, elevated tubercle on each side, and two longitudinal obtuse ones on the disk, separated by a groove: *scutel* with prostrate, cinereous hair: *elytra* dark reddish-brown, somewhat paler at base, with rather rigid elevated hairs and regular striæ of rather large, impressed punctures; two remote whitish bands interrupted at the suture.

Very closely allied to P. *fur*, F., but the body is less

rounded; the punctures of the elytra are smaller, and thoracic groove less profound.

Dorcatoma, Herbst.

D. *similis*. Rounded, blackish; head dark piceous; elytra with two striæ and a half.

Inhabits North Carolina, Harris.

Body rounded, very little oval, convex, punctured; with short, yellowish hairs: *antennæ* dull rufous; not very robust; basal joint piceous; antepenultimate joint extending inwards into a conic process and exhibiting the form of an equilateral triangle, shorter than the preceding part of the antennæ; two ultimate joints equal: *elytra* with three lateral striæ, of which the superior one is half the length; humerus elevated, compressed, acute.

Length less than one tenth of an inch.

The D. *bicolor*, Germar, has a sanguineous thorax, and the *oculàta*, S. is larger, its antennæ more robust, and the terminal joint arcuated.

Hylecœtus, Latr.

H. *lugùbris*. Elytra and postpectus black; abdomen and feet honey-yellow.

Inhab. Indiana.

♂ *Body* punctured, with short hairs: *labrum* tinged with piceous: *antennæ*, third joint obscure yellowish: *vertex* with a glabrous line: *thorax* with an indented line and a little unequal each side: *scutel* glabrous and carinate in the middle: *elytra* with slightly elevated lines: *wings* dusky, nervures black: *beneath* black: *feet* and *abdomen* honey-yellow.

Length from two fifths to nearly half an inch.

♀ *Head* rufous: *antennæ* black, three basal joints yellowish: *thorax* and *pectus* rufous.

Var. α. Elytra dull yellowish on the basal half.

I observed it in considerable numbers, on the 16th of April, flying about a prostrate sugar maple, and running briskly upon it. It is infested by a species of Gàmasus.

Cupes, Fabr.

1. C. *cinèrea*. Brownish-cinereous; elytra with fuscous spots and undulations.

Inhabits Indiana, Ohio, and Louisiana.

Body pale brownish-cinereous: *head* on each side above the eyes, with a series of three tubercles, of which the posterior one is convex, the middle one is most prominent and acute, and the anterior one is at the superior base of the antennæ: *eyes* prominent, black, polished: *antennæ* nearly as long as the body, robust: *thorax* with a carinate line on the middle, widely impressed each side, and with four indentations on the anterior margin; anterior angles emarginate: *elytra* with elevated lines and intervening series of large regular punctures, several abbreviated dark reddish-brown lines and spots which form about three undulated bands, of which one is near the base, one on the middle, and one near the tip: *venter* paler, somewhat testaceous.

Length over seven twentieths of an inch.

This is the second species, of this rare genus, that has yet been discovered; I obtained numerous specimens in the vicinity of New Harmony, Indiana, and one near Springfield, Ohio, and the specimen from Mr. Barabino proves that it inhabits a considerable portion of the

Union. The species is widely different from the *capitàta*, which I have not found in this region.

[The following description, of the foregoing species, was found among Mr. Say's papers, and, as it contains some particulars not noticed above, we have thought proper to insert it in this place. *Pub. Com.*]

C. *cinèrea.* Cinereous; elytra with abbreviated blackish lines.

Inhabits Indiana.

Body cinereous, covered with minute scales: *head* inequal: *thorax* inequal, anterior angles not excurved: *elytra* with largely punctured striæ, the interstitial lines convex, subequal, the alternate ones a little larger; numerous abbreviated fuscous or blackish lines, hardly to be traced into three or four very oblique bands.

Length seven twentieths to two fifths of an inch.

A larger species than the *capitàta*, Fabr. and very distinct, though the inequalities of the head and thorax are somewhat similar. It is common about old frame houses. I have received a specimen from Mr. Barabino.

Silpha.

S. *caudàta*. S. Journ. Acad. Nat. Sc. 1823.
S. tuberculàta, Germar, Sp. Novæ. 1824.

Ips, Fabr.

1. I. *obtùsa.* Black; elytra each with two nearly orbicular rufous spots.

I. 4-notàta? Melsh. Catal.

Body oval, convex: *antennæ* piceous: *head* and *tho-*

rax with small, regular, subequidistant punctures: *elytra* punctured, regularly rounded at tip, and rounded at the sutural angle; slightly elevated transversely on the posterior margin; each elytron with two rufous, rounded spots, of which one is at the middle of the base, and the other beyond the middle of the elytron; *beneath* piceous black.

Length from three tenths to seven twentieths of an inch.

The largest species I have seen; the name **4-*notàta*** is preoccupied.

2. I. 4-*signàta*, Black; elytra each with two yellowish spots, of which the basal one is sublunate.

I. 4-signàta Melsh. Catal.

Body oval, deep black: *antennæ* piceous: *head* and *thorax* with small, regular, subequidistant punctures: *elytra* punctured, very obtusely rounded at tip, almost truncate; each elytron with two yellowish spots, slightly tinged with rufous; the basal one arcuated so as to enclose the humerus; posterior one behind the middle transversly oval, not sinuated; terminal lateral margin obscurely piceous: *beneath* piceous-blackish.

Length slightly more than one fifth of an inch.

Very similar to the NITIDULA *fasciàta* Oliv. but it may be distinguished by its uniformly smaller spots. The ENGIS *confluénta* Nob. strictly belongs to this genus, as well as the NITIDULA *fasciàta* and *sanguinoléntа* of Olivier.

3. I. 4-*maculàta*. Black; elytra with a basal and terminal ferruginous spot.

I. 4-maculàta Melsh. Catal.

Body black, polished, oblong-oval, punctured: *clypeus*, at tip, tinged with piceous; *antennæ* piceous: *elytra*

with a large ferruginous spot at the middle of the base, and another somewhat longer one at the tip of each: *feet* and *tip of the venter* rufous.

Length more than one tenth of an inch.

4. I. *vittàta*. Blackish-brown; elytra with whitish, abbreviated vittæ.

Inhabits Arkansaw.

Body dark-brownish: *elytra* with a whitish vitta abbreviated beyond the middle and abruptly curved at base towards the scutel; another much abbreviated, somewhat oblique one, hardly reaching the middle of the humerus, and an intermediate one hardly more than one fourth of the length of the elytra; tip obliquely truncated.

Length less than three twentieths of an inch.

This species was presented to me by Mr. Nuttall, who obtained it during his expedition to Arkansaw.

Hydrophilus, Fabr.

H. *cástus*. Oblong-oval, black; palpi rufous; thorax with an oblique line each side before.

Inhabits Louisiana.

Body black, polished: *head* with a dilated, hardly impressed oblique line each side before, in which are scattered punctures with short hairs, another narrower impressed line nearer the eye: *antennæ*, first joint of the club with an acute ciliated process; second joint triangular, small, the interior angle prominent, acute; terminal joint subovate, rounded at tip: *palpi* rufous, last joint hardly as long as the preceding one: *labrum* slightly and very widely emarginate, the anterior edge piceous, and about two small punctures on the middle: *thorax* with a rather slender arcuated line each side before, and laterally

with a few scattered, slightly impressed punctures: *scutel* rather large: *elytra* with four striæ of impressed punctures and an approximate marginal one: *feet*, excepting the base of the thighs, piceous.

Length nearly three fifths of an inch.

A specimen was sent to me by Mr. J. Barabino. The whole surface is covered with very minute crowded punctures, not at all visible without a pretty good lens.

Hydrophilus, Fabr.

1. H. *mérgus*. Black, highly polished; sternum not reaching the middle of the venter.

Inhabits Mexico.

Body highly polished, black, oblong-oval: *head* with an abbreviated line of impressed, confluent punctures on the inner orbit; a much arcuated line of punctures from the anterior canthus terminates between the eyes: *thorax* with a much abbreviated, oblique line of punctures each side: *elytra* with three series of distant, obsolete punctures; exterior series remote from the others: *sternum* not canaliculate, not extending to the middle of the venter: *feet* more or less piceous.

Length nearly seven twentieths of an inch.

In comparison with H. *natàtor*, Nob. which it closely resembles, the surface is more highly polished, the sternum much shorter and without any appearance of a groove between the anterior pairs of feet.

2. H. *exstriàtus*. Subsutural stria none, black; thoracic edge and beneath piceous.

Inhabits Louisiana.

Body short-oval or rounded, convex, glabrous, black;

with small, equal, equidistant, numerous punctures; polished: *palpi* and *base* of the *antennæ* pale yellow; three last joints of the latter fuscous: *thorax* piceous on the lateral and posterior margins: *scutel* small, with but few punctures: *elytra* destitute of striæ and without any appearance of one on the sutural margin; punctures on the basal margin obsolete: *beneath* piceous: *tarsi* yellow, brighter beneath.

Length less than three twentieths of an inch.

This species was sent to me by Mr. Barabino. It is smaller than the *orbiculàris*, F., which it resembles much in the puncturing and form; but that species has the sutural striæ extending from before the middle to the tip of the elytra.

3. H. *fuscus*, Nob. Corresponding, almost unvariedly, with specimens found in Pennsylvania. I obtained it in company with HYDROCANTHUS *atripénnis*, Nob.

SPHÆRIDIUM, Fab.

S. *méllipes*. Black; beneath honey-yellow.

Inhabits Mexico.

Body very minutely, and densely punctured, black: *antennæ* and *palpi* honey-yellow: *thorax* with the anterior and lateral margin obsoletely piceous; an impressed puncture on the lateral margin before the posterior angle: *elytra* with punctured striæ, and minute, dense punctures on the flat interstitial spaces; immaculate: *beneath* honey-yellow.

Length less than one fifth of an inch.

The largest North American species which I have seen; rather larger than S. *bi-pustulàtum*, Fabr. but somewhat less robust.

ONTHOPHAGUS, Latr.

1. O. *incénsus*. Clypeus with two elevated, transverse lines; thorax with an anterior double prominence.

Inhabits Mexico.

Body black, polished, punctured: *head* with two transverse, elevated lines; posterior line between the eyes, and slightly emarginate in its middle; anterior line a little more elevated in the middle, equidistant from the tip of the clypeus and posterior line; tip slightly contracted: *antennæ* ferruginous: *thorax* on the middle of the anterior submargin with a transverse, sub-bilobate, or slightly and widely emarginate elevation; an indented dot each side: *elytra* with punctured striæ; interstitial spaces plane, minutely punctured: *head* and *thorax* with a hardly perceptible tinge of green.

Length over three tenths of an inch.

The specimen is probably a female. It is smaller than the O. *taurus*, Linn., the female of which it resembles in the form and disposition of the lines of the clypeus. It is much larger than O. *latebròsus*, Fabr., from the female of which it differs considerably in the form of the elevated lines of the head, but agrees in having a thoracic prominence: this prominence, however, is more obvious, and widely emarginate.

2. O. *viridicàtus*. Green; clypeus bidentate; elytra smooth.

Inhabits United States.

Scarabæus smaràgdulus, Fab. Melsh. Catal.

Body robust, green: *head* bidentate at tip: *antennæ* blackish: *thorax* on the lateral edge a little angulated before the middle: *elytra* smooth, impunctured, or with

three or four hardly perceptible impressed lines: *beneath* dark green.

Length nearly one fifth of an inch.

Certainly not *smarágdulus* of Fab. but it is related, in point of size and form to Copris *subæneus*, Pal. de Beauv., of which, however, he remarks "Clypeo integro, transversè bicarinato," and "ses élytres sont d'un noir terne, les stries peu marquées, et une rangée de points élevés entre chacune," which prove it to be very different from our species.

3. O. *ovátus*, Fabr.

Our specimens are subject, like the European, to vary considerably in magnitude and some other characters; but I have not observed any trait which can justify the separation of it from the Fabrician type.

Var. α. Elevated lines of the clypeus obsolete or entirely wanting.

Var. β. Anterior elevated line of the head obsolete.

Var. γ. Head bidentate before.

Var. δ. Posterior elevated line of the head interrupted in the middle.

Var. ε. Elytra with dull ferruginous spots. Arkansaw.

It appears to be an inhabitant of nearly all parts of the Union.

Copris, Fabr.

1. C. *colónica*. Thorax somewhat retuse; head with a short elevation between the eyes.

Inhabits Mexico.

Body black: *head* a little rugose, with a slightly elevated, compressed, rounded horn, broader than high, situated between the eyes and not surpassing the line of

their anterior canthi; tip of the clypeus rather acutely rounded: *thorax* somewhat abruptly declining before, with an obsolete, abbreviated dorsal line behind the middle, and a deeply indented, oval impression on the middle of the lateral margin; punctures small, very numerous: *elytra* with indented, punctured striæ; interstitial spaces convex.

Length nine tenths of an inch.

Resembles C. *Carolìnus*, Fab., but is not so robust, and the thorax is much less elevated behind. The horn of the head, also, in *Carolìnus* is equidistant between the eyes and the tip of the clypeus. It is also like *Nicanor*? as figured by Drury I. pl. 35, fig. 1.

2. C. *incérta*. Thorax simple, with an impressed line; head horned; elytra striate.

Inhabits Mexico.

Body black, somewhat polished: *head* with dense, shallow punctures; a short, conic, vertical horn on the middle; tip of the clypeus acutely and rather deeply emarginate: *thorax* punctured excepting on the posterior disk; a deeply impressed line from a little before the middle to the base, and an impressed oval spot each side; anterior margin rather abrupt: *elytra* with deeply impressed, crenate striæ; interstitial spaces convex, impunctured.

Length nearly seven tenths of an inch.

I should be inclined to consider this as the female of the *procídua*, Nob. but in that species the larger horn is very near the anterior termination of the head, and the posterior horn is much shorter and remarkably inclined; whilst in the present insect no tubercle exists to mark the locality of the larger horn, and the horn that it possesses is larger than the posterior horn of that insect, with which it corresponds in locality but not in direction.

3. C. *quádridens*. Thorax angulated, four toothed; head horned.

Inhabits Mexico.

Body blackish-violaceous: *head* densely punctured, and with an elongated, recurved, trigonate horn, which is as long as the thorax, punctured and acute: *thorax* rugose, angulated; posterior angles compressed, elevated, subacute; on a line between them are two remote, short, vertical, conic denticulations; anterior margin near the middle with two short, vertical, conic denticulations separated by a raised line: *elytra* with obsolete striæ.

Length seven tenths of an inch.

A fine species, not so brilliantly colored as the *cárnifex*, Fabr. or even as the *triangulàris*, Nob., from both of which it is eminently distinguished by the thoracic denticulations.

4. C. *procídua*. Thorax three-horned; head two-horned.

Inhabits Mexico.

Body black: *head* punctured, two-horned; anterior horn vertical or hardly recurved, not as long as the head; posterior horn very short, inclined: *thorax* punctured, with three horns, the middle one very obtuse and emarginate, lateral ones acute, in a transverse line on the anterior submargin; anterior margin declivous; anterior angles rounded; an impressed, abbreviated dorsal line and a lateral indented spot; posterior disk impunctured: *elytra* with impressed, punctured striæ; interstitial spaces convex, impunctured.

Var. α. Highly polished.

Length more than three fifths of an inch.

The armature of the thorax is very similar to that of *C. lunàris*, Linn., but it is less robust, and is widely dis-

tinguished from that species, by having two horns on the head. The variety resembles C. *ammon*, Fabr., *anaglypticus*, Nob., in the thoracic sculpture.

Aphodius, Illig.

1. A. *innéxus*. Black; elytra with a dull yellowish margin.

Inhabits Mexico.

Head widely emarginate before, punctured; disk convex impunctured: *antennæ* cinereous at tip: *palpi* honey-yellow: *thorax* punctured, excepting on the disk, anterior margin and middle of the lateral margin; margin, at the anterior angles, obsoletely dull honey-yellow: *scutel* impunctured: *elytra* with impressed, very regularly crenate striæ, exterior and terminal margins rather pale honey-yellow; this color dilates towards the tip, and is deeply undulated on the inner edge: *feet* honey-yellow.

Length less than one fourth of an inch.

About the size of A. *àter*, Fabr.

2. A. *serval*. Black; elytra dull whitish, with black spots.

Inhabits Indiana.

Body piceous black, punctured: *head* widely emarginated before, and with a dull rufous margin: *thorax* with a dull rufous lateral margin: *elytra* yellowish white, with seven or eight subquadrate black spots, and a lateral, abbreviated, black, double, confluent vitta: with slender punctured striæ; interstitial lines flat, impunctured.

Length over three twentieths of an inch.

Very closely allied to the *inquinàtus*, Fabr., and resembles also A. *contaminàtus*, Fabr., but the clypeus is much more deeply emarginated, and is acutely angulated

at each end of the emargination. The latter species is hairy.

Psammodius, Gyll.

P. *interrúptus*. Thorax with three lateral, transverse undulations.

Inhabits Indiana.

Body dark chestnut, punctured: *head* deeply and somewhat acutely emarginated; with very numerous raised points: *thorax* with about three, lateral, transverse, but little impressed gròoves, obsolete above; with a dorsal, longitudinal, impressed line, obsolete before; edge ciliated; surface somewhat rough: *elytra* grooved, and somewhat punctured.

Length three twentieths of an inch.

In the *sulcicóllis*, Ill., the thoracic grooves are not interrupted on the back; it is also smaller than the present species.

Odontæus, Meg.

O. *músculus*. Small, brown, with short hairs; elytra with punctured striæ.

Inhabits Indiana.

Body small, light chestnut brown, darker before, with very numerous short hairs, punctured: *head*, between the eyes, with a hardly elevated, arcuated line, above which is a transverse indentation, then a hardly perceptible raised line: *labrum* emarginate; *mandibles* concave above, convex beneath, regularly arcuated, exterior edge entire: *clypeus* not trilobate at tip, entire: *antennæ* yellowish at tip: *thorax* convex, laterally a little dilated towards the base; an indentation on the middle of the lateral submargin: *elytra* with somewhat impressed and punctured

striæ, which are obsolete on the humerus; interstitial lines depressed, with minute punctures furnishing hairs.

Length over one fifth of an inch.

A rare insect; I have found but one specimen, which is probably a female. It is even smaller than the O. *filicórnis*, Nob., and in form more like the *lázarus*, Oliv. than the *cephus*, Oliv.

Trox, Fabr.

1. T. *alternàtus*. Elytra with cinereous, elevated lines interrupted by black spots.

Inhabits United States.

Body black, or black slightly tinged with brown: *head* bituberculate: *thorax* with obtuse, elevated, interrupted lines, irregularly punctured; posterior angles obtusely dentate: *scutel*, posterior margin cinereous: *elytra* striate with dilated punctures; alternate interstitial lines more elevated, cinereous, interrupted by black spots.

Length over half an inch.

This species is readily known by the cinereous and black alternation of the more elevated interstitial spaces. A variety occurs of which the elytral punctures are much less dilated, and the thorax is less deeply sculptured. I have found the species in Pennsylvania; Nuttall obtained it in Arkansaw, and Mr. Barabino sent me an individual taken near New Orleans.

A label attached to a specimen in my cabinet states that it cannot be the *crenàtus*, Oliv., with which I am now unacquainted.

2. T. *globòsus*. Blackish-bronze; elytra denticulated on the lateral edge.

Inhabits Pennsylvania.

T. globòsus, Melsh. Catal.

Body blackish-bronze, punctured: *head* entire, unarmed: *thorax* with an impressed line on the anterior lateral submargin: *elytra* with oblong, deeply impressed, rather distant punctures; posterior declivity with four or five elevated, converging lines, the two exterior ones continued towards the humerus; exterior edge with numerous, approximate teeth: *posterior tibiæ* much dilated and compressed.

Length about one fifth of an inch.

3. T. *spléndidus*. Dark brassy; elytra with series of punctures, and on the posterior declivity with elevated lines.

Inhabits United States.

T. spléndidus, Melsh. Catal.

Body rather short, oval, polished, dark bronze; punctured: *head* unarmed, entire: *thorax* with an impressed line on the anterior lateral submargin: *elytra* with regular series of rather long, deeply impressed, approximate punctures; on the posterior declivity four or five elevated, converging lines, the exterior one extending towards the humerus: *posterior tibiæ* much dilated and compressed.

Length nearly one fifth of an inch.

Readily distinguishable from the preceding by the more approximate punctures of the elytra, and the simplicity of the lateral edge. They both exhibit a remarkable difference, in their smooth surface, from the greater number of the species of this genus.

Melolontha, Fabr.

M. *íntegra*. Reddish-brown, hairy; clypeus entire.

Inhabits Mexico.

Body reddish-brown, hairy on every part: *head* with rather large dense punctures; tip of the clypeus obtusely rounded: *thorax* with the hair equal, reflected: *scutel* with rather short hair: *elytra* destitute of elevated lines; hair longer near the base: *postpectus* with long hair: *feet* with sparse hair.

Length less than three fourths of an inch.

Distinguishable from all the other known North American species by its rounded clypeus combined with its universal hairy vesture and magnitude.

Anomala, Meg.

1. A. *geméllа.* Yellowish-white, varied with blackish, elytra with geminate striæ.

Inhab. Mexico.

Body pale, varied with blackish: *head* punctured, cupreous: *thorax* with minute, distant punctures; edge blackish-cupreous; disk blackish; this color reaches the middle of the anterior margin, is sinuate on the sides and profoundly so behind; a blackish dot on the middle of the lateral submargin: *scutel* piceous: *elytra* with rather distant, large and blackish punctures; three double series of impressed punctures similar to the others, but approximate, and a single subsutural series; edge all around blackish, a humeral spot and middle of the exterior margin blackish.

Length half an inch.

In some respects resembles A. *unifasciàtus*, Nob. but it is larger, with a shorter head, and is very different by other characters.

2. A. *cincta.* Bluish-green, elytra pale brownish.

Inhabits Mexico.

Head cupreous, punctured: *thorax* slightly punctured, bluish-green: *scutel* bluish-green, punctured: *elytra* pale brownish, or a little testaceous, with punctured striæ and a broad line of irregular punctures near the suture: *suture* and edge all around and spot on the humerus blackish-green: *antennæ* and *palpi* ferruginous.

Length over half an inch.

This insect and the preceding may be only varieties; nevertheless, having three specimens that are similar to each other, I may state that it differs from A. *geméllа*, Nob. in the more obviously punctured thorax, in not having the striæ of the elytra so obviously in pairs, and in the color.

Hegeter, Latr.

H. *punctàtus*. Thorax transverse; elytra punctured, and with obsolete series of punctures.

Inhabits Mexico.

Body black, densely punctured: *antennæ* and *palpi* piceous; terminal joint of the maxillary palpi rather large: *thorax* transverse, convex: *elytra* irregularly punctured, and with regular series of punctures: *feet* piceous.

Length less than one fourth of an inch.

Eurychora, Thunb.

E. *inæquàlis*. Body inequal, with elevated points and lines, and indentations and punctures.

Inhabits Mexico.

Body black, oblong-oval; *head* minutely rugose, with an obtuse indentation each side: *thorax* inequal, with

elevated obtuse lines and indentations, and numerous small, elevated dots; posterior angles acute: *elytra* with many small elevated dots, and deeply impressed, distant punctures; several elevated, obtuse, abbreviated lines, of which the largest one is near the middle and extends to the posterior declivity; on this declivity are three large, elevated tubercles; an abbreviated line extends from the humerus, and a very short basal one is nearest the suture: *beneath*, with numerous, small, elevated dots.

Length three fifths of an inch.

This occurred in abundance in an elevated situation, under old logs.

Blaps, Fabr.

1. B. *rùda.* Elongated; elytra rugose.

Inhabits Mexico.

Body black, punctured: *thorax* somewhat longer than broad, punctures confluent each side and behind; a transverse, sub-basal, indented band, obsolete in the middle; lateral margin rounded, the marginal, hardly elevated line being so low on the side as not to be visible from above: *elytra* convex, covered in every part with irregular rugosities.

Length less than one inch.

2. B. *impolita.* Opaque; thoracic basal angles slightly excurved; elytra simple.

Inhabits Mexico.

Body black, nearly opaque, very minutely punctured: *head*, transverse line between the antennæ obsolete: *thorax* rather wider than long, greatest width a little before the middle; lateral edge a slightly elevated line, abruptly a little excurved at the posterior angle, exhibit-

ing in that part a very small, acute, lateral projection: *elytra* smooth to the eye, but on close inspection minutely and irregularly rugose and punctured; lateral margin rounded.

Length over three fifths of an inch.

Much like B. *æquàlis*, but distinguishable by its almost total want of polish, the minute prominence of its posterior angle, and the microscopic roughness of its elytra.

3. B. *máura*. Elytra with impunctured, obtuse striæ.

Inhabits Mexico.

Body black: *head* punctured, an impressed line between the antennæ: *thorax* with hardly discernible punctures; wider than long; posterior angles not rounded; lateral edge a vertically elevated line, not in the slightest degree curved outwards near the posterior angle: *elytra* somewhat depressed, obtusely striated or grooved, the grooves impunctured, but viewed in a particular direction they appear obsoletely rugose; interstitial lines convex; lateral margin rounded and evidently irregularly punctured: *epipleura* impunctured: *feet* punctured.

Length more than three fifths of an inch.

4. B. *obliterata*. Elytra with obsolete grooves; lateral margin rounded.

Inhabits Mexico.

Body black, immaculate: *head* slightly punctured; an impressed line between the antennæ: *thorax* wider than long; lateral edge a slightly elevated line, a little excurved at the posterior angle, which is consequently somewhat acute: *elytra* with obsolete grooves, minutely punctured; lateral margin rounded and smooth: *thighs* not obviously punctured.

Length less than three fifths of an inch.

Resembles the preceding, but differs in the excurvature of the lateral thoracic edge near the posterior angle, and in the grooves of the elytra being obsolete.

5. B. *célsa.* Body somewhat elongated; elytra with traces of grooves and punctures.

Inhabits Mexico.

Body brownish-black, minutely punctured, somewhat elongated: *head* with the impressed line between the antennæ obsolete: *antennæ* at tip, and *palpi* piceous: *thorax* rather wider than long; lateral edge a slightly elevated line, not excurved at the posterior angles; an obsolete, abbreviated, oblique, impressed line near the posterior angles: *elytra* with a slight appearance of grooves; somewhat attenuated behind; lateral margin rounded.

Length more than three fifths of an inch.

More slender than the *maura* and *obliteràta*, which have no appearance of an indentation near the posterior angles of the thorax.

6. B. *æquàlis.* Elytra smooth, simple; thoracic basal angles not excurved.

Inhabits Mexico.

Body black, minutely punctured: *head* with the impressed line between the antennæ, obsolete: *thorax* broader than long, broadest in the middle; lateral edge a slightly elevated line, not at all excurved near the posterior angle: *elytra* destitute of any appearance of the rudiment of a groove or of striæ; rounded on the lateral margin.

Length over three fifths of an inch.

Shorter and more robust than B. *célsa*, Nob.; allied

more closely to B. *obliteràta*, Nob.; but the elytra of that species are much more rough, and its posterior thoracic angles are slightly excurved.

7. B. *párva*. Lateral thoracic edge reclivate; elytra with punctured striæ.

Inhabits Mexico.

Body black, punctured: *head* with two obsolete indentations between the antennæ: *thorax* emarginate before for the reception of the head; anterior angles acute; lateral edge with a hardly prominent line, curved convexly before and concavely behind, forming an acute posterior angle; greatest breadth rather before the middle: *elytra* with large punctures in regular series; interstitial lines irregularly punctured.

Length nearly three tenths of an inch.

The smallest species I have yet met with in North America.

Of this genus I have described sixteen North American species, each of which has only the *three* ultimate joints of the antennæ moniliform; whereas in all the exotic species of my collection, nine in number, the *four* ultimate joints are moniliform.

Opatrum, Fabr.

1. O. *striàtum*. Clypeus obtusely emarginate; elytra with punctured striæ.

Inhabits Mexico.

Body punctured, black, with a slight brassy tinge: *head* densely punctured; emargination of the tip much dilated; *thorax* densely punctured, posterior edge not deeply sinuated: *elytra* with impressed, punctured striæ: *tarsi* piceous.

Length three tenths of an inch.

Resembles O. *púllum*, Nob., but is smaller, and the base of the thorax is more rectilinear.

2. O. *nòtum* Nob. Specimens found near New Orleans vary from those of more northern regions, in being a little polished, and in having the elytral punctures larger.

Tenebrio, Lin.

1. T. *suppréssus*. Thorax large; clypeus entire; elytra with punctured striæ.

Inhabits Mexico.

Body black: *head* densely but minutely punctured; *clypeus* a little reflected and entire: *labrum* nearly concealed: *thorax* densely and minutely punctured; rather large; a large, slightly indented spot on the posterior submargin; posterior angles acute; posterior margin with an impressed line: *scutel* triangular: *elytra* with impressed, punctured, and crenate striæ; insterstitial spaces convex, impunctured; lateral edge acute: *anterior tibiæ* with a strong tooth.

Length half an inch.

In comparison with T. *reflèxus*, Nob., the thorax is larger, more arcuated on the lateral edge, and more narrowed behind; the anterior tip of the clypeus is not so prominently reflected, and the contraction towards the junction of the thorax and abdomen is more obtuse.

2. T. *rufinàsus*. Suboval, black; head before, antennæ and feet ferruginous.

Inhabits Louisiana.

Body oval, a little oblong; densely punctured: *head* on the anterior part obscure rufous: *antennæ* obscure,

ferruginous; joints transverse, subtriangular or conic: *palpi* and *mentum* ferruginous: *thorax* regularly punctured; basal edge undulated; basal angles rectangular: *scutel* densely punctured: *elytra* with regular series of punctures; interstitial spaces slightly convex, particularly the lateral ones, and with three or four irregular series of small punctures: *beneath* ferruginous, punctured.

Length over one fifth of an inch.

Sent to me by Mr. Barabino from New Orleans.

Uloma, Meg.

U. *ferruginea*, Fabr. Several specimens occurred at Vera Cruz, but I suspect it to be a naturalized foreigner, as it is with us.

Œdemera, Oliv.

Œ. *apicàlis*. Pale reddish-brown; elytra black at tip and with four elevated lines.

Inhabits United States.

Body rufo-testaceous, densely punctured: *eyes* obviously emarginate: *mandibles* black at tip: *thorax* dilated each side before the middle, narrowed behind: *elytra* with four narrow, slightly elevated lines, on each side of which is a series of more obvious punctures; third line obsolete before the middle; tip black; *postpectus*, *abdomen* and *feet* black, a little sericeous: *wings* blackish.

Length about half an inch.

I have found it in Pennsylvania and other parts of the Union, and Mr. Barabino sent me an individual from Louisiana.

Lagria, Fabr.

To this genus, as it is at present constituted, it seems probable that the following species belong, rather than to Anthicus, under which I published an account of them, stating, at the same time, that they differ much from the other species of the genus that had fallen under my observation, viz.:

Lagria *lugùbris*; L. *collàris*; L. *terminàlis*; L. *labiàta*; and L. *impréssa*, Nob., but the orbicular thorax, the nails being armed with a tooth or abrupt angle beneath, &c. seem to justify, if not the formation of a new genus, certainly a division of the present, under the name of Corphyra.

Rhipiphorus, Fabr.

R. *limbàtus*, Fabr. Sanguineous; thoracic disc and margin of the elytra black.

Inhabits United States.

Body rather slender, yellowish-sanguineous: *antennæ* black, basal joint yellowish: *mandibles* black at tip: *thorax* deeply sinuated behind, and with a more or less dilated, black spot on the middle: *elytra* with a whitish disk, more or less broadly margined with black: *thighs* at tip, *tibiæ*, except at base, and *tarsi*, except the base of the first joint, black.

Length to tip of elytra, a quarter of an inch.

Var. α. Vertex black.

Var. β. Elytra black, immaculate.

Var. γ. Beneath, varied with black.

Fabricius was unacquainted with the native country of his *limbàtus*, but as his description agrees very well with

our insect, and was made out from a specimen belonging to the same collection in which he described his *dimidiàtus*, I have no doubt that it was intended to indicate this species. Dr. Melsheimer was of the same opinion, and has recorded the name in his catalogue. I introduce the description, for the purpose of preserving the Fabrician name for a species, not commonly known.

Mordella, Latr.

1. M. *hilàris*. Blackish, silvery-sericeous; elytra with a dilated, irregular, dull yellowish band margined with whitish.

Inhabits Indiana.

Body black, somewhat purplish-iridescent, sericeous: *head* dull yellowish-sericeous: *thorax* varied with gray hairs: *scutel* silvery: *elytra* with a much dilated, dull golden, sericeous, oblique band, occupying about one third, spread widely towards the scutel, and margined before and behind with a whitish line, the anterior line much angulated and the posterior one reclivate; tip rounded: *beneath* with purple and green reflections, and silvery-sericeous.

Length about two fifths of an inch.

This has some resemblance to M. *bidentàta*, Nob., but it is widely distinct by the elytral band and the much more dilated terminal joint of the maxillary palpi. It is common about the flowers of the Hydrángia cordàta, Ph. Its movements are rapid.

2. M. *oculàta*. Black; elytra bifasciate, anterior band with two dots.

Inhabits Pennsylvania and Indiana.

M. fasciata, Melsh. Catal.

Body black, whitish-sericeous: *antennæ* dull rufous, dusky towards the tip: *thorax* with two slightly indented dots a little behind the middle: *elytra* with a yellow-cinereous band a little behind the middle, interrupted at the suture and contracted on each side, and a much larger basal band extending posteriorly on each elytron in a point, nearly to the middle, and having a sub-basal obvious, definite, black dot each side of the suture: *tibiæ* and *tarsi* dull rufous.

Length over three tenths of an inch.

The two black dots in the basal band of the elytra are very obvious, and serve to distinguish it from M. *fasciàta*, Fabr., which it certainly resembles, and to which it has been referred.

3. M. *serval*. Blackish, spotted with yellowish.

Inhabits Indiana.

Body brownish-black: *antennæ* and *palpi* pale, dull rufous: *thorax* with numerous spots of short, yellowish hairs: *elytra* with numerous subequal spots of short, yellowish hairs, a dentated band behind the middle, and narrow terminal margin: *beneath* sericeous: *venter* each side with obsolete oblique, brown lines: *tarsi*, color of the antennæ.

Length three twentieths of an inch.

A very pretty species.

Apate, Fabr.

A. *bicaudàta*, Nob. A variety of this species occurred in Mexico. It is large, the feet are nearly black, and the punctures of the elytra are somewhat larger than in those of this country.

Parandra, Latr.

P. *polita.* Ferruginous, head and thorax dusky, impunctured.

Inhabits Indiana.

Body ferruginous, polished: *head* blackish-ferruginous, almost impunctured, excepting behind the eyes, where the punctures are numerous; a longitudinal, slightly indented line before: *antennæ* ferruginous at tip: *mandibles* with a large, prominent, rounded tooth near the base; then a profound, rounded sinus, then a subterminal tooth: *palpi* ferruginous: *thorax* blackish-ferruginous, impunctured, gradually a little narrowed behind; an obsolete indentation in the middle of the lateral margin; lateral margin decurved, the edging line hardly prominent, so that, when viewed from above, it is not visible; posterior angles almost rounded: posterior edging line hardly visible: *scutel* small: *elytra* minutely punctured: *pectus* and *postpectus* dark ferruginous.

Length about seven tenths of an inch.

This species, by its size and color, may be readily mistaken for the P. *brúnneus*, of authors, but it differs in many characters. It has a more slender thorax, which is not wider than the head. The teeth of the mandibles are but two, the basal one being very large and remote from the other, so that, when the mandibles are closed, an oval interval appears, as in the *ferruginea*, Sturm, which species, however, has the posterior angles of the thorax very obtusely rounded. The P. *brúnnea* has three subequal, subequidistant teeth in the mandibles; the head and thorax obviously punctured, the latter broader than the head, &c.

The species is rare.

Prionus.

P. *dasystomus*, Nob. Occurred near Natchez, on the Mississippi.

Moneilema, Say.

M. *inæquàlis*. Cinereous; rough with elevated points and tubercles.

Inhabits Mexico.

Body pale, brownish-cinereous: *eyes* small, distant from the antennæ: *antennæ* nearer to each other than to the eyes; first joint robust, longer than the second and third together; half the length of the body: *thorax* cylindric-oval, covered with small, unequal, irregular elevations: *elytra* with many elevated tubercles, of which some form a regular arcuated series from near the humerus to the tip, and parallel with the suture beyond the middle; tip entire, as long as the abdomen.

Length seven twentieths of an inch.

Inasmuch as this species is apterous and has a similarity of habit, I place it in the present genus, although the approximation of the antennæ is an obvious distinction.

Clytus, Fabr.

1. C. *charus*. Thorax yellow, with three black lines; elytra black; base, band behind the middle, and tip yellow.

Inhabits Indiana.

Body covered with short, dense, prostrate hair: *head* black; a band on the vertex curving under the head, an abbreviated line above the antennæ, and front yellow: *thorax* yellow, with three dorsal, transverse, abbreviated,

parallel, blackish bands: *elytra* black; basal third, a narrow, undulated band behind the middle, and tip in which is a small black spot, yellow; a black dot on the humerus: *beneath* yellow, sutures and feet black.

Length nine tenths of an inch.

Somewhat like C. *decòrus*, Oliv., and *speciòsus*, Nob., but the bands of the elytra and other characters are essentially different. I first observed it near the end of August. It is a remarkably fine insect.

2. C. *căprea*, Nob. Occurred at New Orleans.

Stenopterus, Illig. (Necydalis, Fabr.)

S. *sanguinicóllis*. Blackish, thorax sanguineous.

Inhabits Indiana.

Body black, with cinereous hairs, punctured: *thorax* sanguineous, inequal, with three more obvious elevations: *elytra* with a longitudinal, slightly elevated line; disk obscurely tinged with brownish: *feet* yellow; club of the thighs and tip of the tibiæ black.

Length seven twentieths of an inch.

It is more slender than S. *præústus*, Fabr.; but the thoracic and elytral elevations are somewhat similar.

Molorchus, Fabr.

M. *mellitus*. Black; abdomen, feet and basal joint of the antennæ honey-yellow.

Inhabits Indiana.

Body black: *head* indented between the antennæ: *antennæ* about as long as the body, basal joint rufous: *thorax* subcylindric, contracted before the middle, and with an indented longitudinal line: *elytra* with a dull

honey-yellow vitta, external edge, and obsolete spot on the basal middle: *postpectus* sericeous: *feet* honey-yellow; tip of the posterior thighs, their tibiæ and tarsi dusky: *abdomen* honey-yellow.

Length ♂ nearly three fifths of an inch; ♀ over four fifths.

In the form of the thorax it is more like M. *bimaculàtus*, Nob., than *marginàlis*, but it is greatly superior in magnitude to either, and very distinct as a species.

Acanthocinus, Meg.

A. *quadrigíbbus*. Antennæ annulate; thorax four tubercled; elytra with a cinereous spot on each.

Inhabits Louisiana.

Body dark brownish, when closely examined, varied with ferruginous and cinereous, short, prostrate hair: *antennæ* hardly longer than the body, blackish; the joints, excepting the basal ones, reddish cinereous at their bases; basal joint clavate: *head* before remotely punctured; behind the eyes, small, numerous punctures: *labrum* dull honey-yellow: *thorax* with distant punctures; four tubercles nearly in a transverse line, and a longitudinal, elevated line: *elytra* quadrigibbous at base; inner gibbosity extended into a longitudinal elevated line, gradually declining and terminating before the tip; numerous, distant, profound, punctures; a dilated, undulated, cinereous spot, before the middle; a sutural series of alternate, quadrate, small brown and cinereous spots, nearly opposite; tip emarginate: *thighs* clavate.

Length less than three fifths of an inch.

For an opportunity to describe this species, I am indebted to Mr. Joseph Barabino, who obtained it near New Orleans.

Tetraopes, Schœnh.

T. *tornàtor*, Fabr. This species is subject to vary. I obtained an individual near the Rocky Mountains, so covered with short whitish hair as almost to conceal its color; it was destitute of the large black spot of the elytra. Two specimens occurred in Mexico, both of which were destitute of the same spot. It is the T. *tetropthálmus*, Forster.

Of this genus are two species; the *tornàtor*, F., and the *canteriàtor*, Drapiez, both of North America. The latter has received three or four other names from as many different authors, but as they are unaccompanied with descriptions, the above will, of course, take precedence.

Hispa, Linn.

H. *atricórnis*. Above yellowish; antennæ, thoracic line and tip of the elytra, black.

Inhabits Mexico.

Body above yellowish-fulvous: *head* impunctured: *antennæ* black: *thorax* with rather large punctures; a black dorsal line: *scutel* black: *elytra* serrate, with double series of punctures, and interstitial, slender, elevated lines; tip black-brown, not more than one fifth of the whole surface of the elytra: *pectus* and *postpectus* with a lateral black vitta dilating behind: *feet* black: *thighs* fulvous at base: *venter* black, yellowish each side.

Length more than one fifth of an inch.

This cannot be H. *quadràta*, Fabr., which has the elytra margined with purple.

Cassida, Linn.

C. *unipunctàta*, Nob., Journ. Acad. Nat. Sc., Vol. iii.

A variety of this species occurs in Mexico, of a smaller size, with sometimes a black, arcuated, transverse line behind the abbreviated thoracic line. The inferior surface, in some specimens, is black, the feet varied with whitish, and whitish triangular lateral spots on the incisures of the venter; in others the inferior surface is pale greenish-yellow, more or less varied with black, the spiracles black.—It is an abundant species.

Clythra, Leach., Fabr.

C. *micida*. Black, metallic; head, thorax, and beneath with white hair.

Inhabits Mexico.

Body blackish, punctured: *head* with a coppery tinge, and covered with prostrate white hair: *labrum* honey-yellow: *palpi* blackish: *antennæ* piceous: *thorax* tinged with cupreous, with dense, small punctures, and covered with white prostrate hair: *scutel* with prostrate white hair: *elytra* naked, with blue and coppery reflections, confluently punctured, lateral edge deeply arcuated: *beneath* covered with white prostrate hair: *feet* piceous.

Length over one fourth of an inch.

Much larger than C. *dominicàna*, Fabr., much more hairy above, and the lateral edge of the elytra more profoundly excavated.

Chrysomela, Linn.

C. *barda*. Green; elytra with rounded whitish spots.

Inhabits Mexico.

Body dark green, somewhat metallic, punctured: *head* with an impressed angular line between the antennæ: *antennæ* honey-yellow, at tip fuscous: *labrum* and *palpi* honey-yellow: *thorax* irregularly, and in parts confluently, punctured, particularly on the sides; on the disk the punctures are sparse: *elytra* with a cupreous tinge, and more or less arcuated and abbreviated series of punctures, including the whitish spots; spots unequal, more or less rounded, between twenty and thirty in number, yellowish-white, the largest one on the humeral margin and bilobate, two germinate ones at base, none on the sutural margin: *wings* carneous: *beneath* tinged with cupreous on the venter: *feet* honey-yellow.

Length three tenths of an inch.

A common species, easily distinguishable from others.

Galeruca, Fabr.

1. G. *lépida.* Sanguineous; elytra blackish, bifasciate with white.

Inhabits Mexico.

Head sanguineous: *antennæ* white: *thorax* narrow, sanguineous, with a transverse, slightly indented line, impunctured: *elytra* blue-black, obsoletely and irregularly punctured; a transverse, bilobate, abbreviated band before the middle, and a transverse, oval spot near the tip, yellowish-white: *feet* yellowish-white.

Length less than one fourth of an inch.

Habit of G. 4-*maculàta*, Fabr., but not so much elongated. At first sight, without inspection of its generic characters, it might be mistaken for a Lema.

2. G. *cava.* Head with one, thorax with two impressed dots.

Inhabits Mexico.

Head punctured, sanguineous, beneath the antennæ whitish: *vertex* with an impressed dot: *antennæ* fuscous, or blackish, basal joints whitish beneath: *thorax* sanguineous, punctured, with two indented dots: *elytra* densely punctured, with a common suture and vitta blue, the latter originating on the humeral tubercle and abbreviated before the tip: *pectus* ferruginous: *postpectus* and *venter* black: *feet* white.

Length one fifth of an inch.

Distinguishable from other species by the indentations of the head and thorax, combined with the elytral vittæ and irregular puncturing.

The G. *vittàta*, Fabr. is common in Mexico.

Altica, Geoff.

1. A. *mellicóllis*. Head black; thorax yellowish; elytra blue.

Inhabits Louisiana.

Head blue-black, with rather large punctures each side, between the antennæ convex, dark piceous: *antennæ* black-brown, three basal joints honey-yellow beneath: *palpi* black: *thorax* pale honey-yellow, punctures not obvious: *scutel* impunctured: *elytra* dark violaceous-blue, with numerous, small, distant, not profound punctures: *pectus* yellowish: *postpectus* blackish: *venter* blackish, last segment dull yellow: *thighs* honey-yellow: *tibiæ* black, yellowish at base: *tarsi* black.

Length nearly one fifth of an inch.

Related to *collàris*, Illig., and *collàta*, Fabr., particularly the latter, from which it may be distinguished by its blue elytra, and immaculate face. A specimen was sent to me by Mr. Barabino from New Orleans.

2. A. *crepicóllis.* Yellowish; thorax five-spotted; elytra with black vittæ.

Inhabits Mexico.

Body pale yellowish: *antennæ* blackish; three basal joints honey-yellow, with a black line above: *vertex* with a black spot: *thorax* with two small dots, and an abbreviated line, arranged triangularly, black, and a lateral, somewhat larger, oblique, oval, indented, black dot: *scutel* black: *elytra* impunctured, destitute of striæ; a common sutural black vitta, another in the middle somewhat narrower than the intervening portion, and a submarginal one: *pectus* yellowish: *postpectus* and *venter* black, the latter with yellowish margins to the segments: *feet* honey-yellow; *tibiæ* and *anterior* and *intermediate thighs* with a black line.

Length one fifth of an inch.

Very closely allied to the A. *alternàta*, Illig., the form and proportion of the elytral vitta being the same, but that species is somewhat larger, and is altogether destitute of the lateral thoracic impressed dots.

3. A. *ceracóllis.* White; head black, elytra violaceous.

Inhabits Mexico.

Body white, impunctured: *head* black, with an elevated line below the antennæ: *antennæ* black, second and third joints white, with a black line above: *thorax* immaculate: *elytra* violaceous, burnished: *tarsi* and *tips of the tibiæ*, black.

Length less than one fifth of an inch.

Resembles the A. *collàris*, Illig., (*xanthomèlas*, Dalman,) but is much more closely allied to A. *collàta*, Fabr. It is somewhat doubtful if it be a distinct species; but as I possess specimens of the latter from Pennsylvania, Mis-

souri and Florida, all corresponding in having green elytra, white front, and other distinguishing traits, I have ventured to assign it a distinct name.

Erotylus, Fab.

E. *4-punctàtus.* Testaceous, beneath black: thorax with four black dots; elytra trifasciate with black.

Inhabits Missouri.

Erótylus 4-punctàtus? Oliv. Enc. Meth.

Head black: *thorax* testaceous, with an arcuated series of four subequal black dots: *scutel* black: *elytra* testaceous, with regular series of impressed punctures, an interrupted band at base composed of a large common spot, and a smaller longitudinally oblong one originating on the humerus, an irregular band on the middle, dilated on the suture, and a terminal, longitudinally oblong spot, black; edge black: *beneath* black: *pectus* each side, and a series of five spots on each side of the venter, testaceous.

Length three tenths of an inch.

This insect I believe to be the E. 4-*punctàta*, Oliv., and as it is but little known, I describe it more particularly to fix the species.

Languria.

L. *simplicicóllis.* Black; head and thorax sanguineous, immaculate.

Inhabits Mexico.

Body blue-black: *head* sanguineous: *antennæ* blackish-fuscous: *thorax* sanguineous, immaculate: *elytra* with

very distinct series of well impressed punctures: *pectus* and *head beneath* sanguineous.

Length nearly two fifths of an inch.

Much larger than L. *mozárdi*, Latr., and with a proportionally shorter thorax, in these respects corresponding with L. *puncticóllis*, Nob., which it equals in magnitude, but has an immaculate thorax, more profoundly punctured elytral striæ, and black postpectus and venter.

Coccinella, Linn.

1. C. *munda*. Elytra immaculate; thorax black, with a white margin and spots.

Inhabits North America.

Body black: *head* with dilated, white, inner orbits: *labrum* honey-yellow: *thorax* with a white anterior and lateral margin, and a white abbreviated line proceeding from the middle of the anterior margin; a lateral white dot sometimes confluent with the anterior margin: *elytra* immaculate, yellowish: *tibiæ* and *tarsi* piceous.

Var. α. Tibiæ and tarsi black.

Var. β. Elytra sanguineous; head white; anterior pairs of feet honey-yellow.

Length nearly one fifth of an inch.

I have specimens in my collection from remote parts of North America. Dr. Harris sent it to me from Massachusetts, and Dr. Melsheimer from near Maryland. I have found it in the North West Territory, Pennsylvania, Indiana, Missouri, Florida, and varieties α and β, in Mexico. The name is taken from Melsheimer's Catalogue.

2. C. *déntipes*, Fabr., is common in Mexico, and I formerly obtained an individual in the North West Territory.

3. C. *cacti*, Fabr. This species occurs abundantly in Mexico; it certainly resembles very closely the *stigma*,

Nob., so common in this country, and the *renipustulàta*, Mull. of Europe; but it is more than twice the size of either of those insects, and may also be distinguished from the former, by the superior magnitude of the rufous spot of which the form is transversely oval, whilst that of the *stigma* is orbicular.

Scymnus, Herbst. (Coccinella, F.)

S. *terminàtus*. Black; elytra, at tip yellowish.

Inhabits Louisiana.

Body black, polished, punctured: *head* honey-yellow: *antennæ*, club not much dilated, with numerous short hairs: *thorax* with numerous short hairs; lateral margin honey-yellow: *scutel* acute behind: *elytra* at tip yellowish: *beneath* piceous-black: *pectus*, *feet* and *venter* behind, honey-yellow.

Length about two twenty-fifths of an inch.

For this species I am indebted to Mr. Barabino.

ART. XI.—DESCRIPTION OF A NEW ANIMAL BELONGING TO THE ARACHNIDES OF LATREILLE; DISCOVERED IN THE SEA ALONG THE SHORES OF THE NEW SOUTH SHETLAND ISLANDS.

By James Eights, M. D.

(Communicated September 17, 1834.)

ARACHNIDES.

Gen. Decolopoda.*

Thorax. Elliptical, composed of five segments, separated from each other by slightly impressed articulations;

From δεκα, ten, δλος, perfect, ποδα feet.

anterior one produced into a head-like process. Contracted behind, and having on its superior surface a subconic tubercle with two eyes placed on each side; segments terminated at each extremity by a tubular joint, to which are attached ten perfect legs. *Rostrum* longer than the thorax, tubular, clavate, arcuated downward, with a triangular aperture at its apex; inserted into the anterior portion of the head-like process below. *Cheliceræ* rather longer than the rostrum, inserted on each side of its base, above, biarticulate, and terminated by a forceps composed of a finger and thumb, much curved, and meeting only a short distance along their tips, the superior finger, alone movable. *Palpi* setaceous, ten jointed, longer than the rostrum, inserted beneath the cheliceræ. *Egg-bearing organs* attached to a process at the base of the palpi, ten-jointed, with a terminal incurved nail. *Legs* cylindrical, composed of a three-jointed coxa, one-jointed femur, and a two-jointed tibia and tarsus, the latter terminated by a simple, slightly curved claw. *Abdomen?* attached to the posterior segment of the thorax by a movable articulation, small, sub-clavate, and perforated at its extremity by an anal incision.

D. Australis.

Entire animal of a bright scarlet; disk of the thorax convex, beneath, slightly so; on the superior surface of the tubular joints, near the margin, are situated about four very small, rigid spines; basal joint of the cheliceræ, elongated. *Palpi* with the third and fifth joints elongate, the former of greater length than the latter. *Egg-bearing organs* with the three first joints small and sub-equal, fourth and sixth elongate, the remainder nearly equal:

the four terminal joints are prehensile, and have their inner margins dentated, the teeth arranged in about four longitudinal rows. *Legs* long and nearly equal, posterior pair rather smaller; joints of the coxæ short and subequal. *Thighs* about twice the length of the coxæ, furnished with small spines at their superior extremity. The first joint of the tibia equal in length to the thigh, the other rather longer. *Tarsi* as long as the thigh; the last joint of the tibia, and those of the tarsi, each armed at their extremities beneath, with four rigid spines. *Eyes* very small. *Tegumments* pergamineous.

Habitat: sea in the vicinity of the New South-Shetland Islands.

Cabinet of James Eights.

I have placed this interesting animal in the class ***ARACHNIDES***, in consequence of its close approximation to Latreille's second family *Pycnogonoides*,* of his order TRACHEARIÆ; it possesses all of the characters, besides which, it has a segment supporting two additional legs, making in all *five perfect pairs*; this latter circumstance would doubtless bring it in the preceding class ***CRUSTACEA***, being a character which strikingly distinguishes the animals that compose it; at all events, I think it will certainly form a connecting link in the great chain of the animal kingdom, between these two classes, passing from the ***CRUSTACEA*** into the ***ARACHNIDES*** by the genera NYMPHON, PHOXICHILI, PYCNOGONUM, &c. Their mode of respiration I could not determine, as no appearance of the stigmata, through which they are supposed to breathe, were visible. Of the many specimens that I obtained, I saw none but such as were furnished with

* Cuvier, Regne Animal.

what are termed the egg-bearing organs, consequently, if those are the females that are thus distinguished, they prove much more numerous than the males.

The tegument covering the body is soft and yielding, the appearance of segments and articulations are necessarily faint, indicating that little motion of the parts is required.

They are to be found in considerable numbers in connexion with the fuci, thrown up by the waves along the shores of the islands, after being detached by the motion of the large masses of ice, from the bottom of the sea.

Plate VII.

Fig. 1. Superior view of the animal, natural size.
" 2. Inferior " " " deprived of the legs near the coxæ.

ART. XII.—CHEMICAL ANALYSIS OF CHRYSOCOLLA FROM THE HOLQUIN COPPER MINES, NEAR GIBARA, CUBA.

By C. T. Jackson, M. D. Read May 6, 1835.

Mr. James Davis, Jr. presented me with several ores of copper, from the mines recently explored in Cuba, for chemical analysis. Among these ores I observed a beautiful green ore, similar to the mineral described in works on mineralogy as *Chrysocolla*. It occurs in botryoidal and mammillary incrustations in the cavities of *Bronzite* or *Diallage* rock. Some of the incrustations are an inch or more in thickness, and when the mineral is broken, it

exhibits a perfect conchoidal fracture. It yields to the knife, but scratches glass readily. It is brittle. Its powder is nearly white, having a slight tint of green. It adheres to the tongue, and absorbs water when immersed in that fluid. It takes a good polish, which it preserves when the surface is oiled.

Sp. Gr. = 2.16. When a fragment of the mineral is treated with carbonate of soda on charcoal before the blow-pipe, it melts with effervescence, and a globule of copper is obtained. A portion of the mineral being powdered and treated with muriatic acid, no effervescence took place, but oxide of copper dissolved, leaving silica, insoluble, behind.

ANALYSIS.

A. To ascertain the quantity of water contained in the mineral, 25 grains in powder were subjected to a red heat in a platina capsule. It lost 8.26 grains, equal to 33 per cent. of water.

B. Twenty-five grains of the powdered mineral, in a glass flask, were subjected to the action of muriatic acid, and the digestion was continued 48 hours on the heated sand bath, the acid being removed and renewed until it ceased to dissolve any thing. The solution was then diluted largely with water, and the whole thrown on a filter, to separate the silica, which, collected, washed, dried, ignited and weighed, amounted to 7.5 grains, equal to 30 per cent. of silica.

C. The solution which had passed the filter with the washings of the silica was treated, while boiling hot, with a hot solution of pure potash, and boiled. A dense, black precipitate took place, consisting of deut-oxide of copper, which, collected on a filter, washed, dried, ignited

in a platina crucible, and weighed, amounted to 9.25 grains.

The oxide of copper was re-dissolved in muriatic acid diluted with water, when 0.12 grains of silica remained undissolved, which is to be added to the silica obtained by process *B*. The solution was now supersaturated with pure ammonia, when oxide of iron separated, which, collected, washed, dried and ignited, did not amount to more than 0.05 grain per oxide of iron.

This ore consists, then, in 100 parts, of

A. Water	33.00	containing oxygen	29.20	: 4
B. Silicic Acid	30.12	"	15.05	: 2
C. Deut Ox. Copper	36.83	"	7.31	: 1
Ox. of Iron, a trace.				
Loss	00.05			
	100.00			

From which it will appear that this ore is a bi-silicate of the deut-oxide of copper *plus* 4 atoms of water, and its chemical formula will be

$$\dot{C}u \quad \dot{S}i'^{2} + 4\ Aq.$$

The per-oxide of iron is evidently accidental, having been derived from the gangue in which the mineral occurs. This ore is of great value, as its silica renders it suitable to aid in the reduction of the black sulphuret of copper and iron which occurs at the same place; the silica combining, in the metallurgic operations of reduction of the copper, with the iron, which is thus separated in the slag from the copper which collects at the bottom of the furnace. This green ore has lately been brought to Boston by the cargo, and it is also carried from Cuba to Swansey, in England, where it is used with the black sulphuret to aid in the process of reduction of that ore.

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ART. XIII.—DESCRIPTIONS OF NEW SPECIES OF NORTH AMERICAN HYMENOPTERA, AND OBSERVATIONS ON SOME ALREADY DESCRIBED. By THOMAS SAY. Communicated Feb. 1835.

FAMILY TENTHREDINETÆ.

Genus ACORDULECERA, Say.

ARTIFICIAL CHARACTER.

ANTENNÆ filiform, 6-jointed, short; radial cellule one; cubital cellules three, the second smallest.

NATURAL CHARACTER.

Antennæ six-jointed; 1st and 2d joints subequal, the second larger; third joint longest but equal to the following ones in diameter; remaining joints gradually shorter; terminal joint not longer than the second: mandibles arcuated, acute; a prominent tooth on their middle: labrum prominent and distinct: radial cellule rather large: cubital cellules three; first elongated, as long

again as the second: carpus large: tibiæ with one pair of spines at tip.

OBSERVATIONS.

The family of which this new genus is a member, was divided by Leach into 9 Stirpes, all of which have 9 or more joints in the antennæ excepting the 1st, 2d, and 5th. Of these, two genera only, have 6-jointed antennæ, viz. ZAREA and PERGA, Leach; but both have clavate antennæ and in many respects are at variance with the characters of the present insect. In a later work, the "Entomologische Monographieen," by Dr. Klug, which that author has done me the favor to send me, are the two new genera PACHYLOSTICTA and SYZYGONIA, both of which have clavate antennæ, and therefore, like the preceding, cannot possibly include our insect.

SPECIES.

A. *dorsàlis*. Black; hypostoma, a base of the tergum and feet whitish.

Inhabits Indiana.

♂ ♀ Black, with minute whitish hairs: *nasus*, *labrum* and *mouth* white: *mandibles* rufous at tip: *thorax* with the anterior segment, curving to the base of the wing, white; line of the insertion of the wings white: *wings* a little dusky; nervures fuscous: *tergum* pale yellowish on the basal disk, blackish brown at tip: *venter* more or less yellowish-white, dusky or blackish at tip: *feet* and coxæ whitish-green.

Var. α. Feet and part of the costal rib green; scutel and posterior portion of the stethidium whitish.

Var. β. Thorax and abdomen entirely black.
Length three twentieths of an inch.
This insect is common.

Hylotoma, Latr.

1. H. *scutellàta.* Fulvous; head and thorax, excepting the humerus and scutel, blackish.

Inhabits United States.

♀ *Body* reddish-yellow: *head* blue-black: *thorax* blue-black; each side before the wings, including the superior portion of the pleura, reddish-yellow: *scutel* elevated, bright reddish-yellow: *metathorax* with two oblique, oblong, white spots: *wings* dusky violaceous: *pectus, neck, incisure of the stethidium (and feet?)* blue-black: *anal segment* at tip black.

Length nine twentieths of an inch.

I do not remember in what part of the Union I found this species. The feet in the specimen are mutilated.

2. H. *calcànea.* Blackish; thorax yellow; tarsi whitish at base.

Inhabits United States.

Violaceous black: *thorax*, with the anterior superior portion of the pleura yellow; suture of the anterior segment, or collar, blackish: *wings* dusky violaceous: *tarsi* at base white.

Length less than seven twentieths of an inch.

I have also lost the particular locality of this species. They do not correspond with either of the species decribed by Dr. Leach.

Genus ATOMACERA, Say.

GENERIC CHARACTER.

Body rather short: antennæ with but three obvious joints; in the male ciliated: cellules, one radial, unappendiculated; three or four cubitals, the dividing nervure of the first and second being obsolete: tibiæ destitute of a spine in their middle.

OBSERVATIONS.

The name of CRYPTUS, applied by Jurine to one of his genera, had been previously appropriated by Fabricius to a genus of *ICHNEUMONIDES*, and is altogether synonymous with HYLOTOMA of Latreille, which is the anterior designation. It includes species of at least three genera, all of which are distinguishd by tri-articulate antennæ. It may be thus divided, with modified characters.

HYLOTOMA, Latr. Radial cellule appendiculated: four posterior tibiæ with a spine on their middle.

H. *rosæ*, F.

ATOMACERA, Nob. Radial cellule simple; tibiæ destitute of a spine on their middle.

CRYPTUS, Jurine (by error). Antennæ of the male biparted; tibiæ destitute of a spine on their middle.

C. *furcàta*, F. C. *Klùgii*, Leach, &c.

1. A. *débilis*. Black; tibiæ whitish.

Inhabits Indiana.

♂ *Body* black, polished: *antennæ*, ciliæ longer than the transverse diameter of the antennæ: *mouth* dull piceous: *wings* fuliginous, a little paler at tip; first and

second cubital cellules confluent: *tibiæ*, anterior pair dull pale yellowish.

Length three twentieths of an inch.

2. A. *cellulàris*. Black; abdomen rufous.

Inhabits Indiana.

♀ *Body* black, polished: *antennæ* distinctly and rather densely ciliated with hairs, which are a little shorter than the transverse diameter of the antennæ: *nasus*, *labrum* and *palpi* whitish: *wings* dusky violaceous; cubital cellules three; the second very small, hardly one third the length of the first, and but little wider at its tip than at its base: *abdomen* entirely yellowish-rufous: *feet*, *coxæ*, *trochanters* and *small base of the tibiæ*, whitish; *anterior pair of tibiæ* dull whitish.

Length less than one fourth of an inch.

Much smaller than HYLOTOMA *abdominàlis*, Leach, which it probably resembles.

Genus THULEA, Say.

ARTIFICIAL CHARACTER.

Antennæ six-jointed; last joint clavate. Radial cellule one. Cubital cellules three.

NATURAL CHARACTER.

The antennæ are rather short, decidedly clavate; first joint very short, not longer than broad; second joint at least as long again as the first and somewhat more robust, cylindrical; third rather longer than the 1st and 2d together, much more slender, cylindric, hairy; fourth minute, shortest; fifth about the length of the third, sub-

cylindric, naked; sixth slightly longest, nearly equal to the 3d and 5th, a little dilated towards the tip; scutel large.

OBSERVATIONS.

This is distinguished from the genera into which Leach has divided CIMBEX, Fabr. by the number and construction of the joints of the antennæ, combined with the wing cellules. It corresponds with CLAVELLARIA in its one-jointed club, but has one joint more in its antennæ, and only one radial cellule. It agrees with ZARÆA in the number of the joints of the antennæ, but not in the number which constitute the club, nor in the number of radial cellules. With PERGA it is related by the comparative magnitude of the scutel, and the number of joints of the antennæ, but differs remarkably in the proportions of the latter, as well as in the number of cubital cellules. PACHYLOSTICTA of *Klug* has a one-jointed club, but one joint less than the present genus, and two radial cellules; and SYZYGONIA of the same author, with a one-jointed club, has appendiculated radial cellules.

SPECIES.

T. *nigra*. Body black: nasus and labrum green: spot before the wings, wing-scale and feet yellowish-green.

Inhabits Mexico.

Length to the tip of the wings three twentieths of an inch.

The smallest species I have seen of this family with clavate antennæ.

Allantus, Panz. Leach.

1. A. *epinòtus.* Black; tergum with a white band at base; feet varied with white.

Inhabits Indiana.

Body black: *mouth* white: *tongue* piceous: *thorax* with the posterior edge of the collar, wing-scale, posterior edge of the scutel and two minute dots behind it, white: *wings* with brown nervures; stigma somewhat inflated: *tergum* with the posterior margin of the first segment white: *feet* white: *coxæ* with a dilated line before and behind: *anterior* and *intermediate thighs* and *tibiæ* with a black line behind, tarsi dusky at tips of the joints: *posterior thighs* black in the middle: *tibiæ* at base and tip, black: *tarsi*, first joint black, remaining joints black, white at base.

Length ♂ three tenths, ♀ less than two fifths of an inch.

2. A. *goníphorus.* Black; abdomen rufous; scutel and thoracic triangle yellow.

Inhabits Indiana.

♂ ♀ *Body* black: *nasus* emarginate, white: *labrum* orbicular, and with the other parts of the mouth white; *mandibles* at tip piceous: *antennæ*, basal joint white: *thorax* with a central triangle and posterior margin of the collar white: *scutel* white with a black band: *wings* hyaline; costal nervure and carpal spot yellowish; nervures fuscous: *abdomen* honey-yellow: *pleura*, with a longitudinal vitta and a line descending from the superior wing white: *feet* white; anterior pairs with a black line behind the thigh and tibia; posterior pair honey-yellow, base of the thigh, spot on the middle of the tibia, tarsus, excepting the base of the first joint, and coxæ, white, the latter with a black line.

Length three tenths of an inch.

A female has the basal joint of the antennæ almost black.

3. A. *apiciàlis*. Black; antennæ at tip white; abdomen honey-yellow.

Inhabits Indiana.

Body black: *antennæ*, four last joints white: *nasus* profoundly lunate, white: *labrum* obtusely angulated before, white: *thorax*, with the posterior margin of the collar and wing-scale, white: *scutel* white: *wings* hyaline; nervures black; carpus white on the basal half: *abdomen* honey-yellow: *feet* honey-yellow: *coxæ* white.

Length seven twentieths of an inch.

The white terminal joints of the antennæ strongly contrast with the remaining joints.

4. A. *epícera*. Black; abdomen, base of the antennæ and feet honey-yellow.

Inhabits Indiana.

♂ *Body* somewhat slender, black: *antennæ*, 1st and 2d joints yellow, the latter two thirds the length of the first; 3d and 4th joints yellow on the upper side: *nasus* deeply emarginate, yellow-white: *labrum* suborbicular and with the mouth whitish: *mandibles* piceous at tip: *thorax*, collar and wing-scale yellow: *wings* hyaline; nervures black; carpal spot white on the basal half: *abdomen* honey-yellow, basal segment black: *feet* honey-yellow: *coxæ* white.

Length less than three tenths of an inch.

Var. α. Scutel dull yellowish.

5. A. *cestus*. Black; a white band at base of the tergum; pleura with a white spot.

Inhabits United States.

♂ *Body* black, with large crowded punctures: *an-*

tennæ*, 1st and 2d joints yellow: *nasus hardly emarginate, with a lateral whitish spot: *thorax* with the posterior margin of the collar white: *pleura* with a white spot on the anterior upper part: *wings* tinted with fuliginous; nervures black; carpal spot wax-yellow: *tergum* with a dilated band extending to the lateral sutures, white: *feet* white, a little varied with yellowish at tips of the joints: *thighs* black at base beneath.

♀ Anal segment white: posterior coxæ at base black: posterior thighs in the middle and their tibiæ at tip black.

Length seven twentieths of an inch.

Resembles the *epinòtus*, but may be at once distinguished by the white spot of the pleura.

6. A. *pannòsus*. Black; mouth white; feet varied with white.

Inhabits Indiana.

♂ *Body* black: *nasus* very deeply emarginate, white: *labrum* suborbicular, truncate-subemarginate before, blackish on the disk, or within the emargination of the nasus: *mandibles* black at tip: *maxillary palpi* dusky in the middle of the basal joint: *thorax*, posterior edge of the collar white; wing-scale blackish: *wings* hyaline; nervures black; carpus on the inner half dull wax yellow: *pleura* immaculate: *feet*, anterior pairs white before, with a black line behind; coxæ white; tarsi white with dusky incisures; posterior pair black, incisures of the thighs, band on the tibiæ and base of the ultimate joints of the tarsi white; coxæ white, with a black spot above and beneath.

Length one fourth of an inch.

♀ Coxæ with a large black spot; posterior tibiæ with a white longitudinal line.

Length three tenths of an inch.

Much smaller than *extérnus*, Nob. (Western Quarterly Reporter.)

7. A. *bardus*. Black; thorax and anterior upper angle of the pleura rufous.

Inhabits Indiana.

♀ *Body* short, dilated, black: *antennæ*, 2d joint nearly as long as the first, but less dilated: *front* and *vertex* with impressed lines: *nasus* not deeply emarginate: *labrum* rounded before: *mandibles* piceous at tip: *thorax* and *humeral portion of the pleura* honey-yellow: *wings* tinged with blackish purple.

Length three tenths of an inch.

Belongs to the genus SELANDRIA, Leach. The short and dilated form is like that of *ovàtus*, L. and *nigérrima*, Klug..

NEMATUS, Jur.

1. N. *vertebràtus*. Green; antennæ and spots above blackish.

Inhabits Indiana.

♀ *Body* pale green: *vertex* with a black spot: *antennæ* black, fuscous towards the tip; 2d and 3d joints subequal: *nasus* white, somewhat bilobate: *labrum* not very obtusely rounded before, a little indented on the disk, white: *mandibles* piceous at tip: *thorax* trilineate with black: *scutel* black: *wings* hyaline; nervures blackish; costal nervure and carpus pale greenish: *tergum* with a vitta of blackish spots, almost obsolete towards the tip: *tarsi* dusky.

Length one fourth of an inch.

2. N. *integer*. Greenish-yellow; antennæ, spots and tergum black; costal edge not emarginate at the carpus.

Inhabits Indiana.

♀ *Body* greenish-yellow: *head* with a dilated black vitta on the vertex: *antennæ* black: *nasus* whitish, not very deeply emarginate: *labrum* white, depressed anteriorly, rounded before: *mandibles* piceous at tip: *thorax* with three much dilated, abbreviated, black vittæ; an oblique, black spot behind the scutel: *wings* hyaline; costal nervure and carpus dull waxen; no obvious emargination on the costal edge near the carpus; nervures blackish: *tergum* black; lateral edge and posterior narrow margins of the basal segments whitish: *posterior pair of tibiæ and tarsi* black.

Length over one fourth of an inch.

Resembles the preceding, but the form is much more robust, and that species has the usual emargination of the costal edge. The present species has much more of black in its color.

3. N. *longicórnis*. Black; beneath, head and before the wings whitish.

Inhabits Indiana.

Body black: *head* yellowish-white, a dilated black spot on the vertex: *antennæ* fuscous, joints elongated: *thorax* black, line before the wings and wing-scale whitish: *wings* hyaline, nervures fuscous; carpus rather large, yellowish: *beneath* greenish, or yellowish-white: *pleura* with two black spots beneath the wings, the anterior spot longitudinal.

Length three twentieths of an inch.

Emphytus, Leach.

1. E. *tarsàtus*. Black; tarsi and tip of the antennæ white.

Inhabits Indiana.

♀ *Body* black: *antennæ* with three and a half or four terminal joints white: *nasus* sublunate: *labrum* rounded at tip, white, or with a dusky disk: *palpi*, terminal joints whitish; *wing-scale* whitish: *wings* very slightly tinged with fuliginous; carpus white on the basal half: *feet*, tarsi and coxæ white: anterior pairs of tibiæ white: posterior pair of tibiæ at base white.

Length nearly one half an inch.

In form it resembles the female of ALLANTUS *atra*, L. and the thorax, as well as the abdomen, is entirely black.

2. E. *semicórnis*. Honey-yellow; tip of the antennæ and disk of the pectus black.

Inhabits Indiana.

♀ *Body* honey-yellow: *antennæ*, four terminal joints black: *nasus* deeply emarginate: *labrum* and *mouth* pale yellowish, the former rounded at tip: *stemmata* black: *thorax* with a dusky line on the two middle lobes: *scutel* dusky on the posterior edge: *metathorax* dusky near the scutel: *abdomen* immaculate, rather paler at base and beneath: *wings* hyaline; nervures blackish; base of the carpus yellowish-white: *pectus* before and on the middle black: *coxæ* whitish: *tarsi* pale: posterior thighs and tibiæ blackish at their tips.

Length over three tenths of an inch.

A very distinct species and easily recognised.

3. E. *platycerus*. Black; tibiæ and tarsi white; first and second joints of the antennæ very short, equal.

Inhabits Indiana.

♂ *Body* short, robust, black, polished: *antennæ* rather robust, compressed; first and second joints remarkably short, when taken together less than half the length of either of the others; remaining joints subequal, the third

hardly longest: *mouth* dull piceous: *wing-scale* dull piceous: *wings* fuliginous, with a violaceous tinge: *feet* white; thighs in the middle and coxæ black.

Length less than three twentieths of an inch.

The joints of the antennæ are shorter and more compressed than those of any other species I have seen.

4. E. *recens.* Antennæ, basal joint white; pectus and feet white.

Inhabits Indiana.

♂ *Head* black; basal joint of the antennæ, nasus, labrum and mouth white: *thorax* black, with a white collar and wing-scale: *wings* hyaline, nervures fuscous: *tergum*, on the basal half white, with three dilated black bands slightly interrupted in the middle; terminal half somewhat fulvous, with about two marginal black spots and a larger double one each side near the tip; lateral processes at tip obvious: *pectus* white: *pleura* with a dilated black line: *feet* white; intermediate tibiæ and tarsi with a black line; posterior thighs tinged with honey-yellow; their tibiæ and tarsi dusky or blackish.

Length one fifth of an inch.

Xiphydria, Latr.

1. X. *maculàta.* Abdomen black with seven lateral white spots.

Inhabits Indiana.

♂ *Body* black: *head* punctured on the front; with two small spots above the antennæ, anterior and inferior orbits extending in a line behind the eye, base of the mandibles, and two lines upon the vertex, white: *thorax* confluently punctured; about four short lines on the disk, white; a white spot before the wings: *wings* immacu-

late: *tergum* with seven lateral, emarginate, white dots: *beneath*, on the neck and pectus with a few white spots: *feet* honey-yellow.

Length over two fifths of an inch.

This is undoubtedly much like the X. *camèlus*, Linn. which, however, is destitute of spots on the disk of the thorax, the wings are clouded towards the tip, and there are but six lateral spots on the abdomen, the ultimate segment being immaculate.

2. X. *basàlis*. Black; abdomen fasciate at base.

Inhabits Indiana.

♀ *Body* black, polished: *mandibles* and palpi white: *thorax*, anterior segment glaucous on the posterior margin: *wings* hyaline; first cubital cellule confluent with the first radial, having only a rudiment of the dividing nervure: *abdomen*, two basal segments honey-yellow, more or less intermixed with black: *feet* honey-yellow; posterior tarsi and tibiæ black, the latter white at base.

Length seven twentieths of an inch.

Found in the latter part of May.

Lyda, Fabr.

L. *ocreàta*. Yellowish-green, antennæ and spots blackish.

Inhabits Indiana.

♀ *Body* yellowish-green: *head* with a spot on the stemmata and three lines behind, blackish; one or two brownish lines beneath the eyes and an obsolete one before the eyes: *mandibles* piceous at tip: *antennæ* black; basal joint dull whitish beneath: *thorax* with a transverse black line on the collar near the neck; another behind the collar; about four brown spots, of which the inner

ones are smallest; a larger brown spot behind the anterior wings: *wings* hyaline, with fuscous nervures; carpus greenish in the middle: *tergum* blackish, dull greenish in the middle: *tarsi* and *tibiæ* exteriorly dusky: posterior tibiæ blackish.

Length nearly two fifths of an inch.

Xorides, Latr.

X. *humerălis*, Nob. Contributions of the Maclurean Lyceum, p. 74, where I placed it, agreeably to Jurine, in his genus Anomalon.

♂ *Antennæ* entirely black: *tergum*, first segment on each side with two longitudinal impressed lines; second and third segments each with an impressed oblique line each side at their bases: *trochanters* partly white; *anterior and intermediate feet* varied with whitish.

Length over two fifths of an inch.

Brachygaster, Leach. (Evania, F.)

B. *reticulătus*. Black; first joint of the antennæ, and anterior pairs of feet piceous.

Inhabits Indiana.

Body black, reticulate with large punctures: *antennæ* not longer than the trunk, with close set, subequal joints; first joint subclavate, piceous, longest; second joint not longer than broad, shortest, about half the length of the third: punctures on the posterior face of the metathorax more dilated than those of the thorax: *wings* hyaline; nervures fuscous: *petiole* about as long as the abdomen, punctured: *abdomen* orbicular, polished, impunctured: *feet*, two anterior pairs piceous.

Length about one fifth of an inch.

I agree with Leach in the propriety of separating this group from EVANIA. In addition to the great dissimilarity of the neuration of the wings, the proportional length of the posterior feet and of the antennæ is quite different.

PIMPLA, F.

1. P. *hùmida*. Black; feet yellow; thorax with white lines; abdomen with white lateral spots.

Inhabits Indiana.

Body black, transversely rugulous: *anterior orbits* and *palpi* white: *thorax* with rather large, transverse wrinkles; wing-scale, line before the wing, and two abbreviated dorsal lines white: *wings* immaculate: nèrvures blackish; stigma at base whitish; second cubital cellule petiolated: *scutel*, posterior margin white: *abdomen* falcate; segments, excepting the first, with a rather large, rounded, whitish, lateral spot: *oviduct* at least as long as the body: *pectus* and *feet* honey-yellow: *tarsi* whitish, incisures dusky: *tibiæ* whitish, posterior pairs blackish at tip.

Length over half an inch.

Form and magnitude of P. *ptérelas*, Nob., which, however, is destitute of white spots and lines.

2. P.? *petiolàtus*. Black; varied with yellowish-white; second cubital cellule minute, petiolated.

Inhabits Indiana.

Body black, densely punctured: *hypostoma*, *mouth*, and *antennæ* beneath, whitish: *thorax* with a wide, white line before the wings: *wings* hyaline; nervures blackish; stigma whitish towards the base; second

cubital very minute, the petiole being elongated: *scutel* dull honey-yellow: *tergum* densely punctured; two basal segments with an elevated, abbreviated line; that of the second segment parted into several at base, that of the first segment dilated into a groove at base; basal segment with a tubercle each side and an elevated line on the lateral margin, continued on the second segment: *pleura* and *pectus* honey-yellow varied with white: *coxæ* and *trochanters* white; posterior pair of coxæ honey-yellow: *feet* pale honey-yellow; posterior pair of thighs at tip, their tibiæ from the middle to the tip and their tarsi black: *venter*, in the middle, white.

Length nearly three tenths of an inch.

A small frontal escutcheon and sessile abdomen led me to place this insect here, although the palpi are not dilated and the wing cellules differ.

Agathis, Latr.

1. A. *polita*. Black; antennæ, tibiæ and tarsi yellowish.

Inhabits Indiana.

♂ *Body* deep black, highly polished: *head* yellow: *vertex*, *front* and *eyes* on the posterior margin, polished, black: *antennæ* honey-yellow: *mandibles* honey-yellow, black at base and tip: *posterior orbits* and posterior margin of the vertex, yellow: *occiput* obscure honey-yellow: *thorax* with a double, yellow, central spot, cordate spot on the scutel, abbreviated, transverse line beneath it, and posterior margin of the metathorax, yellow: *wings* blackish-brown; second cubital cellule quadrangular: *tergum* with a yellow band on the posterior margin of the first and second segments, slightly interrupted

in the middle: *feet* honey-yellow: *posterior thighs* black; the tibiæ pale, and tarsi yellow.

♀ Thorax with a hardly visible, piceous vitta on each side of the central spot; abdomen towards the tip attenuated.

Length nine twentieths of an inch.

2. A. *ornàta*. Black, varied with yellow; tergum yellowish, fasciate with fuscous.

Inhabits Indiana.

♂ *Body* black, polished: *head* yellow, a black frontal spot confluent with a black transverse line of the vertex, that is continued on the posterior margin of the eyes: *antennæ* honey-yellow, somewhat dusky above: *mandibles* blackish at tip: *thorax* with a broad, yellow margin, interrupted before, and double central spot: *scutel* and two or three small spots beneath it yellow: *metathorax* with a small spot behind the wing and posterior margin yellow: *wings* fuliginous; stigma and costal nervure honey-yellow; second cubital cellule quadrangular: *tergum* yellow, becoming greenish behind, segments with a broad blackish band at base, the anterior bands broader: *pleura* with more of yellow than black: *feet* yellow: *coxæ* varied with honey-yellow: *posterior thighs*, their tibiæ at tip, and tarsi at tip, honey-yellow.

Length less than half an inch.

Resembles the preceding.

Ichneumon.

1. I. *suturàlis*. Ferruginous; scutel yellow; sutures black.

Inhabits North America.

Body pale ferruginous: *antennæ* black beyond the

middle: *trunk* with black sutures: *scutel* more or less tinged with yellow: *wings* tinged with ferruginous; carpus yellowish; nervures blackish; central cellule pentangular, the side on the radial cellule rather smallest, basal and apicial sides longest, not parallel: *metathorax* with slightly elevated lines in the form of an H: *tergum* with the apicial sutures not black; basal segment with two slightly elevated longitudinal lines: *tibiæ*, posterior pair black at tip: *venter*, basal segment black; sutures not black: *oviduct* not longer than the breadth of the anal segment.

Var. α. Front, scutel and basal joint of the tergum at tip, yellow.

Var. β. Sutures of the tergum not obviously black.

Var. γ. Somewhat polished.

A common species, of which I obtained specimens in Mexico; it is also found in Pennsylvania, Indiana and Missouri. This must resemble the *ferrugàtor*, Swederus, (Trans. Stockholm Soc. for 1787) which I have not met with, unless this should prove to be a variety of it, which is very doubtful and even improbable.

2. I. *málacus*, Nob. (Contrib. Macl. Lyceum I., p. 72.) To "abdomen with an impressed line each side," ought to be added *beneath the edge;* this is a character, however, common to many species. The tergum, in a particular light, has a slight tinge of blue.

3. I. *mórulus*, Nob. (ibid, p. 73.) Annulation of the antennæ beginning with the seventh or eighth joint and ending with the fourteenth. The tibiæ and tarsi are honey-yellow; and the oviduct hardly extends beyond the tip of the abdomen.

It resembles the *málacus*, and requires the additional description I have now given, to be distinguished from it.

I have found this species in Indiana, Missouri and the N. W. Territory. The "acute angle" of the metathorax is prominent, spiniform.

4. I. *otiòsus*, Nob. (ibid, p. 69.) Occurs in Indiana and N. W. Territory.

It resembles *unifasciatòrius*, Nob. (Amer. Entom. vol. II.) but is rather smaller, the annulation of the antennæ is differently situated, and it has two abbreviated white lines on the middle of the thorax.

5. I. *brevinctor*, Nob. (Amer. Entom. pl. 22.) Terminal segment of the tergum with a large, white, rounded spot.

6. I. *paràta*, Nob. (Contr. Macl. Lyc. p. 68.) The following is a description of the opposite sex, and of some of its varieties.

Body black: *head* with yellow orbits, mouth and hypostoma: *antennæ* beneath dull honey-yellow; basal joint beneath yellow: *thorax* with two small abbreviated lines on the disk, line before the wings approaching before, and wing-scale yellow: *scutel* yellow: *wings* slightly tinged with fuliginous: *nervures* pale brownish; stigma dull honey-yellow; second cubital cellule pentagonal, the two recurrent nervures with a short process near their middles: *metathorax* with a dilated spot each side, often confluent, and a small line under the scutel: *tergum* with four dilated yellow bands: *feet* yellow; posterior thighs, excepting their base and their trochanters, black; posterior tibiæ at tip black.

Length over three fifths of an inch.

Var. α. Tergum with but two bands.

Var. β. Metathorax immaculate behind.

Var. γ. Bands of the tergum contracted in the middle.

Var. δ. Short lines of the thorax confluent, so as to form a lunate spot.

Var. ε. Short lines of the thorax obsolete.

A very common species. I have taken it in Missouri, Indiana, Pennsylvania and N. W. Territory.

7. I. *comptus*. Black; tergum with a yellow band on each segment.

Inhabits United States.

Body black: *head* with yellow hypostoma, orbits and cheeks: *thorax* with a line before the wings, two slender parallel lines, nearly as long as the disk, on the middle, wing-scale, and often a short line between the wing and scutel, yellow: *scutel* yellow: *wings* tinged with fuliginous; second cubital cellule pentagonal, the anterior recurrent nervure with a short process near the middle: *metathorax* with a short transverse line at tip of the scutel and two dilated longitudinal spots, yellow: *tergum* with a dilated yellow band on each of the segments, the 2d and 3d widest: *feet* yellow, or honey-yellow.

♀ with a whitish annulation rather beyond the middle line of the antennæ.

Length half an inch.

Resembles the preceding, but differs in many characters, as the two descriptions will prove.

8. I. *navus*. Black; orbits, line before the wings and lateral margin of the scutel, yellow.

Inhabits United States.

♀ *Body* greenish-black; *head* with narrow yellow orbits: *palpi* dull yellowish: *thorax* with a slender line before the wings yellow: *wings* a little fuliginous; nervures fuscous: *scutel* with a yellow lateral margin: *metathorax* with a line beneath the scutel generally interrupted into two distant dots: *thighs* at base and tip, *tibiæ* at tip, and *tarsi*, with a slight tinge of piceous: *antennæ* annulate.

♂ *Hypostoma* and *mouth* yellow: *feet* with the thighs at base and tip, *tibiæ* at tip and base of the joints of the tarsi dull yellowish.

Length from nine twentieths to three fifths of an inch.

May be distinguished from *brevicinctor*, *unifasciatòrius*, and *otiòsus*, Nob. by its black scutel; and from *mórulus* and *málacus*, Nob. by having a yellow line before the wings. I have found it in Pennsylvania, Indiana and Louisiana.

9. I. *devinctor*, Nob. (Amer. Entom. vol. II.)

It varies in having the scutel black and the feet entirely black.

Another variety has the tibiæ and tarsi ferruginous. My largest specimen was sent to me by Dr. Harris.

10. I. *duplicàtus*. Black; abdomen rufous; metathorax with yellow marks.

Inhabits Indiana.

♀ *Body* black: *hypostoma*, *palpi* and *orbits* yellow: *antennæ* with a whitish annulus beyond the fifteenth joint: *thorax* with the dorsal impressed lines not deep, and extending from the middle to the anterior margin; a yellow line before the wings; wing-scale dull yellowish: *scutel* bright yellow, a little convex: *wings* slightly tinted with fuliginous; stigma dull honey-yellow; second cubital cellule four-angled; the recurrent nervures with slight processes: *metathorax* with a large yellow W behind, and a yellow spot at tip of the scutel: *tergum* rufous; second segment not distinctly excavated at base each side; first segment as long as the second, slender, black at base and tinged with yellow at tip: *coxæ* having a yellow spot: *thighs* black, the two anterior pairs varied with yellowish towards the tip: *tibiæ* yellow; anterior pairs having a black line behind; posterior pair black at

tip and at the extreme base: *tarsi* yellowish, terminal joint black at tip.

♂ Thorax with a quadrate yellow spot on the middle. Length over three fifths of an inch.

The form of the abdomen is that of an ALOMYA, Panz. but the wings are not remarkably short, nor are the antennæ convoluted. The markings of the metathorax are much like those of I. *pectorālis*, Nob.

11. I. *residuus*, Nob. (Contr. Macl. Lyc. p. 73) resembles *suturālis*, Nob. but is much smaller, with tricolored antennæ.

CRYPTUS, Fab.

1. C. *orbus*. Second cubital cellule incomplete; thorax with two dorsal yellow lines.

Inhabits Indiana.

Body black: *orbits* and *hypostoma* white: *thorax* with two lines on the disk and collar white: *scutel*, transverse line beneath it, and line each side at its base diverging towards the base of the wings, white: *wings* hyaline; nervures fuscous; second cubital cellule small, rounded, pentangular, the nervure of division from the third cellule wanting: *metathorax* whitish with about three black abbreviated lines: *abdomen* long, tapering to the base: *tergum* with the posterior margin of the first and second segments white; remaining segments more or less yellowish: *pleura* white, with a black furcate line: *pectus* and *coxæ* white: *feet* honey-yellow: *posterior feet*, coxæ with a black line; tarsi white; tibiæ at tip and base blackish.

Length less than one fourth of an inch.

2. C. *discitérgus*. Whitish varied with black; tergum black, disk white.

Inhabits Indiana.

Body white, slightly tinged with yellow: *antennæ* black: *vertex* with a black dot on the locality of the stemmata: *thorax* with an abbreviated black vitta before, and another vitta on each side, confluent upon the scutel, which is also black: *metathorax* black on the disk: *wings* hyaline; nervures brown: *tergum* polished, black, with a dilated whitish spot in the middle; broadest rather behind the middle, and tapering to the base: *oviduct* less than half the length of the abdomen: *posterior thighs* with a blackish line each side: *posterior tibiæ* blackish at base and at tip.

Length nearly three twentieths of an inch.

Spins an oval, silken cocoon, of a white color slightly tinged with reddish.

3. C. *conquisitor*. Black; tergum with the posterior margins of the segments white; feet honey-yellow; posterior tibiæ and tarsi with black joints.

Inhabits Indiana.

Body black, punctured: *palpi* white: *thorax*, punctures minute; a longitudinal white line before the wings: *metathorax* not distinctly punctured on the disk: *wings* very slightly tinged with dusky; nervures blackish; stigma rather large, with its base and tip whitish; second cubital cellule oblique: *tergum* densely punctured on every part; segments on their posterior narrow margins white: *oviduct* about half the length of the abdomen: *feet* honey-yellow; intermediate and posterior tarsi white, the joints black at their tips; posterior tibiæ black, white in the middle.

Length one fourth of an inch.

Resembles *inquisitor*, Nob., but the posterior margins of the segments of the tergum are white.

4. C. *dúctilis.* Second cubital cellule petiolated; abdomen falcate.

Inhabits Indiana.

Body black; basal joint of the antennæ beneath, and mouth whitish; *thorax* without obvious impressed lines: *wings* hyaline; nervures fuscous; second cubital cellule minute, petiolated: *abdomen* arcuated, slender at base, more dilated and compressed towards the tip, but not truncate; honey-yellow, dusky at base: *oviduct* more than half the length of the abdomen, a little recurved, black: *feet* honey-yellow; anterior and intermediate coxæ and trochanters whitish; posterior feet rather more dusky.

Length under three tenths of an inch.

In the form of the abdomen and general appearance it resembles ANOMALON *ejúncidus*, Nob.

5. C. *tenéllus.* Honey-yellow; wings banded.

Inhabits Pennsylvania.

♀ *Antennæ* blackish towards the tip: *wings* hyaline; a fuliginous band before the middle, and a much dilated or double one beyond the middle including the stigma; stigma triangular and with the nervures brown; radial cellule wide; second cubital somewhat rounded, the exterior nervure wanting; apicial nervure obsolete: *metathorax* beneath the scutel and at the insertion of the abdomen black: *abdomen* arcuated, blackish at tip: *oviduct* half as long as the abdomen.

Length nearly three twentieths of an inch.

6. C. *inquísitor*, Nob. (Contrib. Macl. Lyc. p. 71.) *Tergum* rather densely punctured in every part; segments with a transverse, slightly indented, obtuse line in the middle: *venter* whitish, with black lateral spots.

Var. *α*. Much larger; oviduct hardly over half the length of the abdomen.

Length two fifths of an inch.

7. C. *calipterus*. Wings yellowish, fasciate; central cellule pentagonal.

Inhabits Mexico.

Body pale ferruginous yellow: *antennæ* black, ferruginous at base, and with a white semi-annulus on the middle: *scutel* with its basal angles connected with the thorax by an elevated line: *wings* yellowish, a black band before the middle, another beyond the middle, connected in the form of a *v* with the black apicial margin; central cellule pentangular, its basal and apicial lines being nearly parallel: *inferior wings* with a dot in the middle, and apicial margin blackish: *tergum* with the third segment dusky or black at its base: *oviduct* black, nearly as long as the abdomen: *posterior tibiæ* blackish at tip.

Length less than three fifths of an inch.

The remarkable resemblance which exists between the present insect and the *bifasciàtus*, Nob. in point of color, renders it necessary, in order to prevent mistake, that we should observe that in the *bifasciàtus*, the oviduct is not half the length of the abdomen, and the central cellule of its wing joins the radial cellule in an acute angle, its basal and apicial lines being confluent at the point of junction with it.

8. C. *cestus*. Wings hyaline, fasciate; inferior wings dusky at tip.

Inhabits Indiana.

♀ *Body* rufous, almost sanguineous, opake: *antennæ*, excepting the two basal joints, black with a white annulus in the middle; *wings* hyaline, a blackish band on

the middle, abbreviated before; another blackish band nearer the tip abbreviated behind; tip margin dusky; second cubital cellule pentangular, its basal and terminal lines not parallel: *metathorax* a little rugose each side, with a short, compressed tubercle each side on the declivity: *tergum* with the basal segment polished; third segment black at base: *oviduct* nearly as long as the abdomen: *pleura* with the incisures punctured: *posterior tarsi* a little paler.

Length half an inch.

This is very much like C. *calipterus*, Nob. but the wings are hyaline; the cellules somewhat different; the inferior wings destitute of a central spot; the body is of a deep rufous color, &c.

9. C. *plurivinctus*. Black; segments of the tergum margined with white.

Inhabits United States.

Body black: *thorax* with a short line before the wings and wing-scale yellow: *wings* hyaline, with a slight dusky tinge; nervures blackish; stigma rufous at the stricture; second cubital cellule quadrangular, somewhat oblique, meeting the radial cellule in an angle: *abdomen* almost sessile: *tergum* with the first segment excavated near the base; densely punctured; all the segments with narrow, white posterior margins: *oviduct* exserted, short, hardly half the length of the abdomen: *feet* honey-yellow; posterior pair with the knees, tips of the tibiæ and of each tarsal joint, black.

Length over half an inch.

♂ Hind pair of feet with an annulus on the tibiæ and base of each tarsal joint, white.

The male is much smaller than the female. I obtained a female from a follicle of the common folliculate

Linnæan Bombyx, with transparent wings, which were extremely abundant a few years since in Maryland, causing much apprehension for the safety of the trees of their choice. Some of them were obtained for me, by my friend Mr. Gilliams, for examination, when I described them under the name of *hyalìna*, but did not publish the account.

10. C. *grallàtor*. Ferruginous, with black sutures and wings.

Inhabits Indiana.

Body ferruginous: *head* slightly yellowish on the orbits: *mandibles* black at tip: *antennæ* dusky, before the tip yellowish: *thorax* with two obsolete, parallel, yellowish lines; sutures before the wings and scutel black: *wings* violaceo-fuliginous; nervures blackish; stigma ferruginous; second cubital cellule rather large, pentangular, the side of the radial cellule much the smallest; two bullæ and recurrent nervures each with one: *metathorax* with the sutures black: *scutel* rounded: *abdomen* clavate, falcate, gradually narrowed to the base, somewhat polished; posterior margins of the segments obsoletely yellowish; the base of the segments or incisures black: *pleura* and *pectus* with black sutures; separating suture between the pleura and metathorax black, including a yellow line: *oviduct* as long as the abdomen; posterior pair of tibiæ and tarsi paler than the thighs; posterior coxæ nearly as long as the thighs.

Length about three fifths of an inch.

This insect differs somewhat in appearance from its congeners. The form of the abdomen, excepting that it is not compressed, the fact that it originates higher upon the metathorax than others, and the elongated posterior coxæ give it a little the air of a Fœnus, but the numerously jointed antennæ place it in this family.

11. C. *núncius.* Black; abdomen excepting the base and tip rufous.

Inhabits Pennsylvania.

Body black: *palpi* white, blackish at tip; *antennæ* ♀ a long white annulus in the middle: *thorax* immaculate; two impressed lines: *wings* hyaline; nervures brown; stigma rather slender; second cubital cellule rather large, pentagonal, the two angles on the radial nervure nearly rectangular; recurrent nervures almost rectilinear: *tergum*, basal segment wholly or in part black; second, third and generally half of the fourth rufous or honey-yellow; remaining segments black: *oviduct* nearly half the length of the abdomen: *feet* honey-yellow; posterior pair of tibiæ at tip and knees black; posterior tarsi pale yellowish.

Length about two fifths of an inch.

I obtained many specimens from the larva of ATTACUS *promèthea*, Linn. several years ago.

12. C. *subclavàtus.* Black; antennæ subclavate, at base and feet honey-yellow.

Inhabits United States.

Body black: *antennæ* on the basal half piceous or dark honey-yellow, dilating gradually towards the tip, terminal half dusky or black; first joint robust: *thorax* depressed on the posterior disk, in which are longitudinally confluent punctures; a slightly elevated line before the bi-foveolate scutellar groove: *wings*, radial cellule rather wide and short; cubital cellule pentangular, sides subequal, angles at the radial cellule nearly rectangular: *abdomen* ♀ oval, honey-yellow, dusky or blackish at base and tip: *oviduct* nearly half the length of the abdomen: *feet* honey-yellow.

Length under one fifth of an inch.

Approaches a little to the genus HELWIGIA by the form of its antennæ. I found one specimen in Pennsylvania and another in this State.

13. C. *micrópterus*, ♀. Black; feet and middle of the abdomen rufous; wings abbreviated.

Inhabits Pennsylvania.

Body black: *antennæ*, honey-yellow, with a paler yellow annulation: *palpi* whitish: *wings* not reaching the tip of the metathorax: *metathorax* concave behind; posterior angles a little prominent: *tergum* polished, suboval; first segment black; second and third honey-yellow; remaining segments black: *oviduct* half the length of the abdomen: *feet* honey-yellow, paler at their origin; posterior pair of thighs and tibiæ each at tip blackish.

Length one fifth of an inch.

This seems to be related to C. *abbreviàtus*, Fabr. but it has no "striga alba."

OPHION, Fabr.

1. O. *purgàtus*. Honey-yellow; two opake dots in the first cubital cellule.

Inhabits Indiana.

Body pale honey-yellow, somewhat sericeous: *antennæ* rather longer than the body: *orbits* yellow, dilated before, so as to occupy the greater part of the hypostoma: *ocelli* large, prominent: *wings* hyaline; stigma slender; first cubital cellule with two opake, subtriangular spots; second cubital cellule none: *metathorax* with a single, raised, rectilinear, transverse line, near the base.

Length about seven tenths of an inch.

This is much like an insect sent me by Mr. Winthem

as the *ramídulus*, Fabr. which has also opake wing-spots, but is black on the tip of the abdomen. The *bilineàtus*, Nob. may be distinguished from this species by having many raised lines on the metathorax and by being destitute of the opake wing-spots. The sexes are similar in color, and both have the opake wing-spots, which is not the case in Mr. Winthem's specimens of *ramídulus*.

2. O. *glabràtus*. Honey-yellow; a glabrous spot in the large cubital cellule.

Inhabits Indiana.

Body dull honey-yellow: *head* bright yellow: *antennæ, mouth* and *stemmata* honey-yellow: *eyes* blackish: *wings*, first cubital cellule beyond its middle with a longitudinally oval glabrous space, but destitute of any opake spot: *metathorax* transversely wrinkled near the petiole of the abdomen.

Length about four fifths of an inch.

Much like *purgàtus*, Nob., with a similar glabrous spot in the cubital cellule, but this spot is destitute of any appearance of the opake coriaceous spots which distinguish that species.

3. O. *mundus*. Black; antennæ, posterior tibiæ and tarsi yellow.

Inhabits Indiana.

♂ *Body* black: *head* with the front, nasus and anterior orbits greenish-yellow: *antennæ* fulvous yellow; three or four basal joints above black; the first joint beneath greenish-yellow: *trunk* with rather dense, short hairs: *wings* purple-black: *abdomen* much compressed; basal joint cylindrical; second segment as long as the first, or a little longer, compressed towards the tip: *anterior pair of feet* yellowish before: *intermediate pair* with a line before and base of the tibiæ yellowish: *pos-*

terior pair with the tibiæ, excepting the tip, and the tarsi, excepting the terminal joint, fulvous-yellow.

Length nearly one inch.

Resembles *flavicórnis*, Nob., which, however, has the first segment of the abdomen considerably longer than the second. It is also allied to *mòrio*, Fab. but that species is described to have the wings blue, tipt with brown, and the legs black, the anterior ones testaceous.

4. O. *bilineàtus*, Nob. Contributions of the Maclurian Lyceum, p. 75.

This is the analogue of the O. *lùteus*, Fab.

5. O. *brachiàtor*. Black; abdomen and feet yellowish; a petiolated second cubital cellule.

Inhabits Indiana.

Antennæ, first joint beneath, white: *mandibles* whitish, piceous at tip: *palpi* white; *wings* hyaline; stigma slender, blackish; second cubital cellule rather large, quadrangular, more or less petiolated from the radial cellule, anterior recurrent nervure a little arcuated, not angulated and with a white bulla; second recurrent nervure rectilinear, with a white bulla: *metathorax* with an impressed longitudinal line, and a transverse raised one at base: *abdomen* honey-yellow; first joint white at base; second joint blackish above: *feet*, posterior pair honey-yellow, tarsi blackish; intermediate pair white, with honey-yellow thighs; anterior pair white.

Length nine twentieths of an inch.

I place this in the genus Ophion because of the compressed, falcate abdomen, notwithstanding the existence of the second cubital cellule.

Anomalon, Jurine.*

1. A. *attráctus*. Black; feet and base of the abdomen honey-yellow.

Inhabits Indiana.

Body black, somewhat polished: *frontal orbits*, part of the *hypostoma* and *mouth* yellowish-white: *thorax*, line before the wings and wing-scale whitish: *wings* hyaline; nervures fuscous, towards the base whitish; stigma whitish towards the stricture; second cubital cellule destitute of the exterior nervure; recurrent nervures each with a bulla: *scutel* pale yellow: *metathorax* with a transverse pale yellow line beneath the scutel: *abdomen* honey-yellow; posterior half of the 4th segment and the remaining segments black; first segment sessile, with an arcuated groove in which are many elevated lines; 2d segment with two less arcuated ones; 3d and 4th segments each with one of the grooves; all the yellow portion of the tergum has large close-set punctures: *feet* honey-yellow, origin of the anterior pair pale yellow: posterior tibiæ black towards the base, with a large white annulus; posterior tarsi black: *pleura* with a white line before: *pectus* having an angulated white line: *oviduct* not extending beyond the tip of the abdomen.

Length one fifth of an inch.

2. A. *ejúncidus*. Ferruginous, reticulate with large punctures; pectus black.

Inhabits United States.

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* I place in this genus, those species that are destitute of the small cubital cellule, and which have not the abdomen so compressed and truncated, as to associate with Ophion.

Body ferruginous, with crowded, discoidal punctures, giving the surface a reticulate appearance: *head* without obvious punctures; orbits tinged with yellow: *antennæ* blackish; first joint yellowish beneath: *thorax* with a slightly impressed line before, and another each side behind, obsolete; dilated sutures about the scutel black: *wings* hyaline; nervures blackish; stigma rather slender; second cubital cellule none, the anterior recurrent nervure obtusely arcuated; second recurrent nervure rectilinear: *abdomen* slender, dull honey-yellow, piceous black above and at tip, without large punctures: *oviduct* as long as the basal joint of the abdomen: *feet* dark honey-yellow: *pleura* above the anterior feet with oblique lines: *pectus* black.

Length about two fifths of an inch.

3. A. *méllipes*. Black; feet honey-yellow; posterior thighs armed with a spine.

Inhabits Indiana.

ANOMALON *méllipes*, Nob. Contrib. Macl. Lyc. p. 74.

♀ *Body* black, polished: *head* with the distance behind the eyes considerable: *labrum* dull piceous: *palpi* dull whitish: *thorax* with the impressed lines rather deep, rendering the thoracic lobes very distinct: *wings* with a slight dusky tint: *metathorax* with an obvious spine on each side of the posterior declivity: *feet* honey-yellow: *coxæ* and *thighs* robust, particularly those of the posterior pair, of which the thighs are armed beneath near the tip with a prominent spine: *oviduct* as long as the body, or a little longer, somewhat compressed towards the tip.

Length nearly seven twentieths of an inch.

♂ Anterior and intermediate thighs rather less robust.

Length less than seven twentieths of an inch.

Has some resemblance to a XORIDES, but the mandibles are bidentate, and the metathorax and anterior part of the thorax differ. It is a very distinct species. I have thought it may be useful to give the above more detailed and characteristic description than that quoted, which is too short and unimportant. A good name for this species would be *gladiàtor*.

4. A. *densàtus*. Black; thorax rufous; tergum densely punctured.

Inhabits Indiana.

Body black, with short, small hairs: *orbits* above with a white spot; *face*, below the antennæ, and *mouth*, pale yellowish: *antennæ* ———: *thorax* reddish-brown; with an abbreviated black vitta: *scutel* reddish-brown: *wings* hyaline; nervures fuscous; stigma yellowish: *abdomen* sublinear, not attenuated towards the base, but in the first joint: *tergum* with dense, rather large, but not profound punctures; posterior edges of the segments slightly rufous: *oviduct* nearly half the length of the abdomen: *feet* dull yellowish; coxæ and trochanters whitish; tips of the tibiæ and of the tarsi dusky.

Length ♀ over one fifth of an inch.

5. A. *recúrvus*. Black; feet honey-yellow; posterior tibiæ and tarsi with black joints.

Inhabits Indiana.

Body rather slender, black: *head* not extended behind the eyes: *orbits*, *nasus* and *palpi* white: *thorax* trilobate (as in XORIDES and PIMPLA) with a white line before the wings: *metathorax* long, convex: *tergum* equal in width, basal segment a little narrower at base; segments subequal in length; first and second segments with a transverse impressed line near their tips; remaining segments, excepting the last, with a lateral, transverse, im-

pressed line at their middles: *oviduct* less than half the length of the abdomen, a little recurved at tip: *feet* honey-yellow; intermediate and posterior pairs of tarsi white, the joints black at their tips; posterior pair of tibiæ black, white in the middle.

♂ much smaller; thorax tinged with piceous; hypostoma white; pectus honey-yellow; feet paler than in the female.

Length three tenths of an inch.

The metathorax is convex as in XORIDES, elongated, but the head is transverse and not globular.

6. A. *lineátulus*. Black; anterior pairs of feet honey-yellow; tergum with minute lines.

Inhabits Indiana.

Body black, sparsely punctured: *palpi* whitish: *thorax* with two deeply impressed lines, uniting behind: *wings* hyaline; nervures fuscous: *scutel* at base with a dilated indentation: *metathorax* with raised lines: *abdomen* gradually tapering to the base: *tergum* on the three basal joints, with numerous, small, longitudinal, raised lines; fourth and following segments with much more minute transverse ones: *feet*, anterior pairs entirely honey-yellow; posterior pair black, the incisures yellowish; posterior tarsi yellowish.

Length ♂ over one fourth of an inch.

This has some resemblance to *méllipes*, Nob., which, however, has the posterior thighs thickened and with an obvious tooth on their inferior edge.

The lineations of the tergum of the three basal segments distinguish this species.

7. A *divaricàtus*. Black; tergum with two oblique, impressed lines on each segment.

Inhabits Florida.

Body black: *wings* with fuscous nervures, dull yellowish towards the base: *abdomen* nearly sessile, minutely and densely punctured; first segment with two longitudinal, elevated lines; 2d, 3d and 4th each with two very obvious, impressed lines, originating at the base and divaricating towards the posterior angles: *feet* honey-yellow: *posterior pair*, thighs at tip, tibiæ at tip and annulus near the base, and posterior halves of the tarsal joints, black.

Length over two fifths of an inch.

Has considerable resemblance to ICHNEUMON *inquisitor*, Nob., but the impressed lines of the tergum are very oblique, and the wings are destitute of the small second cubital cellule.

8. A. *emarginàtus*, Nob. Contrib. Macl. Lyceum, p. 76. This species is very remarkable by the prominence of the head in front of the insertion of the antennæ, which hence appear to be situated in a deep foveola; this character, together with the very short, robust feet, proves a close relation to ALOMYA, to which in fact I would refer the species, but that there is no appearance of a second cubital cellule; the antennæ have thirty-six joints.

PELTASTES, Illig.

1. P. *pollinctòrius*. Black; two thoracic spots, scutel, and bands of the tergum yellow; tibiæ black.

Inhabits Pennsylvania and Indiana.

♀ ***Body*** black, densely and closely punctured: *head* ———: *thorax* with a yellow line before the wings: *scutel* quadrate; lateral edge elevated; posterior margin, including the prominent spines, yellow: *wings* with a tint of ferruginous; nervures fuscous; stigma paler in the

middle: *metathorax* with a short transverse line beneath the scutel and dot each side at tip yellow: *tergum* slightly tinged with violaceous, particularly towards the tip; posterior margins of the segments yellow, excepting the second and sixth, of which the former has the lateral angle obscurely yellow: *feet*, anterior pairs honey-yellow; the thighs black behind; posterior pair black, the thighs yellow at base.

Length about seven tenths of an inch.

♂ Basal joint of the antennæ beneath whitish: frontal escutcheon on its lateral and basal margins, extending a short distance upon the orbit, yellow: dilated joint of the palpi dull whitish: metathorax with a yellow spot near the posterior coxæ: coxæ and knees honey-yellow.

Length over two fifths of an inch.

The female was presented to me several years ago by Mr. Lesueur, who obtained it in the neighborhood of Philadelphia. It is much like P. *necatòrius*, Fabr. but is considerably larger, and that species is destitute of spots on the metathorax, and its posterior tibiæ are yellow.

The male was taken by myself in Indiana.

Banchus, Fabr.

1. B. *nérvulus*. Black; anterior pairs of feet and posterior tarsi yellow.

Inhabits Indiana.

Body black: *mandibles* polished at tip: *tongue* rather prominent: *wings* dark violaceo-fuliginous; nervures blackish; stigma honey-yellow; second cubital cellule quadrangular, attached to the radial cellule by a slightly petiolated angle; first recurrent nervure with a prominent

process and a small white spot; second recurrent nervure much undulated, margined with white one half its length; exterior nervure of the cellule with a white spot: *feet*, anterior pairs, excepting the coxæ and trochanters, honey-yellow; posterior pair black, their tarsi yellow.

Length at least half an inch.

2. B. *æquàtus*. Black; antennæ and feet, excepting the hinder thighs, yellow.

Inhabits Indiana.

Body black: *antennæ* yellow, at tip and base a little dusky: *hypostoma* with two slight lobes situated longitudinally, and with the mouth and orbits yellow: *thorax* with a slightly indented line each side before and another over the wings: *wings* violaceo-fuliginous; nervures and stigma blackish, the latter with a whitish dot at its stricture; second cubital cellule pentangular, the two angles on the costal side rectangular and the three corresponding sides equal, the two anal sides shorter and equal, two sides with a white spot and the two recurrent nervures with each a white spot: *wing-scale* and junction of the wings with the thorax honey-yellow: *feet*, anterior pairs honey-yellow; posterior pair with the tibiæ and tarsi yellow.

Length about half an inch.

It has much resemblance to AGATHIS *polita*, Nob.

3. B. *fugitivus*. Second cubital cellule petiolated; posterior tibiæ annulate.

Inhabits Indiana.

Body black: *antennæ* in both sexes black: *mandibles* and *palpi* white: *wing-scale* white: *wings* hyaline; nervures black, whitish at base; second cubital cellule very small, petiolated from the radial cellule: *metathorax*

not obviously excavated behind, but with somewhat raised lines; *abdomen* arcuated; towards the tip rather abruptly clavate; punctures very small: *oviduct* as long as the tip of the abdomen: *feet* honey-yellow, with a white reflection; posterior tibiæ white with black tip and base; posterior tarsi black, base of the first joint white, in the male the white of the posterior tibiæ is less obvious.

Length from one fourth to three tenths of an inch.

I obtained a specimen from a very pretty cocoon which is somewhat cylindric, white, with two maculated black bands.

Acænitus, Latr.

1. A. *décorus*. Black varied with whitish; posterior tarsi whitish.

Inhabits Indiana.

♀ *Body* black: *orbits* white, interrupted above and before: *hypostoma* white, nasal sutures black each side: *mandibles* black: *antennæ* with ten or twelve white joints beyond the middle: *thorax* with the line over the wings, wing-scale, line before the wings, and lateral and posterior margin of the anterior lobe white: *scutel* white: *wings* hyaline, with a rounded fuscous spot at tip: *metathorax*, a small spot under the scutel and behind whitish: *abdomen*, posterior margins of the segments white; in profile clavate; dorsal view fusiform: *venter* white; scale prominent, acute: *oviduct* much longer than the abdomen: *pleura* varied with yellowish: *feet* honey-yellow: posterior pair of coxæ with three large yellow spots; incisures of the posterior thigh black; posterior tarsi whitish.

Length nearly three fifths of an inch.

♂ Orbits white uninterrupted: *thorax* more variegated with white: *antennæ* with about eight white joints: *scutel* with a black disk, the white margin extending forwards in the form of a V: *metathorax* black varied with white, spines prominent: *tergum*, first joint on the lateral margin white as well as the tip; second segment with a much arcuated line each side of the middle, curving forwards; remaining segments with the posterior margins dull whitish: *venter* blackish, somewhat banded: *pleura* whitish, with a black line under the wings; anterior portion black with white lines: *pectus* pale honey-yellow: *coxæ*, posterior pair with a black line.

Length nine twentieths of an inch.

This is a very prettily variegated species.

2. A. *mélleus*. Honey-yellow; antennæ white, blackish at base.

Inhabits Indiana.

♀ *Body* honey-yellow: *head* with a large black spot above the antennæ; beneath the antennæ yellowish: *antennæ* white; basal third above black: *occiput* with a dusky spot: *scutel* yellow, the sutures around it black: *wings* with a blackish tip: *tergum*, sutures somewhat dusky: *tibiæ* and *trochanters* yellowish.

Length two fifths of an inch.

Bassus, Fabr.

1. B. *sanctus*. Black; metathorax, abdomen and posterior feet sanguineous.

Inhabits Indiana.

♀ *Body* black: *palpi* tinged with piceous: *thorax*, *pleura*, *pectus*, and two anterior pairs of *feet* immaculate:

wings blackish-violaceous, with a hyaline literation in the middle; nervures black; separating nervure between the first cubital and first discoidal cellules widely interrupted; second cellule triangular; cubital cellule rather large: *metathorax* and *abdomen* bright sanguineous: *posterior coxæ* and *thighs* bright sanguineous, the intervening trochanter black; *posterior tibiæ* dull sanguineous, their tips dusky, their tarsi blackish: *oviduct* nearly as long as the body, ferruginous, with black valves.

Length over three tenths of an inch.

At first view resembles Bracon *initiàtor*, F.

2. B. *limitàris*. Black; feet honey-yellow.

Inhabits Missouri and Indiana.

Body black: *palpi* white: *thorax* longitudinally indented behind the middle: *wings* nearly hyaline, at base yellowish; nervures fuscous; stigma large; first cubital cellule complete; second rather large, quadrangular: radial cellule also rather large: *feet* honey-yellow; posterior pair of tibiæ whitish, their tips and annulus near the base black; posterior pair of tarsi black.

Length seven twentieths of an inch.

Var. *α*. Maxillary palpi, first joint black.

♀ Oviduct hairy, decurved, somewhat robust.

3. B. *gibbosus*. Black; nasus gibbous; terminal joints of the antennæ short.

Inhabits Indiana.

♀ *Body* somewhat polished, black: *nasus* with a prominent gibbosity: *antennæ* with the joints of the terminal third not longer than broad: *wings* slightly fuliginous; stigma robust; the abbreviated nervure at base of the stigma very robust and very near to the costal nervure: *tergum*, second segment at base with two large foveolæ: *oviduct* as long as the abdomen and thorax together:

feet, terminal half of the thighs and basal portion of the tibiæ dull honey-yellow.

Length hardly over one tenth of an inch.

The smallest species I have met with.

Bracon, Jurine, Latr.

† Separating nervure between the radial and cubital cellule arcuated; second cubital cellule not very much elongated.

1. B. *pectinàtor*. Black; abdomen yellowish; wings blackish; cellules regular.

Inhabits United States.

Head rather large and robust, concave behind at the neck: *rostrum* not prominent: *thorax* with the dorsal sutures dilated and containing very obvious transverse lines; the transverse suture at base of the scutel with five elevated lines: *wings* dark violaceous; 2d cubital cellule shorter and smaller than the first, quadrangular; nervure forming the radial cellule rectilinear: *oviduct* exserted, black.

Length ♀ to tip of wings nearly two fifths of an inch.

I am not certain whereabout this insect was captured, but I think I obtained it in the N. W. Territory when engaged on the northern expedition with Major Long.

It resembles the *populàtor*, but the rectilinear form of the nervure of the radial cellule places it nearer *rugàtor*, Nob. and *initiàtor*, F.; from the former it is distinguished by the more simple surface of the tergum, and from the latter by the much shorter second cubital cellule.

2. B. *rugàtor*. Sanguineous; head, wings and feet blackish; tergum wrinkled.

Inhabits Indiana.

Rostrum distinct; *head* piceous: *antennæ* black:

thorax polished: *wings* purplish-fuliginous, with three or four obsolete, small, white spots; cellules regular: *tergum* with numerous longitudinal, elevated lines on each segment; first segment with the lines transverse and interrupted by a large, elevated oval lobe on the disk, which has a longitudinal line and irregular rugæ; the lateral edge elevated; 2d and 3d segments with an oblique indented line at base each side: *oviduct* two thirds the length of the abdomen, black, clothed with short hairs: *feet* piceous-black.

Length ♀ three tenths of an inch.

The remarkable appearance of the tergum readily distinguishes this species from *populàtor*, Nob. which it resembles. It has a general resemblance to B. *initiàtor*, Fabr.

3. B. *hebètor*. Black; head, thoracic lines, tibiæ and base of the abdomen honey-yellow.

Inhabits Indiana.

Body black, polished: *head* pale honey-yellow; antennæ, region of the stemmata, of the antennæ and spot on the hypostoma, black: *mandibles* robust, black at tip: *thorax* with two obsolete, piceous, oblique lines confluent at the middle and terminating in a spot each side of the scutel: *wings* dusky, nervures black; stigma rather large; nervure from the stigma, oblique to the 2d cubital: *abdomen* depressed, oblong-ovate: *coxæ*, knees and base of the tibiæ, yellowish-white: *oviduct* shorter than the abdomen.

♂ Abdomen whitish at base.

Length nearly one tenth of an inch.

The antennæ of the male are 22-jointed and those of the female are short, more robust, fourteen-jointed. The short, thoracic piceous lines have sometimes a cruciform appearance by being continued around the scutel.

4. B. *dorsàtor*. Yellowish, antennæ, three thoracic lines and tip of the tergum, black.

Inhabits Indiana.

Body yellowish, somewhat fulvous, a little polished: *antennæ* short, rather robust, black; area of the stemmata blackish: *thorax* with three distant black, short lines, the anterior one shortest and impressed: *wings* hyaline, slightly dusky towards the base; cellules regular; nervures brownish; stigma triangular, yellow-brown: *tergum* with a black dot on the first segment, and dusky on the disk or towards the tip: *pleura* with a blackish line behind the wing: *pectus* blackish on the disk: *feet* with the tarsi dusky at tip.

♀ Oviduct half as long as the abdomen.

Length to the tip of the wings less than three twentieths of an inch.

Much like *hebètor*, but is somewhat larger and more robust; it may be distinguished at first by its lighter color. As in that species the first cubital cellule is wider by one third than the second at their junction, and the latter is hardly as long as the first, in either sex.

5. B. *argutàtor*. Honey-yellow; antennæ, terminal joint of the tarsi and oviduct, black.

Inhabits Indiana.

♀ *Body* honey-yellow, somewhat polished: *antennæ* black: *mandibles* piceous: *hypostoma* with a transverse, dilated indentation: *stemmata* blackish: *thorax* immaculate: *wings* very slightly tinged with dusky; nervures blackish; stigma yellowish in the middle; second cubital cellule as long or rather longer than the first, and nearly as wide at their junction: *tergum* of a rather paler yellow than the thorax, and opake with minute punctures or granules, oblong-oval: *oviduct* black, half as long as the abdomen: *tarsi*, terminal joint blackish.

Length to tip of wings over three twentieths of an inch.

Of the same general habit with *hebètor*, but is considerably larger, and may be known at once apart from it, by the equality, at their junction, of the 1st and 2d cubital cellules, by the punctured tergum, &c.

6. B. *vestìtor*. With prostrate hairs; basal joint of the tergum bi-sinuate at tip.

Inhabits Mexico.

♂ *Body* with very numerous, minute, prostrate hairs: *head* blackish, with dilated dull fulvous orbits; before the antennæ more prominent than above, and convex: *antennæ* dull yellowish: *thorax* dull fulvous, with three dilated black lines, of which the middle one is abbreviated before the middle: *metathorax* dusky: *wings* hyaline: *tergum* yellowish, somewhat polished towards the tip; lateral edge dusky; first segment at tip bi-sinuate or three-angled: *feet* paler: *thighs* a little dusky.

Length of the body three twentieths of an inch.

Somewhat resembles the preceding, but the hairy vesture distinguishes it from all the foregoing species.

7. B. *scrutàtor*. Yellowish; with prostrate hairs; 1st joint of the tergum bi-sinuate at tip, black at base.

Inhabits Indiana.

♀ Rather dull honey-yellow, with minute hairs: *head* more prominent and paler beneath the antennæ: *antennæ* dull yellowish: *stemmata* black: *thorax* with a slender black line each side: *pleura* with a black oblique line under the wings: *metathorax* black: *wings* hyaline; nervures pale brownish; stigma yellowish at base; 2d cubital cellule shorter and narrower than the first: *tergum* elongate sub-obovate, black at base, this color extending paler on each side; middle of the disk towards the base

pale yellow extending on the tip of the first segment, which is sub-bisinuate or slightly three-angled; second segment as well as the first with an elevated line: *oviduct* not exserted beyond the tip of the abdomen, black.

♂ Third and following segments of the tergum annulate with black; no elevated line on the tergum, nor three angled appearance of the tip of the first segment.

Length less than one fifth of an inch.

Resembles *vestìtor*, but is more slender, larger, and differently marked.

8. B. *rugulòsus*. Honey-yellow; head, breast and three lines on the thorax black.

Inhabits Indiana.

Body honey-yellow: *head* with rather wide and slightly impressed punctures, which on the front are transversely confluent into minute rugæ: *mouth* obscure piceous: *antennæ* obscure piceous, black towards the tip: *thorax* somewhat tinged with sanguineous, and with three, abbreviated, blackish vittæ; behind the intermediate vitta is a rugous space, with a slightly elevated line: *wings* hyaline; nervures and carpus blackish; cubital cellules three; *metathorax* rugous, with an elevated line: *abdomen* longitudinally rugous, oblong; with three larger segments, decreasing in length; and three smaller ones at tip, taken together hardly longer than the third: *pectus* in the middle black.

Length one fourth of an inch.

The magnitude of the three basal segments of the abdomen is remarkable in this species.

9. B. *transvérsus*. Granulated; nervure from the stigma nearly transverse.

Inhabits Indiana.

Body densely punctured or granulated; blackish-piceous: *antennæ, mouth* and *feet* honey-yellow: *wings* hyaline; nervures brown; stigma large; nervure from the stigma to the second cubital cellule nearly transverse, so as to make the three angles at its contact, equal: *tergum* dull honey-yellow at base; first segment with two prominent, parallel lines; second segment occupying three fourths of the whole surface: *oviduct* shorter than the abdomen.

Length over one twentieth of an inch.

The whole surface has a minutely granulated appearance, and the nervure from the stigma is more than usually transverse, having but a very slight obliquity. In having but two principal segments to the abdomen, this species approaches the genus SIGALPHUS, but the venter is not deeply vaulted as in that genus.

10. B. *mellitor*. Honey-yellow; antennæ dusky.

Inhabits Indiana.

♀ ***Body*** honey-yellow, polished: *antennæ* dusky: *thorax* immaculate: *wings* hyaline; nervures fuscous; stigma yellowish at base; 2d cubital cellule as long as the first, but somewhat narrower than the greatest width of the latter: *tergum* short, oval, not polished; paler than the thorax, with minute, prostrate hairs; second segment with an indented dot each side: *oviduct* black, as long as the abdomen: *tarsi*, terminal joint blackish.

Length of the body three twentieths of an inch.

The wing-stigma is sometimes almost entirely black.

†† Separating nervure arcuated; second cubital cellule elongated; the nervure from the stigma inserted at its middle.

CELLERON.

11. B. *inescàtor*. Pale dull yellowish; palpi and feet whitish.

Inhabits Indiana.

♀ *Body* dull yellow, with a slight intermixture of honey-yellow, immaculate: *antennæ* blackish towards the tip: *mandibles* piceous at tip: *wings* hyaline, with a very slight dusky tinge, and yellowish at base; nervures of the middle of the wing and disk of the stigma fuscous: *abdomen* oblong sub-obovate: *oviduct* black, hardly half the length of the abdomen: *palpi* long, white: *feet* white.

Length of the body two twenty-fifths of an inch.

12. B. *pullàtor*. Black; abdomen at base and feet yellowish.

Inhabits Indiana.

♀ *Body* black, a little polished: *antennæ* towards the base obscure yellowish, first joint pale honey-yellow: *mouth* pale piceous: *mandibles* at tip blackish; *wings* hyaline; nervures brownish; stigma fuscous: *tergum* oblong sub-obovate, disk near the base dark honey-yellow: *oviduct* longer than the abdomen, black: *feet* pale honey-yellow.

Length less than one tenth of an inch.

13. B. *honéstor*, Nob. Contr. Macl. Lyc. vol. I. p. 78, belongs also to this subdivision.

14. B. *paulùlor*. Black; abdomen short; feet whitish.

Inhabits Indiana.

Body black: *head* large: *antennæ* fuscous, obviously longer than the body: *mandibles* yellowish: *palpi* white:

wings hyaline; stigma elongated, slender; second cubital cellule elongated, having the nervure from the stigma inserted at about one third its length: *abdomen* short: *oviduct* very short: *feet* honey-yellow, a little dusky towards their tips.

Length less than one twentieth of an inch.

The second cubital cellule is elongated, but the descending nervure from the stigma is inserted considerably behind the middle.

††† Separating nervure between the radial and cubital cellules reclivate. TOXONEURON.

15. B. *viàtor*. Sanguineous; antennæ, vertex, wings and pectus black.

Inhabits Indiana.

Body rather pale sanguineous: *antennæ*, *vertex* and dilated frontal spot, part of the hypostoma and mouth, black: *thorax* with indented lines; a black spot on the middle sometimes obsolete or wanting: *metathorax* behind black: wings blackish-fuliginous; nervures robust, black; stigma and costal nervure honey-yellow: *pleura*, *pectus* and *coxæ* black; the former sanguineous near the wings: *tarsi* at tip blackish: *abdomen* depressed.

Length one fourth of an inch.

This species and the following differ from the type of the genus BRACON in the form of the radial and third cubital cellules, in consequence of the arcuation of the separating nervure.

It is much like *populàtor*, Nob., but among other characters it may be distinguished by the yellowish carpal spot and costal nervure, which are always black in the *populàtor*.

16. B. *populàtor*, Nob. Long's Exp. to St. Peters, Appendix, p. 323, belongs to this subdivision.

17. B. *tibiàtor*, Nob. ibid, p. 322, also of this subdivision.

18. B. *exploràtor*. Black; feet partly rufous.

Inhabits Indiana.

Body black, polished; with small, prostrate hairs: *thorax* with the impressed lines not remarkably dilated; the transverse one punctured: *wings* dusky, stigma rather large: *feet* black; thighs rufous, excepting a small portion at base, posterior pair entirely rufous; tibiæ rufous, black at tip.

Length three twentieths of an inch.

The thorax and head are much less hairy than those of *tibiàtor*, Nob., and that insect has the wings dusky at tip only; the present also is a smaller species.

†††† Second cubital cellule confluent with the third.

ALIOLUS.

Abdomen of three principal segments.

19. B. *trilobàtus*. Yellowish-rufous; thorax and vertex black.

Inhabits Indiana.

Body rufous, tinged with yellowish: *head* black on the vertex: *antennæ* blackish, excepting the two or three basal joints; about as long as the body: *mandibles* black at tip: *thorax* somewhat trilobate, black, with an obsolete rufous central spot: *scutel* black: *wings* hyaline; nervures and robust carpus black; second cubital cellule confluent with the third; inferior discoidal cellule half as large as the central one: *posterior tibiæ* dusky except at base: *coxæ* yellowish: *abdomen* oblong subovate, short, dusky at tip; densely punctured, with three segments, decreasing in length; a small, almost concealed terminal segment.

Length ♂ one fifth of an inch.

The cubital cellules are but two, the second transverse nervure being entirely wanting, and the nervure forming the anal side of the cubital cellules is very slender; the other nervures being quite robust. If the genera throughout this order, are to be divided as in the *TENTHREDINETÆ*, I would propose the separation of this and the following species, under the generic name of ALIOLUS.

The character of the abdomen agrees with this genus; but the neuration of the wings seems to agree rather better with MICROGASTER.

20. B. *thoracicus*. Black; thorax and feet honey-yellow.

Inhabits Indiana.

♀ *Head* ———: *thorax* honey-yellow, with two oblique, lineated grooves; suture before the scutel much dilated, and profound: *wings* hyaline; radial cellule with the nervure as distinct as the others, regularly arcuated, without any angulation; second cubital cellule much dilated and destitute of the exterior nervure: *metathorax* black: *abdomen* minutely punctured or lineated at base, polished towards the tip, oval; second incisure indistinct: *oviduct* longer than the abdomen: *feet* honey-yellow.

Length less than one tenth of an inch.

MICROGASTER, Latr.

1. M. *énsiger*. Black; feet and each side of the base of the abdomen yellowish.

Inhabits Indiana.

♀ *Body* black, with dilated punctures and minute hairs: *mouth* honey-yellow: *palpi* white: *thorax* with a yellow wing-scale; suture before the scutel impressed

and with elevated lines: *wings* hyaline; nervures fuscous, light brownish towards the base; stigma triangular, fuscous; second cubital cellule destitute of the exterior nervure; terminal nervures obsolete: *tergum* with large close-set punctures; towards the tip somewhat polished; first segment with a yellow lateral margin, dilating a little towards the tip; third segment with a yellow point on the lateral margin: *abdomen* each side and beneath, except at tip, yellowish: *oviduct* black, nearly as long as the abdomen, with rather long hairs: *feet* honey-yellow; posterior tibiæ, excepting at base, black: posterior tarsi blackish, with the incisures pale.

♂ Coxæ and anterior pairs of tibiæ and tarsi whitish; posterior tibiæ at tip only, dusky, at the extreme base whitish; second cubital cellule complete; terminal wing-nervures distinct.

Length ♂ over one tenth, ♀ less than three twentieths of an inch.

2. M. *méllipes*. Black; thorax with oblique, lined sutures; feet honey-yellow.

Inhabits Indiana.

♂ *Body* black: *hypostoma* somewhat prominent along the middle: *stemmata* rather prominent: *antennæ* beneath towards the base piceous: *mandibles* honey-yellow: *palpi* blackish or fuscous: *thorax* with two oblique impressed lines confluent behind, in which are several transverse lines; and a transverse more dilated one at the base of the suture: *wings* hyaline; nervure of the radial cellule as distinct as the others; second cubital cellule destitute of its terminal nervure; apicial nervures less distinct than the discoidal ones, but not obsolete: *tergum* somewhat fusiform, polished, a little hairy at base and tip: *venter* at base honey-yellow, pale: *thighs* and *coxæ* honey-yellow: *tibiæ* and *tarsi* dusky.

Length nearly three twentieths of an inch.

Distinguished at once from the *énsiger* by the oblique thoracic lines.

3. M. *xylina*. Tergum at tip polished; sides of the venter yellowish.

Inhabits Indiana.

Body black, much punctured: *antennæ* brownish beneath: *palpi* white: *thorax* destitute of oblique lines, but with the transverse, dilated, deeply indented groove at base of the scutel, having small raised lines within, which are not very obvious: *wings* hyaline: nervure of the radial cellule obsolete at base; second cubital cellule destitute of the exterior nervure: *stigma* triangular, fuscous: *tergum* oblong-oval, punctured, glabrous, and polished at tip; basal segment rather rough, the lateral edge a little elevated and dull yellowish; *venter* each side, excepting at tip, dull yellowish: *oviduct* not exserted beyond the tip of the abdomen: *feet* honey-yellow, tips of the posterior thighs above slightly blackish.

Length nearly one tenth of an inch.

It resembles the *énsiger* very much in its markings, but the oviduct is not exserted. Great numbers are deposited together, and they ultimately spin their cocoons and envelope them with an exquisitely fine silky substance, which has been called "animal cotton."

4. M. *congregàta*. Black; thorax destitute of oblique, lined sutures; abdomen elongate, subfusiform.

Inhabits Pennsylvania.

♂ *Body* black: *mandibles* and *palpi* white: *thorax* destitute of oblique, lined sutures; transverse suture at base of the scutel dilated, profound: *wings* hyaline; radial cellule with the nervure as obvious as the others; second cubital cellule rounded, destitute of the exterior

nervure; apicial nervures obsolete: *stigma* triangular, fuscous: *abdomen* oblong, subfusiform, more polished than the thorax; 1st and 2d joints densely punctured or minutely lineated; the first joint pedunculiform, arcuated, narrower than the second: *venter* along the middle pale yellowish: *feet* honey-yellow: *posterior tibiæ* at tip and *posterior tarsi* dusky.

Length over one tenth of an inch.

Resembles *méllipes*, but the thorax has not the oblique, lineated grooves; and the abdomen is more elongated, and slender at base. This basal segment, like that of *méllipes*, has a slight tubercle on each side.

In June, 1822, I obtained eighty-four individuals of this species from the larva of a SPHYNX.

5. M. *zonària*. Black; feet and band on the tergum yellowish.

Inhabits Indiana.

♀ *Body* black, punctured: *antennæ* fuscous; beneath piceous, dull; basal joint beneath honey-yellow: *mouth* honey-yellow: *palpi* white: *wings* hyaline: radial cellule with the nervure not strongly marked; second cubital cellule very small, perfect: *abdomen* not elongated; each side and band on the middle of the tergum honey-yellow: *oviduct* half the length of the abdomen, black: *feet* yellowish; posterior pair of tarsi dusky.

Length one tenth of an inch.

The fasciated tergum is an obvious character.

6. M. *carpàta*. Black; stigma large, brown; feet honey-yellow.

Inhabits Indiana.

♀ *Body* black: *antennæ* beneath and *mouth* piceous: *palpi* white: *thorax* with the suture before the scutel not much dilated, but having the cross lines: *wings* hya-

line; nervures whitish: stigma large, triangular, light brown; nervure of the radial cellule not visible, or but slightly towards the tip; second cubital cellule destitute of the exterior nervure: *tergum* oval, somewhat polished; first segment punctured: *oviduct* nearly or quite as long as the abdomen: *feet* honey-yellow: wing-scale yellow.

Length over one tenth of an inch.

The stigma of this insect is larger and the nervures paler than those of any other species I have seen.

7. M. *bisstigmata*. Stigma elongated, appearing double.

Inhabits Indiana.

♂ *Body* black, polished: *antennæ* at base and *mouth* piceous: *thorax* with two oblique sutures and one at the base of the scutel: *wings* hyaline; nervures pale brownish; nervure of the radial cellule as distinct as the others, rectilinear, parallel with the rectilinear part of the costal edge; second cubital cellule destitute of the exterior nervure; stigma much elongated, the length being obviously more than three times the greatest breadth, brown; a stigma-like spot at the origin of the nervures of the discoidal cellule on the costal margin much smaller and distinct from the stigma: *abdomen* elongate, subclavate, being slender at base: *feet* pale honey-yellow.

Length about one tenth of an inch.

The much elongated stigma and the small spot which precedes it, being larger and more separate than usual, readily distinguish this species.

8. M. *calliptera*. Wings yellowish at base, bifasciate with blackish.

Inhabits Indiana.

Stethidium black: *feet* honey-yellow: *wings*, at base and stigma yellowish; a blackish band upon the two

discoidal cellules; and another blackish band across the stigma, along the descending nervure to the small second cubital and continued dilating to the anal margin, where it is almost confluent with the other band; terminal third hyaline; inferior wings blackish, yellowish on the basal third, this color extending along the costal margin.

This is larger than either of the preceding species.

Chelonus, Jur.

1. C. *parvus*. Black; base of the antennæ, and anterior thighs yellowish.

Inhabits Indiana.

Body densely punctured: *antennæ*, first joint beneath honey-yellow: *palpi* whitish: *thorax* with dilated punctures, particularly on the disk and anteriorly: *scutel* and *metathorax* with dilated punctures; the latter truncate behind: *wings* hyaline; nervures blackish, pale at base; stigma large; second cubital cellule small, subtriangular: *abdomen* without apparent sutures; densely punctured; the punctures longitudinally confluent into wrinkles, which are more prominent at base: *venter* profoundly concave, excavated: *coxæ* black: *trochanters* whitish: *thighs*, anterior pair honey-yellow; the other pairs blackish: *tibiæ* whitish, posterior pairs blackish at tip: *tarsi* whitish.

Length over one tenth of an inch.

The neuration of the wings corresponds with the *dentàtus*, F., but the abdomen exhibits no more appearance of divisions than that of *sulcàtus*, Jur., and the venter is very profoundly excavated. The metathoracic spines are very short and obtuse.

2. C. *sericeus*, Nob. (Sigalphus, Long's Ex. to St.

Peter's, II. p. 321.) Agreeably to the generic characers given by Jurine, this species as well as the following belongs to this genus, on account of the undivided abdomen: still, however, the *dentàtus*, F., which has two distinct sutures on the tergum, is also referred by some modern naturalists to this genus.

3. C. *basilàris*, Nob. (SIGALPHUS, ibid. p. 322.) much like *parvus*, Nob., but is larger, the 2d joint of the antennæ, mandibles, and feet except at tip, are pale yellowish.

DIPLOLEPIS, Geoff. Leach.

(Antennæ filiform, joints cylindric. Three cubital cellules.)

1. D. *armàtus*. Black; antennæ and feet ferruginous; scutel with a conic spine.

Inhabits Indiana.

Body black, polished: *antennæ* ferruginous; first joint not longer than the third, black; second joint globular, black; third and following joints cylindrical, subequal; terminal joint rather longest: *scutel* with a prominent conic, acute spine: *wings* hyaline; nervures pale brownish: *feet* honey-yellow: *venter* on the inferior edge honey-yellow: *thorax* with two grooves: *collar* and first segment of the tergum with close-set raised lines.

Length to tip of wings three twentieths of an inch.

The scutellar spine is very prominent, elevated and obvious, as in FIGITES *ediogáster*, Panz. but the thorax is not so much sculptured as in that species.

2. D. 5-*lineàtus*. Black; feet rufous; scutel with a spine.

Inhabits Indiana.

Body black, polished: *antennæ*, first joint rather shorter than the third: *scutel* rough with about five raised lines; at tip a broad, compressed, carinate, subacute spine: *wings* hyaline; nervures brown: *pleura and first joint of the tergum* with close-set raised lines: *feet*, excepting the inferior surface of the thighs, dull honey-yellow.

Length three twentieths of an inch.

Aside from the color of the antennæ and of the inferior surface of the thighs, the scutel differs from that of the preceding species in being rugose, or with about five elevated lines, and its terminal spine is much broader at the base and less conic.

3. D. *impàtiens*. Black; feet ferruginous; scutel mutic.

Inhabits Indiana.

Body black, polished, obsoletely tinted with piceous: *antennæ* piceous-blackish: *mandibles* ferruginous: *scutel* with the margin deeply depressed and rugose; the disk elevated, oval, with an acute edge, within which, on the posterior half, is an indentation and a more slight indentation before it, each side of which are two or three punctures: *wings* hyaline, nervures pale brown: *abdomen* acute at the tip of the tergum: *feet* ferruginous or rather piceous.

Length three twentieths of an inch.

4. D. *pedàtus*. Black; feet yellowish; antennæ piceous; third joint long.

Inhabits Indiana.

Body polished, impunctured, black: *antennæ* yellowish-piceous; 1st joint not much longer than the second; third joint much longest, equal to the 4th and 5th together, and a little arcuated; remaining joints subequal,

oval-cylindric: *nasus* with a longitudinal indentation each side before: *mandibles* piceous: *thorax* without dorsal grooves, but a simple one over the wings: *wings* with a very slight obscure tint; nervures brown: *feet* honey-yellow.

Length ♂ less than one twelfth of an inch.

Differs from the two preceding species by the elongated third joint of the antennæ.

5. D. *stigmatus*. Black; feet yellowish; wings with a large stigma.

Inhabits Indiana.

Body polished, black: *antennæ* piceous; basal joint yellowish; second joint closely united to the first, shortest, almost spherical; 2d and 3d joints subequal: *wings* hyaline, nervures yellowish; stigma large, triangular: *abdomen* dull rufous: *feet* pale honey-yellow.

Length about one twentieth of an inch.

Figites, Latr.

(Antennæ moniliform, thicker towards their extremities. Second cubital cellule wanting.)

1. F. *impàtiens*. Black; mandibles and feet piceous.

Inhabits Indiana.

♀ *Body* polished black: *antennæ* piceous-black, two thirds the length of the body, with scattered hairs; beyond the sixth joint moniliform; terminal joint ovate conic: *mandibles* piceous; area of the stemmata a little elevated; behind which, on the occiput, are oblique impressed lines: *scutel* with the margin depressed and rugose, the disk oval, the edge obscurely piceous, with an indentation behind, within the edge: *wings* hyaline; nervures yellowish: *feet* piceous.

Length three twentieths of an inch.

I am by no means satisfied with the only essential characters I can find of the genera DIPLOLEPIS and FIGITES. The present species closely resembles the DIPLOLEPIS *impàtiens*, Nob. The scutel has an indentation as in *scutellàris*, Latr. and some other species.

2. F. *méllipes*. Black; feet honey-yellow; wings ciliate.

Inhabits Indiana.

♀ *Body* black, polished: *mouth* piceous: *antennæ* a little hairy, piceous: *wings* hairy and ciliate; more particularly ciliate at tip; *nervures* piceous: *feet* honey-yellow, somewhat paler at base and including the coxæ.

Length one twenty-fifth of an inch.

LEUCOSPIS, Fabr.

L. *fratérna*. ♀, Black, varied with yellow; oviduct longer than the abdomen.

Inhabits Indiana.

Body black, densely punctured: *head* with an obscure silvery reflection before and on the front in the cavity of the antennæ bright green; vertex varied with obscure violet and greenish: *antennæ*, basal joint yellow anteriorly: *collar* margined each side and behind with yellow and with a yellow transverse abbreviated line on the anterior middle: *thorax* with an abbreviated line over the wings and a transverse one on the scutel yellow: *wings* somewhat fuliginous: *pleura* with an oblique, yellow line over the posterior feet: *tergum*, first segment with a dull ferruginous-yellow band at base and a subterminal yellow one; on the middle of the tergum on each side a transverse yellow spot; a yellow band on the posterior submargin of the penultimate segment; and a double

yellow spot at tip of the ultimate segment: *oviduct* longer than the abdomen, reaching almost to the scutel: *tarsi* and *anterior tibiæ* ferruginous, the latter dusky on the middle: *intermediate tibiæ* and *knees* yellow, tinted with ferruginous behind: *posterior thighs* dentated beneath, yellow at base and tip; tibiæ yellow before, somewhat ferruginous behind.

Length seven twentieths of an inch.

♂ Tergum on each side anterior to the middle, a slightly carinated line; lateral yellow spot on the middle none; a yellow band on the middle or a little posterior to the middle, and towards the tip another yellow band; on the posterior declivity is an abbreviated longitudinal yellow line or spot; sides with a yellow spot or line interrupted from the extremities of the two posterior bands; of these two spots the anterior one is sometimes wanting, and in some specimens is a lateral yellow point near the tip.

Length three tenths of an inch.

Closely resembles *affinis*, Nob. in color and markings, but besides other differences the present species is larger and more robust, and the oviduct is longer than the abdomen. A female specimen was sent me by Dr. Harris, and I obtained several males and one female in this State. Dr. Harris's specimen varies in having only a rudiment of the yellow spot of the middle of the tergum.

I have obtained them chiefly on the blossoms of the parsnip.

Chalcis, Fabr. Latr.

I. C. *amœna*. Yellow, variegated with black.
Inhabits Indiana.

Body with large, close-set punctures; yellow, slightly tinged with green: *occiput* and *antennæ*, excepting the basal joint beneath, black: *thorax* quadrilineate with black, the intermediate lines confluent at the middle, and all united by a transverse line behind and by a slender transverse line at the suture of the first segment, on which the lines do not extend: *scutel* with a longitudinal black line: *metathorax*, excepting at base, black: *abdomen*, petiole black, about one third as long as the abdomen: *tergum* moderately arcuated; each segment having a black band: *pleura* black, about four yellow spots: *posterior pair of feet* with their coxæ at tip, maculated band, inferior edge and tip of the dilated thighs, tip and base of the tibiæ, black; the thighs are about the size of the abdomen, with six or eight large prominent black spines, the superior one divided into three or four.

Length less than one fifth of an inch.

A very handsome species; I obtained it from the pupa of a THECLA.

2. C. *débilis*. Dull honey-yellow; anterior pairs of feet whitish.

Inhabits Indiana.

Front yellowish towards the mouth; a black line from the antennæ to the vertex: *antennæ* dusky, paler beneath: *thorax* punctured, with three black vittæ; *scutel* with a black line: beneath the petiole are two whitish spines: *petiole* as long as the posterior coxæ, blackish, whitish at the tips: *abdomen* polished, the incisures blackish: *posterior feet*, coxæ with a black line on the inner side; thighs nearly equal to the abdomen; tibiæ whitish, blackish in the middle; tarsi white.

Length three twentieths of an inch.

Eurytoma, Illig. Latr.

1. E. *orbiculata.* Blackish; feet, excepting the middle of the thighs, yellowish.

Inhabits Indiana.

Body brassy-black, reticulate with punctures: *antennæ*, first joint honey-yellow: *scutel* obtusely rounded at tip; suture at its base not dilated: *wings* hyaline; nervures brown, branch of the radial nervure not longer than the part that extends beyond it on the edge: *abdomen* in profile almost orbicular, glabrous, polished; petiole punctured, longer than the posterior coxæ and trochanters: *feet* honey-yellow: *thighs*, excepting at their origin and extremity, black.

Length less than one tenth of an inch.

The joints of the antennæ are unequally gibbous.

2. E. *studiòsa.* Black; terminal joint of the antennæ as long as the two preceding ones together.

Inhabits Indiana.

♀ *Body* reticulate with crowded punctures: *antennæ* moniliform, of eight joints, geniculate; second joint shortest; 3d joint hardly longer than the 4th, and gradually a little shorter to the penultimate; ultimate joint about as long as the two preceding ones together, conic-ovate, with a very slight appearance of being three-jointed: *thorax*, anterior segment in breadth at least equal to twice the length; suture at the scutel not dilated: *scutel* obtusely rounded behind: *wings* hyaline; nervure much arcuated from the edge, its confluence with the edge about as long as the branch, which is subclavate: *abdomen* polished, impunctured; above oval; laterally orbicular; peduncle shorter than the posterior coxæ and trochanters: *knees* and tips of the *tibiæ* honey-

yellow: *tarsi*, particularly the two posterior pairs, whitish.

Length less than one tenth of an inch.

Eulophus, Geoff. Latr.

1. E. *dìcladus*. Blackish metallic; tibiæ and tarsi white.

Inhabits Indiana.

Body brassy-blackish, more or less tinged with cupreous, punctured: *antennæ* larger towards the tip; terminal joint larger than the preceding one, conic-compressed; two long slender branches, originating near the base and nearly as long as the antennæ: *tergum* tinged each side with green: *feet* blackish: *tibiæ* and *tarsi* white.

Length nearly one twentieth of an inch.

The terminal joint of the antennæ in the female is considerably larger than the others.

2. E. *basàlis*. Greenish; feet, tip and base of the antennæ white.

Inhabits Indiana.

♀ *Body* granulated, brassy-green, with a slight violaceous reflection: *antennæ* yellow-white, 3d, 4th and 5th joints dusky: *abdomen* blackish-violaceous, basal disk whitish, and a small whitish spot at tip: *feet* white, including the anterior coxæ: *coxæ* with a small, acute tubercle before: *tarsi*, terminal joint dusky.

Length about one fifteenth of an inch.

I observed a number of the pupæ of this insect, congregated together on the under side of a leaf of the button-wood (Platanus *occidentàlis*, L.). They were of a blackish color, and adhered to the leaf in a vertical

posture, by the extremity of the abdomen. Came out last of June.

This is much like E. *damicórnis*, Kirby, which, however, has a shade in the middle of the wings; antennæ not shaded in the middle and the posterior thighs of the female are dusky in the middle. I have five females, but not one male.

The last joint of the antennæ is evidently divided into three segments.

3. E. *hircìnus*. Black, with sparse, long hairs; feet and base of the tergum yellowish.

Inhabits Indiana.

Body black: *antennæ* yellowish; terminal joints dusky: *mouth* yellowish: *thorax*, *head* and *wings* at base, with long sparse hairs: *wing-scale* honey-yellow: *tergum* on the basal disk yellowish: *feet*, including the coxæ, pale yellow: *venter* on the disk yellowish.

Length over one twentieth of an inch.

Quite distinct from the preceding by the long hairs of the head and thorax.

Perilampus, Latr.

P. *platigáster*. Blackish; face impunctured.

Inhabits Indiana.

Body brassy-blackish, punctured: *head* polished, impunctured before: *occiput* somewhat lineated transversely; before the eyes a little punctured: *thorax* with a glabrous, polished line each side: *scutel* short, obtuse, rounded, slightly emarginate at tip: *wings* hyaline; nervures brown: *tergum* quadrate, angulated each side, simply arcuated above, shining blackish: *feet* blackish, with a tinge of green: *tarsi* yellowish.

Length about three twentieths of an inch.

Differs from P. *hyalìnus*, Nob. by color; and in that species the face is very obviously punctured, the scutel is larger and more acutely emarginated, and the abdomen is elevated above, into an acute, transverse ridge.

Torymus, Dalm. (Misocampus, Klug.)

1. T. *ocreàtus*. Green, tinged with blue; base of the antennæ, tibiæ and tarsi whitish.

Inhabits Indiana.

Body bright green, more or less tinged on the pleura, abdomen and thighs with blue or purplish; reticulately punctured: *antennæ* black; first joint before, dull whitish: *mandibles* and *palpi* piceous: *scutel*, on the posterior half with very small punctures: *wings* hyaline; nervure brown: *abdomen* polished, impunctured; terminal joint ♀ brassy: *oviduct* as long as the body, fuscous: *tibiæ* and *tarsi* whitish.

Length one tenth of an inch.

Resembles *bedeguàris*, F. but is smaller, the abdomen and thighs differently colored, and the minute puncturation of the posterior half of the scutel strongly contrasts with the larger discoidal punctures of the basal half. It inhabits the receptacle of a Liatris.

The male has generally more of the purple tinge.

2. T. *pávidus*. Cupreous-green; no large punctures; tibiæ and tarsi yellowish.

Inhabits Indiana.

Body coppery-greenish, with the appearance of minute granules or scales: *antennæ* black: *hypostoma* with the carinate line very distinct: *mandibles* piceous: *wings* hyaline; nervure pale brownish: *abdomen* bluish-green:

feet honey-yellow: *thighs* bluish-green; posterior pair of tarsi whitish.

Length ♂ nearly one tenth of an inch.

The surface has no large and obvious punctures like those which distinguish the preceding.

Sparasion, Latr.

S. *famélicus*. Slender; abdomen longitudinally lineated.

Inhabits Indiana.

Body much elongated, very slender; with small punctures; black: *antennæ*, six basal joints dull yellowish, remaining joints close-set; 2d and 3d joints equal: *mandibles* piceous: *thorax* with the anterior segment arcuated, each side to the wings; two distant, dorsal, longitudinal, impressed lines: *wings* hyaline; nervure not distant from the edge, branch divaricating from the edge, not dilated at its tip: *metathorax* with longitudinal, elevated lines: *abdomen* elongated, with numerous, longitudinal, parallel, elevated lines both on the tergum and venter: *feet* honey-yellow.

Length over three twentieths of an inch.

Ceraphron, Jur. Latr.

1. C. *armàtus*. Wings fuliginous in the middle; tergum striate at base.

Inhabits Indiana.

Body black, with rather distant punctures: *thorax* with three longitudinal lines before, approaching behind: *wings* fuliginous in the middle; nervure, carpal spot and branch robust, fuscous; the carpal spot or stigma rather

large and truncated: *scutel* with two small spines at tip: *metathorax* with a small spine or tubercle each side: *tergum* depressed, with numerous close-set engraved lines extending to the middle of the length: *feet* piceous: *thighs* blackish.

Length more than one tenth of an inch.

A very distinct species.

2. C. *stigmàtus*. Lateral margin of the tergum extending beyond the abdomen.

Inhabits Indiana.

Body black, minutely punctured: *antennæ*, first joint equal to the four following joints taken together: *thorax*, anterior segment with the three impressed lines distinct: *wings* hyaline; stigma large, semi-orbicular, brown; nervure of the incomplete radial cellule robust, brown, hardly longer than the stigma: *tergum* polished, slightly lineated at base; the segments extending each side beyond those of the venter: *anterior* and *intermediate tibiæ* and *tarsi* piceous.

Length over one twentieth of an inch.

These two species belong to the second division of Jurine's CERAPHRON.

PROCTOTRUPES, Latr.

1. P. *obsolètus*. Black; feet and antennæ honey-yellow.

Inhabits Indiana.

Body polished, black: *antennæ* honey-yellow, simple: *palpi* white: *thorax* with a yellowish wing-scale: *wings* hyaline; nervure from the radial cellule continued to the middle of the wing; discoidal and anal nervures hardly distinct: *feet* honey-yellow: *oviduct* about as

long as the first joint of the posterior tarsi, gradually attenuating from the abdomen to the tip, and continuing the curve of the tergum downward.

Length to the tip of the oviduct nearly one fifth of an inch.

2. P. *abrúptus*. Black; feet and first joints of the antennæ honey-yellow.

Inhabits Indiana.

Body polished, black: *antennæ* rather short, with close-set, short, obvious hairs; two or three basal joints very obscurely honey-yellow or piceous; joints beyond the middle not twice the length of their breadth: *mouth* obscurely piceous: *wings* hyaline; nervure of the radial cellule not extended toward the middle of the wing; discoidal and anal nervures not obvious; wing-scale dull yellowish: *feet* honey-yellow: *oviduct* curved rapidly downward, almost deflected, not gradually attenuated, but somewhat cylindric at base, and hardly longer than the basal joint of the posterior tarsi.

Length one tenth of an inch.

3. P. *pállidus*, Nob. (Contrib. Macl. Lyc. vol. I. p. 80.)

This species is remarkable in having but a very short, bifid process extending from the tip of the abdomen. The sexes are not well understood. Jurine says that the antennæ have the same number of joints and that the pointed valves which terminate the abdomen are nearly alike in both sexes. But the present insect leads me to suppose that the male has not been hitherto known. At the extremity of its abdomen are two, very short, parallel filiform processes, which are probably characteristic of the male sex in this genus. It seems, therefore, possible that the *pállidus* may prove to be of the same species as

P. *caudàtus*, Nob. notwithstanding their great apparent difference. But this cannot be determined without more specimens, and a better acquaintance with them both.

Since the above was written, I have obtained many specimens of this species, all corresponding in apparent sexual character, excepting that in some, the second joint of the antennæ is so far immersed in the first, as to be hardly visible; still as it is not, in any, much exserted, this character is probably dependent on the greater or less degree of contraction in drying.

Cinetus, Jur.

C. *méllipes*. Black; feet honey-yellow.

Inhabits Indiana.

Body polished, black, hairy: *antennæ* fuscous; basal joint honey-yellow: *vertex* tinged with piceous: *mouth* obscure honey-yellow: *thorax* with two impressed lines: *wings* immaculate, ciliate; nervures of the radial cellule extended a little towards the base and centre of the wing; the two anal nervures very distinct; stigma not obvious: *abdomen*, peduncle with longitudinal, impressed lines; second segment very large, composing the chief part of the abdomen: *feet* honey-yellow.

Length one tenth of an inch.

Bethylus, Latr.

1. B. *cellulàris*. Black; antennæ, tarsi and anterior tibiæ piceous.

Inhabits Indiana.

Body black: *head* with a raised line passing between the antennæ before: *antennæ* piceous: *wings* with a very

slight tinge of fuliginous; nervures yellowish; stigma double, fuscous; a small, additional, triangular cellule at the tip of the brachial cellules: *abdomen* polished: *feet* black: *tarsi* and *anterior pair of tibiæ* and *tarsi* piceous.

Length about one tenth of an inch.

This species is remarkable by the supernumerary cellule.

2. B. *músculus*. Black; antennæ and feet yellowish; abdomen depressed.

Inhabits Indiana.

Body somewhat polished, impunctured, black: *antennæ* dusky, honey-yellow towards the base: *mandibles* honey-yellow: *thorax* with the anterior segment not much elongated; dorsal impressed lines very obvious: *wings* hyaline; radial nervure extended, equally distinctly near to the tip of the wing; discoidal cellule none: *metathorax* minutely and densely punctured or granulated above, and minutely lineated each side: *abdomen* depressed, polished, piceous black, distinctly petiolated: *feet* honey-yellow: *thighs* a little dusky in the middle.

Length over one twentieth of an inch.

This is the smallest species I have met with.

3. B. *pedàtus*. Black; antennæ and feet honey-yellow.

Inhabits Indiana.

Body black, with scattered hairs: *antennæ*, particularly at base, obscurely honey-yellow; first joint long: *thorax* minutely punctured: *metathorax* punctured and lineated: *tergum* polished: *feet* dull honey-yellow.

Length over one tenth of an inch.

This species and the following are remarkable for the brevity of the inflected tip of the radial nervure, which is not at all arcuated, but points obliquely inward.

4. B. *centràtus.* Black; tarsi and tip of the tibiæ obscure piceous.

Inhabits Indiana.

Body black, polished, with scattered hairs: *antennæ* with an obsolete piceous tint, excepting the basal joint: *metathorax* with discoidal punctures and lineations: *wings* hyaline; two brachial cellules; a simple, short, oblique rectilinear inflection of the tip of the radial nervure pointing towards the centre of the wing: nervures pale: *tergum* polished: *tibiæ* and *tarsi* obscure piceous; the latter blackish at tip.

Length less than three twentieths of an inch.

This species is considerably larger than the preceding and differs in the color of the antennæ and of the feet.

Coptera, Nob.

ARTIFICIAL CHARACTER.

Wings without nervures; superior wings folded and with a fissure at tip; abdomen of two segments.

NATURAL CHARACTER.

Body moderately slender: *head* longitudinally oblong, truncate or a little excavated before, over the insertion of the antennæ: *eyes* lateral, rounded, entire: *stemmata* three: *antennæ* submoniliform, gradully enlarging a little towards the tip; basal joint longest and dilated: *wings* without obvious nervures; superior wings large, folded longitudinally in two, and at the tip of the fold with a profound fissure; inferior wings rather slender: *abdomen* composed of but two segments, of which the basal one is somewhat petioliform: *feet* moderate.

OBSERVATIONS.

This new genus differs from all others with which I am acquainted, that have nerveless wings, by having the superior wings doubled, by an equal fold, and at their tips a deep and obvious fissure. I have, as yet, seen only the male.

SPECIES.

C. *polita*. Black; feet honey-yellow.
Inhabits Indiana.
Body polished, black: *head* anteriorly rugose and bi-angulated: *antennæ* at base, excepting the first joint, piceous: *thorax* with two impressed lines: *wings* with short hairs and ciliate: *abdomen* oblong-oval, basal segment with elevated lines.
Length about one twelfth of an inch.
Taken on the window July 20.

PSILUS, Jur.

1. P. *terminàtus*. Black; feet and base of the antennæ honey-yellow.
Inhabits Indiana.
Body black, polished, with a few, rather long, scattered hairs: *antennæ* thirteen-jointed, elongated, geniculate between the second and third joints, honey-yellow; first joint in a frontal groove; second joint elongated, subfusiform, third joint cyathiform; remaining joints moniliform, equal to the eleventh joint, which is abruptly dilated and with the twelfth equal, subquadrate, black; thirteenth joint subequal to the preceding, globose-ovate, black: *wings* with short ciliæ, and with short hairs;

nervures none; stigma triangular, black: *abdomen* dull honey-yellow at base; first segment half as long as the thorax: *feet* honey-yellow.

Length over one twentieth of an inch.

Although the wings entitle this species to a place in Jurine's PSILUS, yet the antennæ are entirely different from those of the type P. *élegans*, resembling considerably those of his P. *antennàtus*.

2. P. *abdominàlis*. Antennæ clavate, as long as the body; black, abdomen whitish.

Inhabits Indiana.

Body black: *antennæ* broken at the second joint; first joint one fourth the whole length, whitish; second joint obconic; terminal joint ovate-fusiform, longer than the three preceding joints together: *wings* very deeply ciliated: *abdomen* whitish, particularly at base: *tarsi* whitish.

Length about one fortieth of an inch.

3. P. *apicàlis*. Antennæ at the tip of the head, which is a little prominent.

Inhabits Indiana.

Body black, polished: *antennæ* as long as the body, fuscous, with subquadrately moniliform joints; basal long joint honey-yellow; terminal joint not much longer than the preceding one; inserted at the tip of the head; beneath the antennæ is a rather broad prominence; costal nervure but little less than half the length of the wing, triangular and black at its tip: *feet* honey-yellow: *petiole* distinct.

Length one twenty-fifth of an inch.

It is probable that the present insect is related to the P. *cornùtus* of Panzer, but I have not the means of comparing.

4. P. *colon.* Wings with a dusky dot before the middle.

Inhabits Indiana.

Body black, polished: *antennæ* nearly as long as the body; terminal joint as long as the first and equal to the four preceding joints together: *wings* hyaline; an oval, dusky spot a little beyond the tip of the costal nervure and extending nearly across the wing; costal nervure with its terminal half more dilated than the basal portion and blackish: *tarsi* and *anterior pair of tibiæ* honey-yellow.

Length one twenty-fifth of an inch.

Readily distinguished by the dusky wing-spot.

Anteon, Jur.

A. *tibiàlis.* Black; tibiæ and tarsi dull yellowish.

Inhabits Indiana.

Body polished, black: *metathorax* punctured and with longitudinal slightly elevated lines: *tergum* towards the tip with a few, rather long black hairs: *tibiæ* and *tarsi* dull yellowish-white.

Length about one tenth of an inch.

Hedychrum, Latr.

1. H. *obsolètum.* ♀ Thorax on the disk very slightly punctured; abdomen entire at tip.

Inhabits Indiana.

Body green, varied with purplish: *thorax* on the disk tinged with purple, and with sparse, slightly impressed punctures: *wings* fuliginous: *metathorax* and *pleura* with discoidal punctures, and a confluent blackish, double, in-

dented spot behind: *tergum* with a purple reflection, less obvious on the posterior segment; punctures slightly impressed, more obvious each side and on the terminal segment; terminal segment about equal to the preceding, perfectly entire at tip: *venter* bronze: *tarsi* brown.

Length less than one fourth of an inch.

Differs from *ventràle*, Nob., which has the terminal segment slightly longer than the preceding one and very obtusely and slightly emarginate at tip, and the thoracic punctures are not sparse on the disk; the *sinuòsum*, Nob. has a deep and acute emargination at tip of the terminal segment of the tergum.

2. H. *spéculum*. ♂ Green; tergum and disk of the thorax impunctured.

Inhabits Indiana.

Body green, varied with purplish: *antennæ*, excepting the first and second joints, blackish: *head* with discoidal punctures, vertex and posterior margin impunctured: *thorax* impunctured, polished, with an impressed, abbreviated line each side of the middle: *metathorax* with discoidal punctures: *wings* fuliginous: *tergum* impunctured, polished; terminal segment hardly half as long as the preceding one, obsoletely punctured each side, at tip obtusely emarginate: *tarsi* pale honey-yellow: *venter* brassy.

Length less than three twentieths of an inch.

The smallest species I have yet met with in this country.

Pyria, Lepel. & Serv.

P. *tridens*, L. & P. Encyc. Meth. Chrysis *carinàta*, Nob. Contrib. Macl. Lyc. p. 82.

Formica. L.

A. First cubital cellule without recurrent nervure.

1. F. *méllea.* Honey-yellow; scale truncate.

Inhabits Louisiana.

♂ *Body* entirely honey-yellow: *eyes* rather prominent, black, short oval: *wings* very slightly tinged with yellow; nervures yellow: *scale* robust, broad, truncate, and having a slight tubercle each side before, less than half the height of the abdomen and not higher than the length of its base.

Length nine twentieths of an inch.

Sent to me by Mr. Barabino. The small discoidal cellule, so distinct in the wing of F. *rufa*, F., does not exist in this species.

2. F. *lauta.* ♀ *Body* piceous, more or less varied with black; the piceous color prevails chiefly on the stethidium and mouth: *mandibles* with larger and regular punctures; between the antennæ a slender, impressed line: *thorax* with generally a black line each side: *scutel* darker than the thorax: *wings* with yellowish nervures; no recurrent nervure; inferior nervure of the cubital cellule arising from the middle of the tip of the brachial cellule; the terminal line of this latter cellule is nearly rectilinear and transverse; anal nervure rectilinear at base, angularly undulated and slightly communicating with the tip of the axillary nervure: *abdomen* black; first segment often piceous: *feet* honey-yellow: *tibiæ* and *tarsi* darker.

Length over three tenths of an inch.

♂ Entirely black, excepting the wings, which are like those of the female: the thorax has a distinct, longitudinal impressed line before, which sometimes exists in the female, but less distinct.

Length over one fifth of an inch.
Inhabits Indiana. Common.

3. F. *impàris.* ♀ *Body* light honey-yellow, impunctured: *head* small: *eyes* oval, black: *mandibles*, teeth black: *wings* very slightly tinged with fuliginous; no recurrent nervure; terminal line of the brachial cellule angulated, the anal half being oblique; anal nervure robust to its tip, arcuated from its origin, scarcely undulated, not communicating with the axillary nervure: *scale* emarginate at tip, often deeply and acutely: *tergum*, disks of the incisures a little deeper colored.

Length nearly three tenths of an inch.

♂ Very small in comparison with the female; black: *mouth* piceous: *feet* dull honey-yellow: *thighs*, excepting the knees, black.

Length less than three twentieths of an inch.

This species is common in Indiana. The great disparity in color and magnitude between the male and female, would deceive, as to their specific identity.

They appeared in great numbers on the 2d of April; the males swarmed around small bushes, alighting on the branches and leaves. The females were but few.

B. First cubital cellule with a recurrent nervure.

4. F. *séssilis.* Peduncle concealed by the abdomen.
Inhabits Indiana.

Body blackish: *mouth* dull honey-yellow: *antennæ* rather long: *thorax* with the three segments very distinctly marked: *peduncle* composed of a simple, oblong body; destitute of a scale, unless it be depressed and united to the surface of the peduncle, concealed by the first segment of the abdomen: *abdomen* projecting over the peduncle and having a deep and well defined groove beneath the first segment for its reception: *feet*, except-

ing at base, dull honey-yellow: *wings* with the discoidal cellule, small, quadrate; first cubital cellule not broader than the radial, and bounded by a right line; nervure of the second cubital cellule obsolete.

Length ♀ three twentieths of an inch: neuter about one tenth of an inch.

The projection of the superior part of the basal segment of the neuter abdomen is more remarkable than that of the female. It probably belongs to the genus POLYERGUS.

A variety is much paler, even honey-yellow.

5. F. *triangulàris*. Discoidal cellule subtriangular; blackish-piceous.

Inhabits Indiana.

Body blackish-piceous or obscure reddish-brown: *hypostoma* convex and somewhat carinate: *mandibles* piceous: *wings* whitish; nervures pale; discoidal cellule subtriangular, the superior angle being very obtuse; first and second cubital cellules not separated by a petiole; anal nervure abruptly angulated on the anal submargin: *scale* rather thin, elevated: *tarsi* honey-yellow.

♂ Body darker.

Length ♀ over one tenth of an inch; ♂ about the same.

Var. *α*. Recurrent nervure none.

Var. *β*. Recurrent nervure obsolete or incomplete.

Resembles *séssilis*, Nob. but the scale is obvious; the discoidal cell is more triangular and the nervure of the 2d cubital is obvious.

6. F. *dislocàta*. Yellowish; anal nervure almost dislocated at the anal emargination.

Inhabits Indiana.

Head black: *hypostoma* distinctly carinated: *front*

with an acute, longitudinal, elevated line over the insertion of each antenna and a slightly impressed line in the middle: *antennæ* and *mandibles* piceous: *thorax* honey-yellow, dusky before: *wings* tinged with fuliginous; nervures dusky and very distinct; recurrent nervure forming a quadrate cellule less than half the size of the first cubital; anal nervure abruptly angulated near the anal emargination of the edge, and almost dislocated in that part, the terminal portion being arcuated at each extremity: *scale* thick, prominent, obtuse, entire: *abdomen* blackish, with prostrate hairs, and sparse elevated ones and regular ciliæ on the edges of the segments; first segment honey-yellowish at base, without any indentation opposite the scale: *feet* honey-yellow.

♂ Trunk and scale entirely pale honey-yellowish: scapus of the antennæ, hypostoma and mouth pale yellowish: abdomen somewhat piceous.

Length three tenths, ♂ less than two fifths of an inch.

Not uncommon in the forest, running rapidly upon the branches and leaves of bushes.

7. F. *subsericea*. Black, minutely sericeous; abdomen impunctured.

Inhabits Indiana.

Body impunctured, black, very minutely sericeous: *thorax* with an impressed line before: *wings* dusky; discoidal cellule about half as large as the first cubital, a little narrower before: *scale* obtuse, or widely rounded at tip, somewhat truncate.

Length ♂ less than two fifths, ♀ over two fifths of an inch.

My specimen of the female has the legs entirely black; and of two males one has the legs honey-yellow, with the exception only of the base of the coxæ; and the other

also with honey-yellow legs has the coxæ, trochanters and even the base of the thighs black. It is one of the large species called "wood ants."

ATTA.

A. *fervens*, Drury, vol. III. p. 58, pl. 42, f. 3. I obtained a female of this species in Mexico, and on comparison with an individual of the *cephalòtes* sent me by Dr. Klug, I find it to be a closely allied species. The color of the wings and their neuration are the same; but the body is more hairy or downy, and its brown color is not so deep, (the color is much too black in my copy of Drury, agreeing better with the *cephalòtes*, than with Drury's description.) The head is not so large, so deeply indented above, nor so acute at the posterior angles. The impressed, longitudinal line on the anterior part of the thorax, so distinct in *cephalòtes* is not, or is scarcely visible in *fervens*. Judging from these two specimens, I am convinced that the *fervens* ought to be admitted into the modern books as a distinct species.

MYRMICA, Latr. Klug.

1. M. *lineolàta*. ♀ Black, more or less varied with piceous: *antennæ* subclavate; at tip clothed with dense, short, whitish hairs: *front* with a longitudinal impressed line, terminating before in a small triangular impression between the antennæ; the whole head, excepting the vertex, occiput and antennæ, striate with close-set very small lines, which are rather larger on the mandibles: *wings* hyaline; nervures yellowish-brown; small cubital cellule none: anterior segment of the petiole deeply striate

longitudinally each side, decidedly longer than the second which is subemarginate above: *abdomen* oval, truncate, subemarginate at base: *pleura* striate like the head behind.

Length over three tenths of an inch.

♂ much more slender; transverse incisure between the wings more obvious; segments of the petiole not so deeply divided.

Length over three twentieths of an inch.

Neuter. Piceous varying to black; abdomen cordate, almost always black.

Length under three twentieths of an inch.

This species is very common in various parts of the United States even in houses, and may be observed, by every one, going in procession. The radial cellule is slender and elongated, the including nervures being nearly parallel; the inner nervure does not quite attain the edge. The first cubital cellule is hardly larger than the discoidal cellule, the recurrent nervure of which enters the first cubital at the middle. Second cubital extending to the tip of the wing.

2. M. *corrugàta*. Honey-yellow; wings with three complete cubital cellules.

Inhabits Indiana.

♂ *Body* dark honey-yellow, almost piceous: *antennæ* whitish; first joint not longer than the second and third together; second joint rounded, thickest: *metathorax* with two obtuse tubercles instead of spines: *wings* hyaline; nervures and stigma pale yellowish; second cubital cellule complete, nearly as long as the first cubital and petiolated from the apicial angle of the discoidal cellule, which is oblong subquadrate; the descending nervure from the stigma enters the second cubital: *abdomen*, first

joint somewhat gibbous at tip; second segment rounded: *feet* whitish.

Length over three twentieths of an inch.

♀ Somewhat darker than the male: metathoracic tubercles spiniform; first abdominal segment almost emarginate at the superior tip; second segment short and wide; first joint of the antennæ long; head anteriorly with numerous, approximate, impressed lines.

Length one fifth of an inch.

Appeared on the wing July 19th.

3. M. *oppósita*.

♂ *Body* black, minutely and densely granulated: *antennæ* dusky; pale yellowish towards the tip; first joint slightly longer than the second and third together; second joint obtusely obconic: *hypostoma* convex: *mandibles* piceous: *thorax* with a glabrous line extending to the middle: *wings* dusky; second cubital cellule turbinate, petiolated from the angle of the discoidal cellule, its longitudinal nervures equally curved; nervure separating the second and third cellules in a direct line with the nervure from the stigma; discoidal cellule quadrate: *metathorax*, spines short, acute: *abdomen* polished, not obviously granulated; second node with an impressed line above, dividing the surface into three slight lobes: *venter* and *feet* tinged with piceous.

Length over three twentieths of an inch.

Neuter. Dull honey-yellow: *head* minutely lineated: *antennæ*, first joint long: *stethidium* rather largely granulated; spines prominent, acute, reaching nearly to the tip of the first node: *abdomen* glabrous, polished; second node without impressed line.

Length less than one fifth of an inch.

4. M. *inflécta*. Black; wings dusky; discoidal cellule oblong.

Inhabits Indiana.

♂ *Body* a little hairy, lineated with impressed lines, which are more distinct on the metathorax, black, slightly tinged with piceous: *antennæ* with a piceous tinge; first joint not longer than the three following ones together: *wings* dusky; discoidal nearly as long again as broad; second cubital sessile, the separating nervure from the first cubital rather abruptly inflected towards the base, and nearer the base almost obsolete, the other including nervure rectilinear; separating nervures between the first cubital and radial, and the second and third cubitals, forming a broken or slightly dislocated line, the former almost entering the third cubital: *metathorax* without lineations on the posterior declivity, the spines distinct: *abdomen* polished, without lines; petiolar segments or nodes very distinct, subequal, the posterior one rather larger and spherical: *feet* more obviously tinged with piceous at base.

Length less than one fifth of an inch.

The connexion between the radial and second cubital is very slightly petiolated, and the separating nervure between the first and second cubitals, is almost or quite angulated, and is less distinct towards its junction with the discoidal cellule.

5. M. *dimidiàta.* *Body* pale yellowish: *thorax* somewhat tinged with piceous: *wings* with a very slight tinge of yellowish; discoidal cellule in length nearly twice its breadth; separating nervure between the first and second cubital cellules abruptly ending at the middle of the usual length, being entirely wanting on the basal half.

Length over one fifth of an inch.

6. M. *molésta.* ♀ *Body* pale honey-yellow, immaculate: *antennæ* with the two ultimate joints much larger

than the others; the terminal one as large again as the penultimate one: *wings* whitish; smaller cubital cellule none; discoidal cellule very small, less than half as large as the first cubital; first cubital receiving the recurrent nervure near its base; nervure of the radial cellule terminating abruptly before the tip; the two other apicial nervures feebly traced towards the tip and not reaching the tip: *metathorax* unarmed.

Length less than three twentieths of an inch.

This is called the "little yellow ant," and is frequently found in houses in great numbers. They sometimes eat vegetable food, and some of my garden seeds have severely suffered by their attacks. They also devour grease, olive oil, &c. Their sting is like the puncture of a very fine needle. I placed a piece of meat on a window board frequented by these little depredators; it was soon absolutely covered by them, and thus enabled me to destroy thousands, every few hours that I returned to examine the bait, for several days, during which time their apparent numbers scarcely diminished.

7. M. *minùta*. Pale yellowish; destitute of spines on the metathorax.

Inhabits Indiana.

Body whitish-yellow: *head* rather large: *antennæ*, terminal joint three times as long as the preceding one: *eyes* small, black and placed low down: *peduncle* rather long: *abdomen* oval; very pale honey-yellow.

Length (neuter) less than three fifths of an inch. [Is it not the same as the *molésta*? Editors.]

This may possibly prove to be an Atta. I obtained only a single specimen, which was found entangled in the nails and tarsi of a specimen of Gorytes *phalerùtus*, Nob. in my cabinet. It does not appear to have a spine on any part, but there are a few scattered hairs.

Mutilla, Linn.

* *Eyes emarginate.*

1. M. *contrácta.* Black; above ferruginous; wings blackish.

Inhabits Arkansaw and Missouri.

Body entirely black beneath, inclusive of the feet: *above* ferruginous-yellowish: *head* black below the line of the eyes: *metathorax*, *petiole*, anterior and lateral declivities of the abdomen black. ♂ anterior half of the first segment of the tergum black: *wings* blackish-fuliginous, somewhat paler in the middle; second cubital cellule wide beneath and contracted but not angulated at the radial cellule; third cubital cellule so much contracted at base that its extreme nervure is opposite to and joins the recurrent nervure.

Length about half an inch.

The neuration of the wings somewhat resembles that of the *maura*, F. and is nearly the same as that of the *erythrina*, Klug, of Mexico. I obtained several specimens from Missouri, and Mr. Nuttall gave me one from Arkansaw.

2. M. *hexàgona.* ♂ Black; abdomen honey-yellow.

Inhabits Indiana and Missouri.

Body black, much punctured, and with a slight reflection of silvery hairs, particularly on the head, on the anterior segment of the thorax and on the metathorax: *thorax* with four slight, impressed lines, and numerous confluent punctures: *metathorax* reticulate with punctures, and with a slight groove from the base nearly to the middle: *wings* dark purplish-fuliginous; radial cellule rounded at tip, not truncate; third cubital cellule

rounded hexangular, with abbreviated nervures from the two outer angles; a white line passes through the cubital cellules, and a white spot is in the outer discoidal cellule: *abdomen* rufous or bright honey-yellow; first or petiole segment black: *feet* silvery hairy.

Length from half an inch to nearly seven tenths.

The neuration of the wings is much like that of the M. *Itálica*, F. even to the white line and small spot; but the third cubital cellule is still more regularly hexagonal and the radial cellule is not truncate at tip like those of the *Itálica* and *melanùra*, Klug, and many other species.

3. M. *vigilans*. ♂ Black; large abdominal segment, excepting its anterior and posterior margins, rufous.

Inhabits Pennsylvania.

Body black; with large, dense punctures: *thorax* with three, somewhat elevated lines and a slight appearance of another each side: *wing-scale* convex, lineate on the margin; the outer and hinder margins lineated with minute, elevated, parallel lines: *wings* purplish-black; radial cellule truncate at tip; first cubital cellule bisected by a white line; second cubital gradually and regularly narrowed to the base, with an abbreviated white line at tip; third cubital hexagonal, not contracted, the two exterior angles with abbreviated nervures; exterior discoidal cellule with a white dot: *metathorax* discoidally punctured; dorsal groove extending beyond the middle; large basal segment of the abdomen with large remote punctures, smaller and closer on the sides, bright rufous, its basal and terminal margins black.

Length over three fifths of an inch.

Resembles M. *Itálica*, F. but differs in greater depth of color, in the lineations of the wing-scale, greater length

of the metathoracic groove and the larger and distant puncturing of the larger segment of the tergum. It is also larger.

** *Eyes entire or the emargination obsolete.*

EPHUTA.

4. M. *erythrìna*, Klug. Scarlet-red, beneath black; wings blackish.

Inhabits Mexico.

Body with dense, bright scarlet-red hairs above; beneath black: *antennæ* and inferior part of the head black: *wings* black-violaceous; radial cellule truncate at tip; third cubital cellule pentagonal, contracted on the anal side, its apicial nervures almost obsolete: *metathorax* black: *abdomen*, anterior declivity of the basal segment extending in an angle on the superior portion of the segment, black; petiole black: *venter* with a slight scarlet-red band rather behind the middle. ♀ with a black dot rather behind the middle of the tergum.

Length about nine twentieths of an inch.

I obtained a female of this species in Mexico, and Dr. Klug has favored me with the sexes, differing in no respect from mine, except in being a little larger.

5. M. *scrùpea*. ♂ Black; with dilated punctures; tergum with a whitish band.

Inhabits Indiana.

Body black, a little hairy, and having large punctures, which on the stethidium and head are confluent and discoidal: *mandibles* piceous before the tip: *wing-scale* also punctured: *wings* slightly dusky; nervures blackish; stigma not distinct, or none; second cubital cellule larger than the first; the third largest; separating nerv-

ure of the 2d and 3d cellules rectilinear: *metathorax* reticulate with larger discoidal punctures and having at base an oblong triangle: *tergum*, first segment short, abruptly smaller than the second, petioliform, with discoidal punctures, hairy, abrupt before, and on the anterior inferior tip having an angle on each side; second segment with the punctures rather distant, profound, with a band of whitish hairs on the posterior margin; remaining segments with numerous whitish hairs, and a dorsal elevated line.

Length less than three tenths of an inch.

Rather smaller than *nigrita*, F. and may be distinguished by the more dilated punctures; the basal segment of the abdomen being suddenly smaller than the second, and shorter than in *nigrìta*; by the abdominal band, and different configuration of the wing cellules. The emargination of the eyes is very small and acute.

6. M. ***gibbòsa.*** Black; petiole as long as the second abdominal segment; wings dusky at tip.

Inhabits Indiana.

♂ *Body* black; with numerous gray, but not concealing, hairs; densely punctured; punctures large on the head and trunk: *wings* hyaline; at tip and including the radial cellule, fuliginous; stigma moderate; third cubital cellule incomplete: *abdomen*, first segment petioliform, as long as the second, and somewhat gibbous at tip, distinguished from the second by a deep stricture.

Length over three tenths of an inch.

Resembles *scrùpea*, Nob., but is larger, has a stigma and longer petiole. It is also like *nigrìta*, F. but is larger, with a much more obvious stigma; wings dusky at tip; the petiole more gibbous at tip, &c.

Tengyra, Latr. Klug.

T. *stygia.* Black; mandibles piceous at tip.

Inhabits Indiana.

Body entirely black, immaculate, punctured: *mandibles* piceous at tip; near the tip one-toothed: *wings* hyaline; nervures black, separating nervure of the first and second cubital cellules wanting: *stigma* obvious, black: *abdomen*, segments contracted near the incisures: *oviduct* not extending beyond the terminal processes and concealed beneath them.

Length two fifths of an inch.

Resembles T. *sanvitàli*, Latr., but is larger, with a much larger stigma, and each abdominal segment is much more contracted before its posterior incisure.

Methoca, Latr.

M. *bicolor.* ♀ Rufous; head and part of the tergum black.

Inhabits Indiana.

Body pale yellowish-rufous, polished: *head* black: *antennæ* rufous, terminal joints piceous: *mandibles* and *palpi* rufous: *thorax*, segments subequal; anterior and posterior ones convex, subovate, intermediate one with two slightly elevated convexities: *abdomen* ovate-subfusiform: *tergum* with a transverse, triangular black spot at the tip of the second segment, another on the third, the remaining ones confluent.

Length one fourth of an inch.

The abdomen does not contract abruptly to the petiole but subsides gradually. Vander Linden says that the species of this genus are the females of species of Tengyra. [Ann. des Sc. Nat. Jan. 1829, p. 48.]

Tiphia, Fabr. Latr.

T. *tarda.* *Body* polished, black, punctured: *mandibles* piceous in the middle: *metathorax* with three longitudinal lines, and the minute lines on the margin of the posterior declivity very regular and obvious: *wings* tinged with honey-yellow; nervures brown; stigma black: incisure of the first abdominal segment not very much contracted; second segment at its basal margin with the minute longitudinal lines very regular and distinct: *palpi* dull piceous.

Inhabits Indiana.

Length about three tenths of an inch.

The smallest species I have seen, and may be distinguished from its American congeners by its size. The male has the metathoracic lineations more distinct. It is smaller than the *femoràta*, of Europe.

Myzine, Latr. Klug.

1. M. *hamàtus.* Black; thorax spotted and abdominal segments margined with yellow; the latter not abruptly emarginate each side.

Inhabits Indiana.

♂ *Body* black, polished, with small punctures; nasus, labrum, tip of the basal joint of the antennæ, two spots between the antennæ and base of the mandibles yellow: *collar* on the anterior margin, interrupted in the middle and on the posterior margin, yellow: *thorax* with a spot in the middle emarginate before, yellow: *metathorax*, a transverse yellow spot near the scutel and an obscure yellow, longitudinal spot each side at tip: *tergum* with a perlaceous iridescence; on each segment a slender yel-

low band on the posterior submargin, a little undulated obtusely on its anterior edge, not abruptly emarginated on each side; on the anterior submargins of the segments an impressed transverse line: *pleura,* a small yellow spot beneath each wing: *wings* hyaline, a slight dusky margin at tip: *feet,* coxæ with a yellow spot: *tarsi,* excepting their tips; *thighs* at tip or a line above, and anterior pairs of tibiæ yellow: *venter* five spotted each side.

Length from three fifths to seven tenths of an inch.

This is so much like M. *subulàta,* Nob. that it is not without much hesitation that I give it as distinct. It is, however, much larger and more robust, and the form of the bands of the tergum is different; those of the *subulàta* being abruptly notched each side of the middle as in the *válvulus,* Fabr., whereas in the bands of the present species, instead of the abrupt notch, is an obtuse and dilated undulation of the edge.

A variety occurs in Missouri, of which the wings are yellowish, and the second recurrent nervure is confluent with the dividing nervure of the second and third cubital cellule.

2. M. *subulàtus,* Nob. (Sapyga, Western Quarterly Reporter.) A variety inhabits Mexico in which the abdominal bands are less abruptly emarginate each side.

Sapyga, Latr.

S. *centràta.* Black, with yellow spots; abdomen 5-banded.

Inhabits United States.

Body black: *head* ———: *thorax* with a transverse spot each side before, two on the middle, one beneath the superior wing, and two large ones behind, yellow:

wings hyaline; nervures fuscous: *stigma* brown: *radial cellule* fuliginous: *tergum*, each segment excepting the first, with a yellow, dilated band on its middle and more or less interrupted: *venter* with a transverse spot each side on the 3d, 4th and 5th segments: *feet* yellow: *thighs*, except at the tip, black: *tarsi* honey-yellow.

Length about three tenths of an inch.

Var.? *α*. Spots ferruginous.

Length nearly two fifths of an inch.

I have hardly a doubt that the individual here given as a variety is a distinct species; but as my specimens are much mutilated, I am unwilling to venture to separate them.

Pompilus, Fabr. Latr.

1. P. *calipterus*. Wings bifasciate; antennæ and feet honey-yellow.

Inhabits Indiana.

Body black, polished, slightly pruinose: *antennæ* honey-yellow, a little dusky towards the tip: *nasus*, at tip, *mandibles* and *palpi* honey-yellow: *wings* hyaline, with a blackish band on the middle and a much broader one crossing the second and third cubital cellules; the latter hardly reaches the anal margin; basal series of transverse nervures dislocated at the externo-medial nervure: *feet* honey-yellow; tarsi with the ultimate joint blackish; intermediate and posterior pairs of feet more or less varied with blackish.

Length three tenths of an inch.

A very pretty species, of which I have as yet obtained but two specimens. It is probably allied to the *bifasciàtus*, Fabr.

2. P. *architéctus.* Dark purple; wings hyaline. Inhabits Ohio.

♀ *Body* dark bluish-purple, somewhat hairy: *head* black in front, with short, dense, yellowish-cinereous hair: *mandibles* at tip piceous: *wing-scale* dark piceous: *wings* hyaline, nervures blackish: second and third cubital cellules not unusually contracted at the radial cellule, but almost equal in that part: *feet* black: *tergum*, anal segment polished.

Length about three tenths of an inch.

This insect forms neat mud nests under prostrate logs and stones. They consist of short cylinders, agglutinated together alternately, and each composed of little pellets of mud, compressed, or rather appressed to each other. When these are adjusted to their places on the edge of the cylinder, each has a fusiform shape and the slender end of one laps over that of another, and the convex part of the pellet of the succeeding layer is placed against this duplicature so as to restore the equality of the edge. This arrangement gives the surface an alternate appearance.

The basal series of transverse nervures is very slightly dislocated.

3. P. *biguttàtus*, Fabr. The individual described by Fabricius appears to be a female. Coquebert gives its length at nine twentieths of an inch, but it sometimes exceeds half an inch in length. The male is over three tenths of an inch in length; it is destitute of the anterior white striga of the thorax, and the tip of the tergum has a white reflection; the posterior half of the metathorax also has a white reflection. The basal series of transverse nervures is not dislocated, in this species.

4. P. *lépidus.* Black; abdomen and wings purplish.

Inhabits Mexico.

♂ *Body* black, slightly sericeous: *wings* dark purplish; second and third cubital cellules a little narrowed at the radial cellule, particularly the latter, which is less than two thirds the length of the second cellule, in that part; basal series of transverse nervures not dislocated: *metathorax* with a very slight reflection of purplish, and without any impressed line; the posterior edge obviously reflected: *tergum* with a distinct purplish reflection: *beneath* black; in a favorable light a very slight purplish reflection may be perceived on the thighs.

Length two fifths of an inch.

5. P. 5-*notàtus*. Tergum on the second segment with two white spots; third segment with a white interrupted band.

Inhabits Indiana.

♀ *Body* black: *head* with a slight white reflection before; and a very slender white line on the posterior orbit: *wings* on the apicial margin black; basal series of transverse nervures not dislocated: *tergum* with a white dot each side before the middle, on the second segment; third segment with a white, interrupted band at base; on the fourth segment at base, is an obsolete, whitish spot each side, sometimes wanting; anal segment with a white spot at base.

Length two fifths of an inch.

Resembles *biguttàtus*, Fabr. but is distinguished by the two or four more white spots on the tergum, as well as by the white spot on the anal segment.

7. P. *méllipes*. Black; feet yellowish rufous.

Inhabits Indiana.

♀ *Body* black, somewhat sericeous with silvery hairs: *antennæ*, joints long, distinct: *mandibles* piceous at tip:

palpi whitish: *wings* hyaline; third cubital cellule very little contracted before, larger than the second; first recurrent nervure entering the second cellule at the middle; basal series of transverse nervures dislocated: *feet* bright honey-yellow, the coxæ only black.

Length over two fifths of an inch.

8. P. *(Miscus) córnicus.* Black; wings a little dusky; basal line of transverse nervures widely dislocated by the externo-medial nervure.

Inhabits Indiana.

♀ *Body* black, immaculate: *wings* dusky; nervures blackish; second cubital cellule somewhat conic, the anterior basal nervure entering the radial cellule in a much arcuated direction, so as not to form an angle with it; third cubital cellule not much contracted anteriorly; basal series of transverse nervures widely dislocated, that portion which is between the externo-medial and anal nervures is equal to the length of the dislocation: *abdomen* polished: *mandibles* at tip piceous.

Length less than one fifth of an inch.

♂ Wings less obscure: anterior tibiæ and tarsi obsoletely dull yellowish.

Length one fourth of an inch.

9. P. *(Miscus) petiolàtus.* Tergum fulvous near the base; third cubital cellule petiolated.

Inhabits Indiana.

♀ *Body* black, a little sericeous: *wings* blackish; third cubital cellule decidedly petiolated: *tergum* with the terminal half of the first segment, and the greater portion of the second segment yellowish-fulvous.

Length over two fifths of an inch.

The petiolated character of the third cubital cellule resembles that of the P. *niger*, Fabr. The basal series of transverse nervures is distinctly dislocated.

[To be continued.]

ART. XIV.—SKETCH OF THE GEOLOGY OF PORTLAND AND ITS VICINITY. By EDWARD HITCHCOCK, Professor of Chemistry and Natural History in Amherst College. Communicated April 6, 1836.

HAVING spent the month of May, 1835, in Portland, Maine, and by the kindness of several gentlemen in that city, having had an opportunity to examine the rocks in the vicinity, I am able to give some account of its geology. And although a longer residence would be necessary to obtain a complete view of the rocks occurring there, yet, as no account of the geological structure of that region has been published, to my knowledge, I have thought that I might make some statements which would be acceptable to the scientific public.

The geology of Portland is very simple and intelligible. With the exception of a few limited patches of very recent tertiary strata, and some diluvial and alluvial deposites, the rocks are chiefly slates of a very early date; as is proved by their entire destitution of organic remains, and by their standing upon their edges. Gneiss, however, almost destitute of a slaty character, appears on the northwest and north sides of the city, within a few miles, and forms a very extensive deposite. I shall, however, describe these rocks successively; beginning with those that form the foundation on which the city is built.

The accompanying geological map and section will enable the Society the more easily to understand my descriptions. In extending the map along the coast south of Cape Elizabeth, in order to exhibit the granite at the mouth of Saco River, I have contracted the distance considerably, to save room, since such a reduction of the

scale can produce no error. The section passes from the south east to the north west through Portland, crossing Cape Elizabeth at its northern extremity in fact: but I have introduced the rocks from its southeastern extremity, at the light houses; and have also supposed Jewell's Island to be removed southwesterly, so as to fall in with the line of the section. But as the direction of the strata in all this region is almost exactly northeast and southwest, this supposed movement of interesting rocks, so as to bring them into a line, can cause no error of importance in our inferences.

Talcose and Mica Slate and Quartz Rock.

I commence with these rocks, because they form the basis of the peninsula on which Portland stands. In many places, one finds them extremely distinct and well characterized. But they pass into one another so insensibly, and are interstratified so frequently, that I found it impossible to separate them upon the map. I think that talcose slate decidedly predominates; especially on the islands of Casco Bay. Next in quantity is mica slate; which sometimes approximates, in its character, to argillaceous slate. Quartz rock is the least abundant; yet sometimes we see its strata quite distinct; as for instance on the shore at the northeast extremity of the city; where also, we find well characterized talcose slate, approaching even to soap stone. At Harpswell is a quarry of soap stone, which has been wrought to considerable extent; but is now nearly exhausted. I have not visited it; but presume that bed to be connected with talcose slate.

The southeastern part of Cape Elizabeth is composed

of a peculiar variety of talcose slate, which, in most cases, could hardly be determined, were not the observer to trace carefully, the gradations of that rock; a method to which the geologist is often obliged to resort. Near the light houses, this rock, owing to an almost inexplicable peculiarity of structure, exhibits a remarkable tendency to split in the direction of the layers, like wood. Indeed, where it is laid up to form fences, as one rides along the road, he can scarcely distinguish the long and apparently fibrous masses from wooden rails, or planks. At a few rods distant, where the rock passes under the ocean, it cannot be distinguished from large logs. I refer particularly to a spot a little north of the light houses. On the shore east of these light houses, the rock is so fissile that splinters of it, half an inch thick and nearly a yard long, were obtained by D. Miles, who accompanied me thither.

Much of this talcose slate is that compact variety which is sometimes converted into whetstones; though I know not that it is employed for this purpose in Maine. On the shore near Portland, I noticed one or two boulders that appeared to be a very fine, though rather hard, variety of novaculite. Probably, the bed from which these blocks were detached, is north of the city; since the diluvial current had a southerly direction.

It seems now to be well ascertained, that talcose slate is the deposite of nearly all the gold found in the United States. It is the porous quartz, which abounds in oxide of iron, that constitutes the immediate gangue of the metal. Such quartz is very common in this slate; and I noticed it on Cape Elizabeth. Such facts it may be well to keep in mind; though the occurrence of talcose slate, in any region, does not prove the existence of gold there. But if gold exist in one place in this rock, the presumption is that it may exist wherever the rock is found.

The mica slate around Portland is not very well characterized in general. Often, it takes so much talc into its composition as to perplex the observer. In other places it is so siliceous, that one can hardly say whether it should not be called quartz rock. Again, and perhaps this is most frequent, it has that glazed appearance which characterizes the oldest argillaceous slate; and perhaps it does sometimes actually pass into that rock. There are two varieties of rocks which I have denominated mica slate, in the vicinity of Portland, which, on account of their probable economical value, deserve a distinct notice; and I have given them distinct colors on the map.

Plumbaginous Mica Slate.

Ever since the first settlement of the country, this rock has excited the attention of the inhabitants, on account of its resemblance to the slate that is associated with coal. And, indeed, where the road passes over its surface, so that the wheels grind it into fragments, the appearance can hardly be distinguished from that of disintegrating slate. But on careful examination, the geologist finds that its surface exhibits too much of a shining, plumbaginous appearance, so common in the primary slates, to be considered a slate. It does, indeed, abound in carbonaceous matter: but this seems to be uniformly in the state of plumbago; which, in several places, as at Diamond Cove, on Hog Island, and on Jewell's Island, exists in thin layers. In several other places in the vicinity of Portland, as at Gorham, this mineral is found in a quite pure state; and I confidently expect that it will ere long be found in that vicinity, in large quantity. In short, to give the result of my observations and reflec-

tions upon the remarkable rock under consideration, I regard it as slate, or fine micaceous sand stone, which, by the agency of internal heat and other causes, has passed into the condition of an imperfect sort of mica slate; and that the carbonaceous matter, by the same agencies, has become plumbago. After having examined the remarkable bed of anthracite and plumbago at Worcester, Mass., which occurs in mica slate, I hardly dare predict that anthracite will not be found in the very oldest slates. Yet the Portland rock appears to me to be older than that in Worcester; and I strongly incline to the opinion, that no carbonaceous mineral, but plumbago, will be found in the former.

It is a fact which ought to be noticed, that such is the position of the rocks in the vicinity of Portland, that boring perpendicularly into them, to discover coal or plumbago, must, as every geologist will see, be entirely useless. For the strata stand nearly perpendicular to the horizon; and it is well known, that neither of these minerals occurs except in interstratified beds; so that by merely uncovering their elevated edges, they will most assuredly be discovered, if they exist. And since the soil above the plumbaginous slate is usually thin, the expense of such an exploration must be small. Should it be attempted, it ought to be recollected that these minerals will be most likely to occur in those places where the soil is deepest; that is, in the valleys; since they are more easily abraded than the rock.

The plumbaginous mica slate abounds in iron pyrites, in small disseminated masses and crystals. This is very liable to decomposition; so that often the rock appears minutely porous. In some instances a black powder results from this decomposition; so that perhaps there is

not quite so much carbonaceous matter in this slate, as at first sight we might suppose.

The most distinct and extensive stratum of this rock in the vicinity of Portland, is on Cape Elizabeth. On the north, as may be seen on the map, it extends to Hog Island; where, on the west shore of Diamond Cove, it may be examined to advantage. In a southwest direction it probably extends across the whole Cape to the ocean; though I have not traced it so far. But the rocks of all that region are remarkably regular and continuous; so that the geologist can apply analogical considerations with great confidence, where direct evidence is wanting.

On Jewell's Island—a very interesting spot for the geologist—this rock forms a stratum of considerable width, running through the central parts of the island, as may be seen on the map. I have reason to suppose that it exists in other places around Portland: but I have not examined them carefully enough to justify me in representing them upon the map.

Should it be found, in going northeasterly from Portland, that the rocks pass gradually into decided argillaceous slate, then perhaps, it would be proper thus to denominate this plumbaginous mica slate; or rather to regard it as forming an intermediate link between mica slate and clay slate. But so far east as I went, I perceived no progress towards a change into argillaceous slate; and I think I can perceive, in all the specimens of plumbaginous mica slate that I have examined, a mixture of mica and quartz with plumbago, and perhaps a little aluminous matter; so that upon the whole, I must for the present call this rock plumbaginous mica slate.

Pyritiferous Mica Slate.

Although the plumbaginous mica slate is often pyritiferous, as are other varieties of the slate around Portland, yet in one or two places on Jewell's Island, in particular, we meet with strata of mica slate so loaded with pyrites, and so affected by its decomposition, as to arrest the attention of the most careless observer. And where this mineral exists in sufficient quantity to render it probable that the rock might be employed for economical purposes, I have denominated it *pyritiferous mica slate*. I have marked it on the map nowhere but on Jewell's Island; where it forms at least three distinct beds, several rods wide. On the northwest side of the island, this rock is laid bare for a great extent; and as the layers are nearly perpendicular to the horizon, it forms a wall from fifteen to thirty feet high, easily accessible, should it be wanted for manufacture. The surface of this rock is disintegrated, often for a considerable depth, by the decomposition of the pyrites, and the formation of sulphate of iron, oxide of iron, and sulphate of alumina and potassa. The copperas is perceptible to the taste, almost every where, and the iron gives a rusty aspect to the cliff, as seen from the ocean. The sulphate of alumina and potassa appears in a white efflorescence, where the projecting cliff protects it from the weather. I suspect, however, without having applied any chemical tests, that a part of this efflorescence is not alum: perhaps it may be sulphate of alumina, which would need the addition of potassa to convert it into alum.

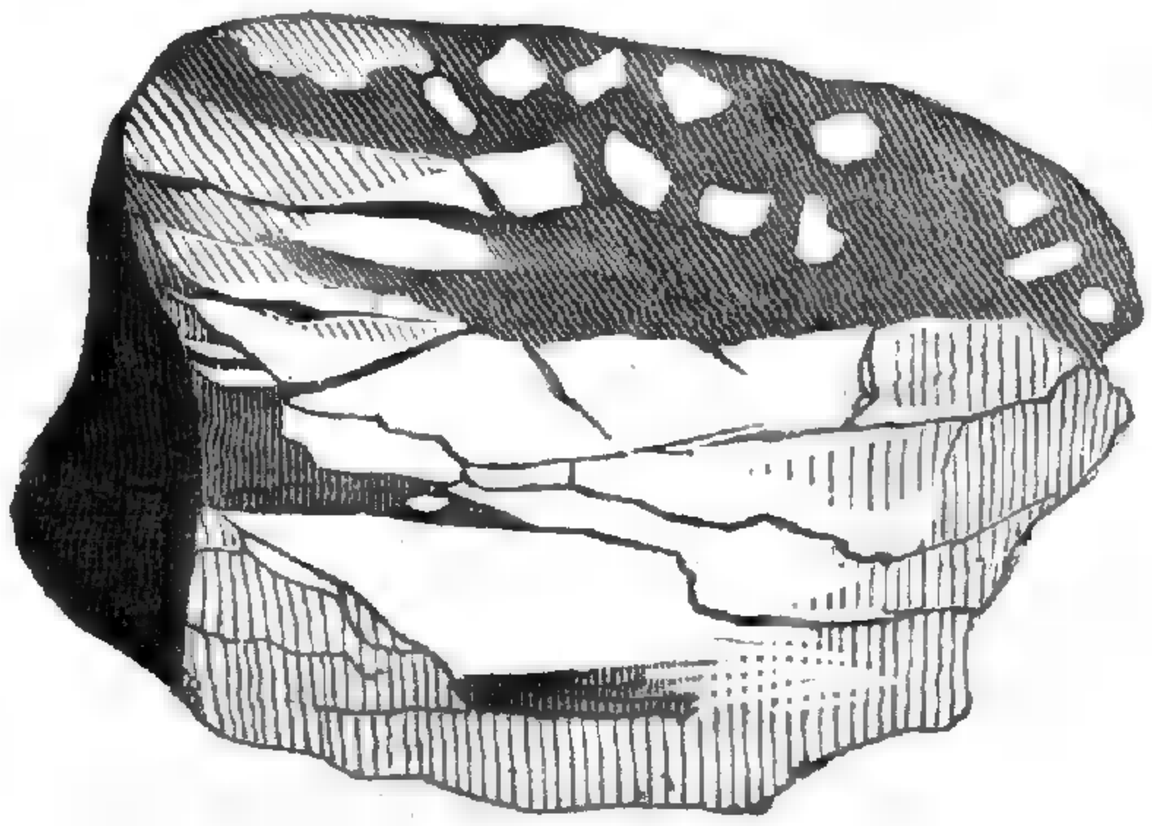
The sulphate of iron, from which the alum and copperas in this rock originate, is disseminated in small grains or crystals through the mass, and rarely forms

nodules of much size. A good deal of the plumbaginous mica slate on Cape Elizabeth, as has been remarked in another place, is in like manner impregnated with pyrites. Upon the whole, I cannot see why the vicinity of Portland, especially Jewell's Island, does not present a good situation for the manufacture of alum and copperas. What practical difficulties may present themselves, I cannot say. But appearances are certainly quite favorable.

We do not go far back from the coast in the vicinity of Portland, before we find that the rocks which have been described, are succeeded by gneiss. As we go westerly from the city, however, towards Saco river, I have good reason for supposing that the slates increase in width, as represented on the map; although I have not given that region a thorough examination.

I picked up a pebble of quartz rock on Jewell's Island, twice the size of the annexed drawing, which presents a tolerably good example of a peculiarity in the structure of this rock, which I have often noticed in other parts of New England. I refer to the evident traces of a mechanical, or at least semi-mechanical origin, which some parts of the mass present; and which, in the pebble exhibited below, shows itself in the angular fragments in the upper part, scattered through a darker colored and apparently somewhat ferruginous cement. The quartzose layers of the specimen seem to have been more or less broken and moved, and afterwards very firmly cemented together. The latter process does not seem so difficult to explain; but what was the nature of that force which could have been so powerful as to break hard quartz into such fragments, and yet scarcely remove them from their places, I confess myself unable to imagine. Specimens

still more remarkably broken and re-cemented by hematitic iron ore, I have found in the western part of Massachusetts; which are described in my Report on the Geology of that State. But I regard the subject as one of the most obscure in geology.



It may not be amiss to notice here a remarkable rock, which I recently met with in Rhode Island, on the west side of Narraganset Bay, as far south as Wickford. I met with it only in large boulders; but have no doubt that it occurs in the vicinity, in place; since masses so large could not have been removed many miles from their native bed. At a little distance, this rock has precisely the aspect of graywacke conglomerate. And indeed, it is a conglomerate; being filled with very distinct and numerous rounded masses of that variety of quartz rock, which takes a little mica into its composition, so as to render it schistose. These masses have been as evidently rounded by attrition as those in the most recent of the conglomerates; or even as diluvial gravel. Yet the cement that holds the pebbles together is nothing more nor less than the most decided mica slate, having a highly crystalline aspect. And the rock is as firmly bound to-

gether as the most solid varieties of mica slate. In fact, it is a mica slate conglomerate. In my Report on the Geology of Massachusetts, I have described a large deposite of a rock, differing from this only in the substitution of talc for mica, occurring on the eastern side of Narraganset Bay, near Newport, and on the eastern border of the graywacke formation. This mica slate conglomerate occurs along the western border of the same formation, where it adjoins quartz rock, mica slate, and gneiss. Do not such rocks as these conglomerates and the quartzose breccias that have been noticed, lend a strong confirmation to the theory, which supposes the primary stratified rocks to be only metamorphic secondary ones? Between these mica and talcose slate conglomerates, and genuine classical graywacke, I found, in Rhode Island, almost every variety of gradation.

Limestone.

As we go over the arm of the sea that separates Portland from Cape Elizabeth, not far from the southeastern extremity of the bridge, we meet with an imperfect sort of limestone; or, it is limestone with a large mixture of the talcose and mica slates that have been described. Its color is blue, and it is traversed by veins of white calcareous spar; and sometimes we meet with thin layers of milky quartz. It bears a strong resemblance to some of the limestone that is brought from Thomastown in Maine, and which is used as marble. And if slabs of sufficient size can be obtained, I do not see why it will not form a handsome variegated marble. At present, it is laid bare only in two or three places along the shore; and not improbably, it may be found more free from fissures, and less

slaty, by removing the diluvium farther from the shore. A quarry of good marble so near, would certainly be of some importance to the city of Portland. How far the stratum extends in a southwesterly direction I am not able to say; not improbably to the ocean: but the country is somewhat level, and the rocks not often visible. On the map, I have represented this stratum as quite narrow, and only a few miles long. Not improbably it may be found to extend northeasterly to some of the islands in the harbor. The dip and direction of its layers correspond to those of the slates already described, viz. running nearly northeast and southwest, and dipping almost ninety degrees.

Hornblende Slate.

This is one of the most uninviting and perplexing rocks with which the geologist meets. Where it exists in its greatest purity, that is, where it is distinctly slaty and highly crystalline, its appearance is attractive. But for the most part, it seems to be in a metamorphic state; its slaty and stratified structure being very obscure; the rock breaking into fragments, either amorphous or somewhat columnar; its crystalline structure becoming less distinct, and constituting in fact, the rock that used to go by the name of primary greenstone. This description corresponds to its characters on Cape Elizabeth, where it forms extensive strata; although often so obscurely characterized as to be mistaken for other rocks, with which it is often confusedly interstratified. In passing from Portland to the light houses on the extremity of Cape Elizabeth, we meet with this rock half a mile beyond the new meeting-house on the north part of the Cape, and it con-

tinues nearly four miles. I have met with it in other places around Portland; but nowhere occupying extent of surface enough to be exhibited on the map. Nor am I sure that I ought to have extended the stratum of this rock on Cape Elizabeth to the ocean southwesterly, as I have not actually traced it so far. But the remarkable uniformity in the dip and direction of the rocks around Portland, has led me in some instances to extend them on the map, somewhat beyond where I have actually traced them on the surface.

In passing along the coast from Portsmouth, New Hampshire, to the mouth of Casco river, we find numerous ranges of hornblende slate, separated by other rocks, particularly greenstone and sienite. Between Portsmouth and the east part of York, we meet with greenstone only, as the alternating rock; and I am inclined to believe (my opportunities for observation have been very limited,) that it is the primary greenstone; and consequently, is only a variety of the hornblende slate, which has lost, more or less, its slaty and stratified structure. But between the east part of York and Casco, we meet with ledges of decided sienite, resembling that on Cape Ann. At Biddeford, on the west bank of Casco river, vast ledges of this rock appear, and are quarried. In that rock I could not discern any hornblende; but it is nearly destitute of mica, and corresponds to a great deal of the rock in Massachusetts called sienite.

From Portsmouth to Casco the general direction of the stratified rocks is northwest and southeast, and the dip northeasterly and large. But from Casco to Portland, the mica and talcose slates (perhaps I ought to add also the argillaceous slate,) run northeast and southwest, and dip northwest, from 70° to 80°. Casco river, then,

forms the place of the junction of two great systems of strata.

In my Report on the Geology of Massachusetts, I have described the northeast and southwest system as crossing the easterly part of that State, and probably embracing a portion at least, of the Allegany mountains, and perhaps connected with Beaumont's vast Pyreneo-Appenine system. I have also, in the same work, described a northwest and southeast system; though in some doubt whether such a system exists on this continent. But if I am not mistaken in my statements about the rocks in Maine, it would seem that such a system must be admitted to exist.

Gneiss.

One has to go only a few miles northerly or northwesterly from Portland, to find himself entered upon a vast region of this rock. How far it extends in those directions I am unable to say: but presume, from all that I can learn, that it constitutes a larger part of the surface of Maine than any other rock. In passing along the coast towards Brunswick, we strike gneiss about three miles from the city; and I am informed that it continues northeasterly as much as sixty or seventy miles. In going west from Portland, we find a remarkable hill of gneiss, not more than a mile or a mile and a half from the city. It is easily mistaken for a ledge of granite, on account of the indistinctness of the stratification. But the schistose arrangement of the ingredients is easily discoverable. I am inclined to believe, that a judicious exploration of this spot would prove, that an inexhaustible quarry of good building stone might here be laid open.

And since not more than half a mile of land carriage intervenes between this spot and Portland, if such a discovery should be made, it must prove of great service. A large part of the stone there used for architectural purposes is gneiss, brought from Yarmouth, twelve or fourteen miles distant.

In general, the gneiss of the region above described is the granite gneiss; that is, the rock approaches to granite in appearance, the lines of stratification being almost obliterated, and the texture of the rock being very coarse. Indeed, as it appears in the walls, along the road, and occasionally in ledges, it is easily mistaken for coarse granite. But the experienced eye will soon perceive it to be gneiss, almost changed into granite. In Yarmouth it abounds in schorl, and sometimes affords beryl. The form of the crystals of schorl may be described by calling it a three-sided prism with triedral summits, the edges of the prism being replaced by two planes, so as in fact to make a nine-sided prism.

In passing west and northwest from Portland, we find the mica slate bearing rapidly more and more to the northwest; that is, dipping southeasterly at a less and less angle; so that when we reach the gneiss, it is not more than 30° to 35°. Proceeding in the same direction, the dip becomes still less, even as low as 20°. This is an important fact; because it is contrary to what we should expect; if, as it would seem we must admit, the anticlinal axis of the system of strata around Portland lies northwest of the city. But it corresponds with what I have observed of the gneiss in other parts of New England. Indeed, I scarcely know of any of our rocks, not excepting those of the secondary class, whose dip is not as great as that of our gneiss in many places; though

there are many exceptions. It is the granitic gneiss that more commonly dips at so small an angle.

Before describing the upper unconsolidated strata around Portland, I may as well notice two or three varieties of unstratified rocks in the same region.

Granite and Sienite.

Under hornblende slate I have already stated all that I know of the sienitic deposits in the southwest part of Maine. Around Portland I have met with nothing that deserves this name, except a few boulders, near the tower in the north part of the city, of great beauty. The mass of the rocks is feldspar, of a much whiter color than in the sienite of Quincy and Cape Ann; and through this base are disseminated brilliant foliated masses of black mica and hornblende. I shall show, further on, that the proper place to look for this rock in place, is several miles north of the city. Should it be discovered in large quantity, I feel sure it would be greedily sought after for architectural purposes.

Genuine granite is a rock of rare occurrence in the vicinity of Portland. In approaching the gneiss from the city, that is, in passing northwesterly, we meet with some veins and irregular intruding masses of this rock, while the slate exhibits that more decidedly crystalline aspect which is so common in the vicinity of granite. In the gneiss also, are numerous veins of coarse granite. But I discovered no large deposite; although not improbably such may exist in some part of the gneiss formation. I have also seen good specimens of granite from the eastern part of Maine. Yet much of the rock that is quarried under this name is genuine gneiss. I am

inclined to believe this to be the case in respect to the Hallowell granite. In respect to the more easterly parts of Maine, however, I shall wait for light, as to its geology, from the expected memoir of Dr. Charles T. Jackson.

Greenstone.

Of that variety of hornblende slate called primary greenstone, I have already spoken. The rock which I am now going to describe exists exclusively, so far as I know, in veins or dykes. And these form one of the most interesting features in the geology of the region around Portland. For the most part, they coincide nearly in direction with the strata, and pursue a very straight course for a great distance often. Yet they are real veins; that is, they were evidently intruded among the strata subsequent to their consolidation. They have a structure more or less columnar; the columns always lying directly across the vein: and since this usually descends almost perpendicularly, they lie nearly horizontally. In some cases, the dyke on the coast seems to have yielded more readily to the action of the sea than the adjoining rock; so that the waves have formed a chasm; as at the north light house on Cape Elizabeth, about four miles from Portland. In most cases, however, as on the northeast part of Jewell's Island, the dyke remains like a wall, while the surrounding rock has disappeared.

About eighty rods northwest of the most northerly light house near the extremity of Cape Elizabeth, we meet with one of these dykes, from six to eight feet wide, in talcose slate. The slate dips about 60° northwesterly, and runs northeast and northwest. This vein coincides

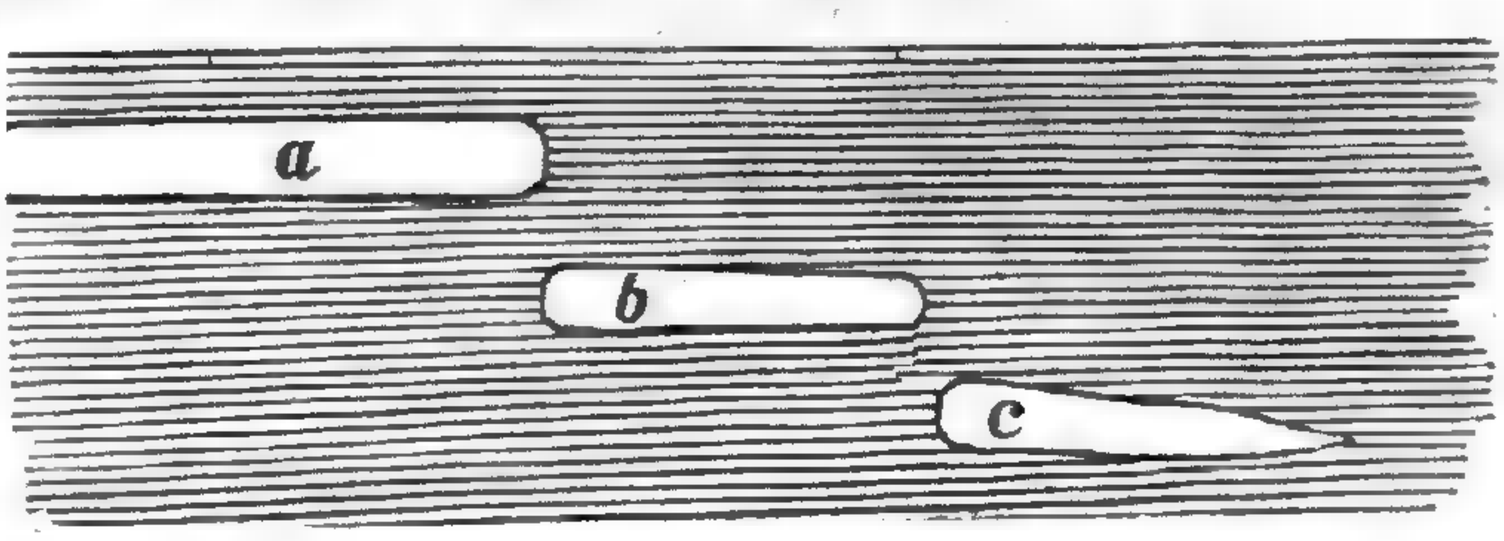
in direction with the strata; but it cuts through their planes nearly at right angles, so that it has a southeasterly dip of about 30°. This dyke is seen at the surface in one or two places on the Cape southwest of the light houses; and it reappears on Richmond's Island, which is about a mile from the mainland. Another dyke crosses that island parallel to the first.

Where the dyke above described appears a little northwest of the light houses, its direction points nearly to Jewell's Island, ten or twelve miles distant. On visiting that island, I found a dyke at its southwestern extremity, three or four feet wide, coinciding in direction and dip with the strata, and extending across the island. This may be the dyke that appears at the light houses on Cape Elizabeth; as is represented by the red dotted line on the map. I am told, also, that a dyke appears on another island eight or ten miles distant, in a northeast direction; and not improbably, all three may be the same continuous vein. On Jewell's Island, I noticed in one place, that the dyke had shifted places, nearly its whole width, without producing any apparent disruption of the adjoining strata. I shall endeavor to explain this anomaly farther on, when I shall describe another similar case. Two other dykes, one of them of greater width, appear on Jewell's Island, having the same general dip and direction as the strata. One also exists near the Portland light house, as may be seen on the map.

In the mica slate south of Portland, not far from a mile, where a small stream has laid it bare, I noticed a distinct vein of greenstone, not more than two feet wide, whose dip and direction correspond to those of the slate.

A little east of the northern extremity of the toll bridge, leading from the north part of Portland into the

country, is a ledge of talcose slate, dipping southeast only 20°; the least inclination that I have met with in the slate rocks around the city. Here, in the edges of the strata, we see thin veins of a peculiar variety of trap, which contains more or less of mica, and which, in fact, seems to be rather intermediate between slate and greenstone, although its schistose structure is obliterated. In some places near this spot, which forms the shore of the bay, the layers of talcose slate are removed, and the surface of the trap is exposed; and I noticed one or two narrow veins crossing the trap and filled with angular fragments. A little nearer to the bridge, however, where the edges of the talcose slate are exposed, I noticed perhaps the most instructive example of these trap veins. The following sketch, showing the edges of the slate with the included vein, will convey an idea of its peculiarities. The dip of the strata here, as measured by the clinometer, is 28° S. E. and the layers are very regular, running northeast and southwest. The three portions of trap *a*, *b*, *c*, are evidently parts of the same vein: for from the



left hand towards the right, the portions taper gradually; *a* being six inches thick, *b* four inches, and *c* three inches: the latter terminating abruptly, so that were *b* and *c* to be brought into a line with *a*, the whole would form an uninterrupted vein. Yet the layers of the slate do not exhibit any fracture or displacement corresponding to the

échellon movement of the trap. How then shall we explain the mode in which this appearance was produced? I can conceive of only one explanation, and that not free from difficulties. All will now admit, I suppose, that all trap rock had an igneous origin. Let us now imagine that the melted mass, at this spot, was forcing its way upwards between the layers of the slate. It is not difficult to conceive that the opening, towards the extremities, might pass between other layers of the slate than those which separated along the central parts; an occurrence which one might see produced by endeavoring with a wedge to separate a mass of slate rock. The opening would be widest where the wedge entered and become gradually narrow towards the extremities, where would probably be seen the scaling up of different layers. In this way, portions of the melted trap rock might be lodged between different layers of the slate, without any apparent fracture of the intervening layers, when they were inspected only on their *bassetting* edges. Yet were this the mode of its intrusion, if the trap were uncovered, its apparently disconnected portions would be found to unite at no great depth.

In the gneiss formation northwest of Portland, we find frequent examples of greenstone veins, from one to five feet wide. In some places the gneiss (here losing all marks of a stratified or slaty structure, and being a real granite in the immediate vicinity of the trap,) is so divided by the ramifications of the greenstone veins, that one can hardly say whether it be veins of trap in gneiss, or of gneiss in trap. Specimens only a few inches long can be broken off, containing two or three very distinct alternations of the two rocks. So firmly are they united, that they separate with little less facility at their junction,

than they divide any where else. The best examples of these veins, which I observed, occur a mile north of Pride's bridge, on Presumpscut river, in Westbrook.

In some places I noticed a fact concerning these veins, that has an important bearing upon geological theory. On Jewell's Island, for instance, in a vein not more than three or four feet thick, the rock in the central parts was decidedly more crystalline than near the walls. Now if the vein was originally injected in a melted state, between the layers of the slate, its outer portions, coming in contact with the cold rock, would harden much sooner than the central parts; and consequently, from all that we know of the chemistry of this subject, we should expect the outer portions to be less crystalline. And, in fact, the specimens are little else than a compact mass, with here and there a small crystalline point; resembling, indeed, the more solid recent lavas that have cooled with the access of the atmosphere.

The uniformity in the direction of these trap dykes, renders it probable that they were of synchronous production, and the result of a common agency. As to the epoch of its operation, we can only say that it was subsequent to the formation of the schistose rocks in which the dykes are contained. I doubt not but a more extensive examination of the geology of Maine would bring to light many more interesting facts on the subject.

Tertiary Strata.

I have not met with any rocks in place, in the southwestern parts of Maine, that belonged to the secondary, or even transition class. But along the shores of Portland I have found a few boulders, some of them nearly

two feet in diameter, of coarse red conglomerate, embracing nodules of quartz, talcose slate, and perhaps sandstone. It is difficult to say whether they originated from a secondary or transition formation. That they were brought from a northerly direction, by a diluvial current, admits of no doubt. But whether any fragmentary rocks occur in that direction, nearer than the valley of the St. Lawrence, may be doubted. I have been shown specimens, however, from the eastern part of Maine, containing petrifactions of testacea. The rock is a fine, very hard, gray, or reddish sandstone. In a similar rock, which is extremely hard, recently sent me from Frankfort, not far from the mouth of Penobscot river, numerous moulds and casts of shells occur. I should infer from hand specimens, that this rock is graywacke; if it be not rather a variety of trap; or rather a sandstone almost changed into trap! I noticed in it three or four genera of shells; but do not feel prepared to name them.

A single tertiary formation exists around Portland, composed chiefly of horizontal layers of clay. The upper part of the bed, to the depth of several feet, seems to have been disturbed by aqueous agency; but lower down, the layers are distinct. It is the blue plastic clay, so common throughout New England; and which I have denominated the *newest tertiary*, in my Report on the Geology, &c. of Massachusetts. After descending several feet, however, in the clay beds of Maine, we reach a stratum of a lighter blue color; and in this, shells are found, partially or wholly converted into stone. I have found them only at a remarkable slide on the north side of Presumpscut river, near Pride's Bridge, in Westbrook; but I was assured by the workmen in the clay pits around Portland, that they occur in two or three places in that

vicinity; and I was informed that they are abundant on Bailey's Island, in Casco Bay. Sometimes these shells are scarcely changed in their appearance from recent shells; not even the epidermis being in all cases obliterated. But generally, the cavity originally occupied by the animal, is partly or wholly filled by an argillaceous limestone. It is the same substance that is found very frequently, in the same clay beds, in a concreted form; and in this state goes by the name of claystones. In one or two instances, where the cavity of the shell was only partially occupied by this matter, I noticed minute crystals of calcareous spar. Even where the whole interior is filled with calcareous matter, the shell itself is not much altered.

The most common shell, and indeed the only one that I found in much quantity, is a delicate species of NUCULA. I am assured by gentlemen well qualified to judge, that it differs from all the recent species of that genus. I have not had as much opportunity as I could desire, to ascertain whether it is identical with any fossil species that has been described. I presume it, however, to be undescribed, and venture to denominate it NUCULA *Portlandica.**

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* Dr. A. A. Gould has furnished the following specific description.

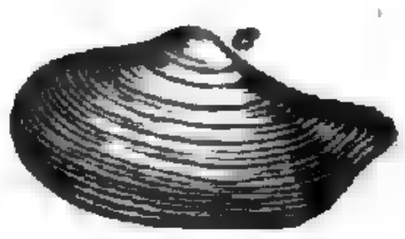
Shell transversely ovate, convex; posteriorly rounded, anteriorly acute and sub-plicate; basal margin regularly rounded, obliquely truncated anteriorly; delicately striated transversely.

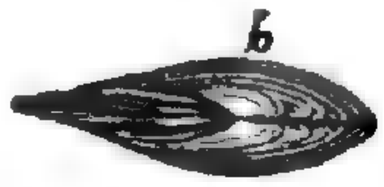
Length seven twentieths, breadth twelve twentieths of an inch.

Agrees with Lamarck's description of N. *emarginata*, as also with the figure to which he refers, and which Brocchi gives as the ARCA *pella*, L. except that it wants the oblique striæ. It differs, however, from A. *pella*, L. a recent species, as referred to by Lamarck in the Encyc. Meth., in being less sloping and somewhat carinated ante-

Figures *a* and *b* are different views of this shell, of the natural size.

In the same place I found two species of MYA. Only a single valve of one species was noticed; which appeared to belong to MYA *mercenaria*. The other is much smaller, and bears a strong resemblance to the NUCULA above described. It is represented below of the natural size.





I found, also, in this clay bed, two or three specimens of another small bivalve, which resembles a SAXICAVA. But I have not been able to separate the valves so as to examine the hinge. The specimens are somewhat injured; but a drawing of the most perfect is here given of the natural size.

At the same locality I noticed likewise a very small species of BULLA; but I obtained only one or two speci-

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riorly, and in the truncation, which is so decided as to give ■■ emarginate appearance. The carinated fossa is very marked. The fold is nearly as distinct as in a TELLINA.

mens. A well characterized, though not entire, specimen of crab occurred in the same place.

The clay at this spot (at the slide on Presumpscut river,) is laid bare from ten to twelve feet deep, and the remains above described, occur in its lower part. In the upper layers I found the peculiar relic which I have described and figured in my Report on the Geology of Massachusetts, as existing in the clay beds of the newest tertiary strata in that State. I have learnt nothing farther, since that account was made out, as to its nature. I can hardly doubt that it is of animal origin; probably of the polypiferous class. It would seem that it consisted of a single spherical head, rarely more than an inch in diameter, with a simple tube of smaller size, proceeding from it downwards, several inches long. Indeed, it seems to have conformed in its structure to the living genus HYDRA. Wherever I have met with it, and I have seen it in many clay beds, it has almost always occurred in the upper part of the stratum. In Maine I found it, not only at the spot above mentioned, but in the clay pits a mile or two west of Portland. Its occurrence at the slide, evidently in the same deposite as the shells that have been described, furnishes us with an important addition to our knowledge of those so numerous clay beds in New England, which I denominate the newest tertiary. Hitherto this polypiferous fossil was the only one that had been found in these deposites; and from it we could not determine whether they were formed in fresh or salt water. But the shells at the slide all belong to marine genera, and they seem to indicate a similar origin for the whole deposite. Yet if such be the fact, the great infrequency of organic remains is difficult to explain.

The concretions called *claystones* are common at the slide; and I have rarely met with so many of a spherical form. In some instances the fossil shells that have been described are wholly, or in part, imbedded in these concretions. The figure below exhibits the smallest species of Mya, that has been described, thus partially enveloped.

It would be desirable that some geologist should direct his attention to an elucidation of the subject of these concretions. The mode and laws of their production are certainly very obscure; although apparently connected with crystallization. I find an almost universal impression that their forms have been the result of running water; an opinion most clearly erroneous. Some of them have a nucleus at their centre; and frequently, some of the concentric layers are of different color from the general mass, so that they appear as if the work of art. Indeed, if I mistake not, one of them has been described within a year or two in Boston, (I have forgotten in what work,) with a drawing, as a curious relic of antiquity. But I have seen the specimen, and am sure it is all a deception.

I have marked on the map only three patches of tertiary strata; one a short distance west of Portland, another along Presumpscut river, and a third near the mouth of Saco river; although clay beds occur in many

other places; but in these spots it is most abundant and well marked.

Diluvium.

In examining the geology of Massachusetts, I found, in every part of it, abundant and incontrovertible evidence of a powerful rush of waters over its surface from the north and northwest. I often, and almost always with success, applied this fact to direct me in tracing boulders to the rock from which they were detached. When I went into Maine, with no knowledge of its geology, I undertook to apply the same principle. From Casco river to Portland, on Cape Elizabeth, and the islands in Casco Bay, the rocks in place, I found, were all some variety of slate. But the boulders scattered over the surface were nearly half gneiss; and I did not hesitate to predict, with great confidence, that a few miles to the north, this rock would be found in place. The subjoined map will show how well verified was this prediction.

The vicinity of Portland is not remarkable for any extensive accumulations of diluvial detritus; I mean, compared with other parts of our country; with the eastern part of Massachusetts, for instance. The peninsula itself, on which the city stands, affords perhaps as good examples of such detritus as I met with. The northern and southern extremities are elevated above the general level of the city, by deposites of diluvium. The boulders here are chiefly gneiss and granite; the slates in the vicinity being among the most unyielding of all rocks. Now whoever is in doubt whether there are any marks of diluvial action in the region of the city, let him stand

upon one of these elevated spots, and account, if he can, for the accumulation under his feet, in any other mode than by a strong current from the north. If any cause now in action could have produced it, it has escaped my observation.

But the diluvial grooves and scratches on the rocks around and within Portland, exhibit the agency of a former *debacle* of waters more strikingly than any thing else. I have never met with them any where else, so distinct and uniform in their direction. The slaty rocks of that region seem to be almost entirely unaffected by the disintegrating and decomposing agencies of the atmosphere. In fact, I apprehend that they exhibit almost the same appearance as they did immediately after the last deluge had swept over them. The tracks of a sleigh, or sled, through fresh fallen snow, are scarcely more distinct, than the scratches upon some of these rocks. I took the direction of many of them with a pocket compass; and found them all running south, from 10° to 15° east. I shall name several places where some of the best examples of these grooves may be seen; so that others will have an opportunity to verify my statements, or to prove them erroneous.

Some very good examples may be found along the shore in the southeast part of the city, and also in the northeast part, especially a little beyond the tower. Also on the north side of Elm street, a little east of its intersection with Cumberland street; and in Fore street, near where Silver street intersects it. On Cape Elizabeth, a tolerably good example exists on the western slope of the hill, a little west of the new meeting-house, opposite to Portland. In Westbrook, the cases are very numerous, and some of them very fine. They generally

occur, however, not more than a mile or two from the shore; as the rock beyond that distance is so changed in its characters, that disintegration has obliterated the grooves. The same is true in respect to the gneiss region generally. At the spot that has been described, a little east of the northern extremity of the toll bridge, leading from Westbrook to Portland, we find, both on the slate and the trap rock, some good examples of these grooves. On the road to Yarmouth I observed others, about two miles from the city. But I found them at length occurring so frequently, that I ceased to keep notes of their location.

In all the above cases, except perhaps that in Elm street, the course of the grooves makes so large an angle (from 50° to 70°) with the direction of the strata, that there is little danger of confounding them with the grooves resulting from the unequal hardness of the successive layers of slate, whereby some of them disintegrate faster than others, and thus produce ridges and depressions. In Elm street, the grooves resulting from both these causes come much nearer to a coincidence than in other places. Still, I am confident that even there, some divergence may be seen between them. It cannot be expected, however, that diluvial grooves will be as distinct in the streets of a city, where they are continually passed over by animals and men, as they are in the country. I was surprised to find them in the city at all.

The striking uniformity in the direction of the elevated edges of the slate in the vicinity of Portland, is another circumstance favorable to accuracy of observation upon these grooves. For where the direction is liable to change, as it often is in slaty rocks, within a few feet, the inexperienced observer especially, is liable to make mistakes.

Slaty rocks, too, not unfrequently are so fissile, that their edges can hardly be made to exhibit a smooth hard surface by the action of water. But around Portland they adhere so closely to each other, that their edges, where worn, present as smooth and uniform a face as sienite and trap rock; while at the same time they are much softer than the unstratified rocks. Hence the distinctness of the diluvial grooves under consideration. And upon the whole, they are the finest examples that have ever come under my observation.

It is known to the Society, that Dr. C. T. Jackson has recently examined geologically, the whole coast of Maine; and I take the liberty to quote here his testimony on the subject of a northerly diluvial current. "I discovered every where, in Maine," says he, in a recent letter, "the fullest confirmation of your opinions respecting the last great cataclysm; and the boulders always led me directly to their origin as I proceeded north. The current was every where indicated to have been from the *northwest* towards the *southeast*. The details would take up too much room now." I trust these details will soon be given to the public.

That same gentleman, in connexion with Mr. F. Alger, in their Memoir on the Geology of Nova Scotia, give similar testimony in respect to the diluvial phenomena of that country. We have now, then, an almost unbroken series of observations on this subject, from the extremity of Nova Scotia, to the western side of our great lakes, a distance of from 1200 to 1500 miles; and with a few local exceptions, perhaps, there is decisive evidence of a comparatively recent and powerful rush of waters from the north or northwest. In all cases, its direction appears to have been to the east of south; and

from all the facts in the case, I presume that its general course was nearly southeast. I am aware that some writers, who profess to be acquainted with our geology, speak of the occurrence of this northerly current as a gratuitous assumption; probably, because it does not accord with their preconceived opinions, or perhaps their prejudices. But until they can hide from view those vast accumulations of detritus, which many parts of our country contain, and which are uniformly found southeasterly from their parent beds; until they can convert the primary boulders of our great western prairies into secondary rocks; until they can obliterate those grooves and scorings, of which hundreds of examples exist in every part of New England at least, unprejudiced observers will certainly infer that a mighty debacle of water must formerly have rushed over this continent. No causes now in action, no drainings of former inland seas, will satisfactorily explain the phenomena of our diluvium. For the highest portions of New England at least, were swept over by the mighty wave. Nor could this deluge have happened before our present mountains were elevated. For in no instance out of the hundreds of diluvial grooves which I have examined, have I seen the least evidence of any change of level in the rocks containing them, since they were made; and had there been any such change, it is certain that some portions of the worn surface, especially of slaty rocks, must have been elevated more than others. But in every case, the entire surface, often several rods in extent, is as even as are the rocks in the bottom of a river, that have been smoothed and furrowed by the flood of a previous winter;—a decisive proof that no essential change of level has occurred since the diluvial current swept over them.

I am also aware that many able European geologists strongly object to the term *diluvium* as indicating a distinct formation. True, it is probably best to avoid terms in description that involve theoretical considerations. But if ever they are allowable, it would seem to be in this case. For it is difficult to conceive, how any one can carefully examine the diluvium of this country, and not come to the conclusion, that if not produced originally by a deluge, it has all been modified and extensively changed in its location by such a catastrophe. In Europe, some geologists suppose that the superficial coat of travelled detritus has resulted from causes now in operation, or from several deluges. But so far as this continent is concerned, I cannot see how the conclusion can be avoided, that the last agency that has acted upon such detritus was a powerful current of water over the whole land from the north and northwest. We, therefore, do not greatly err in calling this detritus *diluvium*; however objectionable the term may be in Europe. I make these remarks after having carefully read what Mr. Lyell has said, in England, in his *Principles of Geology*, and M. Boué, in France, in his *Mémoires Géologiques et Paléontologiques*, on the other side of the question.

I have dwelt longer on the subject of diluvium, because it has seemed to me, from the descriptions given us of this deposite in Europe, that its characters are much less satisfactorily developed in that quarter of the globe than in our country; especially as it respects grooves and furrows upon the rocks in place. This appearance is certainly not common there; but in New England, and in the eastern part of New York, I can say from long personal observation, that it *is* common. And it seems

to me that this is a very important addition to the argument. It may, indeed, be possible to trace erratic boulders to their origin without these marks. But without them, it will be difficult to decide whether the detritus was produced before or since the surface had assumed its present levels; and whether more than one deluge has been concerned in bringing it into its present form. No man, however, can examine these grooves, without being satisfied that the levels have not essentially changed since the grooves were formed. And then the general uniformity of direction which they exhibit, over a vast extent of territory, proves that no local causes, such as are now operating, could have produced them. They could not have been formed when this continent constituted the bed of an ocean; nor by the retiring wave when it was elevated; but by a rise and flood of waters since this part of the globe assumed its present form and levels.

Causes of Geological Change now in Action.

There is scarcely an alluvial deposite in the vicinity of Portland, that is extensive enough to deserve a place on the map, or that requires description. The only spot that I have represented as alluvial on the map, is the large sphagneous swamp on the southwest side of the city; and even there, I apprehend that the deposite is rather thin, so as to make it doubtful whether it deserved this notice. But around Portland, and along the whole coast of Maine, are some causes of geological changes now at work, in such a manner as to deserve attention. Indeed, I have been much interested by them.

Peat Beds and Submarine Forests.

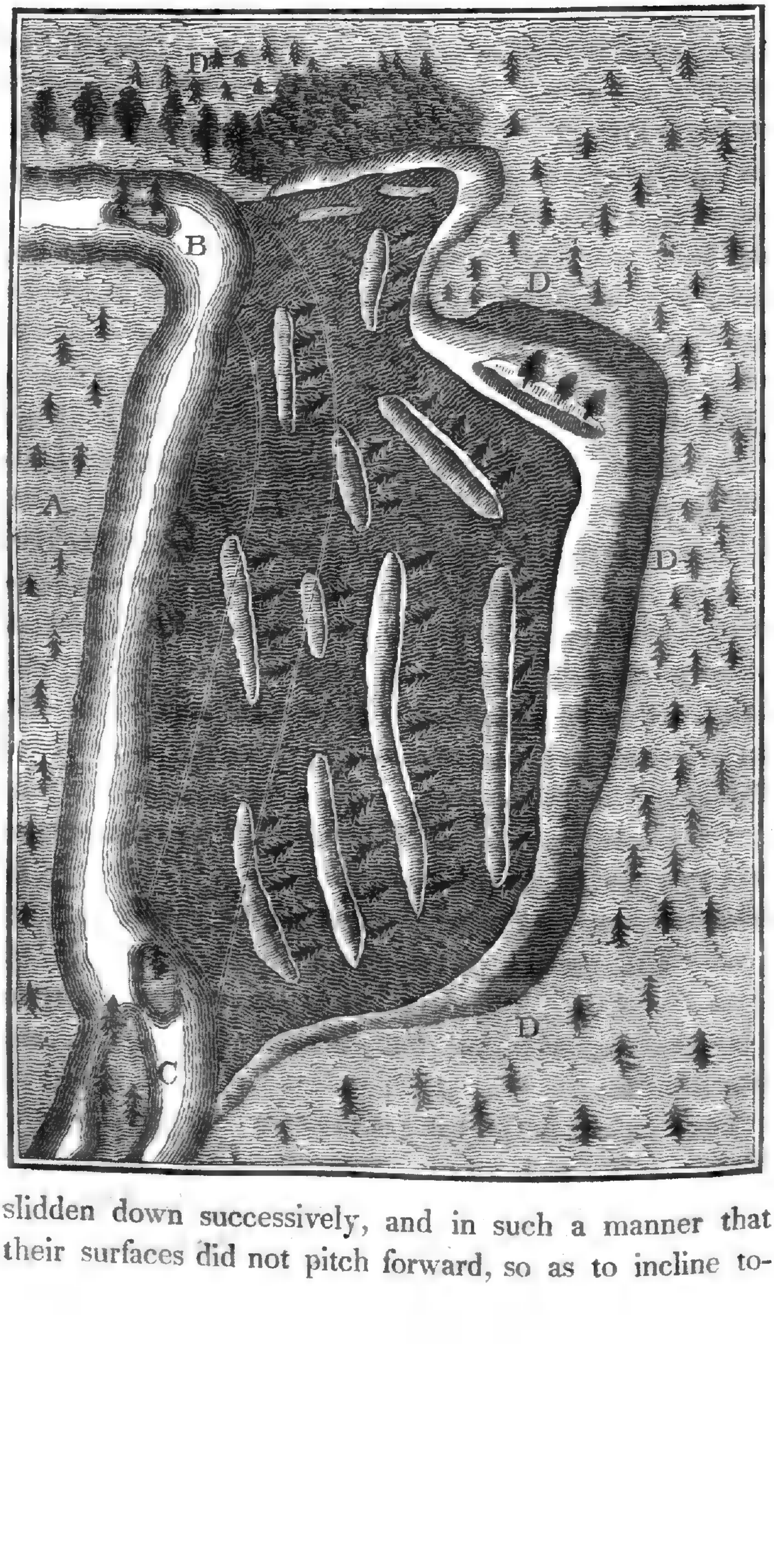
On Jewell's Island there exists a bed of peat and a submarine forest. But I did not examine them. At Diamond Cove, on Hogg Island, (a spot famous for its scenery,) I found a peat swamp so situated, as perhaps to throw a gleam of light on the mode in which some submarine forests may have been produced. The barrier that separated the peat swamp from the ocean has been entirely removed; probably by the action of northeast storms; whereby the strata, for thirty or forty rods in width, have been worn away so as to form the cove which opens to the northeast. During high water, and especially during storms, the water overflows a considerable part of the swamp. When it retires, it carries towards the cove more or less of the contents of the swamp, such as mud, peat, and the stumps and roots of trees. At low water these may be seen along the slightly inclined plane that forms the shore, evidently waiting to be driven by the flux and reflux of the tide; and to a greater distance by the latter than the former; because in that direction the surface is sloping. In the lapse of ages it is clear that the whole swamp may be removed to a lower level, and all traces of its present level be lost. And its new situation may probably appear so much like its original one, especially when seen only at low water, or when covered by the ocean, that the future observer may not suspect that there has ever been a removal. May not these facts explain the situation of some submarine forests?

Land Slip on Presumpscut River.

I have already referred to this spot, as furnishing interesting organic remains. But it is still more important as affording an unusual example of change, which the earth's surface is undergoing. It occurs near Pride's Bridge, in the northerly part of Westbrook, on the north bank of the river. The stream in general is from six to eight rods wide, when at a medium height. At this particular spot, its course, which had been nearly north, suddenly turns nearly east, in consequence, probably, of the high bank forming its northern shore. At the place where it makes this curve, it must of course undermine the bank; and probably in the course of ages, it has made considerable inroads upon it; for the opposite side of the river, A, (see the sketch below,) is a low alluvial meadow. Five or six years ago, the northern bank made one or two very effectual reprisals; and by successive slides, whose whole width cannot be less than twenty rods, and their length twice as much, the river was entirely crowded out of its channel, and compelled to excavate a new one. The island at B appears to have been a part of the northern bank, which was thrust farther into the stream than the great mass of the bank that fell. The island C seems to have been the former southern bank of the river. The greater part of the stream now runs on the south side of it. The dotted lines passing over the slide show the former bed of the river, as nearly as I could determine it.

The northern bank, back of the slide, (D, D, D, D,) is elevated thirty or forty feet above the river. Its surface is more or less covered with small yellow pines, and these are the trees that are seen so abundant on the por-

tions of the surface, that appear somewhat like terraces over the face of the slide. These portions seem to have



slidden down successively, and in such a manner that their surfaces did not pitch forward, so as to incline to-

wards the river, but in the opposite direction; so that the trees all lean more or less from the river. The ridges on which they stand, are elevated but a few feet above the general level, which is from fifteen to twenty feet below the original level of the plain. Between these ridges, the surface is composed of a very light bluish clay. And this stratum, occurring perhaps twenty feet below the surface, and being exceedingly plastic, appears to have been the principal occasion of so extensive a slide. The upper layers of clay are of a darker color; exactly resembling the clay beds that are scattered over New England so abundantly. Above the clay, are a few feet of light sandy soil, which constitutes the surface.

It is a curious fact, that these slides took place, as I was informed by Mr. Edwards, of Portland, in time of a drought, in summer. Perhaps the unusual exsiccation caused the upper strata to crack more readily, while the stratum of whitish clay, being so deep in the earth, still retained moisture enough to be very plastic. It is difficult, however, to conceive how the slide should have been so extensive, without any unusual convulsion. It certainly resembles those land slips that have resulted from earthquakes; but I have not learnt that such an event was concerned in its production.

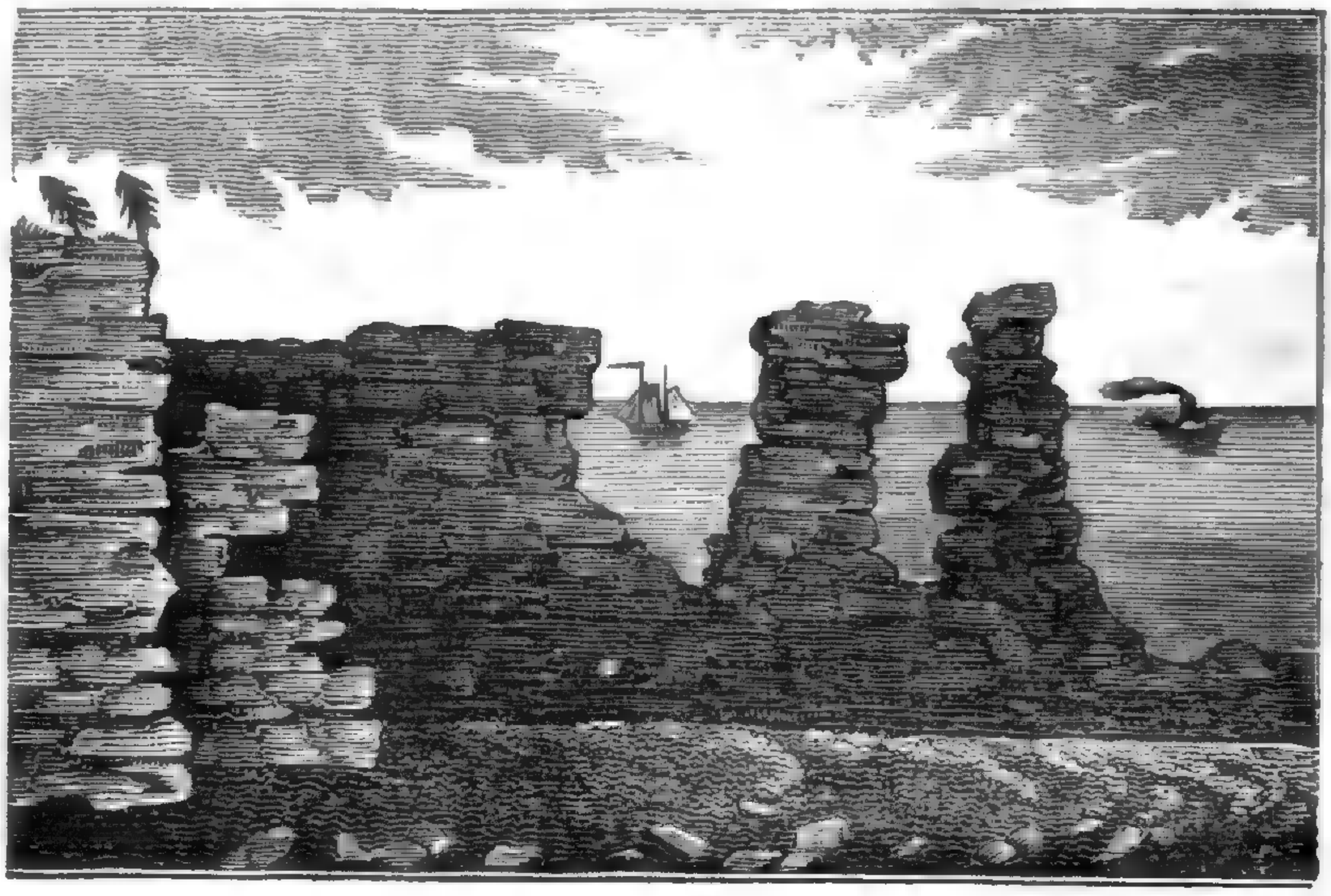
I hope the annexed birds-eye sketch may enable the Society to form a more accurate idea of this land slip, than my description will convey; although it was taken in great haste and by the eye alone. And all the dimensions of this slide, that have been mentioned, are only approximative estimates, obtained in the same manner. But the case is too interesting to be passed without notice.

Action of the Sea upon the Coast.

I can hardly believe that any part of the world presents finer examples of the abrading agency of the ocean upon the land, than the coast of Nova Scotia, Maine, and Massachusetts. I shall, however, limit my remarks to a few cases that fell under my notice during my excursion to Portland.

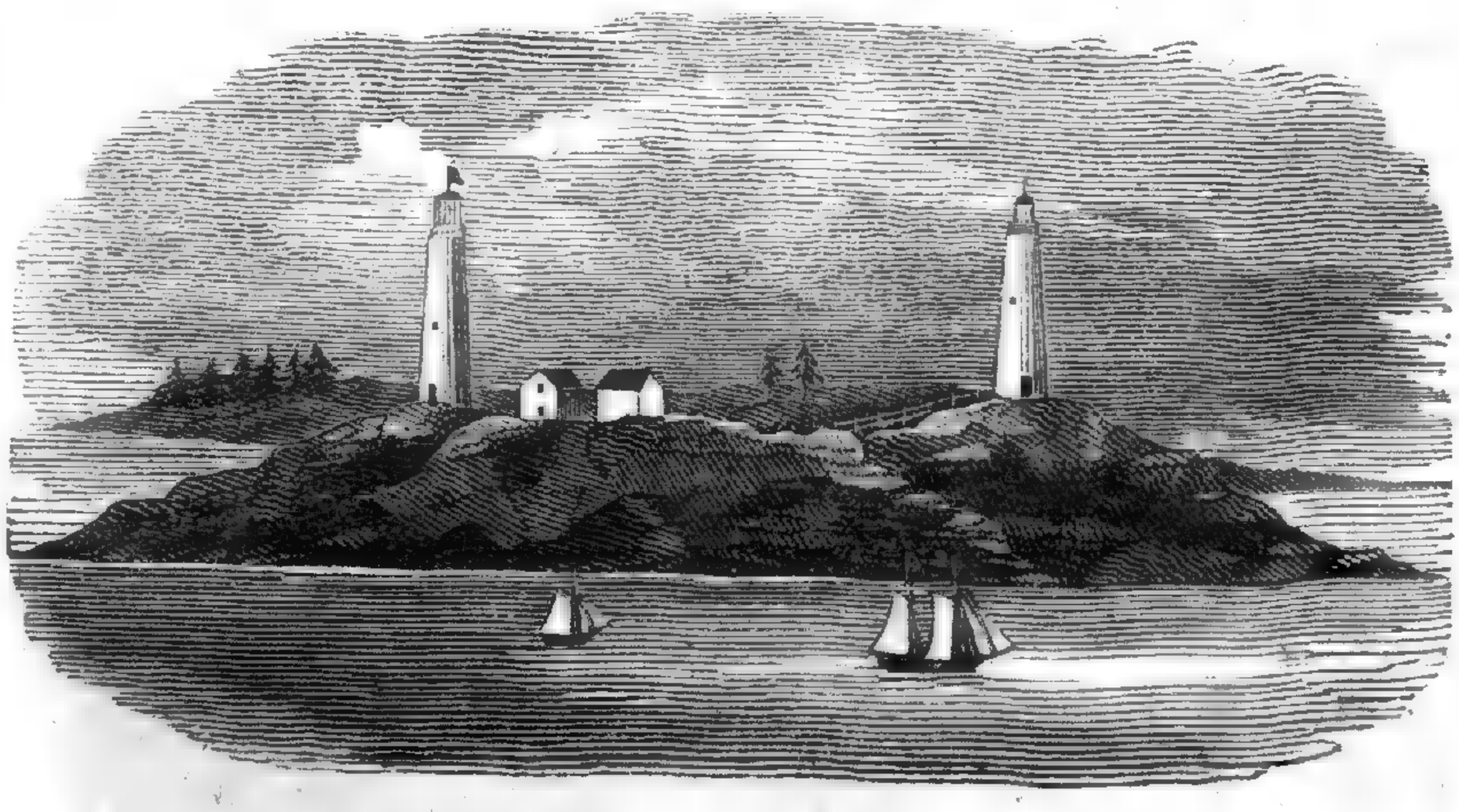
In sailing among the islands in Casco Bay, said to be as numerous as the days of the year, I was struck with the fact that their longitudinal direction is almost always from southwest and northeast; and the same thing is generally true of the numerous islands and capes along the coast, as far at least, as the mouth of Penobscot river. The explanation of this fact depends in a measure, I am persuaded, upon the fact that the strata run in that direction. For the water gradually encroaches upon the softer portions of the strata; the harder ridges resisting its power much more successfully; and thus a succession of gulfs and capes is formed, running in the same direction as the strata. In a variety of ways these capes may be cut off, so as to become islands in the course of centuries. The northeast and southwest storms, also, are more violent on this coast than any others; and the marks of their action are visible almost every where along the shore. The strata are not only denuded for miles often, but the harder portions of the strata remain projecting, sometimes several rods beyond the general line of the coast. These walls are sometimes so narrow that the lateral action of the ocean beats passages through them, and detached portions of the rock stand, apparently without much support, and forming what in Europe are called *drongs*. The following sketch was taken at the southwestern extremity of Jewell's Island; but it conveys only

an imperfect representation of the wildness and roughness of the spot.



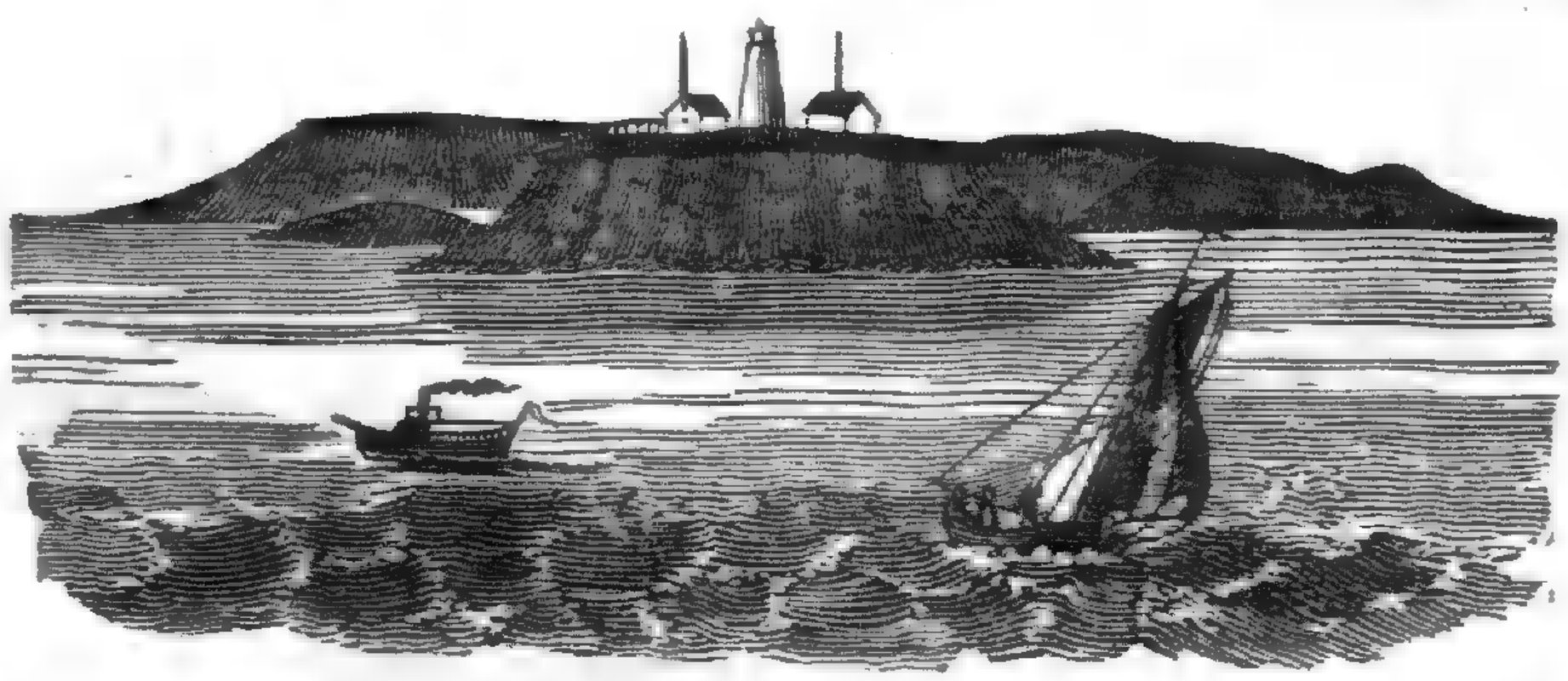
The next sketch was taken from a point one hundred rods northwest of the two light houses, near the extremity of Cape Elizabeth. It conveys, however, but a faint idea of the ruggedness of the spot, exposed as it is to the fury of the northeast storms.

In passing along the coast of Maine towards Massachusetts, we do not meet with many striking cases of the denuding agency of the ocean, after passing Cape Elizabeth, till we reach Cape Ann. Here we should expect to see the powerful effects of the northeast storms, that sweep along this coast with tremendous violence. Accordingly we find that the island on which the light houses are placed, a little in advance of the end of the Cape, is almost entirely swept of vegetable life, and even of soil; presenting nothing but sea-beaten, dark brown masses of sienite; the only rock, perhaps, that could so long have resisted the furious concussion of the waves. There can be no doubt but this island was once covered with soil, and probably was connected with the Cape. The Cape itself is little else than a mass of sienite, especially its shores, as high as the waves wash them in a storm. The following sketch of the island, with the light houses, and of the Cape behind it, was taken as we rushed past the spot in a steam-boat.



Proceeding from Cape Ann to Boston, we see continual, and most striking evidence of a mighty aqueous

agency in the naked rocky islands and shores, especially at Marblehead and Nahant. As we enter Boston harbor, a curious phenomenon presents itself. The outermost islands, as the Graves and the Outer Brewsters, are composed of naked rock, or nearly so. But those more within the harbor, are covered with a thick diluvial coat; except that on their northeasterly, northerly, and northwesterly sides, the sea is encroaching upon this diluvium, so that the shores are precipitous, appearing like the banks of a river which the stream is wearing away. No such denudation is exhibited on those islands, which, by being more within the harbor, are protected from the fury of the waves; nor, so far as I have observed, does any other than a northern or eastern shore present this appearance; showing clearly, that it results from northeasterly storms. Nor can a doubt remain but that the outermost islands have, by the same process, been swept of their diluvial coat. Indeed, who can doubt but nearly the whole coast of Essex county, and I might add, of a great part of the coast of Maine, has been thus denuded. Amid the rapidly changing scenery of Boston harbor, as we pass through it in a steam-boat, I caught at one moment the sketch below. But I am not sure whether



the group of islands represented is that of Calf Island, the Great Brewster, &c. or Lovell's, Gallop's, &c. The

direction in which these islands were seen, when the sketch was taken, was southerly.

Geological Changes produced by Molluscous Animals.

I have been much interested in some observations and facts communicated to me recently by Dr. James E. De Kay, now resident at Oyster Bay, Queen's county, Long Island. And I take the liberty to give them in his own language, presuming that Dr. De Kay will pardon such a use of a private letter.

"I have resided latterly," says he, "on the shore of a large bay, on the northern coast of Long Island; and the changes effected on its sandy beach by winds, tides, and apparently irregular currents, have attracted much of my attention. It has, however, often been a matter of great difficulty to account for the deposition of materials in places, where, from the operation of the above named causes, they certainly ought not to be found. Will the following facts throw any light on this subject?

"In a calm, still day, I have frequently noticed the surface of the water covered with patches of sand, varying in extent from one to six or eight inches square. These patches are composed, of course, only of the finer portions of sand, adhering to each other by a thin film of gelatinous matter, which gives buoyancy to the mass. I have been surrounded frequently, by patches of this kind, in tolerably close contact, and covering a surface of several hundred acres. The lightest touch of an oar, or a slight breeze, causes them to sink immediately. The rationale of their formation I conceive to be this. The shore we know to be peopled with myriads of minute mollusca, furnishing, either by their excretions, or their own proper bodies, a gelatinous substance, which hardens upon ex-

posure to the sun, and forms a crust including the subjacent sand. In this state the tide comes in quietly, detaches successive portions of this crust, in larger or smaller pieces, which are borne away by the retreating tide. May not this silent and hitherto unnoticed transportation counteract, to a certain extent, the operation of other known agents? It is not philosophical, I admit, to impute important effects to slight and apparently inadequate causes; but it is equally unphilosophical to neglect trifling phenomena until the nature and extent of their agency has been thoroughly investigated."

I will only add, that I possess some of these sandy films, found on the coast in the southeast part of Massachusetts, to which the dried animals are still attached. I hope the attention of geologists, who are favorably situated for observing this phenomenon, will be excited to the subject.

ART. XV.—AN EXAMINATION OF THE "CATALOGUE OF THE MARINE AND FRESH WATER FISHES OF MASSACHUSETTS, by J. V. C. SMITH, M. D.," contained in Professor HITCHCOCK's "Report on the Geology, Mineralogy, &c. of Massachusetts." By D. HUMPHREYS STORER, M. D. Read March 16, 1836.

ENGAGED the last season in arranging the icthyological cabinet of this Society, I was compelled unavoidably, to examine "A Catalogue of Marine and Fresh Water Fishes of Massachusetts," contained in Professor Hitchcock's Report. Some well-known fishes I found omitted—several were incorrectly named—and many included, which I think further investigation will show should

not be. It would have been much more grateful to my feelings, had another referred to it; but associated as we are, in search of the truth, and pledged to remove every obstacle which may check our advance towards it, I conceive it the duty of each one of us, however much we may be regardful of personal feelings, to come up here, and speak out frankly and freely—withholding nothing ourselves, which we might hope for from another. With these views, I have felt it due to the character of this Society, to commence an examination of this catalogue—published as it is to the scientific world, with the author's name, and under the auspices of a justly distinguished Professor.

In the first place, I would call the attention of the Society to several fishes which do not appear in the Catalogue.

The beautiful SQUALUS *punctàtus*, so well described by Mitchell, in his paper on the Fishes of New York, contained in the first volume of the Transactions of the Literary and Philosophical Society of New York, has not been noticed. This fish is often taken in our bay; it is sometimes met with, twelve feet or more in length, and is exceedingly voracious. The CARCHARIAS *glaucus* of the catalogue, was probably intended for this fish; a slight investigation will show the difference in the two fishes.

The CLUPEA *fasciàta*, Le Sueur, common in our market in the spring of the year, and called, as well as the *vernàlis*, alewife, by the fishermen, is omitted.

In the cabinet of the Society, is a fine specimen of the ZOARCHUS *labròsus* of Cuvier, from three to four feet in length, taken in our bay, and presented by Captain Couthouy. Dr. Mitchell first described this fish as the BLENNIUS *labròsus*.

But one species of ANGUILLA is mentioned. So long ago as the year 1817, Mr. Le Sueur read a paper before the Academy of Natural Sciences of Philadelphia, in which he described two new species of ANGUILLA, Cuv., (MURÆNA, Lacepede,) which he procured in our market, and named MURÆNA *Bostoniénsis*, and MURÆNA *argéntea*.

We look in vain in the catalogue for the beautiful HEMITRIPTERUS *Americànus*, which, when alive, is one of the most splendid inhabitants of our waters. Although Pennant had described this in his Arctic Zoology, Dr. Mitchell again described and figured it, in his fishes of New York as the SCORPŒNA *flava*. In the invaluable "Histoire des Poissons" of Cuvier and Valenciennes, a new genus is formed, called HEMITRIPTERUS; this species constitutes the genus. It is not only indigenous to, but is very common on our coast. A remarkably large and beautiful specimen of it is in our cabinet. I have lately added another, in which the markings are differently colored; it appears to be a variety.

Another species which has been passed over, is the SEBASTES *Norvègicus* of Cuv. et Valenc., the PERCA *marìna* of Pennant. The fine specimen in the Society's cabinet, I purchased several years since in our market; it was taken in deep water in our Bay. It is but rarely met with here. By the fishermen, it is called the *snapper*.

Although *four* species of the genus COTTUS are mentioned, some of which are very rarely, if ever, found here, the most common fish on our coast and in our harbor, known not only to the experienced fisherman, but to the boy with his pin-hook,—the *sculpin*,—described by Dr. Mitchell, as the COTTUS *octodecimspinosus*, and since incorporated into the great work of Cuvier and Valenciennes, is omitted. It was evidently mistaken for, and catalogued as the C. *scórpius*.

But these deficiencies are not all which should claim our attention. To correct what has already been done, is as necessary as to add materials. I trust I may be excused therefore for pointing out errors, which, were they overlooked by the members of this Society, would imply, on their part, indifference at least, if not gross ignorance.

The common *pickerel* is catalogued as the Esox *lucius*.

The identical specimen which belonged to the cabinet of the gentleman who prepared this catalogue, belongs now to this Society, as well as several others of the same species. It is not the European species; the *lucius* is not found here; but it is the *reticulàtus*, very accurately described by Le Sueur in the first volume of the Journal of the Academy of Natural Sciences of Philadelphia.

In the family *CYPRINIDÆ* stands the CYPRINUS *atronàsus*. Hence it would seem, that the fact of a new genus being formed by Le Sueur, seventeen years since, to receive the mud fishes or *minnows*, was unknown to the gentleman who furnished this list.

Three species of Le Sueur's HYDRARGIRA, found in the vicinity of Boston, already belong to our cabinet.

The scientific name for the species of SILURUS indicated, may be readily found in the volume of which the author seems to have made free use in the formation of his catalogue. Dr. Mitchell has very accurately described it, as the S. *catus*. It belongs to the genus PIMELODUS of Lacepède.

A fish has this season been brought to our market in larger quantities than at any previous time, which the fishermen call the English *turbot*. I have carefully examined this fish, and have satisfied myself that it is not the turbot.

The turbot, on its back, is covered with small tubercles; the scales are very minute, making the skin to appear as if wrinkled. It has been known to weigh as much as thirty pounds. This fish, unlike the turbot, has the eyes on the left side, if it is placed erect on its belly, with its tail towards the observer: the color of the left side is of a light brown, covered with spots of a deeper color, varying in their form and dimensions—some almost circular, and surrounded with a white or yellowish ray; the scales not strikingly small, and appearing to a careless observer as if serrated.

Right side bluish white, immaculate. The dorsal fin commences like that of the turbot, in front of the eye, between it, and the angle of the upper jaw. The membrane between the three first dorsal rays is more deeply cleft than in any of the remainder; this fin is continued nearly to the tail, from which it is separated by a very small space; the anal fin is continued to the base of the tail opposite the dorsal.

Besides the deeply colored spots which are distributed irregularly over the left side of this fish, its margin, as well as the dorsal and anal fins, are sprinkled thickly with white dots; these are more strongly marked in the specimen I most carefully examined, at the base of the tail and on the fins.

The characters then, by which it may be distinguished, are these:

Its eyes are on the left side; those of the turbot are on the right: its left side, or what would commonly be called the *back*, is smooth; the corresponding side in the turbot is covered with tubercles: the turbot grows to the weight of thirty pounds; it is unusual to find this species weighing more than twelve or fourteen, and this is probably near the maximum weight: the lower jaw of

the turbot is regularly oblique; in this species, quite a projection is obvious at the chin: the flesh of the turbot is much more delicate.

Mitchell's description of the *watery-flounder*, PLEURONECTES *aquòsus*, answers in most particulars to this fish; it is probably the same.

In Professor Hitchcock's Report, the RHOMBUS *máximus*, or turbot, is catalogued as being found in our waters: the fish I have thus briefly described is called here, the *turbot*. The fishermen tell me it is the only fish, called turbot, which is caught with us. If so, there is a mistake in the catalogue; and the turbot is not found in the waters of Massachusetts.

The *striped bass* is catalogued as the PERCA *labrax*. But our *rock-fish* is not the European species, but the LABRAX *lineàtus* of Cuvier.

Under the genus OSTRACION, is catalogued the species *bicaudàlis*. The specimen intended to be designated here, was taken alive, three years since, among the sea-weed on the beach, at Martha's Vineyard, and sent to the Society by Dr. L. M. Yale, of Holmes' Hole. In the "Natural History of Fishes of Massachusetts," a work by the author of this catalogue, a description, accompanied by a figure of this identical specimen, is attempted, neither of which applies to our fish.

The author of the above named work says, "the body is marbled and dotted as it were, with black." The fish there alluded to, is on the Society's table; not a black point is to be seen on any portion of its surface.

The figure corresponds with the figure of the *bicaudàlis* in Strack, in Shaw's Zoology, and Rees' Encyclopædia, but does not in the slightest degree elucidate the Society's specimen.

Look at the figure; each hexagonal plate is plain, and

contains several distinct black dots. Look at the specimen; each plate has an elevated centre, from which raised radii diverge to each of its angles. This error would not, however, have been referred to, before a scientific society, had it not been continued in the catalogue under consideration—which, appearing as it does, among the labors of several of the most accurate naturalists of our State, may be accounted by the student as authority.

I suppose this to be an undescribed species, and, in honor of its discoverer, would call it OSTRACION *Yálei*.

O. *Yalei*. Body triangular, all upper portion, of a light lurid appearance, covered with hexagonal plates, each containing six raised lines; two subcaudal spines, short and somewhat incurved; back of dorsal fin, a large isolated plate three quarters of an inch in length, composed of portions of several plates, separated from the rest of the horny cuticle by a continuation of the ligamentary substance in which is imbedded the fin.

Form of the body very similar to the *bicaudàlis*; the entire surface, as far back as the dorsal and ventral fins, is covered with hexagonal divisions or plates.

These are very large, back of the eyes and ventral fins, and include an immense number of small granulations, which are subdivided by six elevated lines of similar tubercles; in front of the eyes and pectoral fins, these plates are smaller and less distinct; the body beneath, white and covered with similar scales; from the angle of the eye to the ligamentary substance at the base of the tail, are included ten plates in a direct line: from the highest point of the back to the belly nine similar rows of plates; behind the dorsal fin is a surface of ligamentary substance, three inches in length, of a darker color than

the rest of the surface, extending to the caudal fin, and containing, just back of the dorsal fin, one isolated plate. Subcaudal spines short, stout, smooth, and a little incurved. Mouth large, prominent, armed with large, strong teeth; eyes large, and distant an inch and a half from the mouth; nostrils less than a quarter of an inch in front of eyes. The number of rays contained in the fins are as follows:

D. 10. P. 12. A. 10. C. 10.

The length of this specimen, in its present dried state, is fourteen inches. From the contracted and wrinkled appearance of the ligamentary portion at the base of the tail, it must vary considerably from the size of the living fish. (Plate VIII.)

Belonging to our cabinet, is a species of this genus, presented to the Society by the Massachusetts Historical Society, which corresponds pretty well with the description of the *bicaudàlis*, but differs somewhat; and should it be decided to belong to that species, it must be considered a variety. In all the figures of the *bicaudàlis*, I have had an opportunity of examining, each hexagonal plate is represented with one or more black spots, contained within the limits of the plate: the orbitar membrane exhibits none of these dots. Our specimen is covered entirely with disks, resembling those of some species of ASTERIAS. The centre of these disks has, in some instances, an oval black spot; in others, it is wanting; but in all cases, the disks are surrounded with these large, circular, deep brown spots, which are probably *black* in the living specimen. These are smaller in front of the pectoral fins, and are not only continued over the entire tail, but are distributed over the membrane of the orbit.

Since this paper was read to the Society, I have seen

a species of OSTRACION belonging to the gentleman who prepared the catalogue, the examination of which I have thus commenced.

This specimen was taken on a coral reef at the Island of Trinidad by Captain Joseph P. Couthouy. It has been mistaken for the *bicaudàlis*, but is a perfectly distinct species.

No *description* of the *bicaudàlis* I have had access to, refers to an isolated plate, between the dorsal fin and tail, which is a principal character of this fish.

In the *figures* of the *bicaudàlis*, the plates enclose regularly distributed tubercles; and are not divided into distinct sections, by slightly raised striæ, as in this species.

In many of their characters, this fish and the *Yálei* correspond.

It is considerably larger, of a yellowish-brown color, and its surface presents a great number of circular black spots. But in the number of the rays of the dorsal, pectoral and anal fins, they are similar; the contracted state of the caudal fin prevents us from ascertaining the number of its rays. They both have two subcaudal spines. In this, however, they are much shorter and less curved. Immediately back of the pectoral fins in this fish, are several deep black undulating lines: the plates in front of the pectoral fins are immaculate; all the other plates contain several circular black spots, varying in number from three to six, eight, and even ten. In both these fishes, the plates are similarly divided, but the diverging rays are much less prominent in this fish. In both, the peculiar plate, back of the dorsal fin, exists. This plate, in the *Yálei*, is composed of three portions. In this fish, it is made up of *two equal* portions. In the former, this plate is separated by a very *narrow canal* of ligament only, from the general horny cuticle; in the latter, it is

divided by a space of a third of an inch at least, in its narrowest point; this circumstance, however, may be merely accidental.

Both these fishes may be the O. *Yálei*, but neither of them can be mistaken for the *bicaudàlis*.

The following are the Fishes not mentioned in the Catalogue, which have been added in this paper:

Labrax lineàtus, Cuv. et Valenc.
Cottus octodecimspinosus, Mitchill.
Hemitripterus Americànus, Cuv. et Valenc.
Sebástes Norvégicus, Cuv. &c.
Zoárchus labròsus, Cuv. &c.
Esox reticulàtus, Le Sueur.
Clùpea fasciàta, Le Sueur.
Rhombus aquòsus, Mitchill.
Muræna Bostoniénsis, Le Sueur.
M. argéntea, Le Sueur.
Ostràcion Yálei, Nobis.
Squalus punctàtus, Mitchill.

The foregoing remarks have been called forth, by a desire to see a more perfect Catalogue of the Fishes of Massachusetts. While the other departments of Natural Science among us, are yearly enlisting the aid of zealous and devoted students, who capture, with enthusiasm, the minutest insect—and carefully separate from collected sand, the microscopic shell—and arrange both, with scientific knowledge, Ichthyology, if not despised, is utterly neglected. It is time an effort should be made by this Society, to become better acquainted with the inhabitants of our waters; and while the slight means possessed by the writer, shall be employed to the best of his ability, he trusts that others, possessing superior advantages for their investigation, will as freely offer the fruits of their labors.

ART. XVI.—CHEMICAL ANALYSIS OF THREE VARIETIES OF BITUMINOUS COAL, AND ONE OF ANTHRACITE.

By C. T. JACKSON, M. D.

DECEMBER 6th, 1835. The bituminous specimens were analyzed in the order of the numbers. Their localities were at the time, to me unknown. They are now added. All the specimens belong to the species called by Werner black coal, and are distinct varieties of that species, differing in composition.

ORREL COAL.

No. 1, is a black, shining kind of coal, having a stratified appearance caused by layers of mineral charcoal, or the remains of charred vegetable fibre. It breaks into irregular pieces of a bright and glossy appearance.

There are a few particles of foliated iron pyrites, or bi-sulphuret of iron, between the joints; but in such minute quantities as not to affect its value.

The streak made by this coal on wedgewood ware is brown. It burns with a large, yellow flame, and leaves a light porous coke of small bulk. Specific gravity = 1.279.

It cakes in burning, and will serve either for fuel in parlors, or for the forge, furnace and gas works; for the latter purpose care should be used in selecting it free from the sulphuret of iron.

One hundred grains of this coal yield on analysis

Coke	64.7
Volatile matter, consisting of bitumen and coal gas	35.3
	100.0

The coke submitted to analysis gave

Carbon	63.4
Oxide of iron	1.0
Silica and alumina or clay	.3
	64.7

This coal consisted of the following ingredients:

Carbon	63.4
Bitumen	35.3
Oxide of iron	1.0
Alumina and silica	0.3
	100.0

NEWCASTLE COAL.

No. 2. It is of a jet black color, giving a dark, brownish black streak on porcelain. It is stratified in its structure, and contains an abundance of mineral charcoal, or ligneous fibres changed into coal. It breaks into irregular shaped pieces, and the fracture is strongly resinous, and of a deep velvet black color. It is perfectly free from sulphuret of iron. It burns with a very large and brilliant yellow flame, and when distilled, gives forth an abundance of coal gas free from sulphur.

Specific gravity = 1.320.

One hundred grains yields on analysis

Coke	62.5
Bitumen	37.5
	100.0

The coke analyzed gives

Carbon	57.5
Oxide of iron	4.5
Silica and alumina	0.5
	62.5

Composition of the coal.

Carbon	57.5
Bitumen	37.5
Oxide of iron	4.5
Silica and alumina	0.5
	100.0

This coal is highly bituminous, and on that account it is very valuable for gas-works and for the blacksmith's

forge. It will also answer perfectly well for the parlor fire and for steam engines of every kind. It is generally, like the specimen before me, free from sulphur. It will be especially valuable for the above uses.

COAL FROM FROSTBERG, Md.

No. 3. This is a very beautiful, brilliant and glossy jet black coal, of a columnar structure, and breaks into sharp, splintery or square fragments. It contains a few vegetable fibres, or mineral charcoal. It is a perfectly clean coal, free from dust, and does not soil the fingers. It burns with a clear yellow flame, without smoke, and swells into a spongy coke, very light and brilliant. It gives out coal gas when distilled, but not so readily, nor in so great abundance, as the former varieties.

Specific gravity = 1.321.

One hundred grains of this coal yield

Coke	83.5	The coke yields on analysis	
Bitumen and gas	16.5	Carbon	77.9
		Alumina & *ox. iron a trace*	3.6
	100.0	Silica	2.0
			83.5

Composition of this coal.

Carbon	77.9
Bitumen	16.5
Alumina and ox. iron	3.6
Silica	2.0
	100.0

This coal is of an excellent quality for parlor fires, furnaces, forges, steam engines, and for the manufacture of coke. It will not be economical for the manufacture of coal gas. When burnt, it will leave a white ashes remaining, after combustion, in the grate. I should prefer it, for domestic use, to any coal I have ever seen.

Anthracite from Mansfield, Mass.

This coal is found in a bed on the estate of Mr. Alfred Hardon. The bed, which is two feet wide, is included in grau-wacke, with wacke impregnated with carbon, and intersected by numerous stems of fossil plants, belonging apparently to the *EQUISETACEÆ*. Carboniferous slate, or slate filled with impressions of species of the genus of fossil plants called Neuropteris by Brongniart, and containing casts of a plant closely allied to the cactus tribe, is also found in immediate contact with the coal. One species similar to the Equisetum *stelliformis*, Harlan, was also found. The strata and bed of coal run E. N. E., W. S. W., and dip 52° to the N. N. W. The specimens of coal analyzed were taken from the bed by myself, and were examined a few days after my visit to Mansfield.

Oct. 30th, 1835. Two specimens were selected for analysis.

The specific gravity of one was 1.71 and of the other 1.73. A specimen of anthracite from Peach Mountain, Pa., was of the specific gravity 1.49.

The specimen of anthracite from Mansfield, whose specific gravity was 1.71, pulverized and submitted to analysis, by mixing it with chloride of sodium and nitre, and deflagrating it in a red hot platina crucible, and then separating, dissolving and precipitating the foreign matters, gave, in 100 grains,

Carbon	98
Per oxide of iron and alumina	2
	100

The other specimen gave

Carbon	96
Per oxide of iron and alumina	4
	100

This coal burns like the Peach Mountain anthracite, and leaves red ashes. Explorations are now going on for the purpose of discovering a wider bed.

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ART. XVII.—DESCRIPTIONS OF NEW SPECIES OF NORTH AMERICAN HYMENOPTERA, AND OBSERVATIONS ON SOME ALREADY DESCRIBED. By THOMAS SAY.

[Concluded from p. 305.]

MERIA, Jur.

M. *costàta*, ♀ Black; tergum with yellow bands and two spots.

Inhab. Indiana.

Body black: *head* above the antennæ with a transverse line, slightly interrupted in the middle, an orbital line, and short line behind the eyes, yellow: *mandibles* piceous: *thorax* with two transverse spots before, a small, triangular one above the wing-scale, a transverse one behind the scutel, and a bi-lobed one each side behind, yellow; each side of the middle of the thorax are two abbreviated, somewhat oblique, impressed lines: *metathorax* with a double yellow longitudinal side and obvious transverse rugæ: *pleuræ* with a triangular spot under the superior wings, a small oblique line over the intermediate feet, yellow: *wings* with a brown costal margin: *tergum*

with a yellow band on the middle or before it, of each segment, excepting the last ; the second band interrupted into two transverse, oval spots : *venter* with a longitudinal, lateral spot on the second segment and a transverse lateral one on the third, yellow : *tarsi* and intermediate and posterior pairs of *tibiæ* piceous ; a yellow spot on the posterior coxæ.

Length half an inch.

Var. *α*. Middle of the thorax with a small double yellow spot.

The observations which I had occasion to make relative to the generic affinities of PLESIA *marginàta*, Nob., are exactly applicable to this species. It agrees precisely with Jurine's character of PLESIA, but differs from MIZINE, Latr. by having the mandibles entirely destitute of teeth, a character which it has in common with MERIA, Ill., but the form of its wing-scale, will not admit of its being referred to the latter genus ; I have, however, in this instance, been guided by the characters laid down by Latreille in the Règne Animale (first Edition).

2. M. *marginàta*. (PLESIA marginàta, Nob., Western Quarterly Reporter).

3. M. *collàris*. Collar with an interrupted band and two spots yellow.

Inhab. Indiana.

Body black : *head* with two spots above the antennæ, frontal orbits, and dilated line behind the eyes, yellow : *mandibles* dark piceous, black at tip : *collar* with an interrupted band on the posterior margin and two spots before, yellow : *thorax* with a small yellow spot above the wings : *wing-scale* dull honey-yellow with a yellow spot : *wings* yellowish, fuliginous, dusky on the costal margin towards the tip ; behind the scutel is a transverse

yellow line: *metathorax* somewhat sericeous, without any appearance of rugæ, and with two yellow longitudinal spots: *tergum* with a somewhat varied reflection; first and second segments with a lateral yellow spot, (those of the former probably, in some specimens obsoletely connected); third and fourth segments with a lateral basal yellow spot, connected by a slender line; fifth segment with an obsolete yellow lateral spot: *pleura* with a yellow spot under the anterior wings: *feet*, anterior knees and tibial dilated line yellow; intermediate and posterior tibiæ and all the tarsi ferruginous: *anal segment* above minutely lineated, and at tip, dull ferruginous.

Length over three fifths of an inch.

This species is larger than *costàta*, Nob. which it much resembles, but may be distinguished by the sericeous appearance of the metathorax and the absolute destitution of rugæ on that part; in the *costàta* also, the lateral spots of the metathorax are double.

Scolia, Fabr.

1. S. *ephippium*. Black; tergum bi-fasciate with fulvous.

Inhab. Mexico.

Body black: *wings* dark violaceous; cubital cellules two, the second receiving two recurrent nervures, and with an abbreviated nervure proceeding from its base towards the tip of the wing: *tergum* violaceous-black; second and third segments fulvous, with a narrow basal and terminal black margin: *beneath* black: *venter* slightly tinged with violaceous: *thighs* not remarkably robust.

Length ♂ over one inch and one tenth.

A large and fine species.

2. S. *dùbia.* Black; abdomen ferruginous behind, with two yellow spots on the third segment.

Inhab. United States.

Body black: *head* and *thorax* immaculate: *wings* dark violet-blue: *cubital cellules* two, with no appearance of more than one recurrent nervure: *abdomen*, first and second segments black; remaining segments ferruginous; more hairy, somewhat, than the others; the third segment, however, more or less tinged with blackish and with two transversely oval, a little oblique, bright yellow spots.

Length four fifths of an inch.

A very fine, though rather common species, in various parts of the Union.

3. S. *confluénta*, Nob. (Western Quarterly Reporter). I think it highly probable that Drury's fig. 5, pl. 44, vol. i, is intended for this insect. I was deterred from quoting this figure in consequence of its yellow head and four-banded tergum; but the head is truly, on its front and base, covered with yellowish cinereous hair, as well as the anterior part of the collar; this may agree with Drury's observation that the "head is of a pale yellow, in front" and "the neck is hairy and of a lemon color." The species also probably varies in having four yellow bands. Drury's figure is that of a female, and my specimen agrees with it in having an immaculate thorax and scutel, as in the *fossulàna*, Fabr. which I believe to be in reality, the female of this same species, and of course the same as that of Drury; whereas he quotes Drury's figure as that of *rádula*, F. which appears to be the male, if I may judge by the "thorace maculato" and other corresponding characters. I have no index to the first volume of Drury, but Fabricius quotes the figure as

SPHEX *plùmipes*, Drury. If this be correct, Drury has the priority, and the name and synonyms, will stand thus.

SCOLIA *plùmipes*, Drury.
" *fossulàna*, Fabr. (female).
" *rádula*, Fabr. (male).
" *confluénta*, Say. (female).

CEROPALES, Lat.

1. C. *interrúpta*. Black, spotted and banded with yellow; wings dusky; antennæ and feet honey-yellow; tarsi yellow.

Inhab. Indiana.

Antennæ honey-yellow; first joint, bright-yellow: *labrum* yellow, black at base: *hypostoma* yellow, with a quadrate spot and incisures black: *orbits* dilated, yellow, interrupted above: *thorax* impunctured; margin of the anterior segment all around, longitudinal spot each side of the scutel and transverse spot behind the scutel, yellow: *metathorax* at tip bi-fasciate with yellow, posterior band clavate each side on the pleura: *wings* fuliginous, particularly on the cubital cellules and tip: *abdomen* ferruginous, varied with obsolete yellow and black bands; and with two yellowish spots on the first segment: *pleura* with a spot behind the wings and a larger one over the intermediate feet, yellow: *coxæ* varied with yellow: *thighs* honey-yellow, black at base: *tibiæ* honey-yellow, yellow at base: *tarsi* yellow.

Length two fifths of an inch.

Closely allied to *fasciàta*, Nob. but the thorax is not distinctly punctured, the wings are dusky &c.

2. C. *apicàlis*. Black; wings black at tip; abdomen with a rufous band; tip white.

Inhab. Indiana.

Body black: *hypostoma* hoary: *collar* on the posterior margin white: *wings* hyaline with a fuliginous tip, in which is an obsolete hyaline spot or band: *metathorax* dull silvery; *abdomen* rather slender towards the base; second segment, excepting on its posterior margin, fulvous; anal segment white: *posterior tibiæ* with a white line on the posterior side: *intermediate* and *posterior tarsi* with the second, third and fourth joints white, with black tips.

Length over two fifths of an inch.

Chlorion, Latr.

C. *canaliculàtum*, Nob. (Ampulex, Western Quarterly Reporter, vol. ii, p. 76.)

The name Chlorion has priority over that of Ampulex given by Jurine.

Bembex, Fabr. Latr.

1. B. *longiróstra*. Rostrum extending beyond the insertion of the intermediate feet; superior wings with the marginal and last submarginal cells divided by a very distinct space.

Inhab. Mexico.

Body black, with short, dense, white hair: *antennæ* tinged with piceous; first joint white beneath: *anterior orbits* dull white: *nasus* whitish, with two black spots: *labrum* white, with a bi-lobate, black spot at base: *rostrum* honey-yellow, extending nearly to the origin of the posterior feet: *collar*, anterior and posterior margins white:

thorax with a very small fulvous, abbreviated line each side of the middle, and a small, double, fulvous spot behind the middle: *scutel* with a white lateral spot: *metathorax* with a white line at base and an oblique one each side towards the tip: *tergum* varied with yellow and black or green and black; the posterior margins of the segments, dull rufous; about four distinct black spots: *feet* honey-yellow: *thighs* black beneath: *tarsi* paler: *venter* honey-yellow, with a black spot before the anterior spine.

Length from seven tenths to four fifths of an inch.

With the short maxillary palpi and the one toothed mandible of BEMBEX, this insect has the radial and last cubital cellules as widely separated at their tips as in MONEDULA. The proboscis is not folded, but extended horizontally beneath the body. These characters may justify the formation of a distinct genus, or at least of a division, under the name of STENIOLIA.

2. B. *fasciàta*, Fabr. A male in my cabinet has six bands upon the tergum and two spots on the ultimate segment; the first band is double the width of that of the female, and is interrupted by a very small space only; second band not interrupted, but its two lunules are so continued as to enclose two black spots; third band with the lunules not or hardly interrupted; fourth and fifth bands interrupted; sixth band entire, undulated; spots on the ultimate segment, orbicular; the female has but five bands.

GORYTES, Latr.

G. *phaleràtus*. Black, sericeous, varied with yellow; wings dusky.

Inhab. Indiana.

Body blackish, impunctured: ***head*** golden sericeous: *antennæ*, basal joint yellowish: *nasus* and *mouth*, excepting the tip of the mandibles, pale yellow: *thorax*, posterior margin of the collar, abbreviated line over the wings, and wing-scale, yellow: *scutel* yellow: *wings* dusky, purplish-fuliginous, tinged with yellowish towards the base; stigma small; second cubital cellule obviously hexagonal: *metathorax* with two large, oblong-oval, yellow spots; triangle at base, destitute of small lines and with but a single impressed line: *tergum*, basal segment yellow; posterior narrow margin, and lobed spot on the disk communicating with the base, black; second segment yellow on the posterior margin, the yellow rather dull and a little undulated on its inner edge: third and fourth segments with obsolete yellowish posterior margins: *pleura* somewhat silvery sericeous, with three almost confluent yellow spots in a line with the collar: *feet* pale, honey-yellow; *thighs* and *coxæ*, with more or less of black above.

Length about half an inch.

This is a large species. The character which Jurine mentions as common to all the species, of having behind the scutel a triangular space, in which parallel lines are sculptured, is so modified in this species as to present the triangle with only a simple longitudinal impressed line.

Nysson, Latr.

N. *aurinòtus*. Black; metathorax two-spined; tergum with three lateral spots.

Inhab. Indiana.

Body black, punctured: ***head*** before with a slight yellowish sericeous reflection; ***mandibles*** piceous: ***collar***

with an obscure golden margin, terminating in a spot: *metathorax* with a golden spine each side, in a golden spot: *wings* dusky: *tergum* on the posterior edges reflecting whitish; at base of the first segment, obscure golden sericeous; posterior margins of the first, second and third segments, each with a yellow band widely interrupted in the middle, the anterior one largest: *feet* honey-yellow: *thighs* black at base.

Length three tenths of an inch.

Readily distinguishable from N. 5-*spinòsus*, Nob. Resembles N. *interrúptus*, F. but the areolæ of the metathoracic spines are not gilded in that species.

Psen, Latr.

1. P. *méllipes*. ♀ Black, with a silvery reflection; antennæ at base, tibiæ and tarsi piceous.

Inhab. Indiana.

Body black: *head* beneath the antennæ yellowish-silvery: *occiput* with a silvery reflection: *antennæ* to the seventh joint honey-yellow: *mandible* piceous: *thorax* with longitudinally confluent punctures, a slender transverse line before, four or six obsolete spots near the scutel and two large obvious ones near the insertion of the petiole of the abdomen: *wings* hyaline; nervures black; stigma brown; second cubital cellule receiving both recurrent nervures: *abdomen* immaculate, with a few hairs towards the tip; petiole as long as the posterior tarsi or rather longer, arcuated, piceous: *tibiæ* and *tarsi* piceous or honey-yellow; anterior pair with dense, short, golden hair.

Length nearly eleven twentieths of an inch.

Very similar in form and color to P. *atràtum*, Fabr.,

which, however, has the second and third cellules each receiving a recurrent nervure, and the petiole is proportionally rather shorter.

2. P. *leucòpus*. Black; hypostoma silvery; tarsi white.

Inhab. Indiana.

♀ *Body* black, with a slight silvery reflection: *antennæ* immaculate: *hypostoma* entirely silvery: *thorax* with minute, longitudinal lines on the disk: *wings* hyaline: *nervures* blackish; second cubital cellule receiving the two recurrent nervures: *tergum* impunctured, polished; petiole slightly arcuated, rather shorter than the posterior tarsus: *tarsi* white, dusky towards the tip.

Length over three tenths of an inch.

♂ Lines of the thorax only visible at base and tip.

Length over one fifth of an inch.

Lyrops, Illig.

† Stemmata one.

1. L. *argentàta*, Beauv. Black; tergum, segments margined with dark glaucous; metathorax with a few wrinkles on the posterior lateral margin.

Inhab. United States.

♀ *Body* black: *collar* having a gradually elevated angle on the middle: *wings* slightly dusky; a darker band at tip; by an obliquely transmitted light, opalescent, varying to purplish, and at tip, in the darker portion, tinged with green; recurrent nervures entering the second cubital cellule very near to each other, but little more than their own width apart: *metathorax*, posterior lateral edge wrinkled transversely: *tergum*, posterior margins of the

segments dark glaucous, without any bright silvery reflection : *posterior pair of tibiæ* at tip behind, with a ferruginous spot. ♂ More slender, wrinkles of the metathorax less obvious, and the recurrent nervures at their entrance into the second cubital cellule not quite so close together.

Length ♀ nearly half an inch.

The color of the wings, by a particular, obliquely transmitted light, is very beautifully pearlaceous and somewhat iridescent.

2. L. *péptica.* Black ; tergum fasciate with glaucous, reflecting silvery.

Inhab. Indiana.

♀ *Body* black ; reflecting silvery, particularly on the head and feet : *palpi* piceous-yellowish : *collar* silvery on the posterior margin : *thorax* and *scutel* having their sutures reflecting silvery : *wings* hyaline ; nervures honey-yellow ; recurrent nervures moderately near each other at their junction with the second cubital cellule : *tergum,* segments excepting the ultimate one, on their posterior margins glaucous reflecting silvery : *anal segment* with a bright golden reflection : *feet* black, reflecting silvery ; last tarsal joint rufous.

Length over half an inch.

♂ *Head and base of the mandibles* with a golden reflection : *anal segment* reflecting silvery.

Length under half an inch.

The black tibiæ and tarsi will at once distinguish this species from *aurulénta,* F., than which it is also smaller.

3. L. *aurulénta,* F. (Larra) Syst. Piez. p. 220.

Lyroda.

†† Stemmata, three.

4. L. *trìloba.* Deep black, immaculate: *head* anterior to the antennæ with a slight silvery reflection: *mandibles* dull rufous towards the base: *collar* somewhat trilobate, or having above, an obvious angle in the middle and a more obtuse one on each side: *thorax* having a distinct, impressed, longitudinal line before: *wings* purple-fuliginous, almost opake; recurrent nervures rather distant at their junction with the second cubital cellule: *tergum* in a particular light, more obviously sericeous on the posterior margins of the segments.

Length over half an inch.

This has very much the appearance of Larra *Æthiops*, Nob. but is much larger. In that species also the collar is emarginate in the middle, the wings are but very slightly tinted, and the recurrent nervures approximate at their junction with the second cubital cellule; it has but one ocellus, and the mandibles are not obviously armed with a tooth on the inner edge.

5. L. *sùbita.* Black; tergum, segments margined with a whitish reflection; metathorax wrinkled above.

Inhab. Indiana.

♀ *Body* black: *head* before with a somewhat silvery reflection: *collar* with an abruptly elevated angle in the middle: *wings* at tip dusky; recurrent nervures entering the second cubital cellule, at a distance from each other; third cubital cellule but little narrowed: *metathorax* with small, transverse wrinkles on the disk as well as on the sides: *tergum*, posterior margins of the segments with a silvery reflection.

Length

Resembles *caliptera*, but may be distinguished by the greater width of the third cubital cellule; by the greater distance between the recurrent nervures at their entrance into the second cubital, and by the more wrinkled metathorax.

Trypoxylon, F. Latr.

1. T. *politus*. Black; very highly polished; without any silvery reflection; *thorax* and *scutel* with a slightly impressed, longitudinal line: *wings* black-purple, almost opake: *abdomen* rather less slender at base than that of T. *figulus*, F. but the basal joint is rather abruptly slender on its basal half; this segment has an abbreviated, impressed, longitudinal line before its tip; second segment with a similar line before its middle: on the head and stethidium are very numerous, small punctures, but none on the abdomen: *posterior tarsi* white, first joint at base, and pulvilli blackish.

Inhab. Indiana.

Length nine tenths of an inch.

Judging by memory, as I have not his work here, this is probably the *albitársa*, Beauvois, but although it agrees with the short description of Fabricius, yet I greatly doubt if it is the *albitársa* of this author, who gives its native country as South America, on the authority of Mr. Smith and of the Museum of Mr. Lund, from whom and from Mr. Sebestedt he obtained an opportunity to describe a great number of Hymenoptera of that portion of our hemisphere; and but two species from North America. For these reasons I have been led to consider the *albitársa*, F. as South American; and as Latreille says that every thirty degrees of latitude exhibits a total change

in the insect productions, I give a new name to this species.

2. T. *clavàtus*. Abdomen at base slender and a little nodulous; wings at tip dusky.

Inhab. United States.

Body black; *head* and *stethidium* with silvery reflection: *wings* hyaline, terminal margin dusky: *abdomen* clavate; the first and second joints petioliform, a little nodulous at their tips: *posterior tarsi* white; the terminal joint and base of the first joint black; ♂ with a spine on the posterior trochanter.

Length about nine twentieths of an inch.

Var. *α*. Terminal joints of the tarsi blackish; a yellow band at base of the second segment of the tergum.

Judging from memory, as in the preceding instance, I suppose this to be the *fuscipénnis*, Beauvois, but not that of Fabricius, for the reasons there adduced. I may also state that this species does not correspond with Fabricius' description in having "alæ nigræ cyaneo parum nitidæ," neither does it agree with "Pedes nigri tarsis albis" inasmuch as the posterior pair only are partially white.

3. T. *carinàtus*. ♂ Black; *head* and *stethidium* with silvery reflection: a prominent, acute carina between the antennæ, divaricating above the antennæ into two carinæ: *antennæ* emarginate beneath towards the middle: *wings* hyaline; a slight tint of dusky at tip: *tergum* gradually attenuated to the base; three first incisures a little contracted: *feet*, anterior pair of knees, tibiæ and tarsi yellowish; intermediate knees and tarsi yellowish, the latter in the middle above dusky; posterior tarsi obscurely yellowish towards the tip.

Inhab. Indiana.

Length three tenths of an inch.

Remarkable by the carina of the head and the emarginate antennæ. It is much smaller than the *figulus*, F. and its abdomen is formed as in that species.

Oxybelus, Latr.

1. O. *emarginàtus*. ♂ Black; scutellar spine emarginate; tergum 4-spotted.

Inhab. Indiana.

Body black, with a slight silvery reflection, particularly on the anterior part of the head: *antennæ* dull yellowish at tip: *wing-scale* honey-yellow: *wings* hyaline: *scutel* with a dilated process widely emarginate at tip, and a lateral sublanceolate, decurved, acute, white one: *tergum*, first segment with a longitudinal, indented line and a transverse, abbreviated, white line at tip each side; second segment also with a similar line: *tarsi* pale honey-yellow: *anterior thighs* yellow at tip: *tibiæ* yellow; posterior pair black, yellow at base.

Length over three twentieths of an inch.

2. O. 4-*notàtus*, Nob. Long's Expedition.

The male is almost destitute of spots on the second segment of the tergum, and all the tibiæ have a white line.

This species resembles the O. *trispinòsus*, Fabr. but that insect may be distinguished by the dilated figure of the spot on the basal segment of the tergum and by the tibiæ, being entirely honey-yellow.

3. O. *lætus*. Line on the collar, on the scutel and five lateral spots on the tergum yellow.

Inhab. Indiana.

♂ *Body* black, punctured: *head* with a slight silvery reflection: *antennæ* ferruginous: *mandibles* yellow, pice-

ous at tip: *collar* with a transverse, somewhat undulated yellow line, interrupted in the middle: *scutel* with a double, transverse, yellow spot: *metathorax* with the middle spine simple; the lateral ones depressed, whitish, margined on the inner side with bright yellow: *tergum* with five yellow spots on each side: *knees*, *tarsi* and *tibiæ* yellow, the latter with a dilated black line on the inner side.

Length nearly one fifth of an inch.

Smaller than *mucronàtus*, F., which is destitute of the scutellar line. It may be distinguished from the preceding species, by the yellow color on the collar and scutel.

Crabro, Fabr.

C. *confluéntus*. Black, with large confluent punctures; tergum interruptedly fasciate.

Inhab. Indiana.

♀ *Body* black, densely and confluently punctured, particularly on the stethidium, where they are sometimes longitudinally confluent, so as to exhibit lines between them; they are largest on the metathorax: hypostoma and *anterior orbits* behind the basal joint of the antennæ, silvery: *antennæ*, basal joint yellow; second joint honey-yellow: *collar* yellow, slightly interrupted in the middle: *scutel* with a large, transverse, yellow spot; a yellow transverse line behind it: *wings* slightly tinged with dusky: *abdomen* oval, rather abruptly narrowed at base: *tergum* with the incisures contracted, the segments being convex; approximately punctured; segments on their middles, each with an equal band which is interrupted for only a narrow space at the middle: *pleura* with a yellow spot at the humerus: *knees*, *tibiæ* and *tarsi* yellow: *venter* immaculate.

Length over three tenths of an inch.

♂ Spot of the scutel interrupted or wanting; antennæ beneath dull honey-yellow; the two posterior bands of the tergum generally confluent in their middles; abdomen longer and more slender than that of the female.

Length three tenths of an inch.

The sexes are more readily distinguished by the tip of their abdomen than by the antennæ. I have nine males and three females: two of the latter measure two fifths of an inch. The punctures of this species are larger and more dense than in our other species.

C. *arcuàtus*. Metathorax with numerous parallel lines; tergum with yellow spots and bands.

Inhab. Indiana.

Body black, with minute, dense punctures: *front* with a wide glabrous interval between the silvery orbits: *antennæ*, basal joint yellow, with a black line near the inner base; sixth joint arcuated, a little prominent inwardly at tip: *hypostoma* yellowish-silvery: *thorax* with a slightly interrupted line on the collar of a bright yellow; a yellow transverse line beneath the scutel: *wings* a little tinged with dusky: *metathorax* with numerous, small, parallel lines, arcuated at base, and transversely rectilinear behind, extending upon the pleura beneath the wings: *pleura* with two small yellow spots before: *tergum* with an oblique somewhat arcuated, yellow spot each side of the first segment; an oblique elliptic one on the second segment each side; a reclivate, transverse, lateral yellow line on the third; remaining segments each with an entire, slightly undulated, slender greenish-yellow band: *anal processes* acute, very deeply and regularly ciliated: *feet* yellow: *coxæ* and *trochanters* black: *thighs* at the base black; the black portion very small on the anterior

pair, but on the posterior pair extending on the inferior surface to the tip: *venter* immaculate.

Length two fifths of an inch.

Stigmus, Jur. Latr.

1. S. *parallèlus*. This species resembles the *fratérnus* Nob. but it may be distinguished by the following comparative characters. The posterior thighs and middle of the tibiæ are black. The stigma is a little smaller. The dividing nervure of the first and second cubital cellules is parallel to the posterior nervure of the second discoidal cellule; whereas in the *fratérnus*, the latter is more oblique.

The size is much the same.

Inhabits Mexico.

The Stigmus *fratérnus*, is not uncommon in Indiana, and as in the present species, the hypostoma of the male is somewhat silvery.

2. S. *pusillus*. Petiole obsolete: second cubital cellule large.

Inhab. Indiana.

Body black, polished: *head* before and *mouth*, including the mandibles, whitish: *antennæ* honey-yellow; basal joint before, whitish: *wings* hyaline; nervures pale brownish; stigma fuscous; second cubital cellule large, somewhat longer than broad: *feet* honey-yellow; *posterior pair* blackish; *abdomen* with a very short petiole, almost sessile.

Length about one twelfth of an inch.

This is much the smallest species I have seen. The dividing nervure of the first and second cubital cellules is exactly opposite to the posterior nervure of the middle discoidal cellule. The hypostoma of the female is black.

Pemphredon, Latr.

1. P. *marginàtus*. Black; antennæ at base, mandibles and feet honey-yellow.

Inhab. Pennsylvania.

Body polished: *antennæ*, blackish; first and second joints honey-yellow; the former as long as the second and third together, which are nearly equal: *mandibles* honey-yellow, not very obviously denticulated at tip: *wings* tinted with fuliginous; nervures brown; stigma fuscous, not much dilated; nervures of the second cubital cellule and second recurrent nervure margined with whitish, the latter abbreviated before the anal tip: *abdomen* subsessile; with the exception of the first segment, piceous blackish: *feet* honey-yellow.

Length over three twentieths of an inch.

The second cubital cellule is somewhat larger than usual, and the nervures which form it, as well as the second recurrent nervure, are less distinct than usual.

2. P. *annulàtus*. Black; mandibles white; feet yellowish.

Inhab. Indiana.

♀ *Body* black, polished, minutely punctured: *antennæ*, basal joint white; second joint piceous: *nasus* prominent in the middle: *mandibles* and *palpi* white: *wing-scale* dull honey-yellow: *wings* hyaline; nervures blackish, tinged with yellow at base; first and second cubital cellules receiving their appropriate recurrent nervures: *metathorax* with larger punctures and lines: *abdomen* polished, impunctured, subsessile, the petiole being very short: *pleura* with a small whitish dot under the wing-scale: *feet* honey-yellow.

Length one fifth of an inch.

♂ *Hypostoma*, silvery: *nasus* rounded: *antennæ* annulate, one half of each joint being yellowish.

Length over three twentieths of an inch.

ALYSON, Jur.

1. A. *oppósitus*. Black; feet honey-yellow; tergum with two yellow spots.

Inhab. Indiana.

♀ *Body* black: *mouth*, *hypostoma* and *anterior orbits* yellow: *antennæ* at base beneath yellow: *thorax* with an obsolete yellow spot before the wings each side: *wings* very slightly tinted with dusky, more particularly in an obsolete band towards the tip: *nervures* fuscous: *stigma* brown: *recurrent nervures* entering the petiolated cellule exactly opposite to its bounding nervures: *spines* very short: *feet* honey-yellow: *tergum* polished; first segment honey-yellow; second segment with a large, lobately-rounded, bright yellow spot each side at base; the base is also obsoletely honey-yellow.

♂ *Antennæ*, terminal joint as long as the first, arcuated: *wings* not distinctly tinted with dusky except in the radial cellule: *abdomen*, with the exception of the two yellow spots, black: *tarsi* paler than the tibiæ and thighs.

Var. *a*. Yellow spots of the tergum obsolete.

Length three tenths of an inch.

In form, size and color, very similar to A. *spinòsus*, (POMPILUS,) Panzer. But in that species the feet are blackish, &c.

2. A. *mélleus*. ♀ Honey-yellow; head, pectus, and tip of the abdomen black.

Inhab. Indiana.

Thorax honey-yellow: *head* black: *mouth*, *anterior*

orbits and ***basal joint of the antennæ*** excepting a line on the exterior side, whitish: *region of the scutel*, dusky: *wings* with a dusky band: *metathorax* honey-yellow with the elevated lines rather slender; the lateral lines of the dorsal area arcuated: *tergum* with the first and second segments honey-yellow, the latter with a lateral whitish spot; remaining segments blackish; anal segment obscure piceous: *pectus* black: *feet*, excepting the base of the posterior coxæ, honey-yellow.

Length under one fourth of an inch.

The prevailing honey-yellowish color distinguishes this species; and the metathoracic lineations are much finer than those of the preceding species. The lateral lines of the dorsal area of the metathorax in the *oppositus* are nearly rectilinear.

Cerceris, Latr.

1. C. *fumipénnis*. ♂ Black; tergum with a broad band and very narrow ones; wings blackish.

Inhab. Indiana.

Body black, densely punctured: *head* with a golden, sub-orbicular, orbital spot beneath the line of the antennæ, and dense golden ciliæ each side at the mouth: *antennæ* entirely black: *collar* with two yellow spots: behind the scutel a transverse, yellow line: *wing-scale* with a small yellow spot: *wings* blackish; first recurrent nervure entering opposite to the dividing nervure of the first and second cubital cellules: *tergum*, incisures wide; first segment rounded; second with a broad, equable, terminal band; remaining segments with each a terminal capillary band, more or less interrupted in the middle; posterior band wider and somewhat irregular: *tibiæ* yellow pale,

on the inner side and tip of the exterior side black: *tarsi*, anterior pair dull yellowish; posterior pairs, except at base, blackish: *venter* immaculate.

Length over two fifths of an inch.

Resembles C. *desérta*, Nob. but aside from other differences it may be distinguished by that species having somewhat clearer wings and the inosculation of the first recurrent nervure being opposite to the middle of the second, or petiolated cubital cellule; the antennæ also in that species are yellowish before, towards the base; the scutel has two spots in addition to the yellow line behind it, and the bands of the tergum are always broader than in the present species. The *fallax*, Nob. differs in having the transverse yellow line *on* the scutel, in a direct line between the origin of the posterior wings; whereas in the present species it is behind the scutel.

2. C. *sexta*. A broad band on each segment of the tergum; metathorax with a lateral spot.

Inhab. Missouri.

Body black; head before, base of the mandibles and basal joint of the antennæ beneath, yellow; third joint of the antennæ dull honey-yellow: *collar* with two large yellow spots: *wing-scale* and transverse line behind the scutel yellow; the triangular impunctured space behind the transverse line very obvious, with oblique lines and a longitudinal one in the middle: *wings* a little fuliginous particularly on the margin and tip; nervures brown; stigma yellow; recurrent nervure of the second cubital cellule entering at its middle: *metathorax* with a large, oval, longitudinal, yellow, lateral spot: *tergum* with a broad yellow band on each segment; that of the first or petiolar segment slightly interrupted in the middle; the two ultimate ones almost ferruginous: *feet* honey-yellow,

more or less varied with bright yellow: *venter* with interrupted bands.

Length over half an inch.

This was given to me by Nuttall. With the exception of *frontàta* and *bidentàta*, Nob. this is the largest North American species I have seen, and the much more dilated bands of the tergum are distinctive.

Philanthus, Fabr. Latr.

P. *solivagus*. Black, with small punctures; tergum fasciate on each segment.

Inhab. Indiana.

♂ *Body* black; punctures numerous, small: *hypostoma*, *anterior orbits*, to the emargination, and large spot above the insertion of the antennæ yellow: *collar*, margin yellow, slightly interrupted in the middle: *stethidium* immaculate: *wing-scale* yellow: *wings* very slightly tinged with dusky; nervures fuscous, towards the base and stigma honey-yellow: *tergum*, segments having each a greenish yellow band on the posterior submargin, that of the first segment largest, the others subequal; sixth segment immaculate: *pleura*, *pectus* and *venter* immaculate: *knees*, *tibiæ* and *tarsi* yellow: posterior pair of tibiæ with a spot on the posterior tip and their tarsi above tinged with ferruginous.

Length two fifths of an inch.

Rygchium, Spinola.

1. R. *balteàtum*. ♀ Black, thorax and head varied with ferruginous; tergum with a yellow band.

Inhab. Indiana.

Body black, punctured: *head* ferruginous; region of the stemmata, black: *antennæ* black, first and second and half of the third joints ferruginous: *thorax* with a broad ferruginous margin, including the scutel, and with more or less of ferruginous in the middle; anterior margin with a slender yellow line interrupting the ferruginous margin: *wings* black-violaceous: *feet* yellowish: *thighs* dusky at base: *tergum*, first segment impunctured, on the posterior margin a yellow band abruptly dilated each side; second segment slightly punctured at base, posterior indented, with large punctures, and dull ferruginous; remaining segments punctured.

Var. α. Behind the scutel a transverse, yellow, abbreviated line.

Var. β. Posterior margins of the terminal segments of the tergum, obsoletely ferruginous.

Var. ϰ. The ferruginous color predominates having but a small portion of black on the thorax; the tergum is ferruginous with only a line of black on the first segment, and a triangle of black at base of the second segment; but the yellow band on the first segment is still visible though less obvious.

Length over four fifths of an inch.

Not a common insect.

2. R. 5-*fasciàtum*, Nob. (PTEROCHILUS, Appendix to Long's second Expedition). I am not sure of the generic place of my specimens as they have lost their trophi.

3. R. *cryptìcum*, Nob. (ODYNERUS, Western Quarterly Reporter).

4. R. *annulàtum*, Nob. (ODYNERUS, Appendix to Long's second Expedition).

Odynerus, Latr.

1. O. *quadrisectus.* Black; trunk before and behind, tergum before and a band, white.

Inhab. United States.

Body black, punctured: *head* with a small spot above the interval of the antennæ, line on the basal joint of the antennæ, superior lateral margin of the clypeus and slight spot on base of the mandibles obscure white: *thorax*, a bi-lobed band on the anterior margin, spot beneath the wing, triangular spot each side on the scutel, transverse line behind the scutel, behind that again on each side is a very large triangular spot extending down almost to the origin of the abdomen, white; edge of the posterior declivity of the metathorax with a slight bifid, transverse, denticulated crest: *wings* dark violaceous: *tergum*, first segment white, with a dorsal, triangular, lobated black spot communicating with the black anterior declivity; second segment with an undulated, dull white band behind and an obsolete, very small spot of the same color each side before the middle: *feet* with short, whitish sericeous hair.

Length over seven tenths of an inch.

This is much like the *quádridens*, Linn. which is a true Odynerus, but it is destitute of the metathoracic spines of that species, and besides other differences it has a band on the second abdominal segment. This latter character not being very obvious may readily have been overlooked by Fabricius.

The male differs but little from the female; my specimens have two additional white spots on the anterior portion of the nasus.

2. O. *oculàtus.* ♂ Black, tips of the abdominal segments and two points on the second segment, yellow.

Inhab. Ohio and Missouri.

Body black, with dense, rather large punctures: *clypeus* yellow, emarginate at tip: *mandibles* yellow, honey-yellow at tip: *antennæ*, basal joint yellow, with a black line above: *front* with a yellow line from the base of the antennæ, into the emargination of the eye, and a small spot above the interval of the antennæ, yellow; *thorax*, a bi-lobed spot on the anterior margin, wing-scale and small spot beneath it, and transverse spot behind the scutel, yellow: *wings* dusky: *tergum* not so grossly punctured as the thorax; first segment with a yellow posterior margin; second with a yellow small dot each side, and yellow posterior margin extending around the venter; remaining segments obsoletely margined at tip with yellowish: *feet* yellow; *thighs* black at base.

Length over three tenths of an inch.

Like the *acutus*, Latr. but may be distinguished by its more gross puncturing, as well as by the yellow dots on the tergum.

A variety from Missouri, has the feet all yellow.

3. O. *quádridens*, Linn. (Vespa, Syst. Nat.—Amoen. Acad.) *cinerascens*, Fabr. The remark "size of *parietina*" may refer to the male.

4. O. *uncinata*, Fabr. (Vespa, Syst. Piez. p. 25). Fabricius mistook this species for the *quádridens*, L., which is our largest and most common species, and sufficiently distinguished from the present, besides the denticulated metathorax, by many characters; and the following is a detailed description of it.

♀ Black; tergum with ▪ yellow band.

Inhab. Indiana.

Body black, punctured: *head*, short line behind the eye, dot above the interval of the antennæ, one exterior

to the antennæ, one each side on the clypeus, and antennæ beneath, brighter towards the base, dull fulvous: *mandibles* on the exterior margin, honey-yellow; *thorax*, bi-lobed spot on the anterior margin and transverse line behind the scutel, yellow: *wing-scale* piceous, black on the inner margin: *wings* blackish-violaceous: *tergum*, first segment on the posterior margin with a yellow band abruptly dilated each side; second segment at tip with much larger and confluent punctures: *feet* orange: *thighs*, except at the knee, black.

Length three fifths of an inch.

Differs from any of the varieties of our *parietinus*, Linn., I have seen, though it is nearly allied to that species.

5. O. *anórmis*, S. (EUMENES) Long's second Expedition, probably belongs to this genus, but as the head of my specimen is destroyed, I cannot be certain whether it may not be a PTEROCHEILUS, Klug. It is like the *oculàtus*, S.

LETHUS, F. Latr.

L. *spìnipes*. Black; clypeus broader than long; first abdominal segment somewhat white at tip:

Inhab. Indiana.

Body black, punctured: *clypeus* much wider than long: *wings* dark violaceous: *tergum* slightly punctured; peduncle rather slender, somewhat gibbous, with an indented spot above, near the tip, terminal margin with a piceous, dentate band; second segment with a distinct neck at base; posterior margin abruptly and smoothly impressed; and with the remaining segments immaculate: *tibiæ*, posterior pairs spinous behind.

Length seven tenths of an inch.

Differs from L. *cyanipénnis*, F. which it seems to resemble most, in being smaller, more polished, having no testaceous at base of the petiole or on the sides of the metathorax; the wings also are less opake.

Polistes, Latr.

1. P. *métrica*. Ferruginous; abdomen black; wings dark violaceous.

Inhab. United States.

Body ferruginous: *antennæ*, fuscous; first and second joints ferruginous beneath; five or six last joints fulvous beneath: *hypostoma* with a few distant yellow, short hairs, not sericeous; at the middle of the tip, a little prominent: *thorax*, with a black dorsal line abbreviated behind, each side of which is an obsolete line confluent behind, exterior to which at base is a black line attenuated before and abbreviated: *wings* dark violaceous: *feet* black; tibiæ within, excepting the posterior pair; knees and tarsi yellowish: *abdomen* black; first segment obsoletely piceous each side and on the posterior edge; second segment also with obscure ferruginous on each side, sometimes obsolete.

Length over four fifths of an inch.

Resembles the *annularis*, Fabr. but the ferruginous color is more prevalent; the hypostoma is not sericeous, a little more prominent in the middle; the basal abdominal segment is somewhat larger and destitute of the annulation. I have obtained it abundantly in Indiana and Mr. Barabino sent it to me from New Orleans.

2. P. *areàta*. Thorax black bi-lineate and margined with yellow.

Inhab. Mexico.

Head yellow: *nasus* with black sutures and line before from the middle bifarius near the antennæ: *mandibles* piceous at tip: *antennæ* reddish-brown, darker above, and on the first joint yellow beneath: *vertex* black, of which two broad lines descend to the antennæ and one descends each side, for a short distance, posterior to the eyes; a yellow oblique line from the summit to the tip of the eyes: *thorax* black, with two yellow vittæ: *collar*, with an abbreviated line before the wings, and a transverse anterior one, black: *wings* slightly ferruginous on the costal margin: *scutel* and segment beneath it yellow, the former black in the middle: *metathorax* yellow, a black vitta, and lateral basal spot: *abdomen*, first segment petioliform, as long as the second: *tergum* black, segments on their lateral and terminal margins yellow, the latter undulated before; second segment yellow also at base: *beneath* yellow, with black incisures: *feet* yellowish; posterior pair darker behind: *venter* yellow, with two or three slender obsolete dusky bands.

Length less than half an inch.

3. P. *válida*. Yellow; middle of the thorax and base of the segments of the tergum ferruginous.

Inhab. Mexico.

♀ *Body* dull yellow, with ferruginous sutures: *head* above, and *antennæ* at base, ferruginous: *thorax* on the disk ferruginous: *wings* yellowish ferruginous: *tergum* with the segments ferruginous at base: *venter* greenish-yellow, at base ferruginous: *feet* ferruginous; coxæ and part of the thigh yellow.

Length over one inch.

A large and rather robust species. The male is more exclusively ferrruginous with the posterior pairs of tarsi whitish; the head in my specimen is destroyed.

4. P. *mellifica*. Wings yellowish; abdomen fasciate. Inhab. Mexico.

Body blackish, sericeous, with a slight golden reflection: *clypeus* not acute, but almost rounded at tip: *mandibles* at tip piceous: *thorax* with a distinct, longitudinal, impressed line before, extending to the middle: *wings* yellowish; dusky at tip: *scutel* truncate at tip, or rather very obtusely emarginate: *metathorax* almost vertical, with a distinct, prominent, robust angle each side: *abdomen*, first segment small and short; second greatly the largest; all margined behind with orange yellow: *venter* with all the margins yellow excepting the basal one.

♂ Basal joint of the antennæ beneath yellow: nasus very sericeous, having a whitish reflection: *coxæ* and *trochanters* yellowish-white.

Length over three tenths of an inch.

Not being able to find my notes relative to this species, I can only state, that near Jalapa, my attention was attracted by a group of Indians, who were eating honey from a paper nest, which was then so far dissected in their repast, that I could not ascertain its proper form. The honey had a pleasant taste, and as far as I could gather from their gestures, the nest was obtained from a tree. Some of the specimens above described I found crawling feebly away, and others I extracted from the cells in a perfect state.

The trophi agree with those of the P. *nigripénnis*, Oliv. excepting that the obliquely truncated portion of the mandibles is a little longer, and the terminal joint of the labial palpi is equal in length to the preceding joint.

I had made the above description and remarks before an opportunity offered to compare the individuals with Latreille's description of his P. *lecheguàna*, (Ann. des

Sc. Nat. tom. 4, p. 335,) which I find it closely resembles, and to which I should refer it, but for the character attributed to that insect of having only the "bord postérieur des cinq premiers anneaux de l'abdomen jaune," whilst all the segments of the tergum of our species are margined with yellow, and the anal segment is also of that color, in all the specimens which I have seen; all the segments of the venter, moreover, are margined with the same color excepting the basal one. These differences induce me not to withhold this description, as we may reasonably infer that others exist, which can be detected only by comparison. Whether this species is the artificer of either of the nests figured by Hernandez and copied by Latreille in Humboldt's Zoölogy, I cannot positively determine, but it seems highly probable. The observation of Latreille relative to the insects that construct those nests, (or at least one of them, for they are very unlike each other) seems judicious, that "j'ai lieu de soupçonner que ces insectes sont identique ou peu différens," from his P. *lechegnána*.

Colletes, Latr. Klug.

C. *inæquàlis*. Labrum with four indentations near the base.

Inhab. Indiana.

♀ *Body* black with pale cinereous hair: *labrum* on the basal half, with four obvious indentations: *thorax* with the hair dusky on the disk: *wings* hyaline; nervures, fuscous: *tergum* with very short dusky hair; that of the anterior portion of the basal segment, and on each side of that segment longer and whitish or pale cinereous; posterior margins of the segments with white hair, beneath

which the surface is dull piceous at tip; basal segment with a longitudinal impressed line at base: *venter*, segments on the posterior margins with dull whitish hair.

Length about half an inch.

♂ With more dense and obvious hair on the front.

Length less than half an inch.

In warm days of March and April, this species may be observed flying about near the surface of the earth.

Sphecodes, Latr.

S. *confertus*. Black, abdomen rufous, black at tip; punctures dense.

Inhab. Indiana.

Body black, with close-set punctures: *head* rather small with whitish hairs: *mandibles* piceous black: *thorax*, middle thoracic longitudinal line very distinct, punctures equally close-set: *scutel* with the impressed line, continued from the thorax: *wings* hyaline: *abdomen* polished; three basal joints rufous; remainder black.

Length three tenths of an inch.

Resembles the *gibbus*, F. but is smaller; with a proportionally smaller head and much more dense puncturing on the thorax and scutel.

Hylæus, Latr.

H. *modéstus*. ♀ Black, opake: *abdomen* polished: *hypostoma* on each side with a triangular whitish spot: *collar* with an abbreviated, transverse, yellowish line each side: *pleura* with a yellowish spot under the humerus: *wings* hyaline, with blackish nervures: *feet* with whitish knees.

Length over one fifth of an inch.

♂ *Head* beneath the insertion of the antennæ, pale yellow: *antennæ* beneath dull ochreous; basal joint beneath, pale yellow: *collar*, immaculate: *tibiæ* and *tarsi* pale yellowish, the former with a black spot near its tip.

Length about one fifth of an inch.

The spots on the head of the female, are like those of H. *variegàtus*, F., but it is a very different species.

Andrena, Fabr. Klug.

A. *válida.* ♀ Entirely black, immaculate; hair very short, dense, giving to the thorax and head a velvet-like appearance: *head* with the hair of the cheeks, tip of the nasus and outer inferior edge of the mandibles longer: *mandibles* with a rather strong tooth before the tip: *wing-scale* glabrous: *wings* purplish-fuliginous, the darkest portion at tip; stigma honey-yellow: *metathorax*, surface not concealed by hairs, with separate punctures and except at base, canaliculate in the middle; at base is a transverse space of much larger, confluent punctures, behind which space is a narrow glabrous space at the origin of the groove; lateral margin hairy: *tergum* with very short hairs not concealing the surface; first segment concave and deeply canaliculate on the anterior face; segments with a transverse, impressed, submarginal, posterior line; on the first and second are two: *venter*, segments with long, rather dense hairs.

Length seven tenths of an inch.

A large and fine species.

Halictus, Latr.

1. H. *nigricórnis*, Fabr. (Centris). This appears to me to be the male of H. *viridula*, Fabr. (Megilla), and the same as H. *nigricórnis*, Coqueb. (Andrena) and H. *seríced*, Forster.

2. H. *radiàtus*. ♀ Green; metathorax behind with a radiated disc.

Inhab. Indiana.

Body green, polished; hairs numerous, short, cinereous, not obscuring the general color: *antennæ* black, more or less tinged with piceous, particularly beneath: *nasus* before black, ciliate; *labrum* piceous: *mandibles* yellow towards the base, piceous at tip: *wings* tinged with fuliginous; nervures brownish, supplementary nervure at tip of the radial cellule very distinct: *metathorax* at base having numerous, elevated longitudinal or oblique lines; on the posterior declivity is a somewhat orbicular disk, distinguished from the general surface by an elevated line equally distinct all around; it is radiated with elevated lines: *tergum* sometimes tinged with blue or purplish; each segment with a slight inequality or impressed transverse line, near the middle: *feet* dark piceous; tarsi and knees somewhat paler.

Length over two fifths of an inch.

3. H. *labrósus*. ♀ Greenish; tergum purplish, segments margined with blackish.

Inhab. Mexico.

Body green, with a purple reflection: *antennæ* black: *nasus* at tip blackish: *labrum* black, much elevated at the middle of the tip; the elevation grooved before: *mandibles* black, tinged with piceous at tip: *wings* hyaline, slightly tinged with fuliginous; nervures fuscous: *meta-*

thorax with the including line of the posterior disk, prominent only towards the petiole: *tergum* darker purplish than the thorax; the broad posterior margins of the segments, blackish: *feet*, purplish and blue: *tarsi* blackish-piceous.

Length about two fifths of an inch.

About the size of the preceding, from which it differs materially in color, and in the sculpture of the metathorax.

4. H. *purus*. Green; first recurrent nervure confluent with the dividing nervure of the second and third cubital cellules.

Inhab. United States.

♀ *Body* green, polished, tinged with brassy or cupreous: *antennæ* black: *labrum* and *mandibles* piceous, the latter sometimes almost honey-yellow: *metathorax* at base lineated; no distinct posterior disk, but the groove is well impressed, and there are often near the petiole, a few, obsolete, raised, converging lines: *wings* hyaline, very slightly dusky at tip; nervures brown; radial nervure fuscous; stigma pale yellowish; second recurrent nervure exactly uniting with the tip of the dividing nervure of the second and third cellules: *tergum* obviously varied with brassy; posterior slender margins of the segments dark purplish or blackish, sometimes not obvious: *feet* dull piceous: *venter* dull piceous.

Length less than three tenths of an inch.

♂ *Head, thorax* and *metathorax*, greenish-blue: *mandibles* and *labrum*, dull honey-yellow: *thighs* obviously tinged with bluish-green: *venter* on the middle segments green.

Length less than one fourth of an inch.

A very common species. I have found their nests in

the soft, decomposing sap-wood of the Oak and Hickory, between the bark and the solid wood. Their cells are oval, horizontal, not symmetrically disposed, though many are parallel. These cells are composed of particles of the decayed wood, agglutinated together. Each cell contains an individual, subsisting on a yellow pollen, enclosed with it by the parent. In the same assemblage are the young of all ages to the perfect insect.

The male varies in having the tibiæ and tarsi yellowish-white, with more or less of green on the middle of the posterior tibiæ.

The preceding species, distinguished by their polished green color, are also remarkable by the very obtuse emargination of their eyes, or, in other words, the curvature of the inner side of the eye: they might very properly constitute a division of the genus.

5. H. *ligatus*. Black; tergum banded with whitish.

Inhab. United States.

♀ *Body* black, with whitish cinereous hairs on the head and stethidium: *wing-scale* honey-yellow: *wings* hyaline, tinged with yellowish towards the base; post-costal nervure black; first recurrent nervure entering the second cubital cellule near, but not at the dividing nervure: *metathorax* at base having the depressed surface granulated or very minutely lineated; posterior face sub-orbicular, slightly concave: *tergum* having the posterior margins of the segments white with prostrate hair, beneath which the surface is piceous: *venter* a little hairy; posterior margins of the segments obscurely piceous: *feet* tinged with piceous, paler towards their tips; the posterior with pale ferruginous hair.

Length about three tenths of an inch.

♂ *Antennæ* beneath, ochreous, excepting the first and

second joints: *nasus, labrum and middle of the mandibles,* yellow: *wings* with the nervures darker: *tergum* not so very obviously banded: *feet* black; *tibiæ* and *tarsi,* yellow; the former having a black spot on the anterior middle of the posterior pairs.

Length three tenths of an inch.

A very abundant species. The male is a little longer than the female.

The scutelliform base of the metathorax is more or less sculptured with slightly elevated, longitudinal lines.

6. H. *parallélus*. Black; tergum banded; wings and feet ferruginous.

Inhab. Indiana.

♀ *Body* black, somewhat hairy; hairs yellow-cinereous: *nasus* ciliate with ferruginous hairs which extend over the labrum: *antennæ* with the third joint but little longer than the fourth: *wings* pale ferruginous, dusky at tip; second cubital cell quadrate, the basal and terminal nervures being quite parallel: *tergum*, each segment with a very obvious posterior margin of whitish-yellow hairs: *feet* ferruginous, the base of the thighs and coxæ more or less blackish.

Length less than half an inch.

Ceratina, Latr.

C. *dupla*. Blue; much punctured.

Inhab. Indiana.

♀ *Body* deep blue, densely punctured, a little polished: *antennæ* black: *nasus* with a white spot, sometimes obsolete: *thorax* with an impressed line; disk with few punctures and more polished: *wings* but slightly dusky; nervures blackish: *wing-scale* dark piceous, impunctured:

tergum more densely punctured towards the tip; basal segment on the anterior face impunctured, polished; remaining segments with a distinct line on their anterior sub-margins, curving backward on each side; between this line and the basal edge, particularly on the third and fourth segments, the surface is but little punctured and is polished, resembling a small segment: *feet* blackish, with piceous tarsi and whitish hair: *pleura* with a small yellow point under the wing-scale.

Length a little over three tenths of an inch.

♂ Nasus and quadrate spot on the labrum, white; anterior tibiæ whitish on their exterior edge.

Length one fourth of an inch.

The spots on the nasus, labrum and pleura, as well as the line on the tibiæ in the male correspond with those of the male of C. *albilabris*, F. but the general color is altogether different. A variety ? is destitute of the spot on the labrum and has but a very small spot on the nasus.

The maxillary palpi sometimes appear to have six joints.

I am not sure that the male above described, is that of the present species.

Stelis, Panz.

S. *obèsa*. Black, varied with yellow; wings fuliginous.

Inhab. Indiana.

Body robust, convex, punctured, black: *nasus, mandibles* at base, *orbits* anteriorly and abbreviated line behind yellow: *thorax* with a yellow, arcuated line each side extending on the anterior margin: *scutel* somwhat in-

dented towards the tip, margined behind with yellow, which is slightly interrupted in the middle: *wings* fuliginous; nervures fuscous: *tergum*, six yellow bands, the anterior one widely interrupted, the others gradually less so to the penultimate one which is confluent; the ultimate one broadest, entire: *venter* yellowish at base: *feet* yellowish; thighs and posterior face of the tibiæ partly black.

Length over one fourth of an inch.

In the abdominal markings it resembles some species of ANTHIDIUM, but the maxillary palpi have two joints.

OSMIA, Panz. Latr.

1. O. *lignària*. Dark bluish; thorax and base of the tergum, with cinereous hair.

Inhab. United States.

♀ *Body* very dark bluish: *head* with cinereous hair: *nasus* very profoundly emarginated: *antennæ* black: *thorax* with cinereous hair; wing-scale black-piceous: *wings* with a slight fuliginous tinge, particularly on the costal half of the radial cellule; nervures blackish: *tergum*, basal segment with cinereous hair; remaining segments with short blackish hair; anal segment blackish: *beneath* a little darker than above: *feet* and *ventral* hair blackish.

Length about nine twentieths of an inch.

♂ Hair of the head before dense, rather longer, and whitish; pectus, pleura and feet with cinereous hair; venter blackish; nasus very slightly and obtusely emarginate.

Length about seven twentieths of an inch.

A common species; nidificates in old wood. Forms a

dilated oval cocoon of a ferruginous color. It seems to approach MEGILLA *metállica*, Fabr. which however is said to be large, black-bronze, with white wings.

2. O. *buccònis*. Black; tergum with slender white bands.

Inhab. Indiana.

♀ *Body* black, with rather short gray hairs, and obvious, dense punctures: *head* rather large, long between the eyes and thorax: *nasus* entire: *mandibles* with a patch of dense prostrate hairs near the tip: *wings* hyaline: *nervures* fuscous; wing-scale piceous: *tergum* with short, blackish hairs; segments rather convex, narrow, white bands of prostrate short hairs, wider each side; towards the posterior extremity with numerous white, short hairs, obvious in profile; posterior tarsi with longer hairs, tinted with ferruginous: *venter* with fulvous hairs.

Length over three tenths of an inch.

♂ Resembles the female, but is smaller, and the tail has four distant denticulations.

Length one fourth of an inch.

CÆLIOXYS, Latr.

1. C. 8-*dentàta*, Nob. (Appendix to Long's Expedition, p. 353).

♀ Body rather more slender than that of the male; the abdomen conic and polished; head before, a little pruinose, with short hairs; thoracic lines white and less obvious than in the male; feet black; tibiæ and tarsi more or less piceous; tergum, with the bands white and all of them single, those of the male are tinged with yellow.

The ANTHOPHORA *bidentàta*, F., which is said to be

Cælioxys, is described as having the abdomen brown and with only two spines.

The armature of the tail of the 8-*dentàta*, resembles that of C. *cónica*, L. but the middle spines are much more robust and obtuse; the bands are more distinct and the abdomen opake in the male.

2. C. *alternàta.* Bands of the tergum alternately interrupted; ♂ tail 10-spined.

Inhab. Indiana.

♂ *Body* black, punctured; the punctures not much crowded: *head* with short, white hair, almost naked on the vertex: *front* with long, white, dense hair: *antennæ*, tip of the basal joint obscurely piceous: *thorax* an interrupted, arcuated, white line before, curving over the wings; a line before the scutel, and another at its tip, white: *wing-scale* dull honey-yellow: *wings* yellow fuliginous, more dusky at tip: *tergum* polished, punctures more sparse than on the thorax; segments, particularly the basal ones, white on their posterior margins; and each segment excepting the ultimate and basal ones, with a white interrupted band before the middle; tail concave above, with about ten spines: *feet* black, more or less piceous: *venter* banded with white.

Length over two fifths of an inch.

♀ Hair on the front, short; wings destitute of the yellow fuliginous color, excepting on the stigma.

Length over half an inch.

Nomada, Scop. Latr.

1. N. *vincta.* Tergum, with yellow bands which are obsoletely margined with ferruginous.

Inhabits Indiana.

Body black: *head* beneath the antennæ, ferruginous: *orbits* yellow: *antennæ* ferruginous, dusky about the middle; terminal joint paler: *collar* yellow: *thorax* each side over the wings, with a dull ferruginous margin; before the wings a yellow spot: *wing-scale* honey-yellow: *wings* slightly dusky, particularly the terminal margin: *nervures* honey-yellow: *scutel* sub-bi-lobate, yellow, line on the middle posterior margin ferruginous: *metathorax* near the scutel with a transverse line and an irregular, longitudinal, quadrate spot each side behind, yellow: *tergum* with a yellow band, gradually contracted towards the middle, and obsoletely margined with ferruginous, before the middle of each segment; anterior band a little undulated or denticulated: *pectus* with a triangular, yellowish spot over the fore-feet: *coxæ* black, with a yellow spot: *thighs* ferruginous, blackish behind: *tibiæ* and *tarsi* ferruginous and yellow: *venter* with two yellowish bands; towards the tip, honey-yellow.

Length ♀ nine twentieths of an inch.

♂ Ferruginous; orbits and head before, yellow; antennæ blackish towards the tip; first joint yellow beneath; collar, line over the wings, two obsolete ones in the middle, wing-scale excepting a dot in the middle, yellow; scutel undivided, yellow; metathorax in greater part, yellow; abdomen yellow, posterior margins of the segments black, sub-margins ferruginous. Rather more slender than the female.

2. N. *bisignàta*, Nob. (Appendix to Long's Second Expedition). The male has the head black, with the nasus and mouth yellow; antennæ beneath, rufous; the thorax has hardly any appearance of ferruginous; but the scutel in some specimens is of that color; the thighs, par-

ticularly the posterior pair have more black than those of the female.

Var. Abdomen rufous, immaculate.

Epeolus, Latr.

E. *fumipénnis*. Black; thorax bi-lineate, ferruginous all around.

Inhab. Mexico.

Body densely punctured, black: *head* carinate between the antennæ: *antennæ* honey-yellow at base, beneath: *labrum* with an obsolete, minute, ferruginous dot each side: *mandibles* honey-yellow at base: *thorax* with two slender whitish abbreviated lines and whitish lateral edge: *collar* with a ferruginous disk, contracted in the middle; a ferruginous dot before the wings: *wing-scale* and *scutel* ferruginous: *wings* fuliginous: *tergum*, first and second segments with a yellow band, the first broader and widely interrupted; remaining segments with a whitish band, the last segment with the addition of an obscure rufous terminal margin: *tibiæ* and *tarsi* honey-yellow.

Length three tenths of an inch.

The *lunátus*, Nob. also has a bi-lineated thorax, but it is a larger species, has a whitish spot around the base of the antennæ; lunated spot at base each side of the tergum, &c. Smaller than *mercátus*, F. and *scutellàris*, Nob.

Macrocera, Latr.

1. M. *obliqua*. ♂ Thorax with yellowish hair; tergum fasciate, second segment with an oblique band.

Inhab. Indiana.

Body black: *head* and *stethidium* with long, dull yel-

lowish hair: *hypostoma* and *labrum* yellow: *antennæ*, excepting the basal joint, beneath piceous: *mandibles* yellow at base, with a piceous spot, honey-yellow in the middle and blackish at tip: *wings* slightly fuliginous; nervures dusky: *tergum*, first segment at base, with hair as on the thorax; second segment with a broad basal margin of whitish prostrate hair, and a narrow oblique one on the middle; third and fourth segments with oblique bands of the same color on their middles; fifth with the band obvious and a little oblique, intermixed with longer hairs.

Length nearly three fifths of an inch.

I have numerous specimens, all of which are males. The hair of the head and thorax is slightly tinted with ferruginous.

2. M. *binotata*. Black; wings blackish.

Inhab. Indiana.

♀ *Body* black: *head* and *thorax*, particularly the latter, with short hair, that of the occiput and behind the scutel a little longer: *labrum* with prostrate hair: *wings* blackish violaceous: *tergum* on some parts, with a slight purplish reflection; fourth segment with a transverse-quadrate, white spot of prostrate hair on each side, upon its posterior margin: *posterior tibiæ* and *tarsi*, with the long hairs whitish.

Length about nine twentieths of an inch.

♂ A little smaller than the female; nasus and labrum pale yellow; antennæ beneath, dirty yellowish; wings not so dark as in the female; tergum immaculate.

Although it has some points of specific similarity with the preceding, yet it differs so widely from it in other respects, that with much hesitation, I have concluded to give it a distinct place.

3. M. *pruinòsa.* Tergum with much dilated white bands; double on the second segment; hair on the thorax yellowish.

Inhab. United States.

♂ *Body* black: *stethidium* clothed with yellow-ferruginous hair: *head*, hair on the superior part like that of the thorax: *nasus* with a large, yellow, transverse spot before: *labrum* with prostrate whitish hairs, and generally an obscure yellowish, longitudinal line: *antennæ*, rather short, beneath excepting the basal joints, dull piceous: *wings* hyaline: *tergum*, first segment, except at its tip, hairy like the thorax; second segment with a white band at base and another on the posterior sub-margin, united at the sides; posterior margin and transverse middle black; third and fourth segments white with black posterior margins; remainder white; tarsi ferruginous.

Length two fifths of an inch.

♀ *Antennæ*, color as in male: *nasus* immaculate: *posterior feet* with long ferruginous hair.

Length nearly half an inch.

A common species; at first sight somewhat like *obliqua*, Nob. which however is much larger, the bands of the tergum much narrower and more oblique than in the present species. In magnitude this species does not seem to differ widely from that which Drury names *annulàris*, ii, *pl.* 37, *f.* 7. That figure is, however, a very uncertain one, even as respects its genus, and in my copy of the work, does not at all agree with the description which accompanies it.

The bands of the tergum have a pruinose appearance in consequence of the shortness of the hair of which they are composed. The antennæ of the male do not reach the posterior extremity of the thorax.

4. M. *rústica*. Tergum with white bands, double on the second segment; hair of the thorax whitish.

Inhab. Indiana.

♂ *Body* black, with whitish hair: *antennæ* longer than the stethidium; beneath, excepting the three basal joints, dull piceous: *nasus* white: *thorax* with whitish hair: *wing-scale* black: *wings* hyaline; nervures fuscous: *tergum*, first segment, excepting at its tip, hairy like the thorax; bands white, not much dilated; second segment with one at base and another behind the middle, confluent each side; remaining segments with a band on the middle of each: *tarsi* towards their tips ferruginous.

Length under seven twentieths of an inch.

♀ Body much more robust; less hairy; but the bands of the tergum are rather wider, sometimes almost interrupted in the middle; hair of the posterior feet yellowish; antennæ rather short; nasus black.

Length nearly two fifths of an inch.

A smaller species than *pruinòsa* and much like it; but it may be distinguished by the much longer antennæ of the male, by the nasus being all white, and by the whitish or almost uncolored hair of the head and thorax.

When recent, the color of the eyes is light blue, with three or four transverse, movable series of longitudinal dark spots.

Megatchile, Latr.

M. *pollicàris*. ♂ Anterior tarsi dilated, deeply ciliated, appendage rather long; spines of the anterior coxæ yellow.

Inhab. Louisiana.

Body not very hairy, black: *wings* with a slight fuli-

ginous tint, particularly at tip: *tergum* oblong sub-quadrate: *anal* segment with a sinus in the tip, each side of which are small inequalities of the edge: *anterior feet*, coxæ with prominent yellow spines, rufous on the exterior tip; thighs yellow, black at tip and base; tibiæ black, yellow within and at tip, on the posterior tip a very short, acute spine; tarsi much dilated and deeply ciliated behind, yellow-white, covered in their greatest part by a yellow broad scale, which is honey-yellow at tip; nails honey-yellow: *intermediate tarsi* cordate, the lobes of one side more prominent.

Length eleven twentieths of an inch.

Mr. Barabino sent me this species. It differs in many respects from the M. *latimànus*, Nob. (Western Quarterly Reporter) which has in that species the anterior coxæ black; the appendage of the anterior tarsi shorter, &c. but it is perfectly congeneric with it, as well as with ANTHOPHORA *lagópoda*, Fabr., if I may judge by the similarity of the anterior feet, though it certainly approaches STELES in the paucity of ventral hair. The maxillary palpi of *latimànus*, have the second joint rather longer than the first.

M. *brevis*. Black; not remarkably hairy; anterior tarsi simple; abdomen short.

Inhab. Indiana.

♂ *Body* black, somewhat polished: *head* densely covered with long, yellowish hairs in front: *thorax* with whitish hair, sometimes tinged with yellowish, and not concealing the surface: *wings* a little fuliginous, tinged with violaceous: *venter* not, or hardly longer than broad: *tergum* with small, dense punctures, and a narrow, white band on each segment; anal segment transversely concave, at its tip emarginate, in the middle and on each side,

the edge has several small denticulations: *anterior tarsi* simple: *tarsi* piceous at their tips.

Length less than two fifths of an inch.

♀ A little larger than the male; with very little hair on the front; abdomen short conic-oval; venter hairy.

Length two fifths of an inch.

The male of this species closely resembles that of *pugnàtus*, so much so, that it might readily be considered as the same; but the anterior tarsi are not dilated, and the abdomen, although similarly terminated, is remarkably shorter.

M. *pugnàtus*. Black; anterior tarsi dilated in the male, with the first joint prolonged at its anterior angle beyond the tip of the second joint.

Inhab. Indiana.

♂ *Body* black, not densely hairy: *head* densely covered with long whitish hairs in front: *thorax* with whitish hair, not concealing the surface: *wings* fuliginous, tinged with violaceous; venter longer than broad: *tergum* with small, dense punctures; and a narrow white band on each segment; anal segment transversely concave, at its tip emarginate in the middle, and on each side the edge has several small denticulations: *anterior tarsi* whitish, dilated, and ciliated; anterior tip of the basal joint prolonged a little beyond the tip of the second joint, and its whole length excavated before; anterior tip of the second joint also prolonged almost to the tip of the third joint; fourth joint not dilated: *anterior tibiæ* with dilated crowded punctures: *anterior coxæ*, each with a prominent, black spine: *intermediate* and *posterior tarsi* piceous at tip.

Length over two fifths to nearly half an inch.

♀ Frontal hair shorter and less conspicuous; anterior feet simple; venter with dense yellow hair.

Lengh over half an inch.

It is smaller, much more slender and much less hairy than either *latimànus*, or *pollicàris*, Nob. and has a somewhat different habit.

Anthophora, Latr.

1. A. *abrúpta.* ♂ Black; thorax with cinereous hair; nasus and labrum whitish.

Inhab. Indiana.

Body robust: *antennæ* on the anterior side of the basal joint, whitish: *nasus*, and each side of it to the eye yellowish, a little tinged with fulvous in the middle: *labrum* pale yellowish, hairy: *mandibles* having a whitish spot near their outer base: *thorax*, *pleura* and *pectus*, clothed with whitish cinereous hair: *wings* hyaline; nervures fuscous; stigma not at all dilated: *pleura* with an oblique line of black hairs passing downward and backward from the posterior wings: *tergum* with much shorter and less dense hair than that of the thorax, and black; that of the basal segment a little longer, and near the metathorax partaking of the color of the hair of that part: *feet* black; the longer hairs of the anterior pair are whitish.

Length over half an inch.

It is less robust than A. *pìlipes*, F. and is equally well clothed with hair on the anterior part of the body, but the transition of color between the hair of the thorax and that of the tergum is much more abrupt. It has much the appearance of a small humble-bee and also resembles Andrena *thorácica*, F.

2. A. *frontàta.* Thorax with yellowish hair; hypostoma and basal joint of the antennæ beneath, and spot at base and near the tip of the mandibles, yellow.

Inhab. Louisiana.

♂ *Body* black: *hypostoma* yellow and with yellow hair: *antennæ* with the inferior longitudinal half of the basal joint yellow, and with dense yellow hair: *nasus* yellow, with yellow hair: *labrum* black, covered by the hair of the nasus: *mandibles* with a yellow oval spot at base and a slender obsolete one near the tip: *maxillæ* with an obsolete yellowish spot before the palpi: *palpi* with a few rigid hairs; terminal joint one third the length of the preceding joint: *tongue* ferruginous: *vertex* in the middle, having a few yellow hairs: *thorax* with dense, long, yellow hair: *wing-scale* blackish: *wings* with a slight dusky tint; nervures black, exterior recurrent nervure entering the outer cubital cellule directly opposite to the outer nervure of the cellule: *tergum* hairy; hairs black, rather long; a few yellow hairs towards the middle of the first segment: *anterior feet* with yellow hair on the posterior edge: *hind feet*, hairs not much elongated.

Length half an inch.

Sent to me by Mr. Barabino. Differs from the *abrúpta*, Nob. in being less robust, the hair of the thorax being pale yellow, and the mandibles having a white spot near their tips.

3. A. *taúrea*. Thorax pale, with a dusky central spot, from which proceed two lines to the anterior angles.

Inhab. Indiana.

Body black with whitish cinereous hair: *head*, hair on the vertex dusky: *thorax* with whitish hair; a large, obvious, central, dusky spot, with a line curving from it to each anterior angle of the thorax: *scutel*, hair dusky: *metathorax and first segment of the tergum*, with cinereous hair; remaining segments of the tergum with the hair very short and black, excepting on the posterior margins which are pure white; ♀ ultimate segment with

a glabrous, subcarinate, triangular, oblong space above: *wings* hyaline; nervures fuscous; stigma not suddenly dilated; terminal third of the radial cellule slightly separated from the edge of the wing; terminal nervure of the third cubital cellule inserted at the middle of the nervure of the radial cellule.

Length ♂ about two fifths; ♀ half of an inch.

The thoracic spot will readily distinguish this species. The manners and habits of the species may be likened to those of the A. *parietìna*, Latr. It digs a cylindrical hole in compact clay or adhesive earth on the side of a bank, or in earth retained amongst the roots of an overturned tree. The hole is two or three inches in depth. The sides and bottom are of a dark brown color, quite smooth and somewhat polished, containing a quantity of white pollen, considerably larger than the artificer itself. The entrance consists of a cylinder extending downwards from the mouth of the hole, more than an inch in length, and consisting of small pellets of earth compacted together, very rough on the exterior and smooth within. A species of ODYNERUS was numerous in the same locality in which I observed the above, and sometimes entered the holes; but the exterior cylinder does not agree with that which is attributed to O. *murària*, Latr. which Kirby and Spence inform us is composed of "little masses so attached to each other, as to leave numerous vacuities between them, which give it the appearance of filagree-work." Many of the tubes of the *táurea*, have a fissure above, throughout the whole length; resembling in this respect the shell SILIQUARIA. It does not agree with Fabricius' description of MELECTA *remigàta*.

Xylocopa, Latr.

X. *Carolina*, Fabr. This species was referred by Fabricius to the genus Centris, and is even now generally considered as belonging to that genus. But doubting the accuracy of that arrangement, I found on examination, that the labial palpi are rectilinear, the terminal joints being in a right line with the others, and the maxillary palpi are six jointed. The mandibles have only one large tooth, which is on the inner side. The circumstance of Fabricius referring to Drury's *fig.* 1, *pl.* 43, of *vol.* i, for Bombus *virgineus*, Linn. leads me to suppose that he had this species also in view in that description. But as that description in the Syst. Piez. *p.* 346, agrees very well with one of our largest and finest species of Bombus, rather than introduce a new name, I would transfer the quotation of Drury's figure to the description of X. *Carolina*, (Centris), F. I add the following description of it, which I formerly drew out, with the name of *válida*, under the belief that the *Carolina*, is really a Centris, and therefore altogether different.

Blackish; a prominent, compressed, obtuse tubercle between the antennæ; thorax hairy.

Inhab. United States.

♀ *Body* black, tinged with purplish: *head* with close set, discoidal punctures; an obvious, compressed tubercle between the antennæ, rounded at its tip: *labrum* conic: *thorax* tinged with greenish; with pale yellow hair, except on the middle: *wings* fuliginous, sub-opake at tip: *tergum* tinted with very obscure green; basal joint covered with pale yellow hairs: *pleura* beneath the wing, with yellow hairs.

Length about four fifths of an inch.

♂ Nasus white. The tubercle of the head is very distinct.

Common in the Union. The males may be distinguished by their larger and more approximate eyes and white nasus. It varies in having the hair of the thorax and of the first abdominal segment, almost ferruginous.

2. X. *laterà̀lis.* Violaceous; abdomen with a posterior lateral cinereous spot.

Inhab. Mexico.

♂ *Body* blackish-violaceous: *head* black: *nasus* and *labrum* white: *antennæ* with an anterior white line on the radical joint: *genæ* with a few gray hairs: *wings*, first recurrent nervure entering the third cellule within the distance of its own breadth from the nervure of intersection of the third cellule: *abdomen*, each side near the tip with a cinereous spot of hair, extending upwards on each side of the venter, but becoming obsolete towards the base.

Length over seven tenths of an inch.

Bombus, Latr.

1. B. *sonòrus.* Yellow; head, thoracic band and abdomen behind black.

Inhab. Mexico.

Body yellow: *head* black: *thorax* with a broad black band in the middle: *wings* violaceous-black: *tergum* with the first, second and third segments yellow, the others black: *beneath* black.

Length ♀ four fifths of an inch.

Resembles the *fervidus*, Fabr. so closely that it may readily be mistaken for it, but that species has only two segments of the tergum clothed with yellow hair; that of

the second one, however, is so much elongated as to conceal a considerable portion of the next segment. The color is a much deeper yellow than that of *férvida*.

2. B. *ephippiàtus*. Black; pleura and base of the tergum yellowish.

Inhab. Mexico.

Body black: *pleura* pale yellow: *wings* dusky, tinged with violaceous: *tergum* pale yellow towards the base; this color is gradually narrowed behind and terminates on the third segment, forming somewhat of a semi-oval, with its base to the thorax and confluent with the color of the pleura.

Length less than half an inch.

3. B. *ternàrius*. Yellowish; thorax fasciate; tergum fulvous in the middle.

Inhab. Indiana.

Head black: *thorax* with dull yellowish hair, and a blackish band on the middle: *wings* with a slight yellowish tinge; nervures fuscous: *tergum* fulvous on the second and third segments; first and fourth segments yellowish; remaining segments black.

Length ♂ nearly three fifths of an inch.

Trigona, Jurine, Latr.

1. T. *bilineàta*. ○ Blackish; antennæ, beneath, labrum and two lines on the nasus pale.

Inhab. Mexico.

Body piceous black; flagellum of the antennæ beneath, obsolete narrow anterior orbits, two rather broad lines on the hypostoma, labrum and mandibles somewhat pale: *wings* hyaline, slightly tinged with fuliginous towards the base; cubital cellules obsoletely divided into three by two

hardly perceptible nervures; ultimate cellules hardly attaining to the tip of the wing; the second receiving the recurrent nervure: *feet* not different in color from the body; posterior tibiæ with the ciliæ of the edge sparse.

Length less than one fourth of an inch.

It is somewhat smaller, and less robust than the *rùficrus*, Latr. of which the posterior tibiæ are densely ciliated. I am indebted to Dr. Klug for a specimen of the *rùficrus*; and it is very different from the *amalthèa* and *spìnipes*, Fabr. My specimens are workers, and I did not find the nest or ascertain the kind and importance of the honey they make. The generic name is almost too much like TRIGONIA of Conchology, but as the pronunciation differs it can remain.

2. T. *ligàta*. ○ Blackish; abdominal segments margined with ochreous.

Inhab. Mexico.

Body brownish-black, hairy: *antennæ* beneath, particularly the basal joint, anterior half of the anterior orbits, line distinguishing two lobes of the hypostoma and mouth, dull yellowish: *wings* slightly tinged with fuliginous, particularly towards the base; nervures of the cubital cellules like those of the *bilineàta*, Nob. but the first one is much more distinct: *tergum* shortly hairy; posterior margins of the segments ochreous: *feet* dull honey-yellow; tip of the posterior tibiæ and base of the first tarsal joint black.

Length about two fifths of an inch.

Of this I obtained but a single specimen, which is a worker. It is widely different from the preceding species, particularly in being hairy, and is much larger and of a somewhat different habit. I have carefully compared it with Latreille's descriptions and figures of MELIPONA

favòsa, Illig. *scutellàris*, Latr., *fasciàta*, Latr., *interrúpta*, Latr. and other species as given in Humboldt's Zoölogical Observations; and even should it be referred to that genus notwithstanding its denticulated mandibles, I have endeavored to draw out such characters as may distinguish it from them. Latreille, however, says of MELIPONA "Mandibles sans dentelures apparentes" which entirely excludes this species, although it agrees in habit.

ART. XVIII.—DESCRIPTION OF A NEW SPECIES OF THE GENUS HYDRARGYRA; WITH SOME ADDITIONS TO THE CATALOGUE OF THE FISHES OF MASSACHUSETTS IN HITCHCOCK'S REPORT.

By D. HUMPHREYS STORER.

Read June 4th, 1836.

ALTHOUGH the genus CYPRINUS of Linnæus was divided by Cuvier, in his Règne Animale, into no less than seventeen distinct genera, Le Sueur found it necessary to add another—or rather to modify the genus HYDRARGYRA of La Cepède, which Cuvier included in his genus PŒCILIA, in order to admit those well known fishes, called *minnows*, or mud fishes, so often seen about fresh water streams, and the small ponds in salt marshes.

The HYDRARGYRA of Le Sueur is a well characterized genus. The only descriptions, which have been published of these fishes, are contained in the Journal of the Academy of Natural Sciences at Philadelphia. The specimen, upon which a report was requested of me, at the last meeting of the Society, is a new species. Four species have been described by Le Sueur—and each has

received its name from the transverse bands with which it was ornamented. I would follow the example of the distinguished naturalist who has preceded me in the genus, in selecting a name for this species.

Hydrargyra trifasciata.

Four longitudinal bands on each side of the body, and three transverse bands between the termination of the longitudinal bands and the base of the tail.

The upper part of the body is of a yellowish green: on each side, are four dark colored bands running almost the entire length of the fish: the first of these, is high on the back; the second passes from the upper edge of the operculum, in a direct line to its termination; the remaining two, commencing back of the pectoral fin, run obliquely upwards and backwards to a point on a line with the centre of the ventral fin, then turn gently down, and are continued parallel with the other two bands.

At the base of the tail, are three transverse bands of a similar color. All the under portion of the body, is of a brilliant yellow.

Snout elongated—lower jaw straight.

Length of specimen five inches five lines: *thickness*, seven and a half lines: *depth*, one inch one and a half lines.

P 18. D 14. V 6. A 12. C 18.

This fish was taken with other species of the genus in the marshes of this vicinity.

Since reading, a few months since, a paper on the Catalogue of the Fishes of Massachusetts, the following have been met with, not mentioned in that Catalogue, which are now contained in our Cabinet.

SCOMBERESOX *saurus*, FLEM. The *Saury*—called here by the fishermen, the *bill-fish*. Not unfrequently taken on some parts of the coast in nets. Two specimens have lately been cast ashore at Nahant—one of which, very perfect, was presented to the Society by Mr. Jonathan Johnson of that place.

MURÆNOIDES *guttàta*, LACEPEDE. The *butter-fish*. Found in large numbers under the rocks on beaches at low tide.

PHYSIS *furcàtus*, FLEM. The *great forked beard*. Incorrectly called by our fishermen the *Hake*.

GASTEROSTEUS *quádracus*, MITCHILL. The *four spined stickle-back*.—A specimen of this pretty little fish, one inch and three lines in length, was brought me by Mr. Joseph P. Couthouy, who found it thrown upon the beach of South Boston Point, at the entrance of Boston Harbor.

ART. XIX.—REMARKS ON THE POSITIONS ASSUMED BY GEORGE ORD, ESQ. IN RELATION TO THE COW BLACK-BIRD, (ICTERUS AGRIPENNIS) IN LOUDON'S MAGAZINE FOR FEBRUARY, 1836. By THOMAS M. BREWER.

Read July 6th, 1836.

"OF all the known birds that are indigenous to North America" says Mr. Ord, in a communication to Loudon's Magazine for February, 1836, "perhaps there is not one whose habits are so interesting as those of the cow-bunting, cow-bird, cow-pen bird or cow black-bird, (the FRINGILLA *pècoris* of Latham); and yet there is hardly one, whose history has been involved in greater obscurity." These observations are just; and to the

latter clause he might have added, that among American birds, there is hardly a single species whose habits are less generally known, except indeed by professed ornithologists, than those of this interesting bird. Its very existence among us is unknown to most; or if any are aware that we have a bird that imposes upon its neighbors the task of rearing its young, it is but too often confounded with the European cuckoo. But the fact is, our cuckoos, thus unjustly involved in the obloquy attached to the conduct of the European species, in the beautiful language of Wilson, "build their own nest, hatch their own eggs, and rear their own young; and in conjugal and parental affection, are nowise behind any of their neighbors of the grove."

That the habits of this bird should have been thus involved in obscurity, and should continue so, to the present day, will not, perhaps, strike us with so much astonishment, when we learn that such distinguished naturalists as Wilson, Nuttall and Audubon, have not been entirely free, in their account of its habits, from inaccuracies. Many of the errors and omissions of these justly celebrated naturalists have been pointed out by Mr. Ord, in the communication before alluded to. Several of his positions I have it in my power to confirm, by actual observation. There are, however, many, which he seems to have adopted much too hastily; which are not only not supported, but have actually been confuted by established facts. There are also some circumstances which he appears to have overlooked altogether. To the consideration of these, I would ask your attention a few moments.

In the first place, the writer of the above paper enumerates four positions assumed by others, but which he pronounces untenable. They are,

1st. "There is never more than one egg of the cow-bunting deposited in the same nest."

2nd. "The egg invariably hatches before those of the foster bird."

3rd. "The foster mother, in seeking food for her first-born, neglects her own eggs, and their embryos consequently perish."

4th. "The birds selected by the cow-bunting as nurses of her progeny are always smaller than herself."

He is undoubtedly correct as to the first position. His views on this point he makes good, by a number of instances which he adduces. But it has not, as he would lead us to infer, been assumed, by either Wilson or Nuttall, nor yet, in all probability, did Audubon so intend. Wilson merely says, "I have never known more than one egg of the cow-bunting dropped in the same nest;" and Mr. Ord afterwards tells us that the fact of two being sometimes found, became known to Wilson before his death. And even the position of Mr. Audubon, unfounded as it may seem at a hasty glance, and wholly at variance with established facts, which was evidently the one had in view when Mr. Ord maintained the untenableness of the above position, if fairly considered, will admit of a construction, not only not untenable, but one which Mr. Ord's own observations will tend to confirm. His words are; "The cow-bird never deposits more than one egg in a nest, although it is probable it thus leaves several in different nests, especially when we consider the vast number of the species that are to be seen on their return southward?" If, by this, Audubon means to assert that the same cow-bunting never lays more than one egg in the same nest, and not that there is never more than one cow-bunting's egg in the same nest, (which last

meaning Mr. Ord does seem to attribute to his words, but which is by no means a fair inference) he is undoubtedly correct. "The simultaneous hatching of the eggs," (to use Mr. Ord's own words) in every instance where two cow-troopial's eggs have been found in the same nest, "proves that they had been deposited by different individuals."

Mr. Ord would not certainly have us suppose he considered the fact as unknown to Nuttall. For the latter writes, "I have sometimes remarked two of these eggs in the same nest, but in this case, one of them commonly proves abortive." "If one commonly proves abortive," remarks Mr. Ord, "both sometimes must hatch. Now as Mr. Nuttall does not inform us that he ever saw two cow-buntings in the same nest, we are compelled to infer that the circumstance of abortion is related at second hand." I wish not to pass a too hasty judgment, but I cannot but regard the inference involved in the last sentence, one of the most hastily deduced that ever fell from the pen of a naturalist. It is not only not justified by Mr. Nuttall's words, but appears to me directly contradictory to Mr. Ord's own deductions, in the line preceding. If Mr. Nuttall does not tell us, in as many words, that he ever saw two cow-buntings in the same nest, it certainly is much fairer to infer that fact from what he does say, than the contrary. For he tells us, that in several instances, he has seen two cow black-bird's eggs in the same nest; in most of which cases, one of them commonly proved abortive; and as they did not do so in every instance, Mr. Ord very justly infers that in some of them both must have hatched; and in the same breath, he jumps at once to the very opposite conclusion, that because Mr. Nuttall does not tell us that he saw the

one, he is compelled to infer that he did not witness the other. Mr. Nuttall does not tell us, in so many words, that he ever saw the nest of the chipping sparrow. Are we thence to infer that he never did see one, but that his description of it is "related at second hand?" Where then will Mr. Ord find the position in question, which if he *could* find assumed, he would be amply justified in pronouncing it untenable? What naturalist ever assumed it? Not Wilson, for he only expresses his ignorance on the subject. Not Audubon, for, as far as we can see, he leaves the point untouched. And most certainly not Nuttall. We are compelled to think that he has but wasted his time in demolishing an imaginary position.

On the second point I can offer nothing from personal observation, either in support of, or in opposition to Mr. Ord's views. In the only instances that have fallen under my notice, the eggs of the cow-troopial *alone* were hatched. On this head, the writer of the above paper in Loudon modestly observes; "The opinion advanced by Wilson, and echoed by others, that the cow-bunting is invariably the first hatched, is mere conjecture, totally unsupported by facts. *It must now yield to truth;* although the sentimental reader will, doubtless, regret that the profound reflections on the 'wisdom of nature' will lose much of their efficacy or application." After such a preface, we are naturally led to expect that Mr. Ord would make good his point, by at least *one* instance, in which the cow-troopial can be proved to have been hatched after at least one of the other inmates of the nest. What are we to think then, when, although he relates many of his observations, to make good his point, from not one of them can we infer, with any degree of certainty, that the cow-troopial was not, in every instance,

hatched the first? I will not detain you with a detail of his observations; their amount is, that in several instances he found the parasite and the young of the owner of the nest hatched during the same night. But what right has he to assume, that the cow-troopial was not hatched twelve hours before the others? On one occasion, he found a nest of the indigo bird, containing one egg of the cow-troopial and three legitimate eggs: eleven days after he found the egg of the troopial hatched and two of the indigo bird's. The egg-shell of the former, and that of one of the latter, remained in the nest. The other had been removed. From this Mr. Ord infers that the last was the first hatched. This assumption is entirely gratuitous; and until it be admitted that birds uniformly remove their egg-shells within a certain time after the eggs have been hatched, (which indeed, Mr. Ord would seem to assume, but in proof of which he offers nothing) we must beg leave to wait for more satisfactory proof before we can declare untenable, a position assumed by Wilson, Audubon and Nuttall, sustained by their actual observations and proved in every instance to be the fact, when the case would admit of proof. All that has yet been proved, on the opposite side of the question, is, that the eggs of other birds have been hatched during the same night as the cow-troopial.

In pronouncing the third position untenable, Mr. Ord is undoubtedly, in part, correct. But that it holds good in most instances is still undeniable; and the few instances to the contrary that have been cited, must be regarded as but exceptions to a very general rule. Mr. Ord, however, has but echoed a fact, in the discovery of which he has been anticipated by Nuttall, who speaks of the red-eyed vireo "faithfully nursing the foundling along with her own brood."

The last position which Mr. Ord combats is, that "the birds selected by the cow-bunting, are always smaller than herself." In support of his views on this subject he mentions, that he twice found the parasite in the nest of the wood thrush, which bird is larger than the troopial. The eggs were in these instances set upon and hatched by the owners of the respective nests. The credit of the discovery of this fact is undoubtedly due to Mr. Ord. The scientific world is indebted to him so far as this goes, but no farther. For the rule is not the less a general one, because exceptions to it have been found. For, while the cow-troopial's egg is frequently detected in the nests of no less than fifteen different species, all of which are smaller than that bird, it has been thus far discovered in the nest of but one solitary species which is of a larger size, and that in only two instances.

On this subject Audubon has fallen into a singular, and for him, unusual error. He says, "it is also a very remarkable circumstance, that although the cow-bird is larger than the species in the nest of which it deposits its eggs, the eggs themselves are not much superior in size to those of their intended foster-parents." "If this were the fact, it would justly be entitled to the epithet remarkable," says Mr. Ord. In his views on this point, Mr. Ord is undoubtedly correct, and Audubon singularly mistaken. We are willing to award to the former all the credit that is his due, for correcting this mistake. But if Mr. Ord had contented himself with simply pointing out the mistake, instead of descending and disgracing the pages of his paper by bestowing upon Audubon the contemptuous epithet of "sagacious naturalist;" instead of exulting at, and ridiculing the overthrow of the scheme of "adaptation of means to ends which the Author of Birds of

America deduces from this supposed fact,—instead of instituting an odious comparison between Nuttall and Audubon, by styling the former the more discerning naturalist, it would have been much more to his credit. Such things are alike unmanly and unbecoming the cause of science. We can overlook a *mistake* in one who has done so much to the cause of natural history. We cannot so readily excuse the correction of that error when apparently dictated by feelings of a personal character.

In this same paper we also find the following paragraph: "It appears to be the prevailing opinion, that if the cow-bird deposits her egg in a nest wherein the owner has not yet begun to lay, the nest is either deserted forthwith or the egg of the intruder is so buried by the addition of fresh materials, that it becomes abortive. On this head I am not prepared to speak further, than that the opinion wears the appearance of probability." His opinion appears to have been strengthened by the following circumstance. "On the 11th of June I found the nest of the red-eyed flycatcher containing a cow-bird's egg, and one of her own. As from the smallness of the nest, the cow-bird could not enter its cavity, she was compelled to sit over it; and her egg in dropping, broke the fly-catcher's. The nest was abandoned." This fact has very little bearing on the point in question, as it is one of the most common occurrences to find nests forsaken, in which one or more of the eggs have been broken. Mr. Ord is, however, mistaken in regarding it as the prevailing opinion that such is *invariably* the case. Audubon implies the possibility of there being instances to the contrary, and Mr. Nuttall plainly tells us, that such is the fact. Could not the author of the article in Loudon, draw any inference from the following, which we find in Audubon?

"Should the cow-bird deposit its egg in a nest newly finished and as yet empty, the owners of the nest, *not unfrequently* desert it." Did he not read the following passage in Nuttall? "The only example *perhaps*, to the contrary, of deserting the nest when solely occupied by the stray egg, is in the blue-bird, who, attached strongly to breeding places, in which it often continues for several years, has been known to lay, though with apparent reluctance, after the deposition of the cow-bird's egg." From this we see, that the one leaves us to infer that the rule is not universal,—the other plainly tells us so. Be this, however, as it may, an interesting circumstance, that fell under my observation the present summer, places the question beyond controversy, so far as the universality of the rule is concerned. On the 10th of June, I found the nest of a red-eyed vireo nearly finished. It was situated on the extremity of a branch of an oak, at the height of about thirty feet. As in its situation then, it was quite inaccessible, I succeeded in fastening a cord to the end of the limb, and by bringing it nearer to the body of the tree and securing it in that situation, I brought it within reach, with a view of obtaining specimens of its eggs. Although the nest was by this means nearly inverted, the bird did not forsake it, but built up a new side where the nest had been brought down, and thus adapted it to its new situation. This process rendered the nest of a very peculiarly deep shape. About a fortnight after, on examining the nest, I found in it two eggs of the cow-troopial, considerably advanced in incubation, although there were none of the owners of the nest. On the 30th of the same month, one egg of the vireo was found to have been added. This had evidently been set upon but a few days; those of the cow-troopial appeared about to hatch. This fact is of the

most satisfactory nature, for not only one, but actually two eggs of the cow black-bird were deposited, and instead of being forsaken, were set upon at least a week before the bird was ready to lay any of her own eggs. And though repeatedly disturbed, first by having her empty and unfinished nest nearly inverted, then by having the eggs of the cow-troopial removed and afterwards replaced, in order to put their identity beyond a doubt, and again by having her own egg removed, she still clung to her adopted offspring, with unexampled fidelity.

Again, we find the following paragraph, in which, by his unwarranted deductions, he is guilty of great injustice to Mr. Nuttall: "There is a passage in Mr. Nuttall's history of the blue-grey fly-catcher, which I cannot forbear quoting, as it involves one of the most preposterous ideas that ever entered into the brain of a naturalist. After describing the nest of the fly-catcher, our author adds, 'In this frail nest, the cow-troopial sometimes deposits her egg, and leaves her offspring to the care of these affectionate and pigmy nurses. In this case, as with the cuckoo in the nest of the yellow wren, and that of the red-tailed warbler, the egg is probably conveyed by the parent, and placed in this small and slender cradle, which could not be able to sustain the weight, or receive the body of the intruder.'" "It seems," observes Mr. Ord, "that some astute observers have lately discovered that the European cuckoo is in the habit of transporting her egg in her mouth, when the situation of the nest of her selected nurse (a hole in the wall for instance) should seem to hinder her ingress to it. Mr. Nuttall, seizing upon this idea, does not hesitate to conjecture that the same stratagem is practised by our cow-bunting in the case instanced by him." What right has he to assume

that the mouth is the only means by which a bird can be supposed to convey its egg? Is it not far more probable that in this instance the egg is conveyed in the bird's claws? Improbable as this hypothesis may seem, it is much less so than any explanation, that has yet been found, for several facts connected with the history of this bird. Thus its egg is very frequently found in the nest of the golden-crowned thrush. Now the formation of this nest is such as utterly to preclude the possibility of the cow-troopial ever entering it for the purpose of depositing its egg. "It builds," says Wilson, "a snug, somewhat singular nest on the ground, in the woods, generally on a declivity facing the south. Though sunk below the surface, it is arched over, and only a small hole left for entrance." One of these nests, found in Cambridge by Mr. William T. Rotch, is, from measurement, but two inches in diameter. The entrance to the nest has been widened since it was found, but is not now more than one and a half inches wide. The cow-troopial is seven inches in length, eleven in alar extent, and about four through the body. Does it seem more improbable that the egg is conveyed by the bird, than that a body seven inches long and four thick can introduce itself through a passage one and a half inches wide into a space not more than two inches in diameter? Mr. Ord might at least have found some other explanation, before he pronounced the only one that has yet been offered, for these singular facts, "the most preposterous idea that ever entered the brain of a naturalist."

Mr. Ord, in speaking of the opinion advanced by Audubon that birds have the means of distinguishing an addled egg, says; "I have reason to believe that birds possess no such knowledge; and I am confident that

when an addle egg is removed, it is not by the owner of the nest, but by some vagrant bird in search of food." A few pages after, we find the following sentence, which in a manner involves a contradiction to the above: "It is admitted that the cow-bunting never drops her egg into the nest of a bird that has commenced incubation." Now if Audubon is wrong, as Mr. Ord says he is, in the first position, may not Mr. Ord's latter position be unfounded? If Mr. Ord is not incorrect in the latter, why is Audubon necessarily in error? For we see not on what grounds we cannot allow to birds the power of distinguishing addled eggs, and yet allow the cow-troopial the power of ascertaining whether the eggs in the nest in which it proposes to deposit its own, have been set upon or not.

Mr. Ord concludes his article by several positions which he assumes. As the first four are but the reverse of assumptions which he pronounced untenable and which have been already considered, I will not detain you by a repetition of them. The remainder are,

1st. "When two eggs of the cow-bunting are hatched in the nest of a bird smaller than herself, the young of the foster-bird, for the want of room, are either smothered in the nest, or jostled out of it."

2nd. "When only one egg of the cow-bunting is hatched in the nest of a bird smaller than herself, the young cow-bird, and the young of the owner of the nest, are nourished and reared with equal affection, and dwell in harmony together."

3rd. "When the cow-bunting drops her egg in the nest of a bird larger than herself, the selected nurse does not eject the egg, but hatches the stranger, and nourishes it as her own."

4th. "The cow-bunting will drop her egg into a nest which contains more than one egg."

His first position is undoubtedly sound; as in every instance, where two cow-buntings have been known to have been hatched in the same nest, it has uniformly resulted in the death of the smaller birds.

The second position cannot be so readily admitted. That it does frequently occur is undisputed, but that the reverse is much more frequently the case is equally undeniable. The very fact that the circumstance was unknown to men of such observation as Wilson, Audubon and Nuttall, should make us hesitate, before, from a few occasional instances, we set it down at once, as a general rule.

The third rule Mr. Ord founds upon the circumstance before alluded to, of his twice finding the egg of a troopial in the nest of the wood-thrush. Upon these slight grounds he does not hesitate to set it down as a general rule, that larger birds invariably hatch these eggs when entrusted to their care. If new rules are to be admitted as well-founded, and old ones to be dismissed as unfounded, upon such slight grounds and groundless inferences as Mr. Ord would have them, the laws of nature, unchanging and immutable as they in reality are, will be made to appear as uncertain as the sands of the sea-shore. If he had merely assumed that this fact held true with the wood-thrush, nothing could have been said; but what right has he to assume that the same is the case with every other bird, larger than the cow black-bird? it is well known that the cat-bird invariably removes the eggs of strange birds not merely of different, but even of the same species, and the robin as invariably forsakes her nest if thus intruded upon. And until Mr. Ord can adduce satisfactory proof that the troopial is hatched and nursed in the nest of the meadow lark, the Baltimore oriole, the red-winged black-bird, the king-bird, the ferruginous thrush,

the cat-bird, the robin, the hermit thrush, the ground robin, the cardinal grosbeak, the cuckoo, the woodpecker, &c., (I ask not all—a few species will suffice), he cannot but be thought to have hastily adopted an unfounded and untenable position.

His last position, that the cow-bunting will drop her egg in a nest which contains more than one egg, is a fact of too common occurrence to need confirmation. One would think it a fact too well known to the veriest tyro in ornithology to require being mentioned at all; least of all, of being brought forward as a new discovery.

There is one circumstance, connected with the history of this bird, which does not appear to be generally known. It has been mentioned that when a cow black-bird's egg is deposited in a nest newly finished, and before the owner has begun to lay, the bird will frequently enclose the egg in fresh materials so as to prevent it from ever hatching. It does not appear to be known that the bird will sometimes, in order to get rid of the intruder, bury with the cow-troopial's, her own eggs. That such is sometimes the case, the following will show. In the summer of 1835, I found in the botanical garden in Cambridge, a nest of the summer yellow-bird, which a brood had evidently but just left. Its peculiarly elongated shape, attracted my notice. Upon examining it, I found that the bird had apparently first constructed a nest of the usual shape, and had deposited in it three of her own eggs. At this period, a cow black-bird had added another. Not wishing, as it would seem, to waste her time by rearing a stranger, to the probable destruction of her own offspring, and yet unwilling to be at the trouble of constructing a nest entirely anew, she merely built an additional story to it: thus effectually destroying the egg of the intruder,

but with it, her own. In this upper story she had evidently succeeded in raising her second brood in safety. In the centre of this nest, I found these four eggs thus singularly incarcerated.

There is also another circumstance to which I would direct your attention. There are found two kinds of parasite eggs so different in marking, as to warrant us in considering them the product of different species, did we know any other than the cow-troopial to which to attribute one of them. One of these eggs is "thickly sprinkled over with grains of pale brown on a dirty white ground." Its thickness is nearly the same throughout. This is the egg of the cow black-bird. The other egg is considerably larger in size, one end is evidently much more pointed than the other, its ground is pure white and the spots are much more sparing and are of a much deeper tint of brown, nearly approaching to black. To what bird does this egg belong? If to the cow-troopial, in what manner shall we explain this unusual difference? If not, to what bird shall we attribute it? Nuttall, in his account of the ambiguous sparrow, which he supposes a new species, asks, "may not this be the offspring of the white and more sparingly spotted egg, deposited occasionally in the nests of the cow-bird's nurses?" If so, why is not this rare bird proportionally common with its egg?

One word, before concluding, on our cuckoos. To show how little these birds deserve the obloquy with which they are too often inconsiderately regarded, I will relate a trivial, but not uninteresting circumstance, which fell under my own observation. A nest of the black-billed cuckoo, containing three young, was found in Cambridge in the summer of 1835, and the female, brutally shot in the nest by a boy. The young, so far from per-

ishing from hunger, were carefully and affectionately nursed by the surviving male. Such things are of common occurrence among birds in general, but it is what would hardly have been expected from the hated and much injured cuckoo.

Among the foster parents of the cow-troopial, Wilson enumerates the blue-bird, the chipping-sparrow, the golden-crowned thrush, the red-eyed fly-catcher, the goldfinch, the Maryland yellow-throat, the white-eyed fly-catcher, and the blue-grey flycatcher. To these Audubon adds the summer yellow-bird. Nuttall adds the indigo-bird, the song-sparrow, and Wilson's thrush. Ord mentions the wood-thrush. To these may be added the small pewee in the Society's collection, the purple-finch in that of Mr. S. Cabot Jr., and the bay-winged finch in my own.

I must crave the indulgence of the Society for trespassing upon so much of their time. The importance of having every new fact that is advanced in science duly considered, must be my excuse. If I have hesitated from insufficient grounds, to dismiss old positions and adopt the new ones of Mr. Ord, I trust I have given the facts he brings forward, all the weight they deserve. If I have felt called upon to notice and animadvert upon a spirit of hostility towards co-laborers in the cause of science, which but too clearly shows itself in his paper, I trust I have done no more than every friend of fair and honest criticism will be willing to do in similar cases, no matter who be the offender.

Since making the above communication, I have been able to investigate with a little more fulness, the sub-

ject of the removal of eggs by birds, from one place to another; and the result of my inquiries has satisfied me, that the thing is not only not impossible, but that it is practised much more frequently, by several species of birds, than is generally imagined. I have been recently informed by the author of "Birds of America," that he has himself seen the chuck-will's-widow remove her eggs to another place on perceiving that they had been handled. With regard to the cow-troopial, in the case of the golden-crowned thrush, this same accurate observer of nature informs me that the cow black-bird is in the custom of rolling her egg along on the ground, and of thrusting it into the opening of the nest of the thrush with her head. This, however, could not have been practised in the nest of which I have already spoken in the possession of Mr. Rotch, and in which an egg of the cow black-bird was actually found, a fact of which I was not aware when I gave a description of this nest. It was impossible that this method could have been put in practice in this case, as the nest was not built as it generally is, upon the ground, but on a bush slightly elevated above the ground. In all other respects it was exactly similar, the entrance being on the side and not on the top. It must therefore have been thrust into the nest by means either of the bill or of the claws of the bird. From the inconvenient shape of the former, it would seem most probable that the latter was the means employed. I am inclined to think that the removal, not only of the eggs, but even of the nests, is also not of unfrequent occurrence. It has been related, with every appearance of truth, to have been witnessed in France, in the European nightingale. I am nearly certain that I have met with another instance in our common house-wren. The only reason I have for hesi-

tation is, that I was unable to find the nest after its removal. In the case of the nightingale, the observer was more successful. It is to be hoped that this subject will not be deemed unworthy the attention of our field naturalists. A careful investigation cannot fail to lead to the discovery of many interesting facts. And if the result of these investigations shall be to overthrow and refute any of the opinions of those who have gone before us, let such refutations be made in a spirit of friendliness and true love of science.

ART. XX.—SOME ADDITIONS TO THE CATALOGUE OF THE BIRDS OF MASSACHUSETTS IN PROF. HITCHCOCK'S REPORT, &c.

By Thomas M. Brewer. Read Dec. 7th, 1836.

The ornithological portion of the catalogue of the animals and plants of Massachusetts, published by Professor Hitchcock in his report on the geology of this State, though prepared by an eminent naturalist, and with evident and careful labor and research, is yet deficient in the names of a large number of birds that are to be found in this State, some of them in great numbers. These omissions are undoubtedly, in part, owing to the residence of the author in the interior of the State, as the greater part of those omitted are water-birds, and partly to the accession of new species. The following are not in Professor Hitchcock's Report, and are all to be found in this State.

Falco *lineàtus*, (Wilson). This bird has been the cause of some dispute among our naturalists, owing to its supposed identity with the winter-hawk (Falco *hyemàlis*, Gmelin). It was described originally by Wilson as a

distinct species; but he seems afterwards to have regarded their dissimilarity as the result of age. Bonaparte and Nuttall have both supported the same position. It has, however, been satisfactorily proved, by the justly celebrated author of "Birds of America," that these birds are distinct species. The red-shouldered hawk is not only found in the State, but also *breeds* here, as a nest containing four eggs, which were pronounced to be those of this bird by Mr. Audubon, was found in Roxbury. I have also in my possession, the skin of this bird, which was shot last winter in the same town. Since the above was read to the Society, I have been informed by Mr. Samuel Cabot, Jr., that he also met with a nest of this bird in Brookline.

Falco *Coopérii*, (Bonap.) A beautifully mounted specimen of this bird, in the private collection of Mr. S. Cabot Jr., was shot by him near Fresh Pond, in Cambridge.

Muscicapa *Canadénsis*, (Linn.) This bird was met with by Mr. Audubon, from Pennsylvania to Newfoundland.

Muscicapa *Acádica*, (Gmelin). This is a very common bird, and breeds in this vicinity in abundance.

Muscicapa *cærùlea*, (Wilson)? As this bird has been found as far north as Canada, it is not improbable that it is occasionally to be met with in this State.

Sylvia *díscolor*, (Vieill.) This bird was found in this State by Mr. Nuttall.

Sylvia *rara*, (Wilson). Found, says Mr. Audubon, from Pennsylvania to Maine.

Sylvia *Philadélphia*, (Wilson). This bird was observed by Mr. Nuttall in the Botanical Gardens in Cambridge. I also met with it last summer, in the west-

ern part of Roxbury among some willows bordering on a small pond. It was apparently feeding upon insects.

REGULUS *tricolor*, (Nuttall). I obtained one of these birds in the early part of last October, near the Blue Hills in Milton.

REGULUS *calendulus*, (Bonap.) This bird I give on the authority of Mr. Nuttall.

TROGLODYTES *Americana*, (Audubon). On the authority of Audubon.

TROGLODYTES *palustris*, (Bonap.) This bird breeds in the salt marshes on our southern shore.

FRINGILLA *caudacuta*, (Latham). This bird has become, of late, a frequent visiter in this vicinity, though I do not know that it has ever been known to breed here.

PICUS *tridactylus*, (Linn.) One of these birds was shot in Templeton.

TRINGA *subarquata*, (Temm.) Mr. Audubon obtained two specimens of this bird in our market.

TRINGA *maritima*, (Brunnich). I have met with this bird in abundance in our market.

TOTANUS *vociferus*, (Sabine). On the authority of Nuttall.

TOTANUS *Bartramius*, (Temm.) This is quite a common bird about here, and is known as the *upland plover*. I have in my collection an egg of this bird, which was found, if not within the limits of this State, at most, not three miles from its borders.

PHALAROPUS *hyperboreus*, (Lath.) On the authority of Nuttall and Audubon.

PHALAROPUS *Wilsonii*, (Sabine). This bird was found by Mr. Audubon from Boston to New Jersey.

PODICEPS *rubricollis*, (Lath.) A specimen of this bird was sent me from Nahant. It is known there as the

water-witch, a name indiscriminately applied to the whole genus.

STERNA *Cayàna*, (Lath.) ? As this bird breeds both in Florida and in Labrador, it seems fair to infer that it may be met with between these two places. I do not know, however, any instance in which a specimen has actually been obtained in the State.

LARUS *argentàtus*, (Brunnich). I have in my possession a fine specimen, shot in East Boston.

LARUS *leucópterus*, (Fabr.) On the authority of Mr. Audubon.

LARUS *tridáctylus*, (Lath.) This is found in abundance about Boston, in spring.

LARUS *marìnus*, (Linn.) This bird was found here by Mr. Audubon.

LARUS *zonorhynchus*, (Richardson). I have in my possession a pair which I obtained in our market.

LESTRIS *catarráctes*, (Temm.) On the authority of Mr. Nuttall.

LESTRIS *Richardsònii*, (Swainson). Said to be here, by both Nuttall and Audubon.

THALASSIDROMA *Wilsònii*, (Bonap.) This bird is very abundant in the latter part of summer and through the fall. It is known by the name of *Mother Carey's Chickens*.

THALASSIDROMA *Lèachii*, (Bonap.) A specimen of this bird was obtained by Mr. Ives, in Ipswich.

ANSER *leucópsis*, (Bonap.) I put this bird among the birds of Massachusetts, on the same ground as it is in the list of the birds of the United States, *tradition*. Stragglers are said to have been shot on our coast.

ANAS *obscùra*, (Gmelin). This is one of our most common ducks. Improperly known in our market as the *Black Duck*.

FULIGULA *Labradòra*, (Bonap.) Stragglers of this species are said to have been obtained throughout the whole extent of our coast.

FULIGULA *rùbida*, (Bonap.) This bird is quite common in the market, in the early part of September, and is known as the *Dun-Bird.*

FULIGULA *rufitórques*, (Bonap.) One of these birds, in the private collection of Mr. Samuel Cabot Jr., was shot by him in Fresh Pond.

FULIGULA *histrionica*, (Bonap.) This bird, though extremely rare, is still occasionally met with in our waters. It has occasionally been shot near Nahant. Last winter, also, I saw in our market a pair that was shot off Phillips' Beach. This winter they have been procured at the Graves.

MERGUS *cucullàtus*, (Linn.) A specimen of this bird, belonging to the Society, was obtained a few years since in Ipswich. One of these birds was also shot in Fresh Pond by Mr. Cabot.

PHALACROCORAX *carbo*, (Dumont). Found near Boston by both Audubon and Nuttall.

PHALACROCORAX *dilòphus*, (Nuttall). I obtained a specimen of this bird here, this fall.

URIA *grylle*, (Lath.) A specimen of this bird was obtained at Nahant. It is known there as the *sea-pigeon.*

URIA *tròile*, (Lath.) On the authority of Mr. Audubon.

FULIGULA *mollissima*, (Bonap.) This is also a very common bird in severe weather.

FULIGULA *fusca*, (Bonap.) This is very common.

FULIGULA *ferìna*, (Stevens). This bird is often to be met with in our market, and is occasionally shot in Fresh Pond.

ART. XXI.—DESCRIPTION OF A NEW SPECIES OF THE GENUS MARGINELLA (LAM.), WITH SOME OBSERVATIONS UPON THE SAME. By JOSEPH P. COUTHOUY. Read Oct. 5. 1836.

IN examining a box of shells recently received from the Spanish Main, I was struck by the singular aspect of two shells of the genus MARGINELLA which were among them; and subsequently, a careful examination of such as have been already described, has resulted in the conviction that they belong to a new species. I have described it as follows:

MARGINELLA STORERIA.

Pate IX, Fig. 1. 2.

M. testâ parvâ, ovatâ, nitidâ, cineraceâ vel cinereo-albescente, sæpe fasciis duabus obscuris cinctâ, spirâ obtusâ, lævis; labro crasso, albidissimo, intus castaneo, lævique; margine supra aureo-fuscescente fimbriatâ. Columellâ plicis quatuor latis instructâ, super ventrem valde extensis.

Shell ovoid, smooth, shining, of an ash or ashy-white color, back sometimes crossed by two indistinct bands, the successive growth of the shell indicated by white longitudinal lines. Spire slightly prominent, smooth, under side concealed by vitreous matter. Margin very white and strongly developed, its upper edge marked with a dark orange or tawny line. Interior of a dark chestnut-color. Columella furnished with four strong plaits or folds, which extend much farther than usual upon the belly of the shell, and form its chief distinction. The two upper are nearly transverse, the two lower very oblique, and a slight indentation or groove is perceptible in all four, a short dis-

tance from their termination. The belly of the shell is wholly covered with a brilliant, white callosity, formed by the deposit of vitreous matter.

Length fourteen-twentieths, breadth nine-twentieths of an inch.

Inhabits the southern coasts of the Gulf of Mexico. In the Cabinet of the Boston Society of Natural History, that of D. H. Storer, M. D., and my own collection.

The shell bearing most resemblance to it is the M. *bivaricòsa*; but in addition to the spire of that species being much more prominent, the folds on the columella, have all nearly the same direction, the margin is double and its edges rounded; whereas, in this, the two upper folds are nearly transverse, the two lower very oblique, and the edges of the margin very sharply defined. It is also much broader in proportion to its length than the M. *bivaricòsa*. The most unpractised eye could not fail to detect a difference instantaneously, between the two shells. In both the specimens in my possession, the characters above mentioned are uniform.

It is far from my intention to indulge in the too prevalent system of constituting new species from mere varieties of a shell; but while we have such authority as Lamarck and Kiener for considering the M. *faba* and M. *bifasciàta*, the M. *formícula* and M. *muscària*, the M. *glabélla* and M. *aurántia* as being each distinct species; where the closest scrutiny can detect no other differences than those of size and coloration; the shell under consideration must be acknowledged to possess far stronger claims to a name of its own.

It can hardly be doubted, that had any of the European naturalists met with it, they would have designated it as a new species; and after the fiat of their approba-

tion, there is as little question it would have been received as such by us. There is no reason why we should not adopt a similar course on this side the water.

Our situation is peculiarly favorable for the procuring of new objects of Natural History. The researches of a large portion of our community, are daily extended into new regions, abounding with such objects. We have, doubtless, in our several collections, many specimens yet undescribed; and why should we, through indolence or timidity, defer making them known, till at last some one abroad, as fortunate and less hesitating than ourselves, does so, and deprives us of the opportunity of casting our mite into the great treasury of Natural History?

I have been led to these remarks, by the fact of there having been for a long time, in my own limited cabinet, a number of shells, which have only very recently been described, and of which I should have long since given descriptions myself, but for the cautious prudence of some of my friends, and the cry of "oh there is no doubt it has been described by somebody already." So far as in my power, I am determined to prevent such mortifications in future, by describing at once, whatever there may be good and sufficient grounds for believing new objects.

The shell before the Society belongs to the third group of MARGINELLÆ according to Kiener's arrangement, having the spire, wholly or partially concealed by a vitreous deposit.

I do myself a pleasure in naming this shell after my friend D. Humphreys Storer, M. D., whose ardent love of Natural Science, and devotion to its advancement among us, are too well known, to require this feeble tribute as any thing more than a token of my own personal sense

of indebtedness to him, in laboring to present the public with a faithful translation of Kiener's Iconography of Recent Shells.

ART. XXII.—ANATOMICAL DESCRIPTION OF THE GALAPAGOS TORTOISE. By J. B. S. Jackson, M. D. Read February 1st, 1837.

In the summer of 1834, Capt. John Downes, of the United States Navy, soon after he returned from his voyage in the frigate Potomac, made a very valuable present to this Society of two large Land Tortoises. They were the largest and finest specimens out of a number brought by him from the Galapagos Islands, a small volcanic group in the Pacific Ocean, lying under the equator and about 110 leagues distant from the South American coast. One of them, which was a male, died in the course of the summer; the other, a female, lived till the weather became cold, was kept in a frozen condition through the winter, and dissected in the following spring. Both of the dissections were hastily made, but notes of each were taken at the time; and these, imperfect as they are, with a few additions which I can safely make, I would now offer to the Society.

The only scientific description which I have seen of this Tortoise, is by Dr. Harlan and may be found in the 5th Vol. of the Journal of the Academy of Natural Sciences of Philadelphia. The specific name *elephantòpus*, which he has given it, is very appropriate, and is founded on a resemblance which has been noticed by other observers. He considers it as quite distinct from

the TESTUDO *Indica* and that there is no other species with which it can be confounded. Dr. Bell, however, the author of a very splendid work on the *TESTUDINATA*, now in the course of publication in London, regards the two as the same species;—that it is indigenous to the Galapagos Islands, and has been casually introduced into other countries through the medium of commerce. This difference of opinion may be accounted for by the remark which has been made, that entirely distinct species are found in this group of islands.

Captains Porter, Delano, Basil Hall, and more recently Mr. J. N. Reynolds, have each in their popular Journals, given an interesting description of these tortoises—of the profusion in which they are found, such as to have furnished a name for these islands to the Spaniards who discovered them (*galapago*, a fresh-water tortoise)—of their immense size, some of them weighing between 3 and 400 pounds—their being able to live without food or water for a year or more, their harmless disposition, their ungainly and even disgusting appearance, their clumsy movements and their great delicacy as an article of food, far exceeding, according to Capt. Porter, the finest green turtle. The following additional account of their habits was prepared for the Society by Mr. Reynolds, the author of the "Voyage of the Potomac," a gentleman to whom the Society is indebted for many valuable donations, and at whose suggestion Capt. Downes was induced to present to us the two fine specimens which are the subject of this paper. He says, "From the last of May to December, embracing the rainy season, the Terapin leaves the mountains and high grounds and may be found spread in all directions over the plains and low grounds near the sea, where they feed principally upon the prickly pear, and

find water in the little lakes in the crevices of rocks. From January to May, as the dry season advances, they return again to the high ground where the trees are larger, vegetation more abundant and where springs may be found issuing from the sides of the mountains. These watering places become much frequented, and paths leading to them may be traced for a great distance along the sides of the hills; and I have seen in many places, the rocks worn away more than six feet in depth, and just sufficiently wide to allow them room to pass. At these springs hundreds of them are often seen at a time, waiting their turns to drink, or, becoming impatient, pile themselves one upon another, in their efforts to obtain water. When satisfied, they again return by the little roads hewn through the soft rocks and again disappear amid the thick underwood."

The following observations were made on our own specimens.

External characters.—The male tortoise weighed at the time of its death 302 lbs., having gained 17 lbs. during the few weeks that it was in the possession of the Society. The general outline and the form and number of the scuta are so well represented in Plate XI., as scarcely to need any description; of the vertebral there are five, of the costal four on each side, of the marginal twenty-three and of the sternal sixteen. A remarkable concavity of the sternum, which belongs to the sex, could not be well represented, neither the slight depth of the furrows between the scuta which in some places are so faint as to be with difficulty traced. Surface of the upper shell quite smooth, except near the edges of the scuta, where are seen the remains of the concentric lines, and of the lines which radiate from the angles of

the scuta towards the centre, both of which are much more strongly marked in the young animal, as shown in two or three specimens in the Cabinet. There are, however, irregularities on the surface which are evidently the result of external injury, and correspond with a thickening of the bone beneath. Color of the upper shell deep brown, almost black; under shell has a light shade of the same color and the surface is more rough than that of the upper. Dimensions as follows: length of upper shell, following the curve, three feet nine inches; breadth of same, three feet ten inches; vertical diameter, seventeen inches; lateral, two feet four inches; circumference of upper shell, following the edge, nine feet ten inches; length of head and neck sixteen inches; of head alone five and a half inches; and breadth four and a half; anterior extremity twenty inches in length, and the posterior a very little longer; length of tail, eleven inches, and breadth at base, four; longest nail on hind foot, one and a half inches—there are five toes on the front, and four on the hind feet.

Weight of the female not noted, but it was not far from 240 pounds. In Pl. X. is seen a drawing made from a very correct colored view which was taken after death, but before the dissection. The color and the number of the scuta are the same as in the male; the form of the upper shell, however, is quite different, having almost a globular appearance and the sternum is much less hollowed, showing one of the peculiarities of the sex. "The lateral compression of the anterior part of the dorsal shell and the elevation of its front margin," by which some have thought the Galapagos Tortoise to be distinguished from the Indian (Proceedings of the Zoölogical Society of London, Oct. 14th 1834), was not found in any one

of our specimens which we know to have come from the Galapagos Islands, though it is strongly marked in a small shell in the Cabinet, which otherwise corresponds with this species. Dimensions of the female as follows: length of the upper shell, following the curve, three and a half feet, breadth of the same four feet two inches, vertical diameter seventeen inches, and lateral, two and a half feet; circumference of upper shell, not following the edge seven feet two inches; length of head and neck, one foot, of head alone six inches, and breadth four and a half inches; length of anterior extremity from sixteen to seventeen inches; of posterior, seventeen to eighteen; longest nail on hind foot two inches. Tail very short and thick, scarcely extending as far backwards as the upper shell; not corneous at tip; that of the male considerably longer. Skin of head dark brown, thin and not at all lax as in Dr. Harlan's specimen; that of neck and greater part of anterior extremities is of a dirty brownish color, thin, rugous, and quite lax; on the palmar face of the fore-arms it becomes thicker, darker and granulated, on the dorsal face of the fore-arms and feet, and on the soles of the feet, it is nearly or quite black, exceedingly thick and dense and almost horny in structure; it is made up of protuberances, varying from two to six lines in diameter; those on the soles of the feet quite flat, for the most part of a very regular five or six sided form, and separated by deep fissures; those on the back of the feet and fore-arms are convex and rather oblong; on the radial edge of the elbow and over the lower end of the ulna in front are two of them which measure one and three fourth inches by three fourths. Skin of the posterior outlet and extremities generally, resembles that of the anterior.—The form of the feet which has furnished Dr. Harlan with so expres-

sive name for the species, and also that of the nails is well represented in Plate X. and is strongly characteristic of the Land Tortoise.

It may here be mentioned, that the following description applies more particularly to the female.

One of the *Eyes* examined; form globular; about three fourths of an inch in diameter; nine ossific plates in anterior part of sclerotic coat, slightly convex on the external face, overlapping irregularly and varying in width from two to three lines (a line being considered as the twelfth of an inch). Lachrymal glands large and granular. Lower eyelid much deeper than the upper.

The *Ear* had a single ossiculum, long, slender and funnel-shaped at its inner extremity, such as is generally, if not always, found in this order of reptiles. The faculty of hearing is denied by Capt. Porter, but there was abundant proof to the contrary in our two specimens during life, and the observation was fully confirmed by dissection.

The *Jaws* were very powerful, being formed of a dense, horny substance, and made up of serrated ridges corresponding with grooves which fit perfectly into each other like the blades of scissors. They measure in thickness, or from without inwards, from one half to nearly an inch; vertically, one and a half inch in front, but diminishing to one half, towards the articulation. The upper surface of the lower jaw consists of a deep, well defined groove, bounded on either side by a sharp, high ridge, and terminating anteriorly in a stout conical tooth which is very much larger than any in the upper jaw; the outer ridge is serrated upon the summit and upon the outside as far down as where it shuts into the upper jaw; it is rough from numerous, fine, projecting points and lines;

the inner ridge is also serrated, but very much less so. The lower surface of the upper jaw is marked by a strong, prominent, serrated ridge with regularly inclined sides, and fitting exactly in the groove in the lower jaw; on each side of it are deep grooves to receive the marginal ridges in the lower jaw; these grooves again are bounded by high, sharp ridges—the outer one is serrated and becomes more and more so as we proceed forwards, till at last we come to three teeth, one on each side of considerable size and one in the middle which is smaller; directly behind these is a deep hollow to receive the large tooth in the lower jaw.

On the mucous membrane of the *Mouth* and fauces, which is thin and quite firm, are seen the minute openings of innumerable mucous follicles, but no trace of the spines which are so conspicuous in the green turtle and some others; neither were they found in the *œsophagus*. The follicles are much larger along the sides of the tongue than elsewhere. Just inside the lower jaw and beneath the tip of the tongue are two glands, of a flattened, oval form, one and a half inches long, one inch wide, and one third of an inch thick; on their surface are more than thirty openings, some of them very large and all communicating with cavities filled with a tenacious, transparent mucus which collected repeatedly during the process of maceration to which the parts were subjected. The opening of the nostrils on the inside of the mouth is bounded on each side by a high ridge an inch long, and probably intended to close the passage during the process of the deglutition of air.

The *Tongue* is a triangular, or, as it would commonly be called, a heart-shaped organ. It is three inches long

and at the base two and a quarter inches wide; upper surface covered with long, soft, slender papillæ.

The *Œsophagus*, which is generally described as capacious, measured twenty three inches in length, and transversely, when cut open, four inches. The mucous membrane was thrown into longitudinal folds, and resembled that of the mouth in structure, and in being covered with innumerable, fine openings of follicles; no epithelium; contained a considerable quantity of mucus. Muscular coat very thick towards the stomach, but at the upper part it was almost or quite wanting, the deficiency being probably supplied by a superficial muscle which was external to and covered the upper half of the trachea; the fibres were generally, if not altogether, transverse; the connexion between this and the mucous coat was by means of a very loose cellular tissue. According to Capt. Porter, "these turtles carry with them a constant supply of water in a bag at the root of the neck; and on tasting that found in those we killed on board, it proved perfectly fresh and sweet." Mr. Reynolds, in his "Voyage of the Potomac," fully confirms this remark; but nothing of the kind was found in either of our specimens.

The *Stomach*, which is probably the bag referred to by Capt. Porter, seems to be little more than an expansion and thickening of the œsophagus, the limits between the two not being very readily seen; the pylorus, on the contrary, is as strongly marked as I have ever seen it in any of the mammalia, forming a prominent ridge which projects into the duodenum, and into which all of the tissues enter; according to Cuvier (Leçons d' Anat. Comp. iii. p. 412,) the pylorus has no valve, but the cardia is well marked. The length of the large curvature

was twenty-six and a half inches; being cut open, the cardia measured transversely six inches, the largest part of the organ, which was not far from this, was found to be ten inches, after which it gradually became smaller towards the pylorus where it was four and a half inches. The mucous membrane was thrown into broad, longitudinal folds, and connected with the muscular by means of a lax, cellular tissue; towards the pylorus these tended to be effaced, and the membrane altogether, was less movable upon the parts beneath. The muscular coat was very thick and dense, having on its external surface a fibrous appearance, so that the organ looked not unlike the gizzard of a bird; towards the cardia it was from one to two lines in thickness, gradually increasing till within three inches of the pylorus, where it had reached its maximum and measured from four to five lines; it then became suddenly very thin and continued so till it reached the pylorus; this change of structure is well described and figured by Sir E. Home in his work on Comparative Anatomy. The stomach and intestines of the male tortoise were filled with grass more or less digested. The female, which lived for some time after being taken from its food, had in its stomach an abundance of mucus, but nothing else; in the small intestine a quantity of liquid, and in the large intestine grass.

The *Intestines* of the male tortoise were about five times the length of the animal, as Blumenbach found in the hawks-bill turtle; the small intestine measuring seven feet three inches in length and five and a half inches transversely, when cut open, the large intestine nine feet in length. In a dissection of the Testudo *Indica* (Proceedings of the Zoölogical Society of London, March 8th, 1831) the large intestine was found to be nearly

twice the length of the small. In the female, they were more than seven and a half times as long as the body of the animal, the proportionate difference being much greater than we should expect to find between two individuals of the same species; the length of the small intestine was eight and a half feet, of the large thirteen and a half feet; this last, it need hardly be said, takes numerous turns instead of going nearly straight to the vent as stated by Cuvier (Anatomie Comp. iii, p. 512). The small intestine is of an uniform size from the pylorus to the cœcal valve, measuring seven inches transversely when cut open; just beyond its commencement the large intestine is from ten to eleven inches, afterwards diminishing to five, but increasing again to seven in the rectum, and in the cloaca to nine inches. According to Cuvier, the large intestine is four times as large as the small.

The mucous membrane is thin; in the upper part of the small intestine it has a reticulated appearance, in which respect, as well as in their muscularity, the intestines resemble those of the common green turtle; it afterwards became more lax, and the appearance just noticed passed by imperceptible degrees into fine longitudinal folds, which insensibly disappeared, and the lower portion of the small intestine and the whole of the large was smooth and polished, except the rectum in which were found once more the longitudinal folds, but not strongly marked as they have sometimes been described. In a small tortoise of the same species, procured for the Society by Dr. Charles T. Jackson, isolated mucous follicles were observed about the termination of the small, and the two extremities of the large intestine, but nothing of the kind was seen in either of the large ones. The muscular coat of the small intestine was one line in thickness at the two

extremities, but in the intermediate portion it was considerably less; the fibres, wherever observed, were transverse; for the first five or six inches of the large intestine it measured from six to seven lines in thickness, was quite firm and had a shining white fascia external to it, such as was seen in the stomach; it was generally about as thick as in the small intestine, but in the rectum it again became thicker. The cœcal valve was well developed and made up of all the tissues.

The *Liver* was an immense organ and consisted mainly of three lobes, one on the right which was subdivided into two, and one on the left which was entire. In the male tortoise it weighed fourteen and a quarter pounds (avoird.) In the female the weight was not ascertained, but the dimensions were as follows:—Transverse diameter of the two right lobes taken together eighteen inches, and of the left twelve inches; antero-posterior diameter of the two right lobes eleven inches, and of the left fourteen inches; the greatest thickness, which was rather more than two inches, was in the posterior part of the organ;—towards the anterior edge it became much thinner and more irregular (in these measurements the animal is supposed to be in its natural position upon the under shell); inferior face quite smooth and regular. The lobes on the right side united with the one on the left superiorly and anteriorly, by a thin slip of the same substance two inches wide. The organ is uniform in its texture, soft to the feel and of a very faint pink color, mottled with grey; there was no exudation of fat upon the recent cut surface, as we were led to expect from the description by Capt. Porter, but there is a considerable quantity of it upon a specimen which is preserved in spirit in the Cabinet of the Society. The gall-bladder was situated towards

the middle of the posterior edge of the extreme right lobe, mostly on the upper surface, but just appearing also on the under; it was in a great measure imbedded in the substance of the organ, of a pyriform shape and three inches in length; in the male tortoise it contained a little yellowish, watery fluid, and in the female ʒijss or ʒiij of a thin, dark fluid; parietes firm, and the inner surface quite smooth except for several small, rough prominences. Bile ducts not satisfactorily traced. Vena portæ quite large.

The situation of the *Spleen* was very peculiar, being found in all three of the specimens in the right side of the abdomen, between and rather below the cœcum and a convolution of large intestine, with both of which it seemed to be intimately connected. The color was deep red, consistence firm, and in form and apparently in structure it resembled the same organ in the human subject. It measured, in the female, five inches long, two and a half wide and one and three fourths inches in thickness.

The *Kidneys* were situated just in front of the sacrum, not far from the vertebral column and obliquely to the direction of it. They were partially invested by peritoneum, but otherwise closely connected with the neighboring organs. The external tunic being removed, they were found to be much lobulated. Internally there was no division into cortical and tubular portions and there was no proper pelvis. In the female they measured six inches in length and four in width. The ureters were five inches long, large enough to admit a full-sized catheter and terminated in the urethra near the opening of the oviducts, but on the side most distant from the bladder; so that the urine, in order to reach that organ, would have to take a perfectly retrograde course.

The immense size of the *Bladder* is one of the most remarkable peculiarities in this order of reptiles; and indeed it is so far out of proportion to that of the kidneys, that it has been thought to be not so much a receptacle for the urine as for other fluids, for those which are absorbed by the skin. Carus, in his Comparative Anatomy, gives this as the opinion of Townson and seems disposed himself to adopt it. The bladder of the male tortoise was inflated and dried for preservation, but was unfortunately lost without having been measured; it would, probably, have held two gallons or even more. In each of our three specimens this organ was exceedingly thin, having very little muscular development, and the fundus was divided deeply into two horns of unequal size; they all contained some fluid and a considerable quantity of coarse, earthy substance, of a whitish color and easily crumbling down. Urethra about two inches long and three inches transversely, when cut open; common to the urinary and genital organs, and terminated in a rounded, somewhat prominent lip upon the under surface of the cloaca, about ten inches from the vent.

The *Cloaca*, as already stated, measured transversely when cut open nine inches, and its length was about ten.

The *Clitoris* was remarkably developed and most perfectly resembled the penis, or corresponding male organ, in miniature. It was from three to four inches long, three fourths of an inch wide, and terminated at the distance of three inches from the vent in a pointed, or, as it would commonly be called, a heart-shaped gland which was grooved in the centre and measured also three fourths of an inch long, and the same at its widest part. Like the penis, it had two long, distinct, fleshy muscles, which arise deep within the pelvis, and reach quite to the gland.

The two *Oviducts* hang loosely from the upper shell, enclosed in a broad duplicature of peritoneum, by which they are supported as the intestines are, by their mesentery, approaching the median line towards their termination, but receding far from it towards their ovarian extremity. When removed from the body, one of them was measured and found to be of the prodigious length of twelve feet; the average width, before being cut open, was two inches; at its ovarian extremity it was broader than this, and extremely thin and delicate; towards the cloaca it gradually became thicker and smaller, measuring three inches transversely at this part when cut open, and one line in thickness, having a fleshy feel, marked externally by longitudinal rugæ and still more so on the internal surface, showing how far it may have been distended. The termination of the oviducts in the urethra was quite prominent, having a rounded, mamillary form, smaller than any other part, but quite dilatable. Blumenbach speaks of the two uteri, as if they were distinct from the oviducts, but there seems to be no ground for the distinction. In each of the oviducts, ten inches from their termination, there was an egg, two and a half inches in diameter and perfectly round; shell not fully formed.

The *ovaries* were situated one on each side of the vertebral column, and consisted of a broad duplicature of peritoneum, the ova hanging more or less in clusters from its free edge, or being enclosed between its folds near it. There were about forty or fifty of these ova on each side; those which appeared to be in a state fit for impregnation were about one and one fourth inches in diameter, perfectly round, of a deep yellow color; the investing membrane was very delicate and vascular, and the contents in which the color resided had the consistence of thick

honey, giving the whole a beautifully translucent appearance. By far the greater proportion, however, appeared to be withering, as after the expulsion of the ova; these were of all sizes, from that of the most perfect downwards; the forms were various and irregular, the surface uneven, and the investing membrane had more or less of a dead, opaque, whitish appearance and was much thickened; the contents resembled crumbling masses of soft, yellow wax. Besides these, there were also multitudes of others, most of them very minute and completely wasted.

Of the *Penis* nothing was noted. It was an organ, however, of immense size, and perfectly resembled the clitoris in form, as I have already stated. Two very long, round, fleshy muscles, which served as retractors, arose from deep within the pelvis and reached quite to its extremity. The two prolongations from the peritoneal cavity, extending its whole length and terminating in a cul de sac, were quite distinct.

The *Testicles*, situated very near to the kidneys, were four and a half inches long, and one inch at the widest part, elongated, narrow and of a pyriform shape. The epididymis is separated from the body, and the vasa deferentia open into the urethra in about the same place as the oviducts in the female.

Heart of the male tortoise. The two auricles were very large, of a regular, rounded form, having an entire, thin, membranous septum between them, and separated from the ventricles on the external surface by a deep furrow; neither of them had any appendix. The right was much the largest of the two; a single vena cava entered at the upper part (supposing the organ to be in its natural position) and regurgitation of the blood was

prevented by two thin, semilunar valves on the inside of the auricle, the inner one extending about three fourths the length of the cavity, the outer one being considerably shorter, and the two terminating in a muscular band which would tend completely to close them; muscular structure of this cavity well developed, except on septum and towards the opening into ventricle, the bands running very irregularly. The left auricle receives two small, very delicate, pulmonary veins, which unite just as they enter; the line of entrance is sufficiently marked, but there are no valves as on the right side; Dr. Grant also found these valves wanting in the Testudo *Indica*, (Proceedings of the Zoölogical Society of London, March 26th, 1833), though, according to Cuvier (Anat. Comp. iv, 218), they are found here as well as in the right auricle. This cavity is moderately thick and muscular, the fibres running nearly in a straight line from the ventricular opening, some of them being nearly an inch in length and easily raised. The opening into the ventricle is considerably smaller than on the right side. The ventricle is a broad, flattened, crescentic, kidney-shaped organ, not connected by a tendinous ligament to the pericardium, as stated by Carus (Comp. Anat. ii, 285). It measures transversely at the base three and two thirds inches, and from the base to the part corresponding to the apex two inches. Parietes generally about half an inch thick, but on the right side, just below the giving off of the vessels, they are much thinner; on the outside they are firm, but towards the inner surface spongy, and on the left side very much more so than on the right, the muscular fibres being of considerable size and forming distinct meshes with some small columnæ carneæ; beneath the auricular septum they form a complete lace-

work. The cavity of the ventricle is single, measuring two and three fourths inches from side to side and sufficiently large midway to allow the passage of the index finger; very much more free on right side than on left.

The auriculo-ventricular valves are thin and membranous and stand out on each side from the septum over the cavity of the ventricle. That on the right side is much the largest, measuring an inch and a half along its free edge, and two thirds of an inch from the base to the free edge at its broadest part; superiorly, it turns backwards and terminates bluntly on the inner surface of the ventricle; inferiorly, it inclines to the right, becomes quite pointed and is inserted into the upper part of a large fleshy column, which by its action would tend to shut the valve; this column makes part of the inferior parietes of the right side of the cavity of the ventricle, running its whole length from behind forwards, inclined to the right, forming a kind of septum and probably having for its especial object to direct the blood into the great vessels. The free edge of the valve on the left side is eleven lines, and its broadest part five and a half; the two extremities turn down equally and are attached, the inferior to the inner surface of the ventricle, the superior to several fine, muscular bands which pass off towards the left side and direct the blood into the spongy wall of the ventricle. Just at the opening of the right auricle into the ventricle there is an accessory valve, an inch and a fourth long, and about a line in width, of a semi-lunar form, with a sharp edge, and commencing just where the large valve terminates on the fleshy column; nothing of the kind was found on the left side; in the TESTUDO *Indica* Dr. Grant found it at both the auriculo-ventricular openings. The three great vessels arise from the supe-

rior-anterior part of the right side of the ventricle, are situated one directly above the other and have a moderately thick septum between them. The pulmonary artery is the lowest of the three, and is quite as large as the two aortas; an inch and a half from its origin it divides into two. The superior aorta, which is nearest to the auricular opening, gives off branches, which are about as large as itself, rather more than an inch from its origin. The other aorta is considerably smaller than the last and gives off no branch of any size till it reaches the abdominal organs; after supplying these, it unites with the continuation of the superior aorta by a large branch about three inches in length. Each of the three vessels has two very deep, semilunar valves. According to Cuvier (Anat. Comp. iv, 221), land tortoises have but a single origin for all the arteries of the body, though the marine have two; Dr. Grant, however, found two aortas, commencing by separate orifices from the ventricle, in the Testudo *Indica*.

Of the *Lungs* very little was noted. In the female they extended the whole length of the upper shell, even amongst the bones connected with the extremities, filled up the space on each side of the vertebral column, and reached much more than half the way down to the union of the two shells. Trachea fourteen inches and three fourths of an inch wide; rings perfect and of an oval form; in the male it was seventeen inches long and the primary bronchi were eight inches. These last continued in a straight line nearly or quite to the posterior extremity of the lungs, but not receding far from the median line. The secondary bronchi go off regularly on each side, inclining backwards, small at their origin but immediately becoming of an immense size, measuring probably not less than three or four inches transversely when cut open.

Rings very irregular and imperfect. Some fine, spongy appearance connected with the secondary bronchi in anterior and middle part of lungs, but posteriorly, the structure, instead of being cellular, seems to consist of a very coarse, loose net-work made up of fine, white, tendinous cords. No muscular fibres detected.

There was a great quantity of *Fat* in the male tortoise, filling up the space on each side in the upper shell just above the junction with the lower. In the female this had in a great measure been absorbed, and was very much altered in appearance.

Organs of Locomotion in the male tortoise. The bone, compared by Cuvier to the os quadratum, terminates in a transverse, articulating surface in the form of a groove which receives a corresponding ridge in the lower jaw; in the female, instead of a groove, the upper surface has an arched, concave form. Zygomatic arch quite narrow. Temporal fossa very large, giving origin to a muscle of proportionate size. Articulating surface of occiput with atlas very prominent, much more so than in the green turtle, allowing great freedom of motion. Eight cervical vertebræ; most of them have a ball and socket joint, the posterior extremity being convex; the third is convex at each extremity; the longest are situated about midway and measure four inches; towards the union with the back shell they become much shorter but in proportion thicker, and the processes very prominent; the atlas is scarcely an inch in length and neither are the spinous processes united together nor are the sides to the body of the bone. There seems to be no good reason, however, why this bone should be excluded from the list of vertebræ as Cuvier has done, though it is so little developed (Anat. Comp. i, 172); the dentatus, also, is quite small, and

the odontoid process is a distinct piece. The muscles are numerous, but very distinct, as, indeed, they were in every part of the body; some arising from the upper shell and some from one or more vertebræ to be inserted into those above; one pair arises from the dorsal vertebræ, nearly or quite as far back as the sacrum, is inserted into three of the cervical vertebræ and at last reaches the base of the skull. The muscles of deglutition or of respiration, on the front of the neck, which raise and depress the large hyoid bone, are also very interesting, and especially a pair which passes transversely nearly around the upper half of the neck, arising from the articulating processes and reaching as high as the temporal bone. That peculiar bone, which has received so many names and none more appropriate than that of lunula, which it owes to its form, was about fourteen inches long, formed of one continuous piece and united at each extremity to the upper and the under shells by a short and very strong ligament. The scapula is firmly attached to it, five inches from the lower extremity, and is somewhat triangular, extending backwards four and a half inches. The humerus is nine and a half inches long and four and a half inches in circumference midway; head of the bone round and near it are two tuberosities, one of which is of immense size; lower articulating surface has a convex, oblong form. Radius and ulna from five and a half to six inches long; no olecranon; lower end of ulna larger than that of radius. There are eight carpal bones, one of which seems formed by the union of two; besides these, there are three bones to each toe, all of which may be considered as phalangeal or one of them may be regarded as a metacarpal bone; besides a row of five metacarpal bones, Carus gives three phalangeal to the three middle toes and two to each of the two others

(Comp. Anat. i, 150). The muscles which move the shoulder are of immense size; one, which is probably the largest in the body and entirely fleshy, arises from almost the whole anterior half of the under shell and is inserted into the small trochanter at the head of the humerus; the others take their origin principally from the lunula and scapula, except a few from the upper shell and go to be inserted in and about the great trochanter of the humerus. The long flexor and extensor of the forearm also arise from the scapula, except for one head of the last. Below these the different parts of the upper extremity have their flexors and extensors, pronators and supinators very much like the higher classes. Of the vertebræ, besides the cervical, there are eight dorsal, four sacral and twenty-one caudal. The sacrum unites firmly with the pelvis, but moves freely on the last dorsal vertebra, as do the ilia also by a broad surface on the transverse processes; all of these articulations have a synovial membrane, as have also, those of the caudal vertebræ. The symphysis pubis, as it is usually called, is quite broad and in this case formed about equally by the ossa pubis and the ischia, the limits being quite distinct as the three coxal bones are not united by ossification; anteriorly it is flat and pointed, posteriorly broad and thick; from the anterior edge of the pubes a very prominent spine arises, two and a half inches long, about as large as the middle finger and directed outwards to receive a muscle arising from the under shell. Obturator foramen an inch and a half in diameter and nearly circular. The femur is seven and three fourths inches long and altogether considerably smaller than the humerus; has a single trochanter at upper extremity of moderate size, the lower having a convex oblong form. Tibia and fibula five and a fourth inches long. There are seven

tarsal bones; one only articulates with the leg and this is very much larger than any of the rest—towards the outer extremity, however, and on one side is a line as if there had formerly been a small separate bone; to one of the tarsal bones which is situated on the outer edge, and projects quite beyond the rest, there is attached a very small bone, which appears to be the rudiment of another toe. Each of the four toes has three bones, to which the same remarks will apply that were made in the case of the anterior extremity. The muscles of the posterior extremities generally, were smaller than those of the anterior, and in proportion to the size of the bones; one, which was attached quite round the posterior margin of both shells, was admirably calculated to expel the air from the lungs, by forcing the organs in upon them.

ART. XXIII.—DESCRIPTION OF A NEW SPECIES OF THE GENUS GASTEROSTEUS.

By D. Humphreys Storer, M. D.

Read January 17th, 1837.

Of the fifteen species belonging to the genus Gasterosteus of Linnæus, described in Cuvier's Histoire Naturelle des Poissons, four belong to the United States. Two of these had been previously described and figured by Mitchell, in his Fishes of New York. Of these, *one*, the *quádracus*, belongs to our Cabinet. In presenting a new species, for which I am indebted to Mr. John W. Randall, I would offer the accompanying description.

Gasterosteus mainensis.

Color yellowish, with transverse black bands. Seven spines anterior to the dorsal fin.

The length of this fish is about two inches. Its general color is on the sides yellowish, beneath silvery. Several black bands, varying in their width, commencing at the operculum and terminating at the tail, cross it transversely from the dorsal fin to the abdomen. Seven spines exist upon the back, that next the dorsal fin is larger than the others. Eyes large. Nostrils bordering upon the upper angle of the eye. Mouth moderate in size. Teeth prominent. One broad, oblong, serrated plate, almost hidden by the pectoral fin when expanded, is observed upon the side. Ventral fin serrated upon its upper edge. The fin rays are,

D 7—10. P 10. V 1. A 1—8. C 8.

Taken from fresh water in Kennebeck County, State of Maine.

ART. XXIV.—DESCRIPTION OF A NEW SPECIES OF MARGINELLA.

By D. Humphreys Storer, M. D. Read Feb. 1st, 1837.

Marginella carnea.

Plate X. Fig. 2.

M. Testâ ovato-oblongâ, rubrâ; vittâ transversâ albidâ; spirâ brevi conicâ, obtusâ; aperturâ angustatâ; labro crasso, albo; columellâ quadriplicatâ.

Shell oblong, of a beautiful flesh color; below the middle of the lowest whirl crossed transversely by a

whitish band, commencing at the exterior margin of the right lip, and losing itself upon the columella: right lip thick, white, indistinctly denticulated within, and continued in mature shells to the apex of the spire, which it partially or entirely covers. Aperture narrowed. Four folds upon the columella.

Length six lines. Width three lines.

Inhabits Key West, near the United States Barracks, from whence it was brought by Mr. D. J. Browne. It is contained in the Cabinet of the Society—my own Cabinet—and several other collections in this city.

This shell is readily distinguished by its beautiful flesh color, and transverse whitish band. It more nearly approaches the M. *olivæformis*, Kiener, than any other species: but the more conical spire, the three transverse bands of a deeper color than the ground of the shell, the smaller size, the wider aperture, and the locality of the latter shell, prove its distinction.

ART. XXV.—A MONOGRAPH OF THE HELICES INHABITING THE UNITED STATES. By Amos Binney, M. D.

Read Nov. 19th, 1834, and at subsequent meetings.

The number of described species of the very natural genus Helix, inhabiting the United States, is already considerable; and the researches of naturalists are every year adding to it. For a knowledge of the greater part of them we are indebted to the labors of the late Mr.

Thomas Say, who, if his valuable life had been longer spared to science, would have enriched Conchology with descriptions and figures of all the known species. As a work so desirable is not now expected from any other source, and as there already exists some confusion among the species, caused by the want of correct figures, without which the most accurate descriptions are liable to be misunderstood, I shall make an attempt (though I am conscious in an imperfect manner) to supply the history of this genus as it exists in the United States, and to ascertain and fix the species discovered by our own authors, before they shall have been irrecoverably appropriated by others.

It has often been objected to the study of shells, as commonly pursued, that it is not a branch of Natural History properly speaking, as it gives us no information of the beings by which they are constructed and inhabited; but consists merely of an artificial arrangement and description of their least destructible parts. This objection has great weight, and should induce those who have leisure and opportunity to devote more time than has hitherto been given, to the observation of the habits and manners of the animals, which, it cannot be doubted, are fully as interesting, and as illustrative of the benevolence and power of the Author of nature, as those of any other class. To avoid this imputation in the present instance, a description of the animal has been given when it has been possible to procure living specimens, and such notices of their habits as the limited opportunities afforded by a city residence have enabled me to obtain, will be found under the remarks on the respective species. It is to be noticed here, that the habits of the genus are remarkably similar; so much so, that an account of one species

may serve for the whole, and those of the European species do not seem to differ in any considerable degree from those of our own.

The extraordinary power of reproducing some of their members, and even the head itself, when mutilated, which they were discovered to possess by Spallanzani, and the promulgation of which fact was received with so much doubt and incredulity by the learned,* exists also in our species. The uncertain points of their history, such as the question whether the black points on the end of the superior tentaculæ, which are generally considered to be eyes, are true organs of vision, are equally matters of doubt with us. The state of the question as to this particular, is somewhat singular. The anatomists, including Swammerdam, Spallanzani and Bonnet, affirm that the part in question is a true eye, possessing the structure which in other animals is adapted to the sense of vision; while careful observers cannot distinguish, in the actions of the living animal, any proof of their sensibility of light or consciousness of the presence of objects, except when in actual contact with them; and therefore infer, that they are mere organs of touch. The truth may probably lie between these extremes. These animals are nocturnal, and pass the greater part of their lives under logs and stones, or burrowing in the ground where but few rays of light can reach them; their eyes, adapted to such situations, may be merely rudimentary, and become useless in the broad light of day. Besides, although the eyes are

* The controversy which arose on this subject caused a vast sacrifice of life among these animals. Adanson, one of many who called the fact in question, acknowledged that he destroyed several thousands in experiments.

situated in the tips of the tentacula, these members themselves may be still organs of touch, as they undoubtedly are in other genera, when the black points are situated at their base, and the habit they have of applying them to every object which they approach, confirms the supposition that they are constructed for this purpose. That the black points are eyes, may very fairly be inferred analogically, from the recent observations of a naturalist on one of the largest animals of this class. Rev. Lansdowne Guilding (Zoölogical Journal, vol. iv, p. 72) asserts, that in the giant species of STROMBUS, in the Caribbean Sea, the eyes are more perfect than those of many vertebrated animals,—that they have a "*distinct pupil, and a double iris, equalling, in beauty and correctness of outline, those of birds and reptiles.*"

In comparing our species with those of Europe, there are some general considerations deserving of attention. Our shells are more uniform and less brilliant in their coloring, and are in general destitute of spots and painted bands or zones. This peculiarity seems to be connected with, and perhaps grows out of, the habits of the respective animals which in Europe are common in gardens and fields, on walls and hedges and other places exposed to the action of light, while in this country they are generally found in forests, sheltered under logs and stones, and are rarely seen abroad except during twilight and in damp weather. They do not infest our gardens and cultivated fields, nor cause damage to vegetation. Another peculiarity is, the great proportion of our species whose aperture is provided with tooth-like appendages, amounting indeed to more than half of the whole number, and to more than three quarters of those with reflected lips.

The Epiphragm, in all our species, is a thin, semi-

transparent membrane, composed principally of hardened gelatine with but little calcareous matter, stretched across the aperture of the shell, never convex but sometimes a little concave. The shell is hermetically sealed by this covering, in which, after examination of nearly all our species, I have not been able to discover the "*extremely minute orifice in the centre, communicating with an umbilical chord* of sufficient capacity for the passage of oxygenated air necessary for the purposes of an extremely slow, but not totally extinct respiration" spoken of by Mr. Turton.* On the contrary, I am fully convinced that no such contrivance exists, and that the only air which can serve the purposes of respiration during hybernation is the small quantity contained in the shell at the moment when the epiphragm is formed. The destruction of the epiphragm too, is effected in a more simple manner than by the secretion of an acid to dissolve it, as supposed by him; it being easily broken down by the posterior part of the foot of the animal which is first protruded.

The natural food of the genus is generally supposed to be vegetable matter, and the formation of the mouth and jaws seems to be peculiarly well adapted for cutting fruits and the succulent leaves of plants. The dental edge of the upper jaw, with its minute serratures, being applied against the substance to be eaten, the semilunar, sharp-edged instrument which Spallanzani calls the *tongue*, is brought up against it, cutting out and carrying into the mouth semi-circular portions of the substance. This operation is carried on with great rapidity, and the substance to be eaten soon disappears. It is certain, how-

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* Manual of the Land and Fresh-water shells of the British Islands pages 45 and 46.

ever, that they are fond of animal substances, and sometimes prey upon earth worms, their own eggs, and even upon each other; but the slowness of their motions forbids the idea of their being able to sustain themselves by habitually preying upon other animals. They, in their turn, become the prey of various birds, and it is no uncommon thing to observe in the forest clusters of broken shells on the top of logs or other situations, which have been chosen by the birds as convenient for breaking the shell and extracting the animal.

The reader will notice that I am largely indebted to the writings of Mr. Say for the materials of my descriptions, which I prefer to acknowledge in this general manner rather than to have occasion to mention it in the numerous instances where it would otherwise be necessary. My acknowledgments are due to several living naturalists, and particularly to Dr. C. J. Ward of Chillicothe, Ohio, for much interesting information concerning our western species.

The genus as here described, comprises HELIX and CAROCOLLA of Lamarck. It forms no part of the object of this paper to attempt a division of it in accordance with the views of systematists, although such a division has become necessary in consequence of the great number of species which it embraces. But for convenience of reference to our own species the following divisions and subdivisions are made.

Section I.—Lip reflected.

Comprising all those species the margin of the aperture of whose shell is more or less reflected.

A. *umbilicus, wholly or partially covered.*

Containing species in which the centre of the base of the shell is wholly or partly covered by the reflection of the lip at its junction with the base.

* Aperture destitute of tooth-like processes.

** Aperture furnished with one or more tooth-like processes.

B. *umbilicus not covered.*

Containing species in which the centre of the base of the shell is not covered by the reflection of the lip, but in which the open space, or imaginary axis about which the whorls of the shell revolve, is more or less open and visible.

*** Aperture destitute of tooth-like processes.

**** Aperture furnished with one or more tooth-like processes.

Section II.—Lip simple.

Comprising all those species, the margin of the aperture of whose shell is not in any degree reflected, although it is sometimes a little thickened. The aperture, properly speaking, is never furnished with teeth, but in some of the species there are lamellar processes considerably within the aperture.

C. *umbilicus closed.*

Containing species in which the whorls revolve so closely about the axis as ordinarily to leave no perceptible opening.

D. *umbilicus open.*

Containing species in which the whorls revolve in such a manner as to leave a visible space between them, which in some is minute, in others so ample as to exhibit nearly all the volutions.

Section I.—Lip reflected.

A. *umbilicus closed, or nearly so.*

* Aperture without teeth.

1. HELIX MAJOR.

Plate XII.

H. testâ orbiculato-globosâ, imperforatâ, luteo-corneâ; striis elevatis, crebris, undatis; anfractibus sex; ultimo anfractu ventricoso; aperturâ subrotundâ, contractâ, prope basim subunidentatâ; labro albo, crasso, margine reflexo.

Synonyms and References.

Helix albolabris, *var.* maxima, *Ferussac, Hist. Nat. des Moll.* Pl. xliii. fig. 4.—xliv. fig. 7.

Description.

Animal. Head, upper part of neck, and tentaculæ ferruginous; eyes black; foot rusty, the sides more or less shaded with blue by the fluids of the animal, which are visible through its semi-transparent substance. Tentaculæ short in proportion to the size of the animal, and robust, their situation when retracted marked by brown spots. Foot large, and thick. Genital orifice, indicated by a slight prominence. Superficial glands, large, and distinct. On the centre of the back is a line of them of an oblong narrow shape with a furrow on each side. Those on the sides and posterior part of the foot, when examined by a microscope, exhibit numerous subcutaneous, white dots, or points, arranged in clusters. Length equalling twice the breadth of the shell.

Shell. Convex, ventricose: *epidermis* uniform yellowish or brownish horn color: *whorls* six, with numerous, coarse, raised, parallel striæ: the body whirl very large and turgid: *suture* deeply marked: *aperture* rounded, contracted by the lip, and small in proportion to the size of the shell: *lip* white, thickened, reflected, inner margin near the base of the shell, projecting, more or less prominent: *umbilicus* covered: *base* thickened with a testaceous callus in old specimens.

Greatest transverse diameter one inch and a half.

GEOGRAPHICAL DISTRIBUTION. This species is found in Georgia, Alabama, and Florida, and probably in others of the Southern States. It is common in hickory and oak woods near streams, in Florida.

REMARKS. This is the largest HELIX hitherto discovered in the United States. It is not uncommon in cabinets, but has been generally considered a large variety of H. *albólabris*, SAY. This was probably Mr. Say's view, as the specimens figured by Ferussac were received from him. Some acquaintance with the species in its native habitat, and comparison of a large number of specimens with H. *albólabris* have induced me to give it a place as a distinct species. It cannot be confounded with any other than that shell, and differs from it in the following particulars.

It is much more globose, of a coarser and more solid texture, and the striæ of increase are much more raised and prominent, so much so indeed, as to leave distinct grooves between them. The longitudinal striæ, so distinct on that shell, are either wanting or very indistinct. The aperture is smaller in proportion to the size of the shell, less flattened towards the plane of the base, and more rounded. The pillar lip, and umbilicus are in many cases

covered with a smooth and shining, semi-transparent, testaceous callus. The margin of the lip is thickened, and less widely, and less abruptly reflected, and there is often a prominent tooth-like process on the inner and upper side of the margin near the umbilicus. The color of the epidermis is generally much darker.

In those parts of the eastern and middle States where H. *albólabris* abounds, it is in general but about half the size of this species, and is altogether a more delicate and beautiful shell. That this is not the same species, increased in size by the influence of a warmer climate, would seem to be proved by the fact that H. *fallax*, Say, is smaller in Florida than in situations much farther north. The color of the respective animals are widely different.

Mr. Conrad informs me that he obtained this shell several years since, in Alabama, and considered it a new species, but was deterred from publishing it as such, by the generally received opinion that it was only a variety of H. *albólabris*.

2. HELIX ALBOLABRIS.

Plate XIII.

H. testâ orbiculato-convexâ, imperforatâ, luteo-corneâ; anfractibus transversè striatis; striis crebris, obliquis; labro albo, expanso, margine latè reflexo.

Synonyms and References.

Helix albólabris, *Say. Nich. Encyc. Am. Ed. Vol.* IV, *pl.* 1, *fig.* 1.

Expedition to St. Peter's River, Vol. II, *p.* 258.

American Conchology. No. ii, *pl.* 13, *two upper figures.*

Helix albólabris, *Ferussac. Hist. Nat. des Moll. Pl.* XLIII, *fig.* 1 to 3.
Cochlea Virginiàna, *Lister. Synops. method. Conch. tab.* 47, *fig.* 45.

Description.

Animal. Varying from pure white to cream color, with sometimes a greyish hue; upper part of head and neck slightly brownish; extremities of tentaculæ smoky; eyes black. Superior tentaculæ more than half an inch in length when fully extended, slender, and cylindrical; foot with a slightly expanded margin, terminating posteriorly in an acute angle. Glandular tubercles very distinct and prominent, on the back arranged longitudinally, on the tentaculæ long and narrow. Dental edge of the upper jaw saffron color. Extreme length about two inches and a half.

Shell. Convex; *epidermis*, immaculate, of a uniform yellowish brown or russet color; *whorls*, between five and six, with fine parallel striæ running obliquely across them, and spirally striated with very minute, delicate lines, which are most apparent on the back of the reflected lip; *suture*, well marked and distinct; *aperture*, contracted by the lip; *lip*, white, flattened in the plane of the mouth, abruptly and widely reflected; *umbilicus* of the mature shell, covered by the reflected lip, which is continued to the base of the shell.

Greatest transverse diameter rather more than one inch.

Geographical distribution. This species has been noticed on the banks of the Missouri as high as Council Bluffs, and in the Northwestern Territory. It is also found in nearly all the States intervening from Canada to South

Carolina, and may be supposed to inhabit the whole vast territory of the United States. It is more frequent in well-wooded, than in cleared sections of the country, and is said to be more abundant in the eastern, than in the western states.

Remarks. Although inhabiting a geographical range of great extent, it is very uniform in its characters, individuals from the most distant localities not exhibiting any appreciable differences. Destitute of brilliant tints and markings, it is still a beautiful species, and will always attract attention in a collection, by its delicately striated surface, its broad white lip, its pleasing though modest color, and its elegant contour. Its habits may be taken for those of the whole genus.

In the partially cleared forests of New England, great numbers may at all times be found sheltered in the moist mould under decaying trunks of fallen trees, and rotten stumps, and sometimes under stones. In these situations they pass the greater part of their lives, and feed upon the decaying vegetable matter which exists in profusion around them. When the atmosphere is charged with moisture, and during light showers, and in the morning and evening twilight they leave their retreats, and may be seen slowly making their way over the surface of the fallen leaves, or climbing the trunks of trees; but a change of weather soon drives them again to shelter. In the early days of spring they are sometimes observed collected in considerable numbers on the sunny sides of rocks,* where they pass hours in indolent enjoyment of the warmth and animating influence of the sunshine.

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* The congregation of great numbers of Helices in the spring, is noticed by a writer in Loudon's Magazine.—See vol. vi, p. 200.

Here, with the head just protruding beyond the lip of the shell, and one tentacula extended as if to catch the slightest signs of an enemy, the snail remains perfectly unmoved, unless some insect alights upon its shell, when it shows its uneasiness by raising it suddenly in the air, and moving it around in quick and rapid gyrations until the intruder is dislodged. Whether these meetings serve any useful purpose in the economy of the animal, or are caused by the pleasurable sensations, and renewed strength, derived from the warmth of the situation after their winter's sleep, I cannot say; I am inclined to think, however, that they precede the business of procreation. It is certain that they last but a short time, and that after early spring, the snails are only to be found in their usual retreats.

In the course of the month of June, earlier, or later, as the season is more or less warm, they begin to lay their eggs. These are deposited to the number of from thirty to eighty, in the moist and light mould, sheltered under leaves at the sides of logs and stones, without any order, and slightly agglutinated together. After the number is completed they are abandoned by the animal.

The eggs are white, opaque, elastic, nearly globular, three sixteenths of an inch in their greatest diameter, and covered with minute points. They consist of an outer, semi-calcareous covering or shell of some consistence, and an inner, transparent, thin, shining membrane, which immediately incloses a clear, viscid, glairy fluid, which is analogous to the albumen or white of birds' eggs. The vitellus or yolk seems to be wanting.

The embryo shell is observable in the albuminous fluid in a few days after the egg is laid, and when the new animal makes its way out of the egg, which happens at the end of twenty or thirty days, for it is difficult to determine

the time with precision, it consists of one whorl and a half, the length of the column or axis being about one eighth of an inch, and the breadth somewhat less. No umbilicus is then discernible. I have not been able to determine how much time is required to complete its growth, but I am induced to believe, that the reflected lip, the evidence of maturity, is added in the second or third year.

In the month of October, or at the epoch of the first frost, the snail ceases to feed, fixes itself to the under surface of the substance by which it is sheltered, with the aperture of the shell upwards, and disposes itself for its annual sleep, or hybernation. Withdrawing within the shell, it forms a membranous covering, or epiphragm, over the aperture, and as the weather becomes colder retires further, forming membrane after membrane with only a small interval between them, until sometimes there are as many as six of these divisions. The circulation becomes slower, the pulsations of the heart, which in the season of activity vary from forty to sixty in a minute according to the temperature of the air, decrease in frequency and strength, until finally they are imperceptible. The other functions of the body cease, and a state of torpidity succeeds, which is only interrupted by the reviving heat of the next spring's sun. During the months of April and May, the animal breaks down the membranous partition, and comes forth to participate in the warmth and freshness of the season. At first it is weak and inactive, but recovering in a short time its appetite, it commences feeding, and resumes its former activity.

This species, as before remarked, offers but few varieties when arrived at maturity; but the young shell might be mistaken for a distinct species, it being umbilicated,

and destitute of the reflected lip. It is not until the shell has attained its full size that the reflected lip is added, and the umbilicus is covered. It resembles H. *thyróidus*, H. *zalèta* and H. *major*—but is distinguished from the former by its greater size, covered umbilicus, and want of the tooth-like process on the pillar lip, and from H. *zalèta* by the absence of the tooth, and its less ventricose form. The differences between it and H. *major* are pointed out in the remarks on that species.

3. HELIX MUTILINEATA.

Pl. XIV.

H. testâ orbiculato-convexâ, imperforatâ, luteo-cornea, lineis fuscis diversissimè fasciatâ; anfractibus elegantissimè striatis: striis valdè confertis, obliquis; peristomate albo, margine reflexo.

Synonyms and References.

Helix multilineàta, *Say*. *Journ. Acad. Nat. Sc. Phil.* *Vol.* II, *p.* 150.

Helix multilineàta, *Ferussac*. *Hist. Nat. des Moll.* *Pl.* XLVI, *fig.* 3.

Description.

Animal. Granulated; granules large whitish; interstices blackish; foot beneath black.

Shell. Rounded, convex, rather thin: *epidermis*, yellowish-brown or russet-color, with numerous reddish-brown, finely undulated, revolving lines and bands: *whorls*, between five and six, with delicate, parallel, oblique striæ: *suture*, distinctly marked: *aperture* lunated, slightly contracted by the lip: *lip*, white, not much expanded, reflected.

Greatest transverse diameter three fourths of an inch.

GEOGRAPHICAL DISTRIBUTION. "An exceedingly numerous species in the moist forests on the margin of the Mississippi, near the Ohio," according to Mr. Say. It is also common in the States bordering upon the Ohio river, but has not been noticed east of the Alleghany mountains.

REMARKS. This is a beautiful species, distinguished by its shining epidermis, its crowded and delicate raised striæ, and the numerous reddish-brown revolving lines which contrast well with the russet or yellowish ground on which they are traced. The lines vary in number from three or four to thirty or more, and are sometimes united into bands. On the sides and base of the shell they are usually finely undulated. The general contour of the shell resembles H. *thyroidus*, SAY. I have never been able to obtain the living animal, and have therefore been obliged to quote Mr. Say's description entire. According to Dr. Ward "they inhabit wet and marshy prairies under sods. Two winters since I found in such a situation (in December) at least one hundred of this species agglutinated into one mass. They were about six inches below the surface and appeared to have excavated the cavity which they occupied." This habit of attaching themselves together in great numbers during their hybernation I have not witnessed in any other of our species, but I believe it is common in some of the European species.

4. HELIX CLAUSA.

Plate XV.

H. testâ sub-globosâ, sub-imperforatâ, luteo-corneâ ; anfractibus striatis, striis minutis crebris ; apertura rotundatâ ; peristomate albo, margine reflexo.

Synonyms and References.

Helix clausa, *Say. Journ. Acad. Nat. Sc. Phil. Vol.* II, *p.* 154.

American Conchology, No. iv, *pl.* 37, *fig.* 1.

Description.

Animal. Blackish.

Shell. Rounded, somewhat globular: *epidermis*, yellowish-brown or russet color: *suture*, distinct: *whorls*, between five and six, with delicate, raised, oblique striæ: *aperture*, somewhat rounded, upright, its plane making an acute angle with the axis of the shell, somewhat contracted by the lip: *lip*, white, reflected: *base* rounded: *umbilicus*, nearly covered by the reflected lip.

Greatest transverse diameter half an inch.

Geographical distribution. "Occurs," according to Mr. Say, "in several parts of the Union, and particularly in the Western States," and "but rarely in Pennsylvania." The specimens which I have seen were brought from Alabama and Arkansas.

Remarks. This is a doubtful species. The specimens which I have noticed in Cabinets under this name, have been generally small varieties of H. *Pennsylvànica*, Green, or of H. *thyróidus*, Say, in its immature state without the tooth. The former can be detected by its

sub-triangular aperture, and the latter sometimes when closely examined, by the rudiments of the tooth, exhibited by a slight thickening in its place, resembling the touch of a pencil of varnish over the epidermis. I have, however, seen a few individuals which did not seem to me to admit of doubt, but clearly to belong to the present species. One of these has been represented in the plate. A living individual from Arkansas, supposed to be of this species, has also come under my notice, from a recollection of which, I have described the animal as blackish.

It is a handsome species, somewhat resembling, though not half as large as H. *albólabris*, Say, but rather more globular, and with the umbilicus partially open. The spire is more prominent, and the lip less widely reflected than in that species. Future observation must decide whether it is to be considered a distinct species or not; my impression is, that it will retain its place.

5. HELIX PENNSYLVANICA.

Plate XVI.

H. testâ elevato-convexâ, imperforatâ, corneo-rufescente; anfractibus tenuiter striatis, striis obliquis, confertis; spirâ elevatâ, apice obtuso; aperturâ triangulari; labro albo, margine reflexo; regione umbilicali depressâ.

Synonyms and References.

Helix Pennsylvánica, *Green. Contributions of Maclurian Lyceum. No.* i, *p.* 8.

Description.

Animal. Upper surface of a dull, uniform lead-color, under surface of the foot lighter; about twice as long as the transverse diameter of the shell.

Shell. Convex, elevated: *epidermis*, brownish horn-color: *whorls*, nearly six, rounded, with crowded, elevated, oblique striæ: *suture* distinctly marked: *aperture*, sub-triangular, contracted by the lip: *lip* white, reflected, with sometimes a slight thickening on the inner side near the base: *umbilicus*, closed; umbilical region indented.

Extreme transverse diameter three fourths of an inch.

GEOGRAPHICAL DISTRIBUTION. Inhabits the western parts of Pennsylvania, and Ohio, and is probably found in all the States bordering on the Ohio river.

REMARKS. A very well marked species, distinguished chiefly by its triangular mouth and elevated spire. The volutions are usually about six; the shell is thin, and the lip but narrowly reflected. Some individuals resemble H. *elevàta*, SAY, as is mentioned in the remarks on that shell. The epidermis is rather more rufous than is usual with our helices. The color of all the thinner shells of this genus appears darker when the animal is retracted, and this species has often, in this situation, a purplish tinge, which is well represented in the plate.

The animals of this, and of many other species, is often overrun with great numbers of *Acari*, resembling ACARUS *limàcum* of Europe. There appears to be at least two species of them. They are very minute, of a flesh color, and move with great rapidity, frequently entering and coming out of the respiratory foramen. Their presence does not seem to cause any uneasiness or even to be felt by the snail.

This shell varies in being more or less elevated: in some individuals the spire is much flattened. It differs greatly in size also, some perfect shells not attaining more than one half of the size of others. Some persons have

thought that HELIX *clausa*, SAY, was a small variety of this shell; but the rounded aperture, represented in the figure of that shell given by Mr. Say, precludes that supposition. The individual figured in our plate is a large one.

6. HELIX SUBGLOBOSA.

Plate XVII.

H. testâ subglobosâ, imperforatâ, luteâ; anfractibus glabris, ultimo anfractu ventricoso; labro albo, internè incrassato, subreflexo.

SYNONYMS AND REFERENCES.

Helix subglobòsa, *Nobis*.

DESCRIPTION.

Animal. Head and neck blackish, with a slight tinge of brown; tentaculæ smoky; eyes black; base of foot inky, posterior extremity dirty flesh-color. Foot rather slender, terminating acutely. Respiratory foramen surrounded with a blackish circle. Genital orifice indicated by a blackish spot a little behind the large tentacula of the right side. Length about twice the breadth of the shell.

Shell. Sub-globose: *epidermis*, olivaceous-yellow, shining, smooth: *whirls*, from four to five, convex: *spire*, somewhat elevated: *suture*, at the extremity of the last whirl curved towards the aperture: *lip* slightly reflected, white, obsolete on the base, with the margin thickened internally: *aperture* rounded, slightly contracted at the base by the thickening and indentation of the lip: *umbilicus*, covered, indented: *base* convex.

Greatest transverse diameter three quarters of an inch. GEOGRAPHICAL DISTRIBUTION. Inhabits the eastern part of Massachusetts, near the sea. Is common on the lower parts of Cape Cod, and on Cape Ann, and is very abundant on Salt Island, a rocky, uninhabited island near Gloucester.

REMARKS. This shell bears a strong resemblance to H. *hortensis*, LINN. of Europe, and may by some be considered a mere variety of that species. The restricted locality in which it has hitherto been found would seem to favor the supposition of its having been imported, and its habits serve to confirm that idea. Unlike the other American helices which I have observed in their native haunts, it does not appear to burrow under stones, or decaying wood and leaves, but is found on the surface of the ground, or climbing the stems and adhering to the leaves of the shrubs which cover the soil. I have thought too, that in captivity it is less disturbed by the want of moisture than any other of our species. But notwithstanding these considerations, I am disposed to claim for this shell a place as a distinct species.* The reasons which lead me to this conclusion are, its general aspect, which enables one to distinguish it at once from the

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* It is well known that the active commercial intercourse between this country and Europe, has made several additions to our catalogue of animals. In the genus which forms the subject of this article, two species HELIX *aspersa*, MULL., and H. *lactea*, MULL., are said to have gained a footing in the country. It would not be surprising therefore to find H. *hortensis*, one of the most abundant species in the southern and western parts of Europe, naturalized in a commercial neighborhood. It would be difficult, however, to account for their inhabiting the barren and retired situations at the extremity of Cape Cod, and the rocky islands in the neighborhood of Cape Ann, while in the intermediate country they are not found.

foreign shell; the uniformity of the color, ours being yellow, with an olivaceous tint and destitute of bands, while that is remarkable for its great diversity of coloring, and brilliant zones; the greater prominence of the spire; the difference of the color of the animal, which Draparnaud describes as "commonly pale or a little greyish, or slightly reddish" a description that could not be applied to the species in question; and lastly, the epiphragm, which is a thin, transparent, membranous pellicle, as in our other species, in place of an opaque, papyraceous one, as stated by that author.

In the young shell the umbilicus, which is hardly large enough to admit the point of a pin, is open, and the lip is simple. In a single specimen I have noticed some indistinct bands and lines.

Having kept a large number of this species in confinement, I have frequently had an opportunity of noticing the manner in which the epiphragm is formed, which does not appear to me to have been heretofore correctly described. The collar of the animal having been brought to a level with the aperture of the shell, a quantity of gelatinous matter is thrown out, which covers it. The pulmonary orifice is then opened, and a portion of the air within, suddenly ejected, with such force as to separate the viscid matter from the collar and to project it, like a bubble of air, from the aperture. The animal then quickly withdraws further into the shell, and the presence of external air presses back the vesicle to a level with the aperture, when it congeals and forms the epiphragm. In some of the European species in which the gelatinous secretion contains more carbonate of lime than ours, the congelation seems to take place at the moment when the air is expelled, and the epiphragm in these, is strongly convex.

** Aperture toothed.

7. HELIX THYROIDUS.

Plate XVIII.

H. testâ orbiculato-convexâ, sub-umbilicatâ, luteo-corneâ; anfractibus tenuiter striatis, striis confertis, obliquis; appendiculo dentiformi, obliquo, columellæ adnato; peristomate albo, margine reflexo.

Synonyms and References.

Helix thyróidus, *Say. Nicholson's Encyc. Am. Ed. Vol.* IV, *Art. Conchology.*
Journ. Acad. Nat. Sc. Phil. Vol. I, *p.* 123.
Vol. II, *p.* 161.
American Conchology. No. II, *pl.* 13.

Helix thyróidus, *Ferussac. Hist. Nat. des Moll. Pl.* XLIX, *A. fig.* 4.

Cóchlea umbilicàta, *Lister. Synops. Conch. t.* 91, *fig.* 91.

Cóchlea terréstris Virginiàna. *Schröter. Einleit.* II, *p.* 192, *No.* 60.

Mésodon leùcodon. *Rafinesque.*

Description.

Animal. Of a dirty whitish yellow, with a greyish hue in some individuals, tentaculæ darker, eyes black, base of foot dirty-white; foot rather narrow, terminated posteriorly in an acute angle. Length equal to twice the breadth of the shell.

Shell. Rounded, convex: *epidermis*, immaculate, of a uniform yellowish-brown or russet-color: *whirls*, about five, with fine, parallel striæ running obliquely across them; *suture*, distinctly impressed; aperture rounded,

contracted by the lip, the plane of the aperture making a considerable angle with the plane of the base of the shell: *pillar lip*, with a prominent, white, tooth-like process placed obliquely to the axis of the shell: *lip*, white, widely reflected, and sometimes grooved; exterior of the reflected lip yellowish: *umbilicus* exhibiting only one volution, partially covered by the reflected lip where it unites with the base of the shell.

Extreme transverse diameter three fourths of an inch.

Geographical distribution. Inhabits all the States from New York to Missouri, and from North Carolina to Arkansas. It is very common in the country bordering on the Ohio and Mississippi rivers, and though sometimes found, is rare in the New England States.

Remarks. This species bears a strong resemblance to H. *albólabris*, with which it is sometimes confounded. It has, however, striking specific characters, which are never wanting, and which will enable one always to distinguish it. These are, the partially closed umbilicus, and the tooth on the pillar lip. The yellow color on the posterior part of the reflected lip is also a very constant character; this is derived from the mantle of the animal, which, in a state of rest, frequently overlaps the margin of the aperture. It is a smaller shell than Helix *albólabris*, and more convex, sometimes being even globose, and the plane of the aperture makes a much larger angle with the plane of the base of the shell.

It varies considerably in appearance. Some individuals never reach half the standard size of the species. It is more or less globose, has the umbilicus sometimes covered, and at other times is destitute of the teeth. The animal, though usually yellowish, I have noticed to be in a few cases blackish. It is probable that the color of the

animals of this genus is much influenced by the nature of their food.

8. HELIX ELEVATA.

Plate XIX.

H. testâ orbiculato-conoideâ, imperforatâ luteo-corneâ; spirâ elevatâ; anfractibus sex, tenuiter striatis, striis obliquis; aperturâ subangulatâ; labro albo, parte inferiori sub-dentato, margine reflexo; columellâ dente robusto, albo, subarcuato, armatâ.

Synonyms and References.

Helix elevàta, *Say*. *Journ. Acad. Nat. Sc. Phil. Vol.* II, *p.* 154. (*An.* 1821.)
American Conchology. *No.* IV, *pl.* 37, *fig.* 2.
Helix Knoxvillìna, *Ferussac*. *Hist. Nat. des Moll. Pl.* XLIX, *fig.* 4, 5, 6.
Mésodon helicìnum, *Rafinesque*.

Description.

Animal. Ashy brown on the upper surface, lighter on the posterior extremity and sides; collar greyish-white; glands prominent and distinct.

Shell. Very convex, elevated, almost conical: *epidermis*, yellowish horn-color: *whorls*, nearly seven, rounded, with fine oblique transverse striæ: *suture*, distinct: *aperture*, contracted by the lip, somewhat triangular: *lip*, white, reflected, lower inner margin a little thickened: *pillar-lip*, with a large, white, robust, obliquely-curved tooth: *umbilicus* covered.

Greatest transverse breadth seven eighths of an inch.

Geographical distribution. Inhabits the western

parts of Pennsylvania and Virginia and the States bordering upon the Ohio river. It is very abundant in the neighborhood of Cincinnati, Ohio.

Remarks. The first description of this shell was by Mr. Say, in the Journal of the Academy of Natural Sciences of Philadelphia, in January 1821. Early in 1822 it was indicated by Ferussac in his *Tableau Systematique* No. 94, as Helix *Knoxvillina*, as was afterwards shown, when the explanation of the supplementary plates of his work was published, in which the figure of this species is referred to as Helix *Knoxvillina* of his *Tableau*, and as Helix *elevata* of Say. Mr. Say's *description* having been published a year before the *name* of Ferussac, which was unaccompanied with specific characters to enable the reader to identify it, should give the name first imposed, the precedence, and I therefore retain it. M. D'Orbigny, in his *Synopsis* of the land and fresh water shells of South America, published in Guerin's *Magazin de Zoölogie* for 1835, has applied the same name to one of the species described by him. He was doubtless ignorant that it had been pre-occupied, and will of course replace it by another, when the fact is known to him.

This is a rather thick and heavy shell. It resembles H. *Pennsylvánica* in general aspect, but is larger, has one more whorl, and is a coarser shell. The tooth on the pillar lip, which is wanting in the other, will always enable one to distinguish the mature shells; but the young resemble each other so nearly that it is difficult to discover a difference. The variations of the species are small—the greater or less elevation of the spire, is the common cause of the differences.

In captivity, it burrows much under the surface of the

ground, and keeps itself hidden the greater part of the time.

9. HELIX ZALETA.

Plate XX.

H. testâ orbiculato-ventricosâ, imperforatâ, luteo-corneâ; anfractibus transversè striatis: striis confertis, obliquis; appendiculo dentiformi, albo, columellæ obliquè adnato; peristomate albo, margine reflexo.

Synonyms and References.

Helix zalèta, *Say*. *Manuscript?*

Helix albólabris, Var. unidentàta, *Ferussac*. *Hist. Nat. des Moll. Pl.* XLVI, *A. fig.* 6.

Description.

Animal. Greyish-brown or blackish above, paler on the posterior extremity and base; superior tentaculæ black, long and slender; glands very prominent, length, when fully extended, including the tentaculæ, equal to thrice the breadth of the shell.

Shell. Convex, somewhat ventricose: *epidermis*, of a uniform yellowish horn or russet-color: *whorls*, between five and six, with fine, parallel striæ crossing them obliquely: body whorl large and ventricose: *suture*, well marked, and distinct: *aperture*, rounded, contracted by the lip, the plane of the aperture making a considerable angle with the plane of the base: *lip*, white, reflected: *pillar lip*, with a prominent, white, oblique tooth: *umbilicus* covered.

Greatest transverse diameter about one inch.

Geographical distribution. Common in the States

bordering on the Ohio river, and in the western parts of Virginia and Pennsylvania. I have never noticed it in New England nor in the States east of the Alleghany mountains.

Remarks. This shell is frequently confounded with Helix *albólabris*, and I have often seen it in Cabinets labelled as a toothed variety of that species. Mr. Say seems to have considered it as such, for a time, but at length was induced to consider it a distinct species, and it is said was about to publish the description, under the present name, in a number of his *American Conchology* which he was preparing for the press at the time of his decease. It is now generally known in collections by the name which I have adopted.

Though resembling H. *albólabris* in many respects, it differs in general aspect, and in many very observable particulars. It is smaller, more convex, and the body whorl is more ventricose than in that species. The reflected lip is less flat and broad, and is sometimes a little grooved. The aperture is more round, and the plane of the mouth, instead of being flattened in the direction of the plane of the base, is much more upright, making a considerable angle with the base of the shell. Attention to these differences will enable one to distinguish the shell, even before the tooth is added. In those individuals where the tooth is wanting there is often a slight deposition of testaceous matter in its place, not distinguishable without close observation.

The color of the animal varies in being more or less dark, but I have never seen an individual which approached the white or pearly color, which, after observation of great numbers of H. *albólabris*, I have always found belonging to that species.

There is certainly a strong resemblance between many of our species which, with H. *albólabris* as their type, form a well marked division. But as their differences are as constant as their resemblance, it cannot be proper to unite them into one.

10. HELIX DENTIFERA.

Plate XXI.

H. testâ orbiculato-depressâ, imperforatâ, luteo-corneâ; spirâ subplanulatâ, subtus convexâ; anfractibus transversè striatis, striis crebris, minutis; peristomate albo, margine latè reflexo; columellâ valdè unidentatâ.

Synonyms and References.

Helix dentífera. *Nobis.*

Description.

Animal. Greyish on the sides and posterior extremity, brownish on the upper parts, darker on the head and neck, foot long and narrow, superior tentaculæ long and slender, eyes black.

Shell. Flattened, convex on the upper surface, convex below: *epidermis*, yellowish horn-color, immaculate: *spire* depressed: *whorls*, five, with delicate, parallel, oblique striæ: *suture*, distinct, not deeply impressed: *aperture*, contracted by the lip, flattened towards the plane of the base; *lip* white, broadly and abruptly reflected: *pillar-lip* with a prominent, white, tooth-like process nearly parallel with the lower margin of the aperture: *base* convex.

Greatest transverse diameter about three quarters of an inch.

GEOGRAPHICAL DISTRIBUTION. Noticed by me, hitherto, only in the State of Vermont, on the eastern slope of the Green Mountains.

REMARKS. This species, now for the first time described, is not common in the localities which it inhabits. Its distinguishing marks are, its flattened form, and the tooth on the pillar lip.

While observing it with the animal retracted and the collar just visible at the aperture, I have heard a sharp snapping sound emitted, which seems to have some connexion with the opening and shutting of the respiratory foramen; but in what manner it is produced I have not been able to discover. The same is made by H. *albólabris*, H. *thyróidus*, and H. *diodónta*, and is probably common to the genus.

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March. Cranium of a Musk Rat—Bill of an Albatross—and tooth of a Whale. *John Odin, Jr.*
Three species of Coral and a small Fish. *Mrs. Mary Barnard.*
Crustacea from Martha's Vineyard. *Leroy M. Yale.*

1834.

March. Specimens of Cancer Panope. *John Bethune.*

Fruits of various Tropical plants.
D. Humphreys Storer.

Muriate of Soda from Cracow—an Echinus and several Asterias. *James Jarves.*

Splendid Case of four hundred Insects from Rio de Janeiro. *Charles J. F. Binney.*

Cerithium reticulatum—and Mactra arctata from New Bedford. *Thomas A. Greene, (New Bedford).*

Skins of the Long-tailed Duck, Goosander, and Saddle-back Gull. *Benjamin Tappan.*

Fossil Terebratula from Ohio—Belemnite.
Charles T. Jackson.

Mica Slate with Garnet imbedded, from Northfield—Skin of a Loon. *Thomas Power.*

Thirty Bottles with Reptiles and Insects.
George C. Shattuck, Jr.

A small Alligator. *Jerome V. C. Smith.*

Genital Organs of a Free Martin. *Joshua B. Flint.*

Skeleton of a Coaita Monkey. *Estes Howe.*

Specimen of Strongylus Gigas from the Kidneys of a Mink. *John B. S. Jackson.*

Ligamentary Skeleton of a Rat, Cranium of a Porpoise—Skin of the Great Auk. *Winslow Lewis, Jr.*

Bisulphate of Copper from South America—Specimen of Worthite, a new Mineral, (Russia).
Charles T. Jackson.

Case of Insects from South America.
D. H. Storer, C. K. Dillaway, Amos Binney, A. A. Gould, Winslow Lewis, Jr., J. S. C. Greene, J. W. McKean, J. B. Flint, E. Wigglesworth, Jr., L. S. Cushing, John Ware, Jos. Joy, G. B. Emerson, E. S. Dixwell.

April. Bones of the Pectoral fin of the Doras costatus.
John Ware.

Skins of five Birds. *Benjamin Tappan.*

Rose Asbestos (Staten Island). *Thomas Power.*

Small Box of Insects, from China.
Charles A. Poulson, (Philadelphia).

Box of Iron Ores, from New Jersey.
Charles J. Bates.

Tusks of the Dugong. *Winslow Lewis, Jr.*

Skeleton of the Ostrich.
Drs. Smith, McKean and Flint.

Skins of the Short-eared Owl and Bald Eagle, (mounted).
Amos Binney.

Skeleton of the Great Noddy. *James B. Forsyth.*

Skeleton of a Humming Bird—an Ostrich's Egg—Teeth of a Whale—a Rattlesnake—Upper Jaw of a Leopard—Head and Bones of an Albatross. *Edward Warren.*

Seeds of Plants from Honduras, Cassia triangularis (very large). *Nathaniel Brown.*

May. Horns of an African Buffalo. *Winslow Lewis.*

Larynx and Trachea of the Alligator. *J. V. C. Smith.*

1834.

May. Ninety two Birds' Skins—and a Box of Insects from Demerara. *Park Benjamin.*

Male and Female Grosbeaks. *John Bethune.*

Series of a species of Paludina. *George B. Emerson.*

About fifty specimens of Lavas from the Canary Islands. *George W. Bond.*

Skeleton of a Monkey and Sea Gull. *Estes Howe.*

Skeleton of a common Fowl. *John B. S. Jackson.*

Stuffed Skin of a Muskrat. *Mrs. J. Farrar, (Cambridge).*

Nineteen species of Birds' Eggs—and several Bottles with Fishes, Reptiles, Crustacea and Radiata, from the Azores. *Samuel G. Rodman.*

June. Portion of the Root of the Banian Tree. *Bryant P. Tilden.*

Specimens of Lavas and Dried Plants from Teneriffe. *D. Jay Browne.*

Acetabularia. *F. W. P. Greenwood.*

Two small Galipagos Tortoises. *Lieutenant Babbit, (U. S. Navy).*

Two gigantic Galipagos Tortoises (living) weighing near three hundred and twenty pounds each. *Capt. John Downes, (U. S. Navy).*

Bodies of the Capibara, Ant Bear, Jackall and Leopard. *Welch, Macomber & Co.*

Stomach of an African Ostrich, and the Egg of a South American one. *D. H. Storer.*

July. Coluber vernalis. *John Bethune.*

Variety of Emys punctata—Lungs and Eggs of Emys picta. *Estes Howe.*

Emys scabra (Concord). *Francis H. Jackson.*

A Species of Iguana. *Robert H. Gardiner.*

A Haliotis and seed vessel of a species of Cucumeris from South America. *Joseph W. McKean.*

An Herbarium with fifty-one species of plants from Chili and fifteen from the Galipagos Islands. *J. N. Reynolds.*

Skin of the Night Heron. *Samuel G. Rodman.*

A Sheet of colored Drawings of rare Fishes taken at Charles and Galipagos Islands. *J. N. Reynolds.*

Two species of Echinus—and an Asterias from Demerara. *Park Benjamin.*

Thirty species of Carices (vicinity of Boston). *Moses A. Curtis.*

Mass of Madrepore—Hair Ball from stomach of an Ox. *Jerome V. C. Smith.*

August. Forty-five Birds' Skins from Bombay—Skins of Sciurus. *Joseph Coolidge, Jr.*

Stuffed Birds' Skins from Brazil. *Misses Foster.*

Skeleton of Vespertilio serotinus and Vespertilio ——— (in Alcohol). *Francis H. Jackson.*

Emys Pennsylvanica. *Estes Howe.*

1834.

September. Seed Vessel of Mimosa scandens, Linn. *S. Cooper.*

Birds' Eggs from South America.
Nathaniel B. Shurtleff.

Eight specimens of Coral—and an Elephant's Tooth.
Joseph Coolidge, Jr.

Ten Species of Lepidoptera, from Maine.
Nathaniel Brown.

Physa from Kennebunk, Maine. *George B. Emerson.*

Achatina vexillum. *George P. Bradford.*

Bufo musicus (male and female) Rana pipiens, Rana halecina, Rana palustris. *Estes Howe.*

Hyla squirella. *John B. S. Jackson.*

Rana sylvatica—Rana palustris—Rana halecina—Rana versicolor—two specimens of Vespertilio—an Asterias—and two species of Echinus—Pleurotoma—Mitra—Cistuda clausa, from Florida—ten species of Birds' Eggs.
D. Humphreys Storer.

Three species of Echinus—two of Asterias—eight of Shells—and three species of Fishes—a lot of Fossil Shells, Minerals, &c. *Edward Tuckerman, Jr.*

Sclerotica of the Xiphias Gladius.
Francis W. P. Greenwood.

A Leech with her young attached.
Micah H. Ruggles, (Troy).

A Bill-fish from Nantasket. *Ezra Weston, Jr.*

A Dipper, or pied Dobchick. *Joshua H. Hayward.*

October. Collection of Minerals and Fossils from Buenos Ayres—Fossil tooth of the Hippopotamus, from Rio Negro.
Joshua B. Flint.

Diodon oblongus from the West Indies.
B. C. Clark.

A fœtal Porpoise taken from the mother in the Pacific Ocean. *Capt. Blackler.*

Skeleton of Falco hiemalis. *James B. Forsyth.*

Diodon orbiculatus—egg of the African Ostrich.
Marshall S. Perry.

Eggs of the Murre. *Dr. Ray, (Eastport).*

Twenty-five Dollars towards the purchase of Books from the Cogswell Library—and a hundred and thirty-three Birds' skins, from the vicinity of Calcutta.
John J. Dixwell.

Fungus from the Pine Tree. *Chandler Robbins, Jr.*

Four hundred and forty-four Birds' skins, from Chili, Peru and South Shetland Isles—Botanical specimens from Chili, Peru, Araucania, and the Galipagos Islands—several Boxes of Minerals and Organic Remains, from the Southern Andes—a large and valuable collection of Shells, comprising many rare specimens of Bulimus and Chiton, from Chili and Peru—Nests and Eggs of various South American Birds—Colored Drawings of numerous Insects, Fishes, Fruits, &c., collected in the Pacific Ocean and South America.
J. N. Reynolds.

1834.

November. Pecten from the West Indies. *Joseph W. McKean.*
Specimens of Lead and Iron Ores from Burlington, Vt. *Howard Malcom.*
Fragments of Boulders found near St. Petersburg, supposed to originate in Finland. *Charles Cramer.*
Thirty species of Native Shells (Nantucket). *James Tallent.*
Cranium of a Horse. *Francis Jackson.*
A species of Salamander. *Edward Jarvis, (Concord).*
Fossil Elephant's Tooth, (Colchester, Great Britain). *Abel L. Peirson, (Salem).*
Eggs of the Eider Duck, Murre, Saddle-back Gull, and Foolish Guillemot. *George G. Shattuck, Jr.*
December. Skeleton of a Cat. *John B. S. Jackson.*
Two species of Echinus—several small Crustacea—Egg of Galipagos Tortoise. *John Warren.*

1835.

January. Mounted Swan's Skin, (Susquehanna River). *Howard Sargent.*
Algæ from Nahant, collected by a lady, arranged in two volumes. *George L. Stearns.*
Several Bottles of Reptiles and Insects, (Cuba). *Abbot Lawrence, Jr.*
Scolopendra morsitans—Amphisbæna fuliginosa. *Solomon D. Townsend.*
February. Egg of Testudo Elephantopus. *John Warren.*
Box of Gold Ores, from North Carolina. *Thomas G. Cary.*
Crystals of Quartz from Trenton Falls. *John Odin, Jr.*
Eggs of the Crow. *Charles J. Bates.*
Cypræa lactea—two Cones, and a Pupa. *H. T. Parker.*
Minerals and Fossils from Paris, Italy, &c. *H. I. Bowditch.*
Echinus atratus, Sumatra. *Mrs. Dunlap, (Salem).*
Box of Minerals, from Sicily. *H. B. Rogers.*
Coluber nasutus—Coluber—Gecko Ægyptiacus—Gecko —Sumatra. *D. T. Noyes.*
Nine species of Shells from South America. *George Brown, (Beverly).*
March. Mounted Skins of Anas histrionica. *Benjamin D. Greene, John Bethune, Charles K. Dillaway, Samuel Cabot, Jr., Augustus A. Gould.*
Several species of East India Shells. *H. T. Parker.*
Aulostomus chinensis. *Leavitt Thaxter, (Martha's Vineyard).*
Retepora cellulosa, Lin., R. frondiculata Lk., Pennatula sagitta, Linn. *John Warren.*
Unios from the Hoogly. *Epes S. Dixwell.*
Portions of the Lace tree, from the West Indies. *J. B. S. Jackson.*
A large and very valuable collection of Insects from the

1835.

March. Brazils, contained in a Cabinet of six Drawers and two large Boxes. *George W. Pratt.*

April. A Gigantic Murex ramosus, and a large Madrepore. *I. P. Townsend.*

A Fossil Elephant's Tooth, (Sumatra). *Thomas Sherwin.*

Root and leaves of the Palmetto—Shell Breccia—Recent Shells—Millepore and Birds' Skins, from St. Augustine, (E. Florida). *B. M. Watson.*

Cone of a pine. *J. E. Teschemacher.*

Minerals from Cronspitz. *Charles Cramer.*

Box of Fossils from Sicily. *B. D. Greene.*

May. Bone Breccia from Sicily—Several species of Crustacea. *Francis G. Shaw.*

Magnificent specimen of Crystals of Sulphur on Strontian from Sicily. *Henry Andrews.*

Collection of Plants from this vicinity. *Charles K. Dillaway.*

The Sand Eel (Ammodytes tobianus). *Leroy M. Yale.*

The following Fishes—two varieties of Hemitripterus Americanus—Morrhua vulgaris—Morrhua æglefinus—Merlangus pollachius—Scomber grex—Sebastes Norvegicus. *D. H. Storer.*

Case of Insects, from New Holland. *S. E. Greene.*

June. Box of Native Marine Shells. *William Barrett, (Malden).*

Pied Oyster-Catcher. *Daniel Webster.*

Strix otus. *John M. Bethune.*

The Wolf Fish (Lupus Anarrhicas and Sepia officinalis). *Joseph P. Couthouy.*

Anolis from Cuba. *Joshua B. Flint.*

Cistudo clausa. *William R. Sumner.*

Hydrargyra from Roxbury, Cyprinus auratus and Anguilla vulgaris. *D. H. Storer.*

Salmo trutta. *Thomas M. Brewer.*

July. Specimen of Zoarchus labrosus—and two large Garnets from the Sandwich Islands. *Joseph P. Couthouy.*

A young Sloth (in Alcohol)—a Sponge. *Samuel Adams.*

Several Specimens of Madrepore. *George B. Emerson.*

A Queen Bee. *Simon E. Greene.*

Two species of Crustacea from St. Jago. *Ephraim Brewster.*

Impressions of Vegetables and Shells, from the Pennsylvania coal formation. *Mr. Andrews.*

Large and beautiful Crab, from the West Indies. *Amos Binney.*

A Julus. *Samuel W. Rodman.*

August. Minerals from Labrador. *Quebec Nat. Hist. Society.*

Skeleton of the Shad (Alosa vulgaris). *Samuel Adams.*

1835.

August. Birds' Skins, from Calcutta. *Mr. Bush.*
Vegetable Fur, from Caraccas. *Jerome V. C. Smith.*
Agama cornuta, from Texas. *John H. Belcher.*
Malthe stellata, and Draco fuscus from India.
Joseph Coolidge, Jr.

September. A valuable Case of Insects, from New Holland.
Reptiles and Phial of Asphaltus, from Cuba.
William R. Lawrence.

October. Corals and Shells, from coast of Maine.
Charles T. Jackson.

November. A Box of Chinese Insects. *Herman Green.*
Two Boxes " " *T. B. Curtis.*
One Box " " *Isaac McLellan, Jr.*
Testudo radiata. *George B. Emerson.*
Minerals and Shells, from River Mississippi.
Nathan Barrett.
Specimen of Coral. *Samuel A. Shurtleff.*
Species of Hinnita. *George B. Emerson.*

December. Stalactites, and Suite of Bivalves, from Ohio.
Dr. Hildreth, (Marietta).
Valuable collection of Shells made in a voyage round the World. *Com. John Downes, (U. S. Navy).*
Carcass of an Asiatic Elephant. *G. B. Emerson.*

1836.

January. Birds' Skins, from India. *John Ballistier.*
Mummies of a Crocodile, Hawk and Ibis, from Egypt.
Lewis G. Stackpole.

February. Edible Birds' Nests, (Phillipine Islands)—and three Boxes of Insects from Manilla, very valuable, collected by W. W. Wood. *George Russell.*
Collection of Volcanic Minerals. *William Sweetser.*
Box of Minerals from New Hampshire, by Professor Hale.
H. I. Bowditch.

March. Model in Plaster of a portion of the Alps, to accompany Saussure's "Voyage dans les Alpes."
Richard Sullivan.
Twenty species of Reptiles, from Surinam.
B. D. Greene.
Magnificent Trilobite (Isoteles megalops, De Kay), Trenton Falls. *Joseph P. Couthouy.*

April. Collection of Minerals, from the State of New York.
George W. Boyd, (New York).
Scolopendra morsitans. *Mr. Attwill.*
Several varieties of Rotella—and Skeletons of Hippocampus. *Samuel A. Shurtleff.*
Several Foreign Marine Shells. *Joshua B. Flint.*
A species of Vespertilio. *Epes S. Dixwell.*
A Hen's Egg, (peculiar). *John Odin, Jr.*
Several Birds' Nests, with the Eggs. *H. G. Bigelow.*

May. Ligamentary Skeleton of a Wild Cat. *James Blake.*
Shells, and ▪ Fish. *Leroy M. Yale.*
Salmo Fario, (Medford). *Joseph P. Couthouy.*
Copper Ore, from Cuba. *George Brown, (Beverly).*

1836.

May. Cranium of a Buceros from Japan.
Lieutenant Smith, (U. S. Navy).

Planorbis corpulentus—Lymnæus elongatus.
Mr. Olmstead, (of Olmstead, Ohio).

A Fossil. *Francis W. P. Greenwood.*

A beautiful Parrot, from the Sandwich Islands.
A Lady.

June. Eggs of Fringilla socialis. *Thomas M. Brewer.*

Two Tortoises from Mansfield. *Charles T. Jackson.*

July. Lump Fish, (Lumpus vulgaris). *James Pierce.*

Nest of Sylvia Œstiva with an Egg of Icterus pecoris.
Thomas M. Brewer.

August. Plaster Casts of the several species of Ornithichnites discovered by himself, with several Impressions in the Slate Rock. *Edward Hitchcock, (Amherst College).*

Several Reptiles. *N. M. Hentz, (Alabama).*

Specimen of Scutella pentaforis. *T. W. Harris.*

A large Ostrea, (Boston). *D. H. Storer.*

Stormy Petrel. *Thomas M. Brewer.*

Fine specimens of Mytilus pellucidus, (Mass.)
Joseph P. Couthouy.

Two specimens of Galena from Ogdensburg, New York.
Joseph Moriarty.

Shells from the Alleghany River. *D. Stone.*

Murex haustellum (with double canal)—Voluta diadema, from New Holland. *John Warren.*

Eburna lutosa, Lk.—Pleurotoma, Olivas and Ancillaria, from Senegal—Fossil from Cuba.
Joseph P. Couthouy.

September. Group of Cineras, from Cohasset.
Francis W. P. Greenwood.

A reversed Marginella—and two other Marine Shells.
John Warren.

A valuable Collection of Birds' Skins, Reptiles, and Crustacea, from Calcutta. *John J. Dixwell.*

Packages of Insect Pins. *James B. Gregerson.*

Professor N. M. Hentz's Collection of Insects; consisting of twelve thousand eight hundred specimens of native, and thirteen hundred of Foreign Insects. Cost $600.
A Friend, James Jackson, G. C. Shattuck, Amos Binney, B. D. Greene, D. Henshaw, F. C. Gray, Jonathan Phillips, John Randall.

October. Box of Minerals from Vesuvius, and a Birds' Nest with calcareous incrustation. *John H. Gray.*

Black Coral, from the Mediterranean. *Pietro Bachi.*

A Collection of twenty or thirty species of Marine Shells, from the East Indies. *John J. Dixwell.*

Balanus radiatus, (Lam.)—Tubularia indivisa—Tritonia (new species)—Actinia plumosa, (Cuv.)—and two species of Amphitrite (all from Mass.)—Cyprœa fimbriata —and C. irrorata, (Pacific). *Joseph P. Couthouy.*

Suite of Naiades, and Univalves, from near Chillicothe, Ohio. *Charles J. Ward.*

1836.

November. Two Boxes of Chinese Insects, and one Box of South American Insects. *Henry F. Baker.*

December. Skin of an Anaconda and Monkey. *William Smith.*

Balanus stalactiferus, (Lk.)—B. balanoides, (Linn.)—B. violaceus (Wood)—Cineras vittata, (Leach)—Otion

December. Cuvieri, (Leach), all from a vessel's bottom, coming from the East Indies—three species of Cones.
Joseph P. Couthouy.

1837.

January. Crepidula, Siphonaria, and Calyptræa, from Matanzas.
J. E. Teschemacher.

Isocardia Cor, (Fossil). *William Pratt, Jr.*

Collection of Plants, from Savannah and Indiana.
Mrs. Lucy Say.

Casts of thirteen newly discovered species of Ornithichnites. *Charles B. Adams.*

Specimen of Quartz. *Hubbard C. Currier.*

February. Gar Fish, from the Mississippi.
William S. Emerson, (Alton, Ill.)

Opalized Wood, from Hobartstown, New Holland.
Henry F. Baker.

Alabaster, Malachite, and several Fossils, from Wisconsin Territory. *William S. Emerson.*

Specimens of Loligo—several Reptiles—Crustacea, and Insects, from Pascagoula. *Nathan Barrett.*

March. Two Bottles of Reptiles, and a Snake's Skin, from Pernambuco. *J. P. Preston.*

Podiceps cornutus. *Thomas M. Brewer.*

Ampullaria, with the young in their Nidus, from Sumatra.
George Brown, (Beverly).

Two species of Monodonta, and Buccina, from Sumatra.
Joseph P. Couthouy.

Volcanic Specimens, from Fayal.
Ebenezer S. Brooks.

Head of an Egyptian Mummy, enclosed in a Bell Glass.
A Friend.

Specimens of Biche le Mer. *J. B. S. Jackson.*

April. Nest of Ploceus Phillipinus. *Thaddeus M. Harris.*

Three species of Conalix—Marginella Storeria, (Couthouy)—Helix serpentina—Columbellæ, from the Red Sea—Marginella quinqueplicata—and an Echinus, from Straits of Sunda—Cerithia, from New Holland.
Joseph P. Couthouy.

Eggs of the Ardea Ludoviciana—Pelecanus fuscus—Phalacrocorax Floridanus, and several others, from Florida.
Amos Binney.

A Sponge, attached to the Madrepore on which it grew, from the Red Sea. *F. C. Lowell.*

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ERRATA.

Page 141, one line from top, for "furticosa" read "fruticosa."
" 328, the upper figures should be transposed.
" 351, 9th line from top, for "ray" read "ring."
" 473, 12th " " " " " "XLIV." read "XLVI, A."

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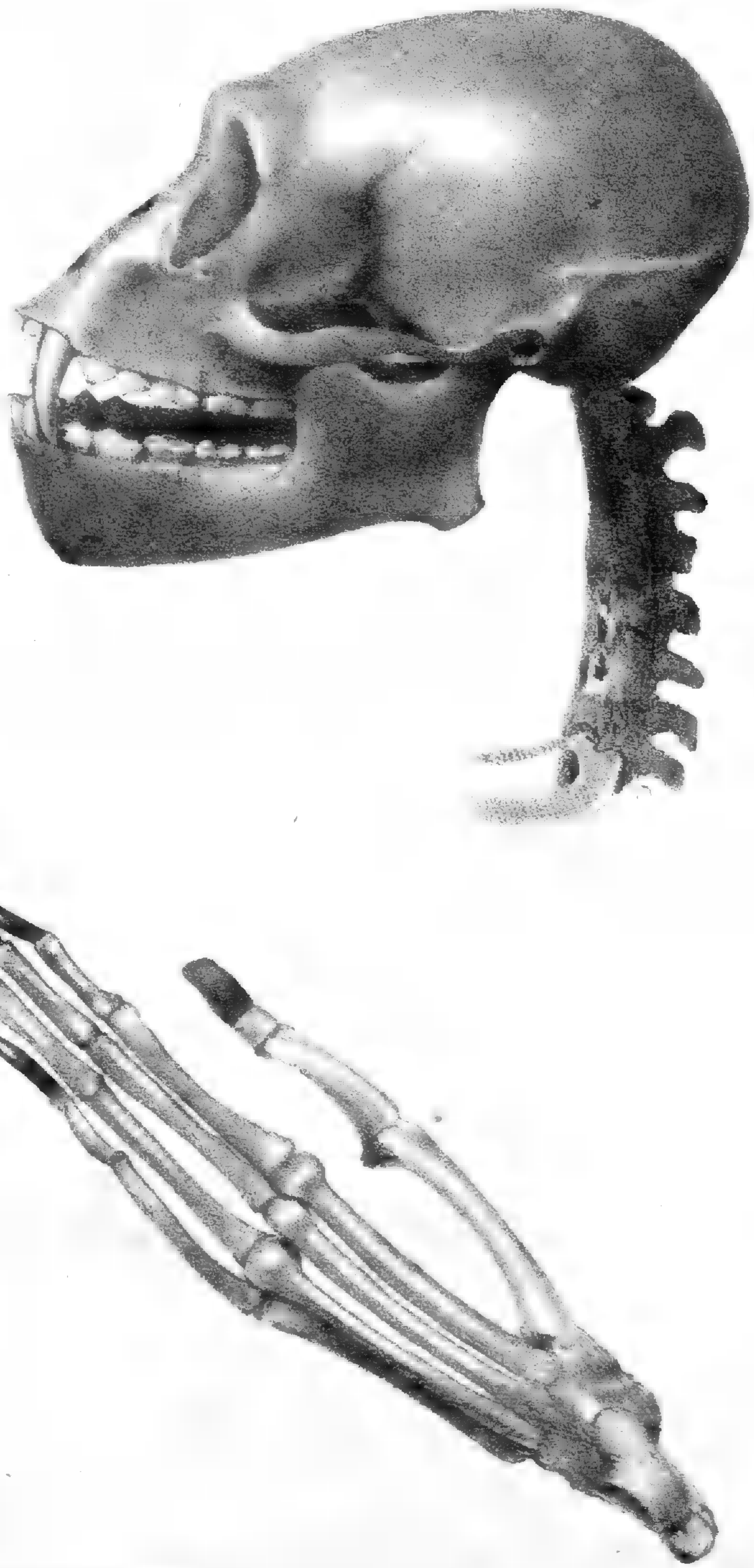
Pendleton's Lith.



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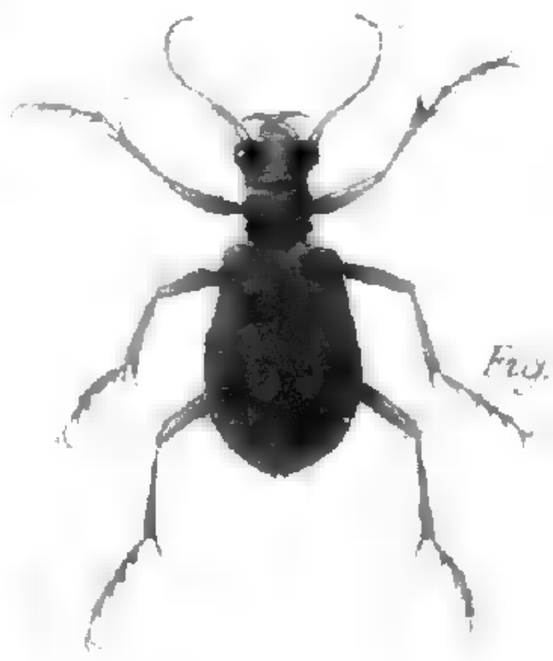

Fig. 1.

Fig. 2

Fig. 3

Fig. 4.

Fig. 5.

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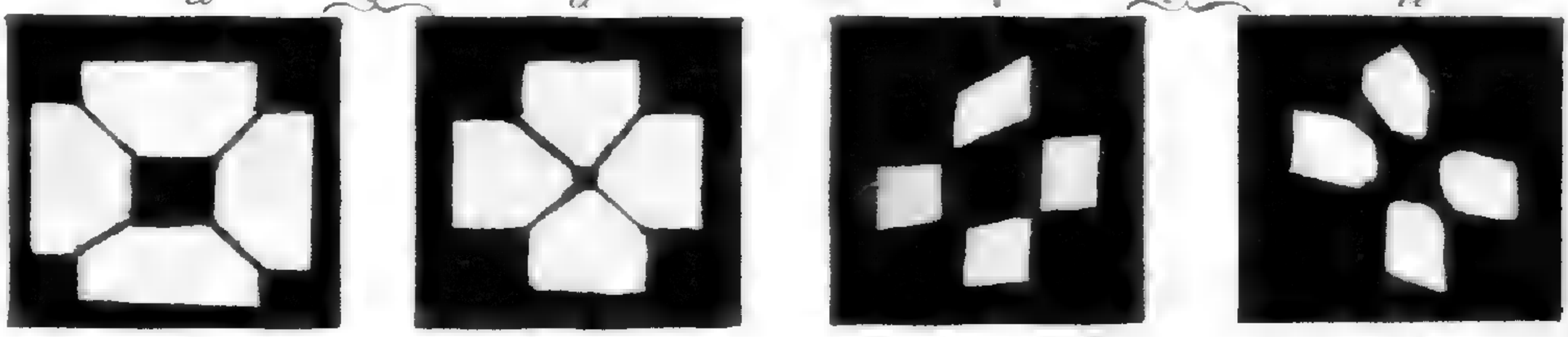
Sections of Macle Crystals.

a *Fig. 1* *b* *c* *Fig. 2* *d*



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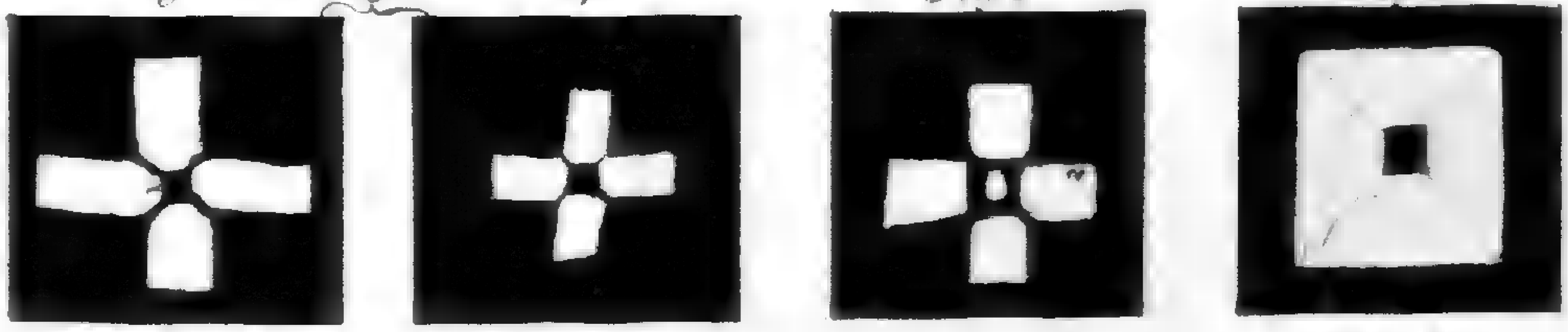

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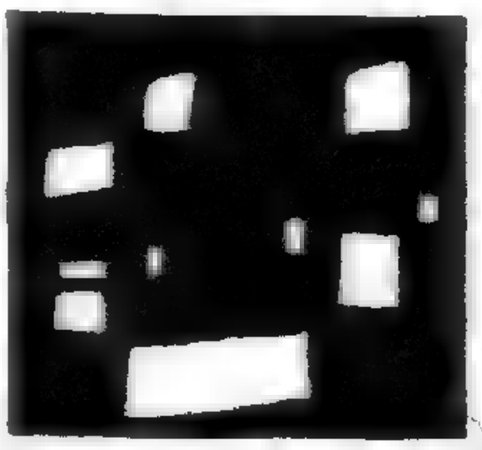

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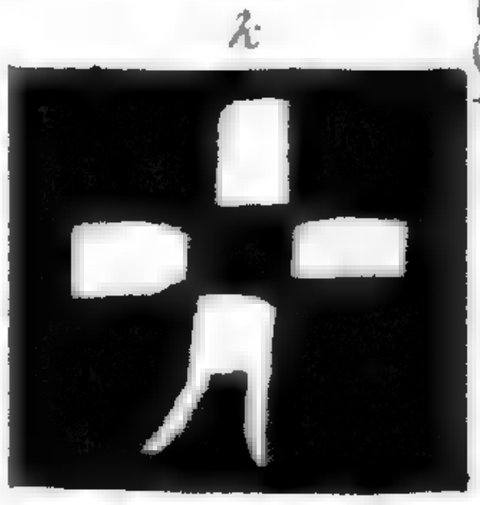

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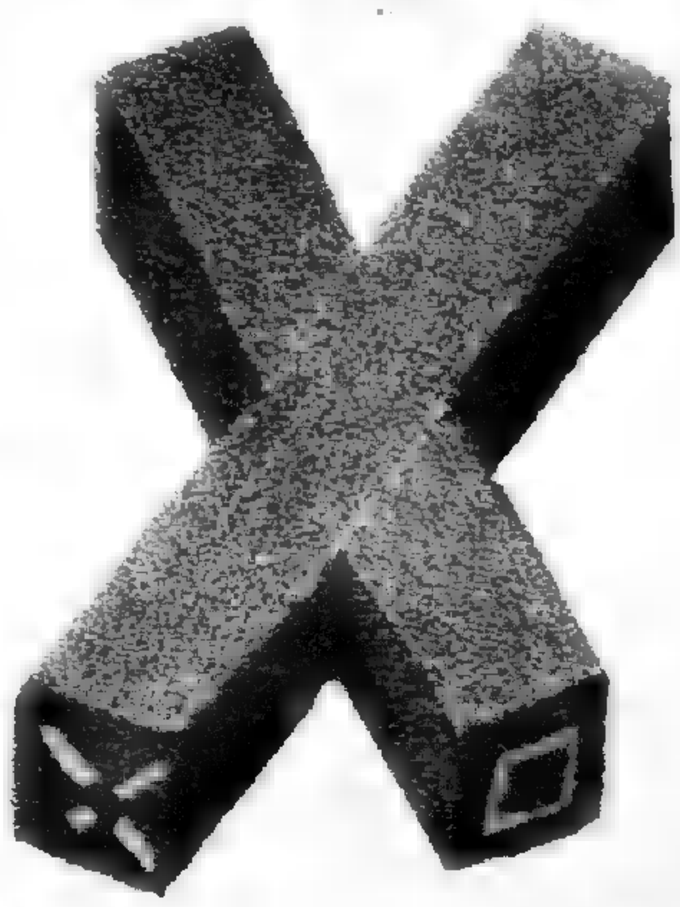

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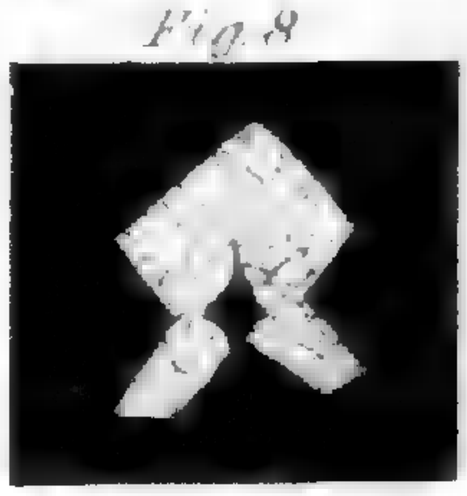


Fig. 9

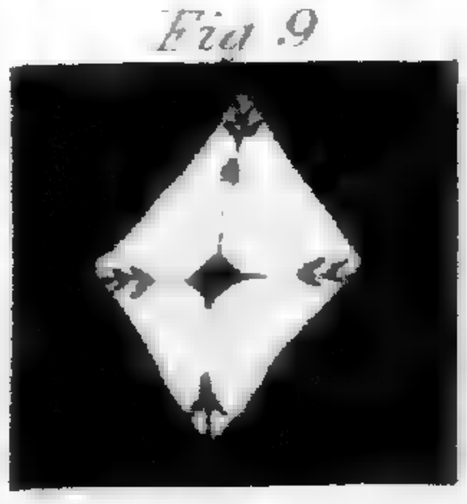


Fig. 10 *Fig. 11* *Fig. 12* *Fig. 13*

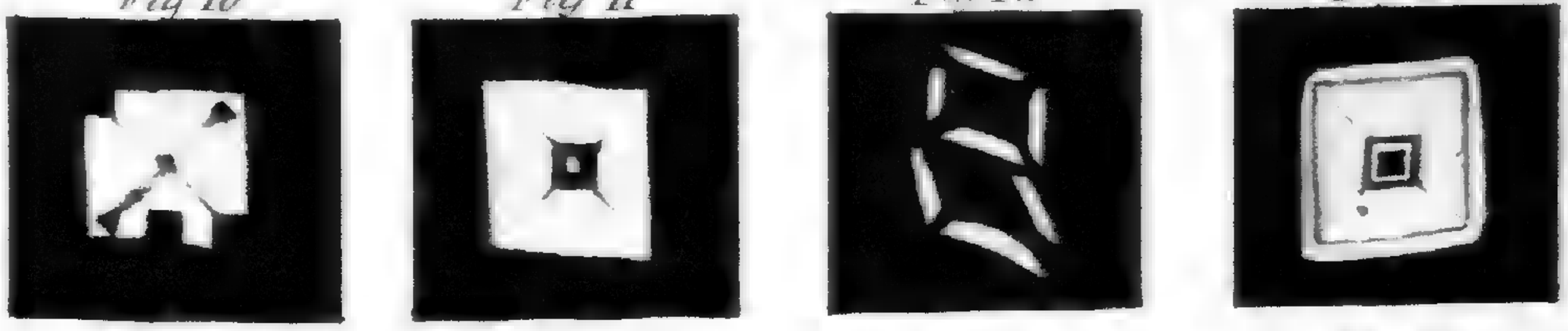


Fig. 14 *Fig. 15* *Fig. 16* *Fig. 17*

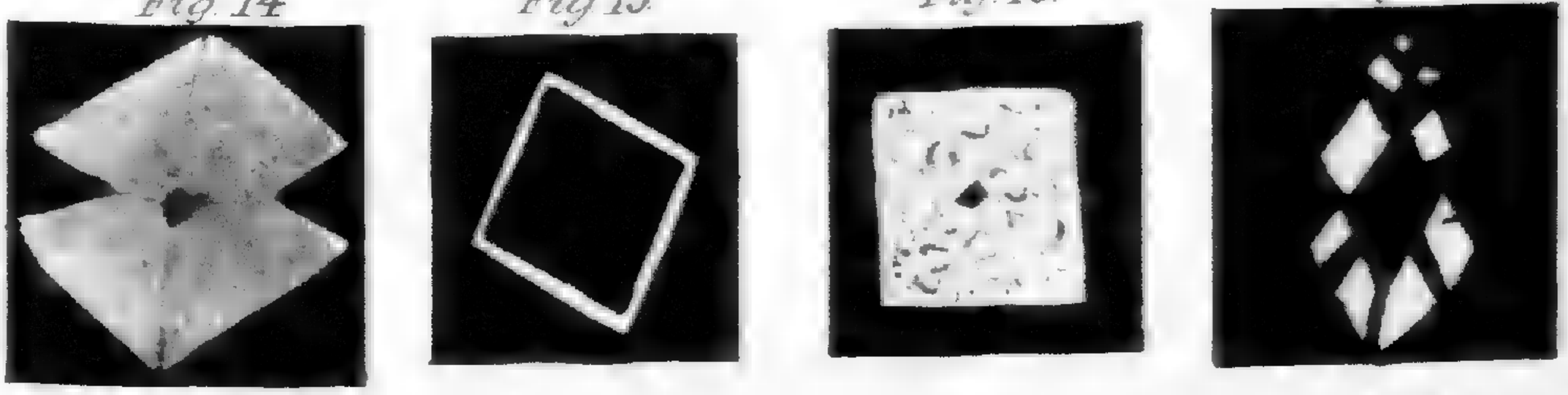
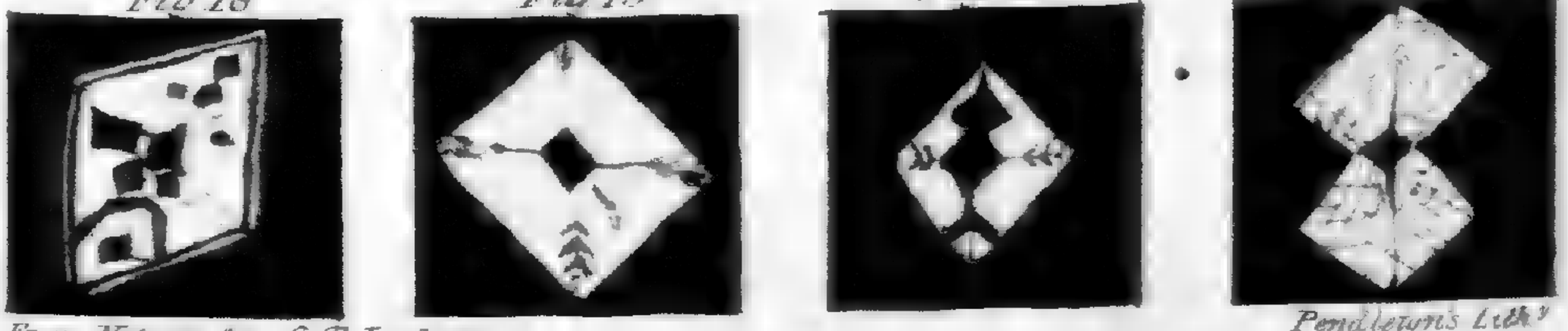


Fig. 18 *Fig. 19* *Fig. 20* *Fig. 21*



From Nature by C. T. Jackson

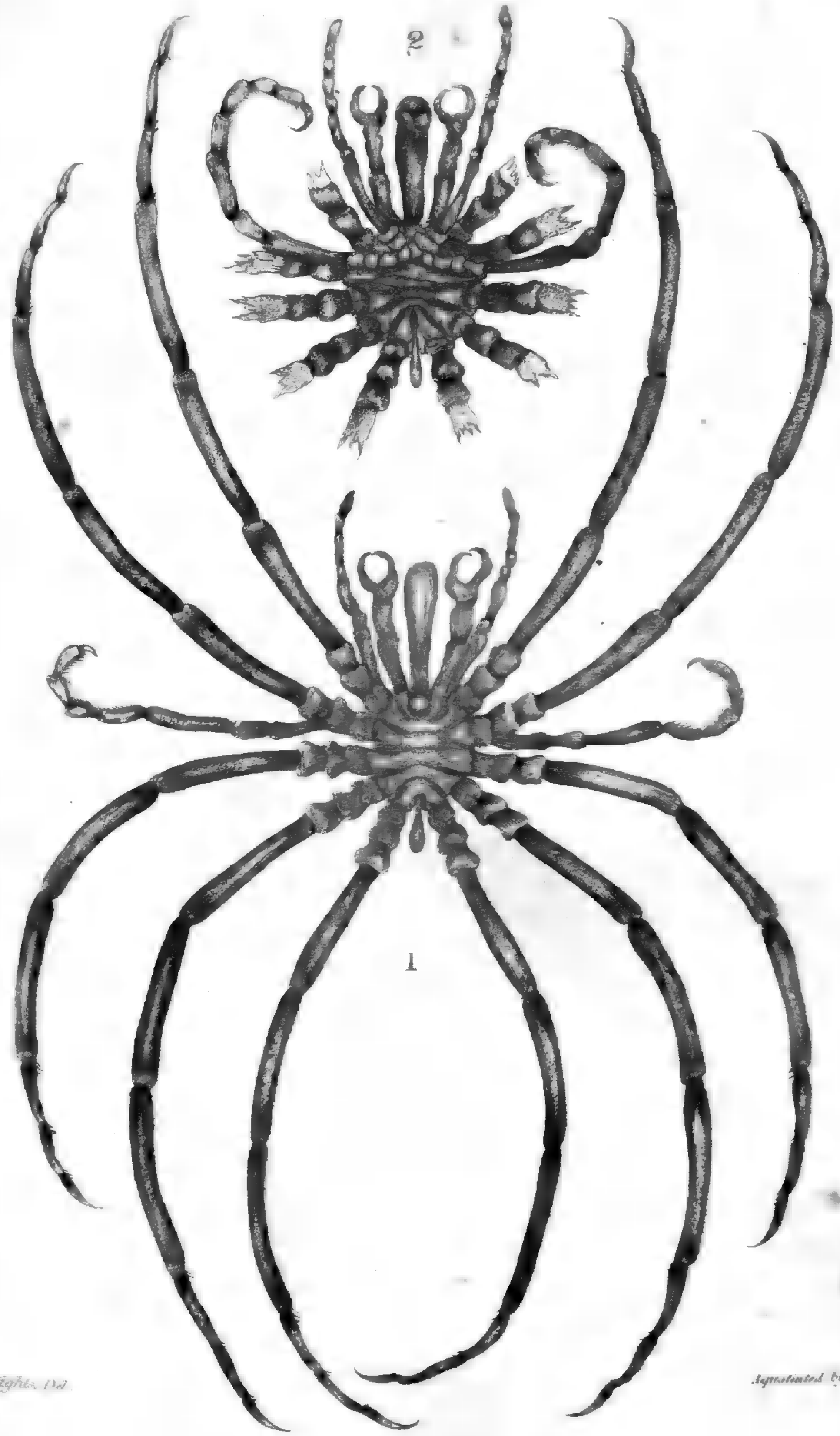
Pendleton's Lith.

Fusus Arnanus

B E Nutting lith. from Nature. *Pendleton's Lith.y*

Fusus Aruanus.

B.F.Nutting—from Nature *Pendleton's Lith.*

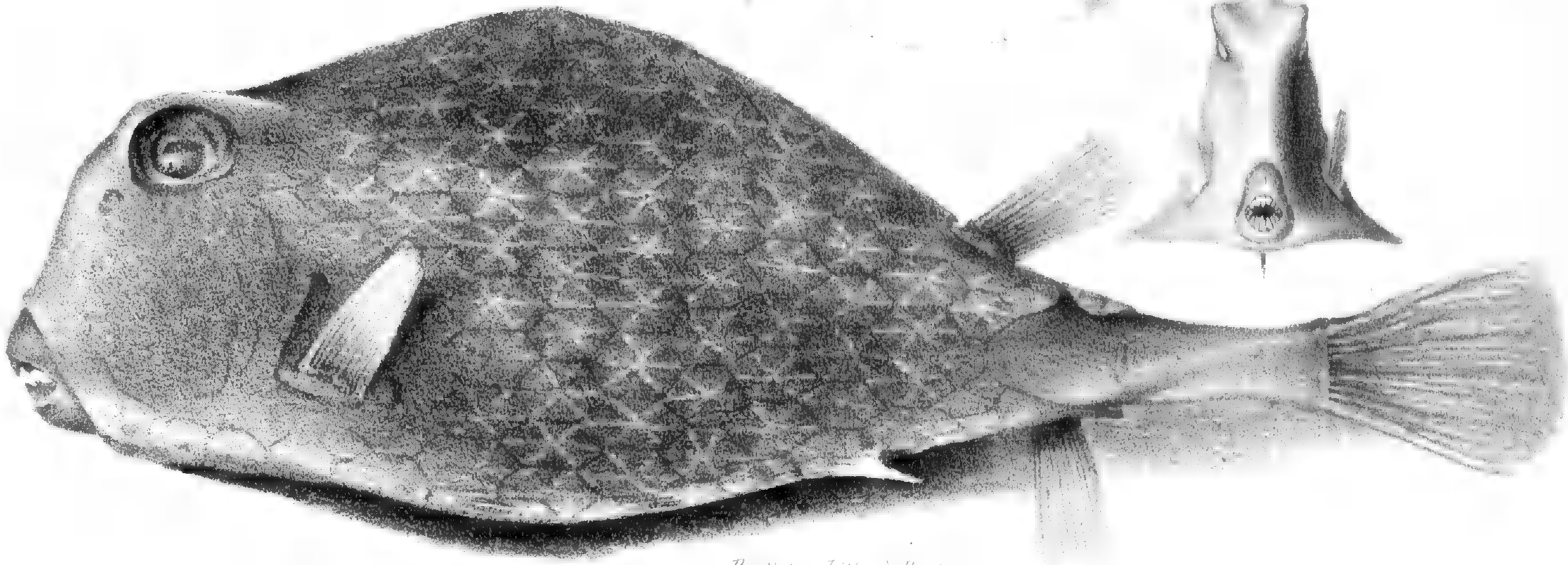


James Eights Del.

Aquatinted by Wm. Smith.

Crustacea amphipoda.—EIGHTS.

Pl. 8.



Pendleton's Lith. Boston

Ostracion Valei. (Storer.)

Fig 1.

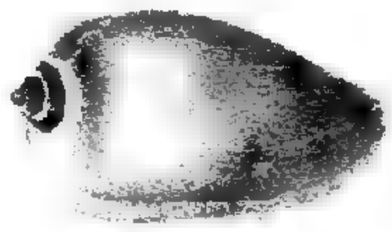
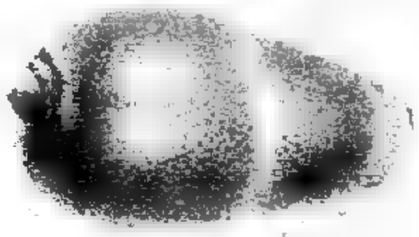


Fig 2

Fig 3.



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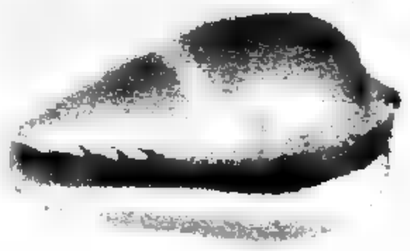
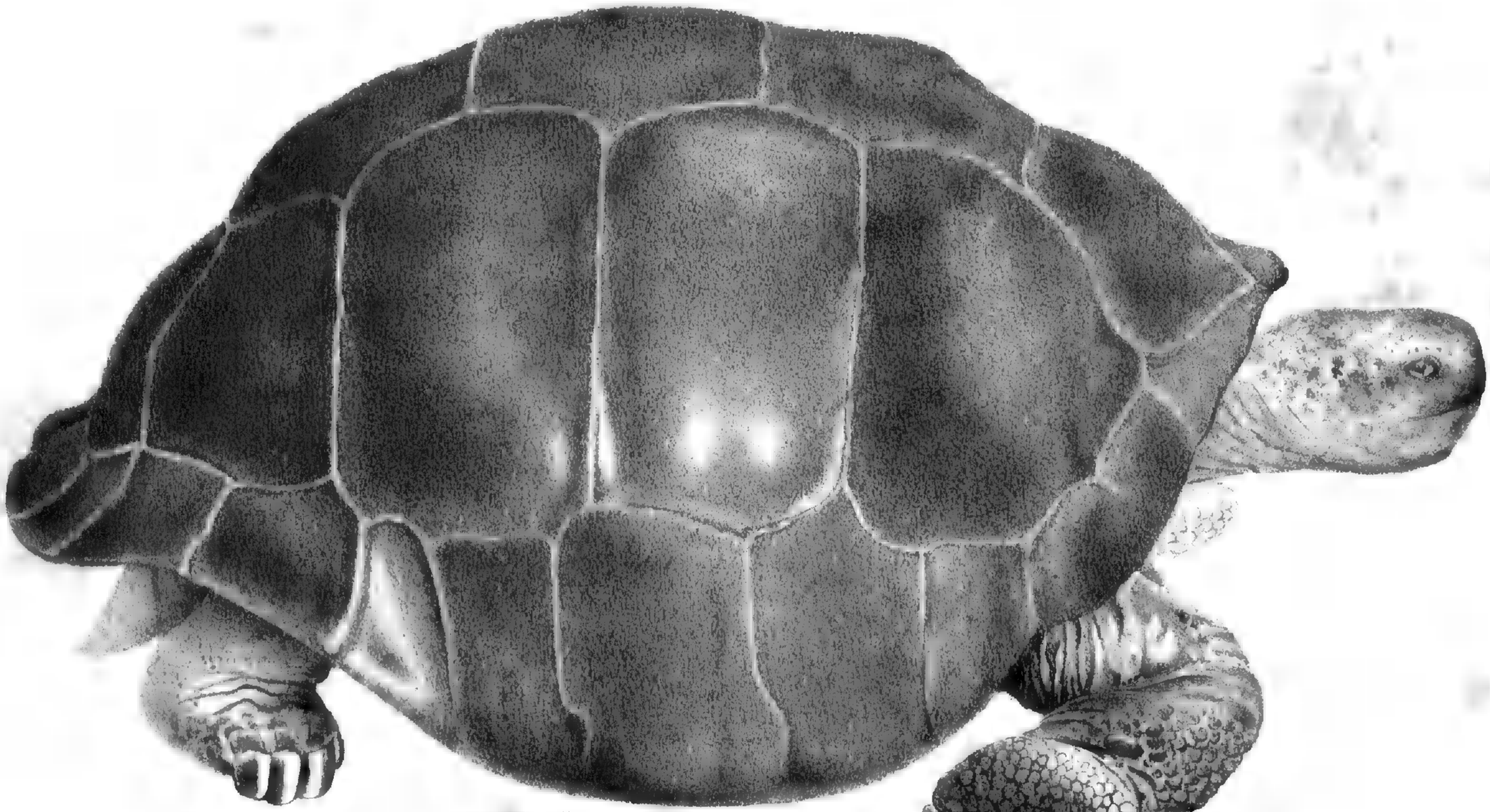


Figs 1. 2. *Marginella Storeria* — COUTHOUY.

3. 4. *M. Carnea* — STORER.

Morris Elkay? Boston

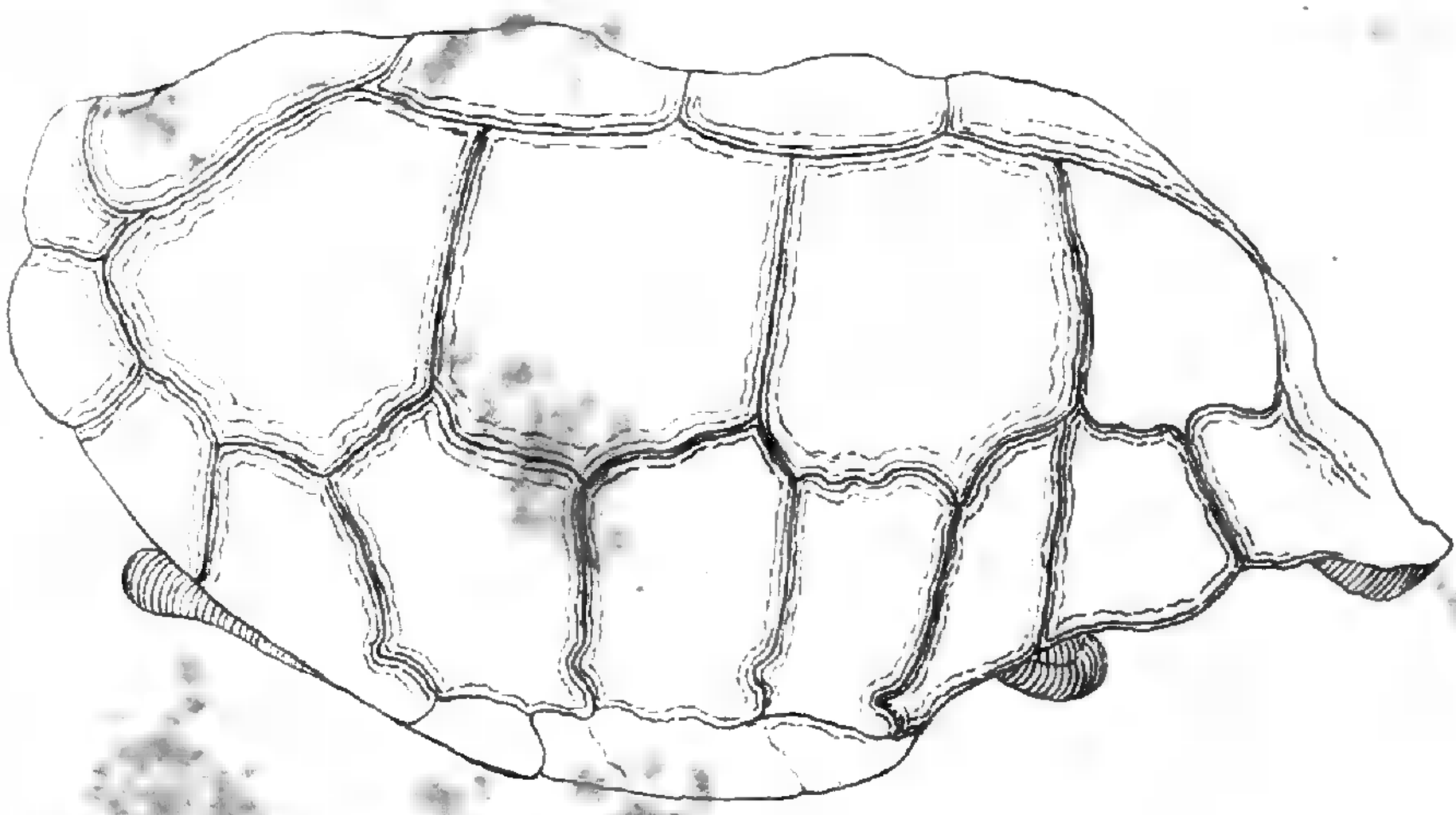
PL. X.

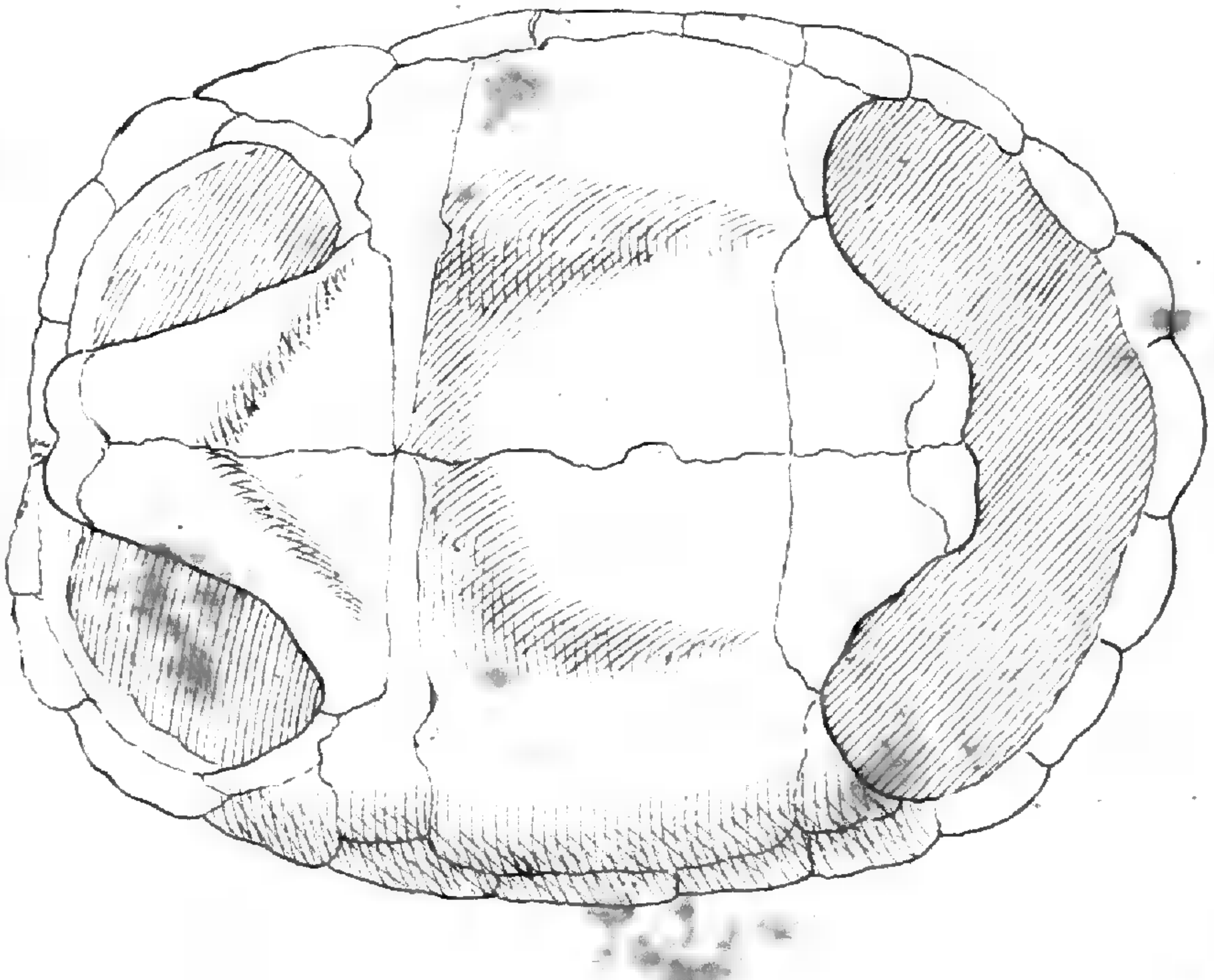


G. F. Nolling del.

Testudo Elephantopus, HARLAN.

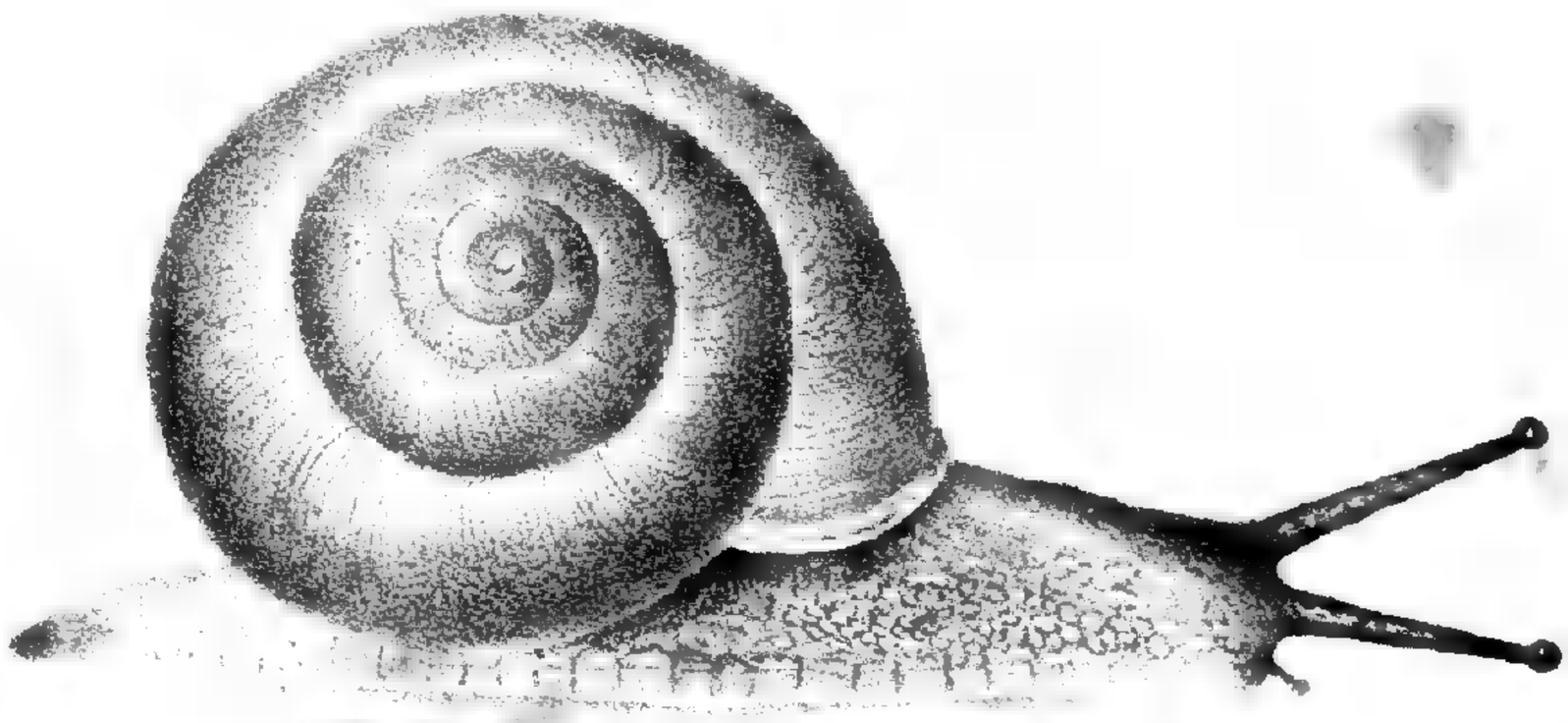
T. Moore's Lithography, Boston





H. Major.

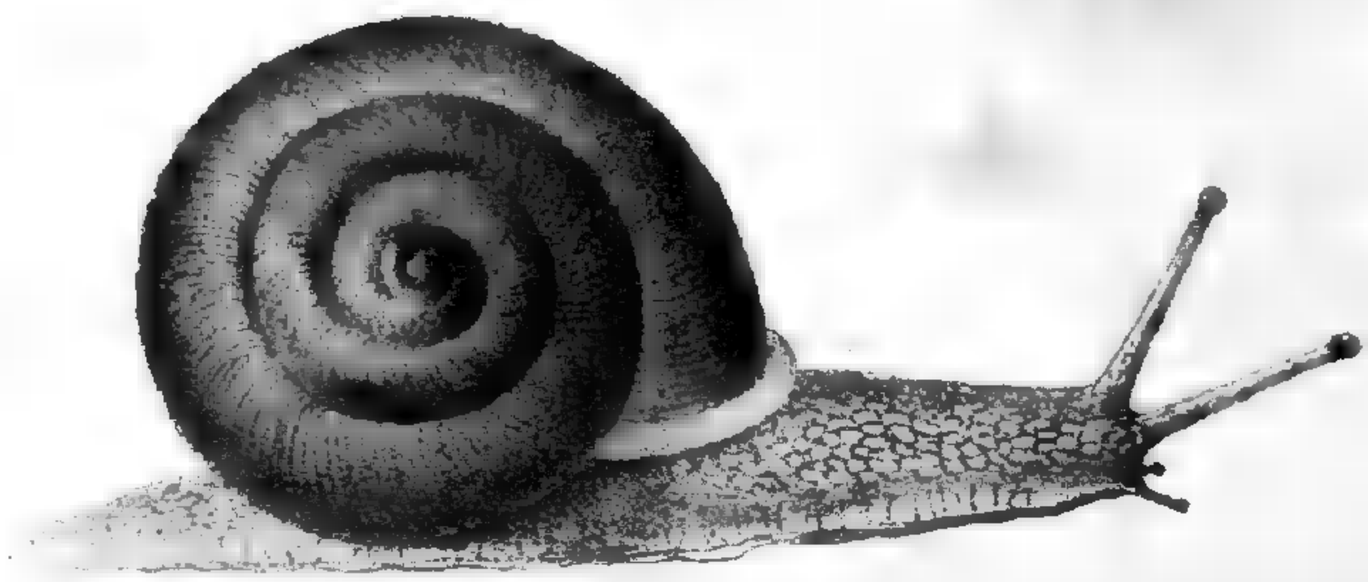
Pl. 12.

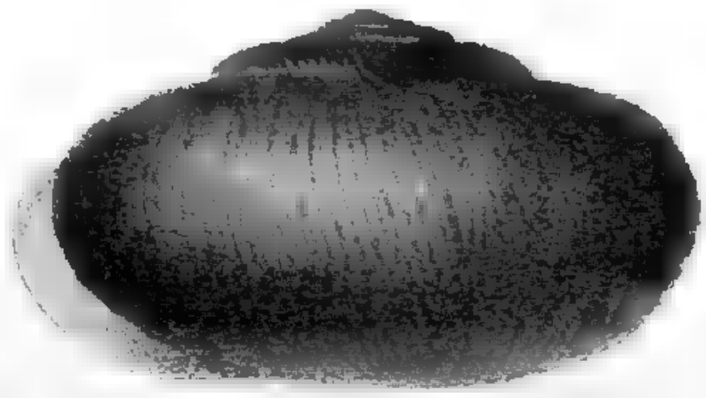


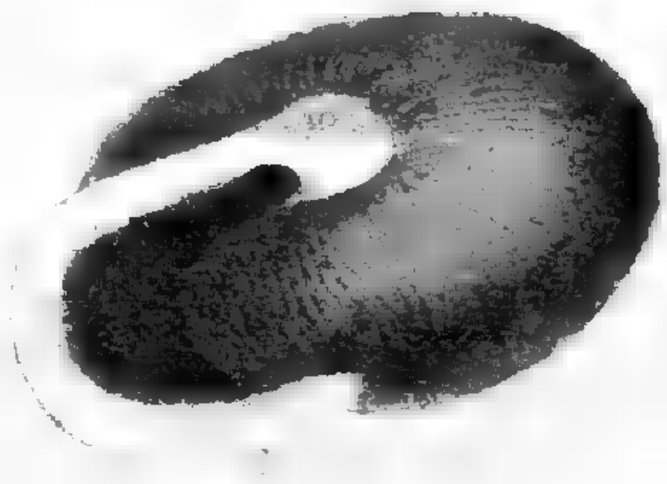
B F Nutting del.

Jenkins' Lith.

H.Albolabris. Pl. 13.

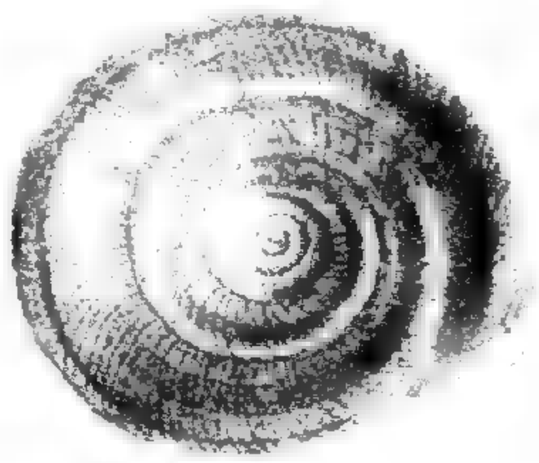


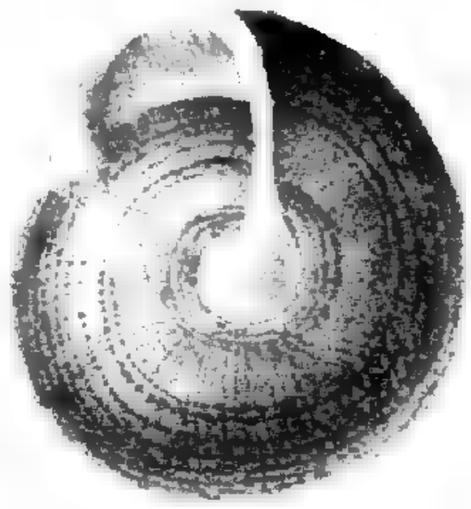




B F Nutting del

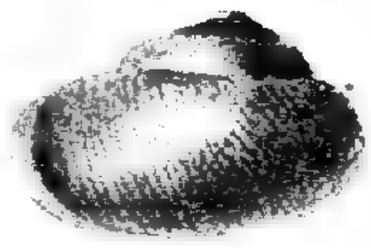
Moore's Lith.





H.Clausa

Pl.15.



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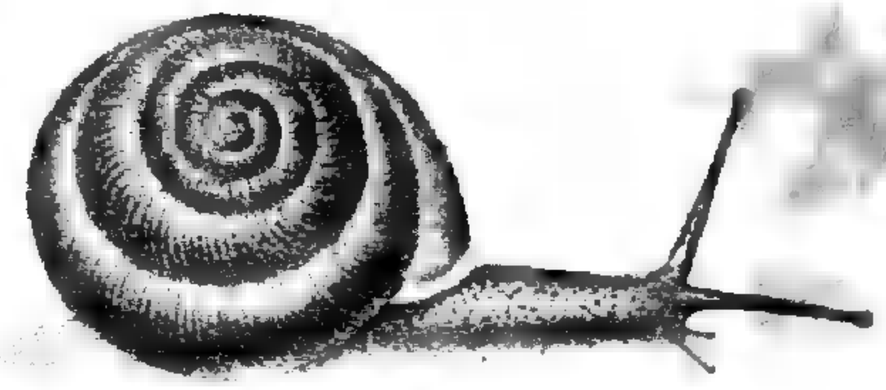
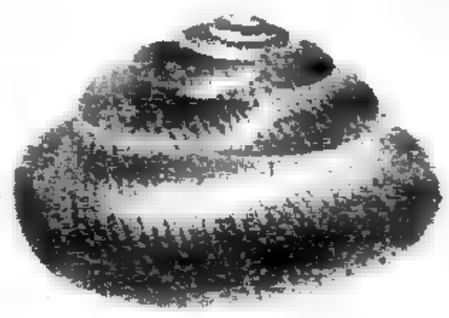
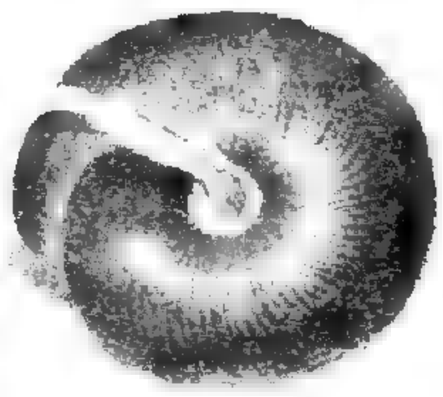
Jenkins' Litho.

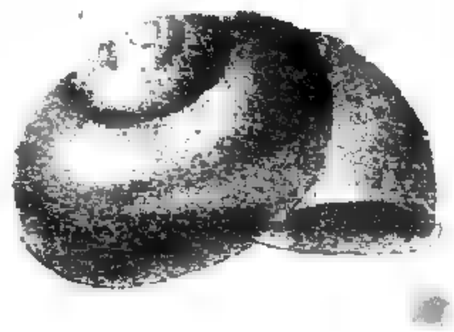






H. Subglobosa

Pl 17



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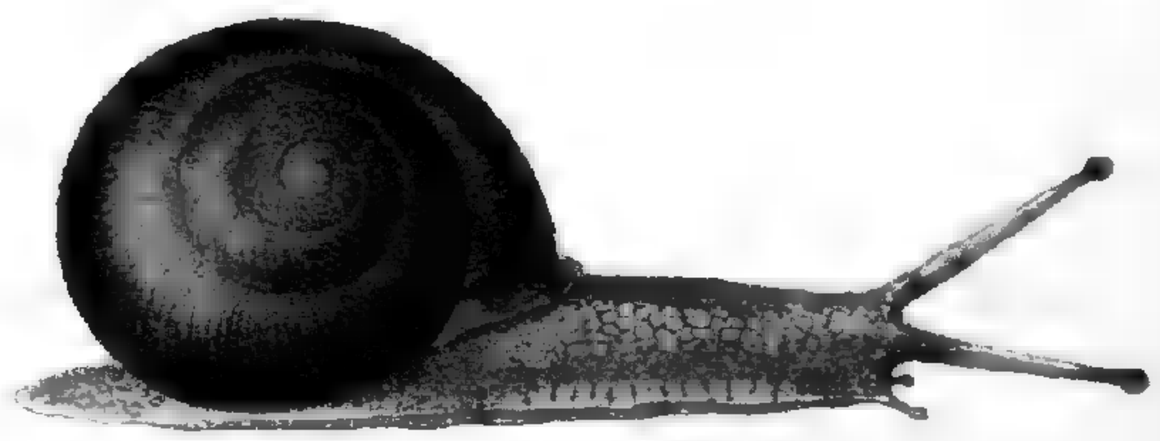
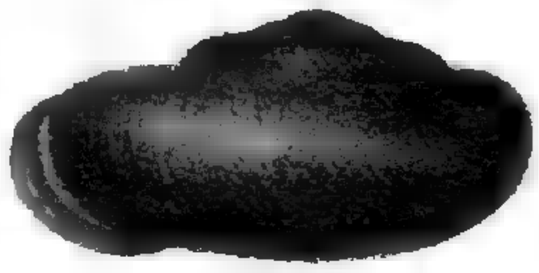
Frankfurt Lith.

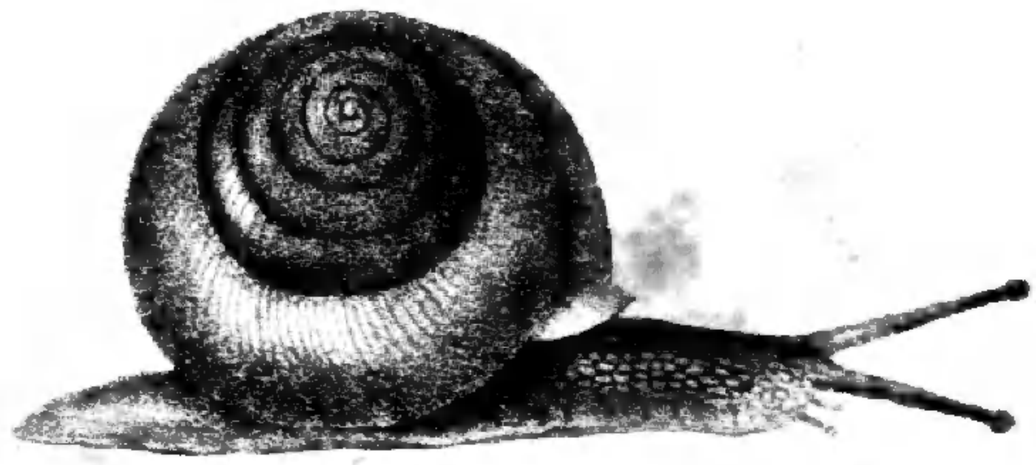
H. Thyroidus. Pl. 18.

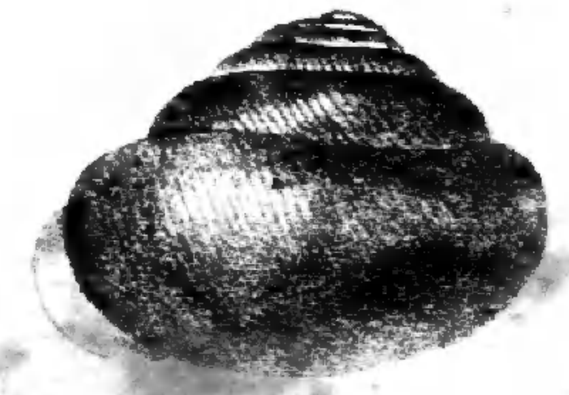




B F Nutting del

Moore's Lith.





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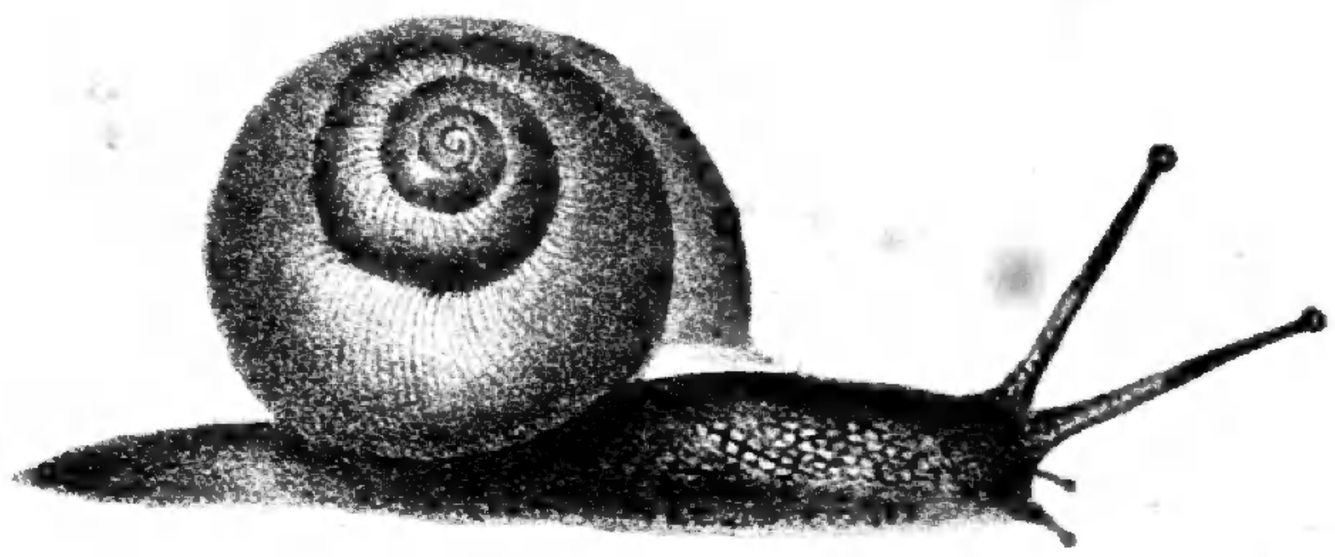
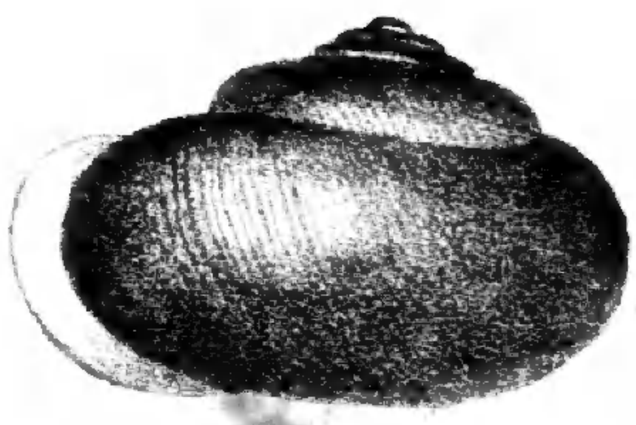
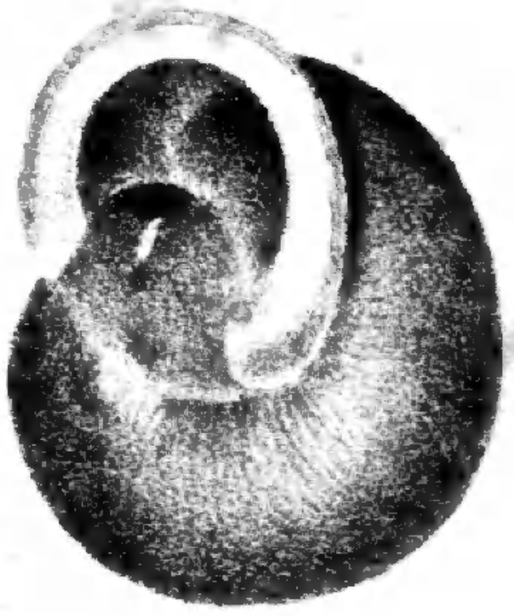


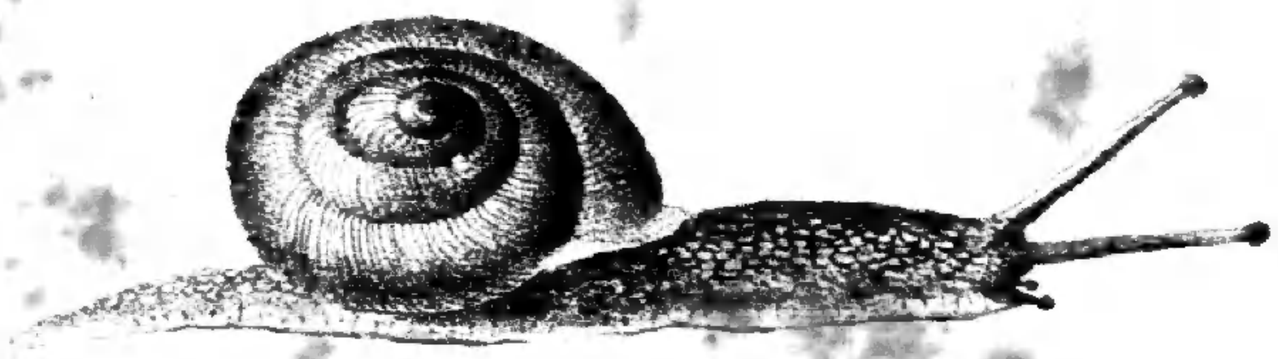




B. F. Nutting del

Jenkins' Lith.

H. Dentifera. Pl 21.



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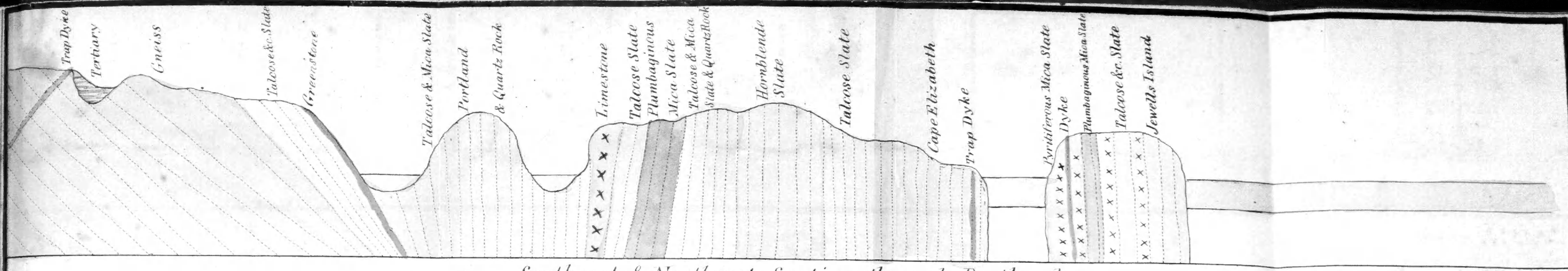
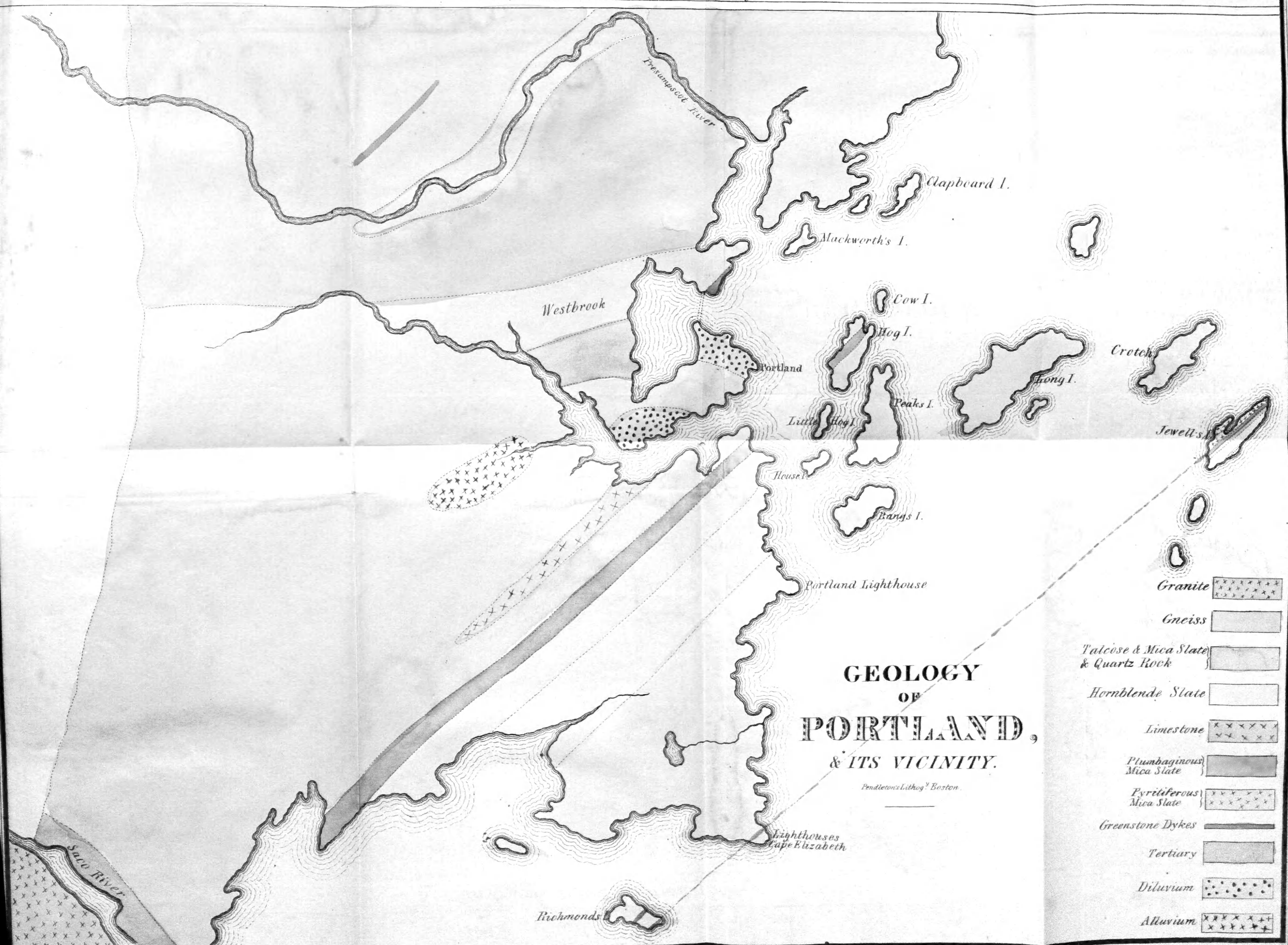
Southeast & Northwest Section through Portland.