

BOSTON

JOURNAL OF NATURAL HISTORY,

CONTAINING

PAPERS AND COMMUNICATIONS,

READ TO THE

BOSTON SOCIETY OF NATURAL HISTORY,

1859—1863.

PUBLISHED BY THEIR DIRECTION.

VOL. VII.

LIBRARY
~~NEW YORK~~
BOTANICAL
GARDEN

BOSTON:

MDCCCLXIII.

X D
.063
N. 7
1859-63

PUBLISHING COMMITTEE:

AUGUSTUS A. GOULD,	SAMUEL L. ABBOT,
CHARLES K. DILLAWAY,	JEFFRIES WYMAN,
SAMUEL H. SCUDDER.	

RIVERSIDE, CAMBRIDGE:
PRINTED BY H. O. HOUGHTON.

THIS volume completes the octavo series of the "Journal." The second series will appear in quarto form, under the title:—"Memoirs read before the Boston Society of Natural History."

Publishing Committee.

CONTENTS.

		PAGE
ART. I.	A supplement to the "Terrestrial Mollusks of the United States, &c." By W. G. BINNEY . . .	1
ART. II.	Observations upon the Geology and Palæontology of Burlington, Iowa, and its vicinity. By CHARLES A. WHITE	209
ART. III.	On the Hymenoptera of the genus <i>Allantus</i> in the United States. By EDWARD NORTON	236
ART. IV.	Descriptions of new species of Crinoidea from the Carboniferous Rocks of the Mississippi Valley. By JAMES HALL	261
ART. V.	Notes on new species of Microscopical Organisms, chiefly from the Para River, South America. By LORING W. BAILEY	329
ART. VI.	Contributions to the Comparative Myology of the Chimpanzee. By BURT G. WILDER	352
ART. VII.	On alternate generation in Annelids and the embryology of <i>Autolytus cornutus</i> . By A. AGASSIZ	384
ART. VIII.	Materials for a monograph of the North American Orthoptera, including a Catalogue of the known New England species. By SAMUEL H. SCUDDER	409
ART. IX.	Observations on the summit structure of Pentremites, the structure and arrangement of certain parts of Crinoids, and Descriptions of new species from the Carboniferous Rocks at Burlington, Iowa. By CHARLES A. WHITE	481
ART. X.	Descriptions of the Fossil Plants collected by Mr. George Gibbs, Geologist to the United States Northwest Boundary Commission, under Mr. Archibald Campbell, United States Commissioner. By Dr. J. S. NEWBERRY	506

	PAGE
ART. XI. On <i>Arachnaectis brachiolata</i> , a species of floating Actinia found at Nahant, Massachusetts. By A. AGASSIZ	525
ART. XII. Prodomus of the history, structure, and physiology of the order Lucernariæ. By Prof. HENRY JAMES-CLARK, of Harvard University, Cambridge, Mass.	531
ART. XIII. Monograph of the genus <i>Callinectes</i> . By ALBERT ORDWAY	567
ART. XIV. On the Fossil Crab of Gay Head. By Dr. WILLIAM STIMPSON	583
ART. XV. On Synthetic Types in Insects. By A. S. PACKARD, Jr.	590
ART. XVI. Description of a "White Fish" or "White Whale" (<i>Beluga borealis</i> Lesson). By JEFFRIES WYMAN, Prof. of Anatomy in Harvard College	603
ART. XVII. Remarks on some characteristics of the Insect Fauna of the White Mountains, New Hampshire. By SAMUEL H. SCUDDER	612

BOSTON

JOURNAL OF NATURAL HISTORY,

CONTAINING

PAPERS AND COMMUNICATIONS,

READ BEFORE THE

Boston Society of Natural History,

AND PUBLISHED BY THEIR DIRECTION.

VOL. VII.—NO. IV.

PUBLISHING COMMITTEE.

AUGUSTUS A. GOULD,

CHARLES K. DILLAWAY,

SAMUEL L. ABBOT,

JEFFRIES WYMAN,

SAMUEL H. SCUDDER.

BOSTON:

1863.

tube is the narrow muscle which Keferstein describes, along which the saccules are attached]: ("four cylindric or flat bundles of muscular fibres, free in the gelatinous mass,") [according to Keferstein's figure the muscular cords are situated half-way between the centre and surface of the pedicel]: ("the radial muscles of the swimming sac" [oral side of the disc] "occupy the middle line of each arm,") [running from the proximal end of the partitions; as in *H. auricula*, this is, doubtless, merely a more strongly developed margin of the principal muscles which occupy the whole area about the partitions, between the genitals]; ("gelatinous mass" [gelatiniform layer of the aboral side] "a massive layer; it fails in the swimming sac," [oral side]; "in the stem solid between the four tubes,") [as in the two foregoing species]: ("on the surface of the swimming sac [the oral side] heaps of nettling capsules lie in little pockets").* Geographical distribution: Norway, Sars; St. Vaast la Hogue, north coast of France, Keferstein.†

Art. XIII. — *Monograph of the Genus Callinectes.* — By
ALBERT ORDWAY.

[Communicated Jan. 7th, 1863.]

[The following paper consists of selections from notes made by Lieut. Ordway during his study of the *Portunidæ* with the view of monographing that group of Crus-

* While the above was in press, I received specimens of this species from Keferstein, and am able, therefore, to confirm what I have quoted from this author.

† I would be glad to receive from the European coast specimens of any of the Lucernarians, and most especially of the following: *Craterolophus Thetys*, *C. convolvulus*, *Depastrum cyathiforme*, *Halielystus octoradiata*, for which I will send in exchange abundant specimens of our common *Halielystus auricula*. I will state that I have already sent specimens to Europe *by mail*, in little bottles about an inch and a quarter long, inclosed between two pieces of cork hollowed out. *Henry James-Clark, Harvard University, Cambridge, Massachusetts.*

tacea, a study which was abruptly broken off at the commencement of the present war. This will account for any want of completeness which may appear in the article, and for the absence of figures, which were necessarily left unfinished. The high degree of interest attaching to the discovery of such remarkable differences in the appendages to the male abdomen of forms supposed to be the same by all previous carcinological writers, may serve as an excuse for presenting the paper in its present incomplete form, against the original intentions of its author. — William Stimpson.]

CALLINECTES HASTATUS Ordway.

Lupa hastata Say, Jour. Acad. Nat. Sci. Philad., i. 65.

Carapax in adult specimens about twice as broad as long; anterior portion sparsely granulated, cardiac and branchial regions more finely and densely so; areolations quite distinctly marked, but not so strongly as in *diacanthus*. Teeth of the antero-lateral border conical and pointed, with the sides concave in adult specimens; posterior tooth more than twice as long as the others. Anterior edge of the carapax, that is, the orbit of the eye and the front, finely beaded. Front with two broad, inequilateral, triangular teeth, there being no median teeth present. Sub-median tooth of front rather broad and conical, and well developed. Lower margin of the orbit strongly beaded, in adult individuals with a slight spinous armature at its interior angle. Pterygostomian region densely pubescent in its posterior portion, but towards its anterior portion almost naked; — perhaps the hair is here worn away by the action of the chelipeds. Abdomen of male rather broad; last segment broad and triangular; penultimate segment constricted near the base, with a concave lateral outline. The intromittent organs are very long, reaching almost, or quite, to the extremity of the abdomen. They have two curves,

curving first inwards from near the base for over two thirds of their entire length, even so as to touch each other, and then with a strong curve outwards to their termination. Abdomen of the female almost circular in its outline, extremely broad, completely covering the sternum posteriorly, its second segment being but little narrower than the others. Chelipeds rather heavy. Meros with three stout spines on its interior border, and one slightly developed one on its external anterior angle. Carpus with two somewhat granulated ridges, the outer one of which is sometimes produced into a rather obtuse spine. Manus with a stout spine at the point of its upper articulation with the carpus, and a small one near its point of articulation with the dactylus. The carpuses of the first three pairs of ambulatory feet have two very small spines on their upper side, one of them, however, being sometimes almost obsolete. The meros joint of the external maxillipeds is sharply truncate at its anterior extremity, and its external angle is rather sharp.

Having had before me hundreds of specimens of this species, I have been able carefully to study all of its variations or departures from the normal form, and some of the changes that it undergoes in its growth. Though in the adult the breadth of the carapax is twice its length, the young are much narrower, — in small specimens, say half an inch long, it is not more than *one and a half* times as broad as long. The teeth of the antero-lateral border, which in the adult are sharp, with concave sides, are in the young broad and conical, with almost convex sides. The chelipeds also increase in length with age. When young, the intromittent organs are also very short, in specimens from one half to one inch in length, not more than two thirds the length of the tail, and almost straight, growing longer and curving as they advance in age. The penult segment of the abdomen is not laterally concave, as it

is in the adult. The pterygostomian region appears to be pubescent over its *whole* surface in the young. In the young there also appears to be no development of the internal angle of the lower margin of the orbit into a spine.

The development of the spine on the carpus of the cheliped does not seem to be controlled by growth, but to be wholly irregular.

There are some anomalies not referable to growth, and which we would naturally expect in examining many hundred specimens. Sometimes we find specimens having four spines on the anterior border of the meros of one cheliped, but in no specimen have I seen it on both chelipeds. In one specimen from Hayti there are on the carpus of the left cheliped two spines, the second being at its point of articulation with the manus; another specimen from the same locality has the same thing on the right cheliped. I have seen a few specimens in which, although it could not be said that there was a development of two extra rudimentary teeth on the front, there was yet a slight waviness of the edge, which is rather a persistence of the embryological character than a variation.

Color of living specimen: carapax, and the upper side of the chelipeds and ambulatory feet, olive green. The inside of the chelipeds and sides of ambulatory feet, bright blue. The dactyli of the chelipeds of the female are of a bright red color and tipped with purple; those of the male are of a bright blue tipped with purple.

Range, from Nantucket to Mobile, and perhaps even down to the Brazil coast. Its centre of distribution appears to be Chesapeake Bay.

CALLINECTES ORNATUS, nov. sp.

Carapax evenly convex, not quite so broad as in *hastatus*, and with the areolations not so distinctly marked as to prevent the carapax from having a smooth, even appearance. The cardiac and intra-medial regions are narrow and elongated. Granulations of the carapax nearly the same as in *hastatus*, except that they are rather more thickly scattered.

Front prominent, four toothed. The outer teeth conical and obtuse, the two inner ones small, almost rudimentary. Sub-median tooth longer and more narrow than in *hastatus*. Teeth of the antero-lateral border very broad, with strongly convex and somewhat granulated sides. The interior angle of the lower margin of the orbit somewhat prolonged into a rounded obtuse tooth. The pterygostomian region is pubescent, although it is quite difficult to determine to what extent, from alcoholic specimens, in which the hair is often worn off. I have, however, a small female in which the whole pterygostomian region is pubescent. The pubescence may decrease with age, being worn off by the rubbing of the chelipeds, or gradually disappearing at successive moultings.

The sternum is quite flat, and its first segment and the episternal pieces of the first segment are different from those of *hastatus*. The abdomen of the male is quite narrow; the penultimate segment has its sides slightly and regularly concave; the antepenultimate segment narrows much more rapidly than in *hastatus*. The intromittent organs are straight and short, reaching to the middle of the penult segment of the abdomen. The abdomen of the female is not so broad as in *hastatus*, only covering the last segment of the sternum, and is much narrower anteriorly, so that it has a more triangular appearance than that of *hastatus*.

The chelipeds are nearly the same as in *hastatus*, and have the same development of spines on the different joints; they are, however, a little longer, and the lamelli-form projection on the trochanter that laps over the coxal joint is smaller and more rounded. There is only one spine on the carpus of the ambulatory feet, with numerous little spiniform projections; on the third pair only the small spiniform projections appear to be present.

This species is easily recognized, and can in no way be confounded with *hastatus*. The great difference in the intromittent organs, the very narrow and almost straight abdomen of the male, with the striking narrowness of the cardiac and intra-medial regions of the carapax, enable us to distinguish this species without difficulty.

It is lightly and brightly colored, and extremely different in that respect from *hastatus*. But I have only an imperfectly colored drawing, from which I would not attempt a description of the colors.

I have not had before me such an immense mass of specimens of this species as of *hastatus*, and of course have not been so well able to trace the growth and variation of the species.

A small specimen from Texas, apparently belonging to this species, has the posterior tooth of the antero-lateral border perfectly straight, without curving at all forwards as it generally does. It also has a faint trace of a development of two extra spines on the carpus of the chelipeds.

I have seen but one female of this species, and in that the carapax is much more convex than in any of the males. Out of nearly one hundred specimens of this species from Tortugas, there was not a single female.

Its geographical distribution is different from that of *hastatus*, being much more southern. Specimens in the Museum of Comparative Zoology are from Cumana, Capt. Couthouy; Hayti, A. Hillembach; Bahamas, Dr.

Bryant; and Tortugas, Dr. Holder. It has also been found in Charleston Harbor, by Prof. Agassiz. It is about two thirds the size of *hastatus*.

CALLINECTES LARVATUS, nov. sp.

Carapax quite narrow, strongly convex, and very uneven — the areolations being very strongly marked. It is granulated in the same way as *ornatus*, though rather more coarsely. The teeth of the front resemble those of *ornatus*, but are more developed and obtuse. Sub-median tooth of front long and narrow. The teeth of the antero-lateral border are long, quite obtuse, separated from each other at their base, and even curved slightly forward. Interior angle of the lower margin of the orbit prolonged upwards into a very prominent tooth, as large as those of the lateral border and very obtuse. Pterygostomian region pubescent. Sternum quite narrow, and slightly convex. Abdomen of the male very similar to that of *ornatus*, but the intromittent organs are very different, being very short and curved, scarcely reaching beyond the base of the penult segment of the abdomen. The abdomen of the female is rather narrow. Chelipeds slightly longer than in *ornatus*. Manus with the costæ very prominent. Carpus quite rough, with three distinct ridges, and scattered granulations; armed with one spine, and with the rudiments of two others generally distinctly visible and even sometimes developed. Meros and manus with the same number of spines as in *ornatus*. The lamelliform projection of the trochanter is broad and square.

This species is most nearly allied to *ornatus*, but can easily be distinguished from it. The striking differences in the intromittent organ and carapax are fully sufficient to enable us to recognize it.

One specimen of this species has *five* spines on the meros joint of *one* cheliped, and two others have four.

Its size is about that of *ornatus*. Found at Key West, Florida, J. E. Mills; at the Tortugas, J. E. Mills; at the Bahama Is., Dr. Bryant; and at Hayti, Dr. Weinland.

CALLINECTES TUMIDUS, nov. sp.

Carapax quite convex, broad, and roughly granulated, with the areolations quite distinctly marked. Antero-lateral border much more arcuated than in any of the preceding species, and provided with very broad and large teeth curving slightly forwards, with convex sides. Posterior tooth very slightly prolonged, differing in this respect from any other species of the genus that we now know. Front armed with four obtuse, sub-equal teeth. Interior angle of the lower margin of the orbit developed into a rounded and somewhat prominent tooth. Sternum flat; in the only adult male specimen that I have, it is even slightly concave. Abdomen of the male slightly broader than in *ornatus* and *larvatus*, penultimate segment quite short, and with a slightly concave lateral outline. The intromittent organs reach to the middle of the penult segment of the abdomen, are curved, and very distinctly hooked at their ends.

The chelipeds are quite stout, and the granulations on the costæ of the manus very coarse. The carpus has roughly granulated ridges, as in the preceding species, but in none of my specimens is it armed with any spines, only faint traces of them being visible; but on its interior border we observe two little prominences, one at the internal angle, the other just below it. Meros armed with three spines on the anterior border, but only faint traces of one at the external angle.

I have examined only a few specimens of this species, but fully sufficient to show that it is distinct from any other. The convex carapax, with its semicircular antero-lateral border, short posterior tooth, and the hooked intro-

mittent organs, are very striking characteristics. It is nearly as large as *hastatus*.

Found at Key West, Florida, by J. E. Mills, and at the Island of Hayti, by A. Hilchenbach.

There is a small specimen of a sterile female from Aspinwall in the museum of the Smithsonian Institution, which apparently belongs to a different species from any of those that I have described. The carapax is quite broad and convex, and in its general features very much resembles that of *tumidus*. But the hepatic region is smooth—wholly destitute of granulation. The front is armed with four teeth which are almost equal in size. The teeth of the antero-lateral border are very broad, with convex sides, and with their bases in close contact. Sternum slightly convex. Chelipeds not quite so stout as in *tumidus*.

CALLINECTES DIACANTHIUS Ordway.

Lupa dicantha Dana, U. S. Expl. Exped., Crust. i. 272.

Through the liberality of the Smithsonian Institution, I have been able to examine the specimen described by Dana, from Rio Janeiro. As it is only a single dried specimen, it is rather difficult to make a thorough comparison, but I have not the least doubt that it is entirely distinct from any of the more northern species. It is the most closely allied to *ornatus*. But the carapax is more convex, the branchial regions more swollen, and the cardiac and intra-medial regions do not exhibit the narrow form characteristic of *ornatus*; in fact, the carapax bears more resemblance to that of *lurvatus*. The teeth of the front resemble those of *ornatus*, but they are comparatively quite sharp. Sub-median tooth of front quite slender. Spine on the interior angle of the lower margin of the orbit comparatively sharp. The teeth of the antero-lateral border are very nearly of the same size and shape as in *ornatus*, but are rather more separated at their bases.

The sternum is quite flat, more so than in *ornatus*. Abdomen of male slightly broader than in *ornatus*, and penultimate segment considerably broader at its base, giving a somewhat different outline to the lower part of the tail. The intromittent organs are quite characteristic, being long and straight, reaching beyond the middle of the penult segment of the abdomen, but not to its extremity; and their tips are slightly turned outwards. The meros joint of the chelipeds is armed with three spines, but they are not so close together as in *ornatus*, and the spine at the base of the manus is much longer and curved. It is somewhat smaller than the *hastatus*.

CALLINECTES TOXOTES, nov. sp.

Carapax quite broad and rather convex, rather sparsely granulated, the areolations quite distinctly marked, the cardiac region distinctly divided into two lobes by a furrow down its middle and a prominence on each side. Intra-medial region rather long and narrow. Front armed with four sub-equal, obtuse teeth. Sub-median tooth of front slender and obtuse. Pterygostomial region as in the preceding species. Sternum quite flat. The abdomen of the male is very broad, and bears a very close resemblance to that of *hastatus*, except that the antepenultimate segment is not quite so much constricted at its base. The intromittent organs are also very long, reaching almost to the end of the tail; but instead of curving inwardly, as in *hastatus*, for two thirds of their length they curve outwardly, and the ends make an almost circular curve, so that their tips are brought together. I have not seen a female.

The chelipeds are quite stout. The granulations on the costæ of the manus and carpus are quite coarse. The number of spines on the joints of the chelipeds is the same as in *hastatus*. The three spines on the meros are long and slender, and quite remote from each other.

This species is entirely distinct from any of those of the eastern coast of North America. In the abdomen of the male and its intromittent organs, it bears a resemblance to the *hastatus*, but is easily distinguished from that species by the different curvature of those organs and the flatness of the abdomen, as well as in the characters of the front, which has four equal teeth. The narrowness of the cardiac and intra-medial region, and the lobation of the former, are also quite characteristic.

Locality, Cape St. Lucas. Collected by John Xantus, Esq. Museum of the Smithsonian Institution.

It is one of the largest species known, equalling even the *hastatus* in size.

CALLINECTES BELLICOSUS Ordway.

Lupa bellicosa, (Sloat MS.) Stimpson, Notes on North American Crustacea, p. 11.

The carapax is quite smooth and evenly convex, the areolations not being prominent, and the granulation quite fine. The front has two outer slender and sharp teeth, with the faint traces of two median ones. The teeth of the antero-lateral border are rather broad and sharp, with somewhat concave sides. The sternum is rather flat and broad, and has scattered punctures on its surface. The abdomen of the male is broad, broader even than in *hastatus*; its penultimate segment is not narrowed near its base, as in that species, but has a broad base, and is contracted near the centre. The meros of the chelipeds, in the only specimen that I have seen, has four spines on the anterior border. There are two small spines on the carpus, one at the outer border, the other at its point of articulation with the manus, with a slight rudiment of one between them. There is one very prominent granulated ridge on the carpus, and two or three granulated tubercles. One quite prominent spine on the carpus of the first three

pairs of ambulatory feet. The intromittent organs reach a little beyond the middle of the penult segment of the abdomen; they curve outwards strongly near their extremities, and then inward to their tips, which again point a little outward. About the size of the *ornatus*.

Pinicate Bay, Gulf of California. Museum of the Smithsonian Institution.

CALLINECTES ARCUATUS, nov. sp.

I have but one specimen of this species, and it is very closely allied to the *diacanthus*. The carapax, however, is more evenly convex, and finely granulated, and the anterolateral borders are quite semicircular. The sternum is not so flat as in *diacanthus*. The abdomen of the male is much broader than in *diacanthus*, being nearly as broad as in *hastatus*, but the penult joint exhibits no constriction near the base, being, on the contrary, wider at the base than anteriorly. The intromittent organs exhibit a striking resemblance to those of *diacanthus*, being more alike than any other of the known species of the genus. Almost the only difference that can be observed is, that they are, perhaps, more slender in this species.

The chelipeds are slightly shorter than in *diacanthus*, and the costæ of the manus and carpus are very sharply defined and closely granulated. The three spines on the meros are more slender and closer together, and what is quite remarkable, there are three sharp and equal spines on the carpus. It is of about the same size as the *ornatus*.

Cape St. Lucas, John Xantus. Museum of the Smithsonian Institution.

CALLINECTES PLEURITICUS, nov. sp.

This species in some of its characters closely resembles *larratus*, while in others it is allied to *arcuatus* and *diacanthus*, but nevertheless it is distinct from any of them. In

the characters of the carapax it resembles *larvatus*, but the carapax is more evenly convex, and the areolations are not so swollen, nor the granulations so coarse. The teeth of the front are less prominent. The antero-lateral border is rather more circular, and its teeth quite different from those of *larvatus*, being broad, convex, and close together. The sternum, instead of being narrow and somewhat convex as in *larvatus*, is broad and flat as in *arcuatus*. The abdomen of the male bears most resemblance to that of *larvatus*, while the intromittent organs closely resemble those of *arcuatus*, and are very different from those of *larvatus*. They are long, slender, and straight, as in *arcuatus*, though they differ in being slightly longer and less bent at their tips.

The spines on the meros joint of the chelipeds are not so close together as in *arcuatus*, and the spine at the base of the manus is much longer and curved.

This species is a small one, our largest specimen being less than half the size of *hastatus*.

Found at Panama by Alex. Agassiz, Esq.

REMARKS.

The scanty materials that most authors have possessed have prevented them from arriving at any definite and correct idea of the species of *Callinectes*, and very great confusion has arisen on the subject. Many authors have thought that there is but one species on the eastern coast, and even those of the western coast have been considered identical with it. Consequently the descriptions in the few cases in which descriptions are given, are such that it is impossible to tell to what species they allude, and evidently in many instances the writers have had several before them. Such being the confusion, it is difficult to determine the synonymy of the different species with accuracy, so that I have reserved my opinions on that point for separate consideration.

Bosc is probably the first one who speaks of any species of *Callinectes*. Unfortunately, however, he speaks of it under the name of *Cancer hastatus* Fabr., (which is probably the *Achelous spinimanus* Stm.) and translates Fabricius' description of that species into French, instead of describing his own specimens. I think that no one can doubt that Bosc really had before him specimens belonging to the genus *Callinectes*, and probably to *C. hastatus*. For he speaks of them as being daily used in Charleston for food, and as caught in great numbers, and describes the method of catching them. No other Portunid is so caught and used there.

Latreille, in the "Encyclopédie Méthodique," was the next author who described any species of *Callinectes*. But his description is so indefinite and confused, that I have found much difficulty in unravelling it. Under the name of *Portunus diacanthus*, he evidently includes several species, one of which was from Brazil, described by Marcgrave — I cannot say to what genus this belongs. He says, also, "Quelquefois, comme dans deux individus envoyés de Philadelphia par M. Milbert, les quatre dents du front sont réunies et ne forment qu'un lobe largement échancré." Here he evidently speaks of the *C. hastatus*, which is the only species that occurs at Philadelphia. In the preceding paragraph he speaks of the carapax as being of an obscure greenish anteriorly, and in his Latin diagnosis as being yellowish, maculated with red, which contradiction is somewhat puzzling. We might at first be inclined to reject the name *diacanthus*, as it seems impossible to affix it to any one species, except arbitrarily. But in such cases as this we must always endeavor to ascertain an author's intention, and I think that I have done that. Under the name of *Portunus pelagicus* he previously describes the *Neptunus pelagicus* from the East Indies, remarking that it is the *pelagicus* of Fabricius, but not of

De Geer and Bose. The *pelagicus* described by these two latter authors, and by Say, (which latter is the *Lupa Sayi* of Gibbes,) he puts as synonymes of his *P. diacanthus*. I think it is perfectly evident that his intention was to change the name *pelagicus*, as being preoccupied by Fabricius for another species, and that his name *P. diacanthus* must therefore apply to the *pelagicus* of Bose, De Geer, and Say, which, as is well known, belongs to the genus *Neptunus*. It does not alter the case, that Latreille in his description mixed up several species, and evidently included the *C. hastatus*.

Milne-Edwards following Latreille, describes one or more species under the name of *Lupa dicantha*, but it is impossible to say to which of our species his description applies, as he gives no character by which one can recognize it. Nor are we aided any by the synonymes which he quotes. He quotes the "Crabe de l'Océan" of De Geer, the *P. pelagicus* of Bose, and the *P. diacanthus* of Latr., (which, as I have shown, are synonymous with the *L. pelagica* of Say;) the *Portunus hastatus* of Fabr., which is probably the *Acheloüs spinimanus*; and finally the *Lupa hastata* of Say.

Subsequent authors have mentioned our species of *Callinectes* without critically examining the work of their predecessors, and have spoken almost indiscriminately of *L. diacantha* and *L. hastata* — often regarding them as synonymous. Gibbes, in his Catalogue of the Carcinological Collections of the United States, speaks of only one species as inhabiting our coast, though he evidently noticed some differences, as he says, "In the specimens from Charleston harbor and northwards, the middle spines of the front are obsolete, but distinct in those from Key West."

Dana in his "Crustacea of the United States Exploring Expedition," describes a species of *Callinectes* from Rio

Janeiro, which, as we have shown, is distinct from any of those of the United States coast. Dana, however, makes it synonymous with the *L. dicantha* of Milne-Edwards, and *Portunus diacanthus* of Latr. But the *P. diacanthus*, as I have already shown, is a *Neptunus*. I retain the name *diacanthus* for the Brazilian species, though it is probably not the *dicantha* of Milne-Edwards.

De Saussure, in his "Crust. de la Mexique," etc., confounds all of the species of *Callinectes* of the eastern coast together, though he thought that there was a great variation in them. He mentions in particular a female from Cuba with a very convex carapax, and the teeth of the front equal, which may be our *C. tumidus*. He calls them all *L. diacantha*.

Stimpson, in his "Notes on North American Crustacea, No. 1," mentions, under the name of *L. bellicosa*, the first *Callinectes*, in fact the first Portunid, discovered on the western coast.

In his second number he institutes with good reason the genus *Callinectes*. But unfortunately, from want of sufficient material, he does not correct the errors of previous authors, but expresses himself as "unable to find constant differences between the northern and southern varieties of this species," and also regards the species of the western coast as identical with it.

Our materials have been large, and we have spent much time in investigating them, being actuated solely by a desire to arrive at the truth, and we think that all of the species that we have indicated are truly distinct. The characters which separate them do not vary, and there is no gradual passage from one species to another. Differences in organs of such importance as those of generation, and so marked as those we have pointed out, are certainly reliable.

All species of *Callinectes* exhibit a singular resemblance

in some characters, while they are widely different in others. Thus the external maxillipeds, the chelipeds, the pterygostomian region, the posterior tooth of the antero-lateral border, in all except *tumidus*, are very much alike. The shape of the abdomen in both the male and female, is quite characteristic of the species, in this genus.

The materials upon which the above observations were made are in the Museum of Comparative Zoölogy at Cambridge and that of the Smithsonian Institution at Washington.

ART. XIV. — *On the Fossil Crab of Gay Head.* — By
DR. WILLIAM STIMPSON.

[Communicated January 21, 1863.]

THE occurrence of remains of Crustacea in the green-sand layer of the interesting series of strata exposed at Gay Head, the southwestern extremity of Martha's Vineyard, has long been known. Dr. Hitchcock alludes to them in the first edition of his "Geology of Massachusetts," published in 1833, as well as in the second edition of the same work (1841). They are there described in the following terms, which we give entire, as showing the *lithological* character of the specimens:—

"*Crustacea.* In the green sand at Gay Head, we meet with well-characterized specimens of the genus *Cancer*, although they are in general much broken; showing that they originally belonged to a formation which was abraded or destroyed anterior to the production of the green sand. The interior part of the specimen consisted of argillaceous matter, probably containing a large proportion of oxide of iron; but the covering of the animal still retains its black shining color, although apparently carbonaceous. The broken state of nearly all the specimens, renders it difficult to determine whether they belonged to more than one spe-

APRIL, 1863.