ELLIS' NORTH AMERICAN FUNGI.—When, in 1878, the first century of "North American Fungi," by J. B. Ellis, appeared with the timidly expressed hope of its author that the work might be continued until a thousand species had been distributed, but few of the subscribers dared hope for a speedy completion of the first decade of centuries, and doubtless most looked for an early suspension of the work. So many attempts have been made to furnish sets of fungi, mosses, lichens, algæ, etc., etc., which have been abandoned long before completion, that subscribers to such sets scarcely expect any other conclusion. It may be that Mr. Ellis will weary of the good work he is doing so well, and thus add his "North American Fungi" to the long list of incompleted exsiccati, but present indications are hopefully to the contrary. Already we have nine centuries, although scarcely more than four and a half years have elapsed since the beginning of the work. The publication of a century every half year involves an amount of labor and a degree of patience and perseverance which only those who have attempted to make up sets of plants can fully appreciate. The two centuries (VIII and IX) which came to hand the middle of April, fully maintain the previously high reputation of the series. Like their predecessors, they include representatives of most of the orders of the fungi, the Hymenomycetes and Pyrenomycetes, however, predominating. No. 775 is *Diatrype tremellophora* Ell., which was critically described in the March NATURALIST of the present year, under the caption of *Diatrype disciformis* Fr. Excellent specimens of this curious species are given showing every stage. We shall look with interest for the tenth century, and hope in due time to see Mr. Ellis bravely undertake the second thousand.

ZOÖLOGY.

PRELIMINARY CLASSIFICATION OF THE BRAIN OF CRUSTACEA.—The following provisional grouping of the brain of Crustacea appears to be justified by known facts, although excepting the brains of Decapoda and Limulus, no special histological work has been accomplished.

The terms archi-cerebrum and syn-cerebrum have been proposed by Professor Lankester, the first to designate the simple worm-like brain of Apus, and the second to designate the composite brain of the Decapoda, etc.

Syn-cerebrum	Decapoda. Tetradecapoda. Phyllocarida. Cladocera. Entomostraca.
Archi-cerebrum	Phyllopoda. Merostomata (Limulus). Cirripedia?

The syn-cerebrum of the Tetradecapoda, Amphipoda and Iso-

poda, judging by Leydig's figures[1] and our own observations on that of Idotea and Lerolis,[2] is built on a different plan from that of the Decapoda. The syn-cerebrum of the Phyllocarida is somewhat like that of the Cladocera and Copepoda (Calanidæ); being essentially different from that of the majority of the Malacostracous Crustacea. The Copepodous brain is an unstable, variable organ, but on the whole belongs to a different category from the syn-cerebrum of other Neocarida.

We have, then, probably two types of archi-cerebra, and three types of syn-cerebra among existing Crustacea.—*A. S. Packard, Jr.*

THE COLORING OF ZOO-GEOGRAPHICAL MAPS.—Having had occasion to prepare a colored map to illustrate the geographical distribution of the phyllopod Crustacea of North America, for Hayden's 12th Annual Report of the U. S. Geological Survey, we would propose for the consideration of zoölogists, the following scale of colors, which we have adopted. In the colored maps already published, one by Mr. W. G. Binney on the Western Mollusks, and one by Dr. John L. LeConte to illustrate the distribution of the Coleoptera, the coloring does not at all agree. It is highly desirable that such maps should, if possible, be uniform, as much so perhaps as geological maps.

Arctic Realm	Very pale carmine.
Boreal (Canadian) Province	Blue.
Eastern (Atlantic) "	Pale yellowish-green.
Antillean Region	Deep green.
Central Province	Pale (Vandyke) brown.
Western (Pacific) Province	Sepia, dark brown.
Central American Region	Yellow ochre.
Annual Isothermals	A deep red heavy line.

This combination of colors seems appropriate to the nature of these regions. The pale carmine is like ice; the blue, yellowish-green and deep green characterizes the wooded portions of the continent, and the light brown forms the treeless plains and plateaus of the West. The Alpine summits of the White mountains and Rocky mountains are concolorous with the Arctic regions, and the summits of the Alleghanies with the Boreal province.—*A. S. Packard, Jr.*

PROFESSOR E. A. BIRGE ON THE FIRST ZOEA STAGE OF PINNOTHERES OSTREUM.—In the summer of 1878 I accompanied the Johns Hopkins Laboratory to Cresfield, Md., and occupied my time with study on the development of decapod Crustacea. I was so fortunate as to obtain from the egg specimens of the first zoëa of Pinnotheres, and so unfortunate as to be unable to rear them beyond the first molting. I therefore send figures of the zoëa in

[1] Tafeln zur Vergleichenden Anatomie. Von F. Leydig. Tübingen, 1864, folio.

[2] Zoölogy for High Schools and Colleges, Figs. 255, 256. Drawn by Mr. Kingsley.

order that future observers may be able to connect the free larvæ with the proper adult form.

The female was found in an oyster with the eggs already well

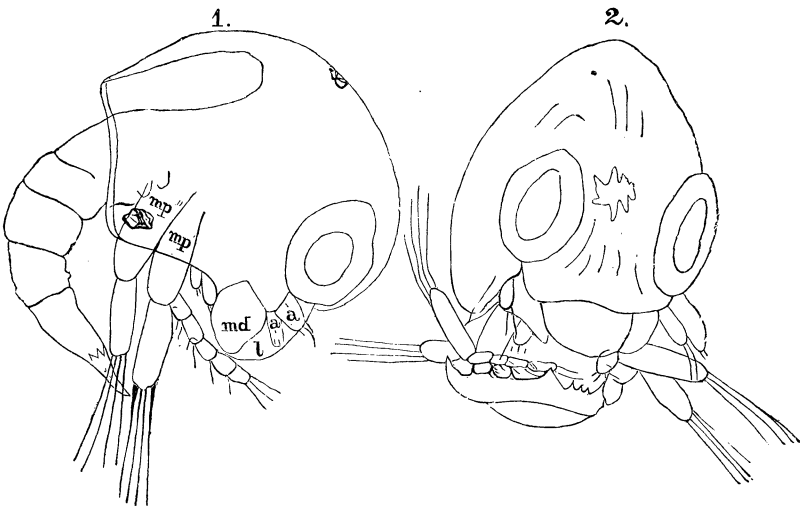

FIG. 1.—Zoea of *Pinnotheres ostreum* (Say) from side. *a'*, antennule; *a*, antenna; *l*, labrum; *md*, mandible; *mp' mp''*, maxillipeds. FIG. 2.—Zoëa from front.

developed. She was put into a large glass jar and given an oyster shell under which to hide, and so lived for more than two weeks. During that time her shell increased greatly in thickness and strength—a fact of which I was made aware by a sharp nip

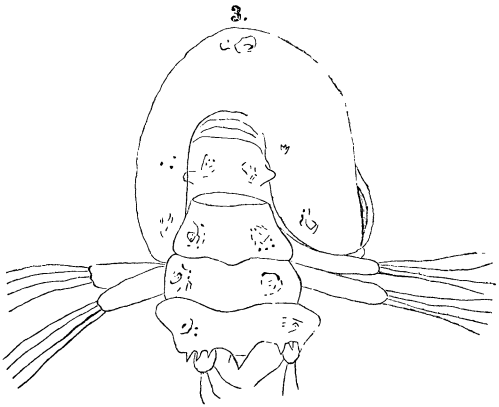

FIG. 3.—Zoëa from rear.

which she gave me one morning as I was putting fresh water into the jar. Evidently the change of environment did not injure her and she seemed well able to live indefinitely in her new quarters.

The eggs all hatched in the course of one night, throve for some days, but died before the first molting, in spite of all possible care.

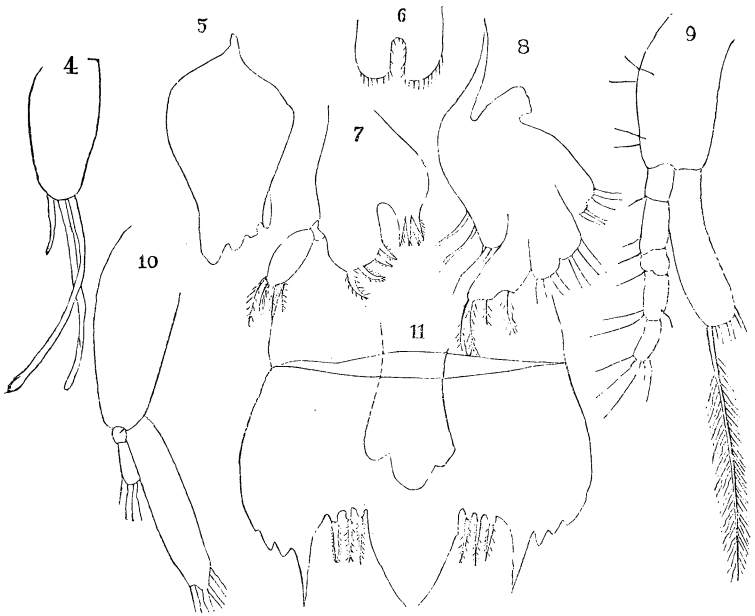

FIG. 4, antennule; 5, mandible from outside; 6, labrum; 7, 1st maxilla; 8, 2d maxilla; 9, 1st maxilliped; 10, 2d maxilliped; 11, end of abdomen.

No special description is needed for the zoëa further than to say that the total length was about $1\frac{1}{2}^{mm}$. No special drawing of the rudimentary antenna was made. The cuts are all traced from camera lucida sketches.

BOPYROIDES LATREUTICOLA, A NEW SPECIES OF ISOPOD CRUSTACEAN PARASITIC ON A GULF-WEED SHRIMP.—Amongst a bottle of marine Crustaceans caught with a fine net out of Sargassum or gulf-weed, near Beaufort, N. C., by Mr. Geo. E. Woodruff, of Brooklyn, N. Y., in October, 1881, I selected eleven specimens of *Latreutes ensiferus* Stm.,[1] having a lateral thoracic protuberance, for the purpose of examining them for Bopyridæ.

The swelling out is very peculiar, being directed outward and forward in looking at the host from above; a front view of the protuberance does not exhibit the star-shaped drawing as in *Bopyrus palæmoneticola* Pack., on *Palæmonetes vulgaris* Stm., owing to the fact that in the present case the female of the para-

[1] *Latreutes ensiferus* Stimpson, Proceedings Acad. Philad., 1860, p. 27.
Hippolyte ensiferus, Milne Edwards in Histoire Naturelle de Crustacées, 1837, Vol II, p. 374.
Bulletin of the Essex Inst., Salem, Mass., 1878, Vol. x, List of North American Crustacea, sub-order Caridea, by J. S. Kingsley, p. 56, No. 16.

site is not at all pigmented. The position of the latter is exactly the same as in Bopyrus, the dorsal side being directed toward the gills of the host and the ventral side toward the swollen carapace of the same.

The examination of our parasite revealed an isopod crustacean belonging to the sub-genus Bopyroides established by Dr. Wm. Stimpson,[1] being closely allied to both the genus Bopyrus and Gyge.[2]

The female of our parasite measures $1\frac{4}{5}^{mm}$ in length and 1^{mm} across its widest diameter. It is not as flat but more of a globular shape than Bopyrus, its integument also less chitinized, the whole body therefore softer. The body is unsymmetrical in shape, similar to Bopyrus, differing also in this respect from the genus Gyge, which is unsymmetrical anteriorly only. Dorsally the segments of the pleon, or tail, are distinct, whereas in Bopyrus they are fused or connate in the central dorsal axis. In this respect it agrees with Gyge as well as in some respects concerning the form of the gills. The latter do not consist of short, thick, fleshy, transversely placed lobes, but of fleshy, roundish ridges attached within the ventral lateral extremity of the six segments of the pleon.

Seven pairs of legs (pereiopods) are developed on one side and only one pair on the opposite side, the remaining six being obsolete through parasitism. They are similar to those of *Bopyrus palæm.*, but even less distinct and not pigmented centrally. The side having but one leg is curved outward.

The marsupium or breeding cavity is bounded posteriorly by the transverse prolonged lamella of the last pereiopod, anteriorly by the cephalic piece and the lamellæ of the first pair of pereiopods, laterally on one side by the fleshy longitudinal ridge along the other developed pereiopods, which are, if I see rightly, there without lamellæ. On the opposite side, where only the first pereiopod remained, the marsupium is covered by two fleshy, sparsely pigmented lamellæ (Figs. 1 and 2 *a*, *a*), and three or four very thin and delicate broad membranes (Figs. 1 and 2 *b*). The membranes and lamellæ are evidently the prolonged margins of the thoracic segments.

The eggs measure 0.12^{mm} in diameter. There are scarcely more than sixty eggs in some marsupia, the greater part of marsupia containing but a few eggs. On account of the scarcity of material but little was done to study the eggs; they were all in the earlier stages of development, without any pigmentation and of a yellowish color.

The cephalic portion, or head, consists apparently of but one triangular fleshy piece. I was somewhat surprised to find in the

[1] See *Bopyroides acutimarginatus* Stm., in Proceed. Acad. Nat. Sciences, p. 165, Vol. XV, 1863.

[2] Emilio Cornalia and Paolo Panceri in Mem. Acad. Reale di Torino, Ser. 2, Tom. XIX, p. 85, Turin, 1861. Also Bate and Westwood, II, p. 223.

otherwise very degenerate female a pair of pigment spots of irregular shape, the eyes, a pair of very minute, short, anterior,

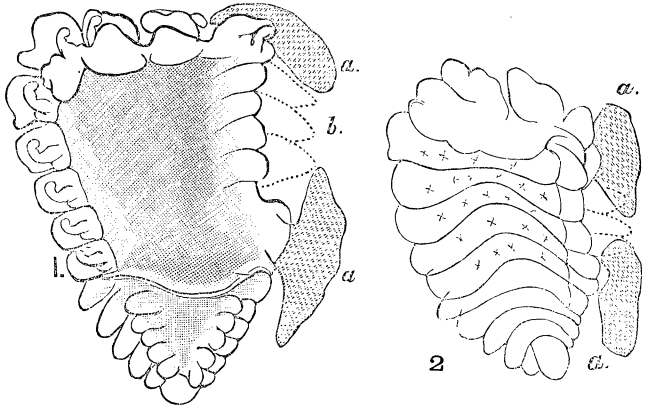

FIG. 1.—Ventral view of female. *a*, *a*, fleshy marsupial lobes; *b*, membranous extensions of pereion, drawn shorter than in reality. FIG. 2.—Dorsal view of female with lobes *a*, *a*, on the opposite side in nature from Fig. 1.

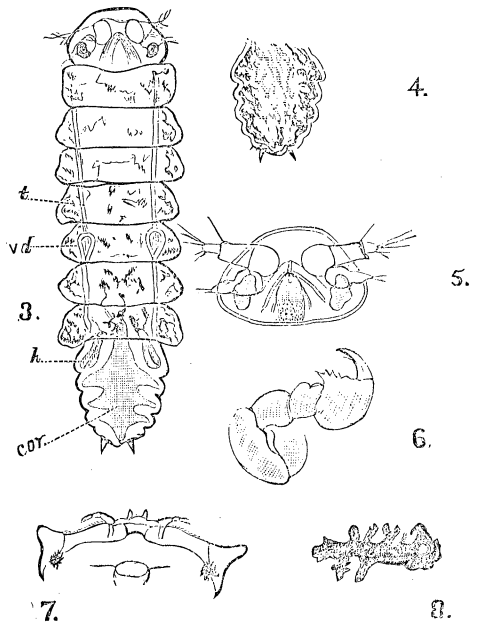

FIG. 3.—Ventral view of transparent male, legs omitted. *A*, pleon without pigment; *t*, testis; *vd*, vas deferens; *h*, liver; *cor*, heart. FIG. 4.—Pleon with pigment of male. FIG. 5.—Head of male. FIG. 6.—Thoracic leg of male. FIG. 7.—Cephalic piece of female. FIG. 8.—Pigment spot of first pereiopod near its lamella of the female Bopyroides.

and a pair of two (three ?) jointed, larger, posterior antennæ (Fig. 7).

The maxilla, if I properly recognized it, consists of a small flat basal piece with a rounded subtriangular flat terminal piece.

The first pair of pereiopods is provided, near the junction of its basal piece and the prolonged lanceolate lamella, with a conspicuous large peculiar pigment spot, as seen in Fig. 8.

The male of our Bopyroides is smaller but higher specialized than that of *Bopyrus palæmoneticola.* It is always found on the same spot—on the ventral side between the breathing appendages of the pleon of the female. It measures $\frac{4}{5}^{mm}$ in length, and nearly $\frac{1}{5}^{mm}$ in width. It is but sparingly pigmented and therefore very transparent.

The head is slightly longer than the first segment of the pereion. Two moderately large pigment eyes are situated a little behind the middle of the head. I have examined five individuals and found in every case the anterior pair of antennæ larger (three-jointed) than the posterior pair (two-jointed). The oral parts are conical and not very distinct.

The first thoracic segment is sub-quadrate, the second to sixth segments are equal in length, width and shape, so is the seventh segment, but with a faint lateral emargination. The propodus of the seven pairs of legs (eight in Bopyrus, male) is sub-chelate with its inferior margin dentate, the dentation not being equally developed in all the legs.

The pleon, or tail, of the male is narrower than the pereion, has six sub-segments, sixth sub-segment with a lateral short spine, an indication of which is also found on the margin of the preceding two sub-segments. The spines may be regarded as rudimentary pleopods.

The heart can be distinctly seen in the pleon, also a narrower string extending laterally from the first to the fifth thoracic segment, where an indistinct twist occurs, after which the string is somewhat flatter, reaching down into the seventh segment, where its terminus is obliterated by pigment. The part of this string anterior to the twist, I regard as the testis, while the posterior may be the *vas deferens.* I did not observe an anastomosis between the two lateral strings, nor have I distinctly seen the anterior terminus of the same. An elongate lobe can be noticed in the first sub-segment of the pleon, which Dr. Fritz Müller also observed in the male of *Bopyrus resupinatus,*[1] and which is regarded by him as the liver.—*Carl F. Gissler.*

Zoological Notes.—The Bulletin of the U.S. National Museum No. 11, is devoted to a Bibliography of the Fishes of the Pacific Coast of the United States to the end of the year 1879, by Theodore Gill.——New birds from the Sandwich Islands, and a new species *(Asio portoricensis)* from Porto Rico, are described by Mr. R. Ridgway, in the Proceedings of the U. S. National Museum, who also contributes a list of the old world birds

[1] Jenaische Zeitschrift fuer Med. und Naturwis., VI, I, p. 53, 1870.

in the Museum, and notes on Costa Rican birds.——A new genus of deep sea fishes (*Benthodesmus*) from the Banks of Newfoundland, is also described by Messrs. Goode and Bean, while Messrs. Jordan and Gilbert describe thirty-three new species of fishes from Mazatlan.——To the same serial Dr. Shufeldt contributes remarks on the osteology of the glass snake (*Opheosaurus ventralis*). ——The Proceedings also contains Mr. Dall's description of certain limpets and chitons from the deep waters off the eastern coast of the United States.——At a recent meeting (April 18), of the London Zoölogical Society, Professor Flower read a paper upon the mutual affinities of the animals composing the order of Edentata, in which the usual binary division into Phyllophaga (or Tardigrada) and Entomophaga (or Vermilingua) was shown not to agree with the most important structural characters. These, according to the interpretation put upon them by the author, indicates that the Bradypodidæ and Megatheriidæ are allied to the Myrmecophagidæ, and also, though less closely to the Dasypodidæ, all the American forms thus constituting one primary division of the order, from which both the Manidæ and Orycteropodidæ of the old world are totally distinct.——A communication was also read from Mr. Charles Darwin, introducing a paper by Dr. Van Dyck, of Beyrout, on the modification of a race of Syrian street dogs by means of natural selection.—— Mr. O. Thomas likewise read an account of a small collection of mammals from the State of Durango, Central Mexico, in which examples of several northern forms, not hitherto recorded so far South, and several southern forms not hitherto known so far North, occurred.——In an essay on certain points in the morphology of the Blastoid crinoids, Messrs. Etheridge and Carpenter discuss in a way preliminary to their larger forthcoming work, some points which will interest our western palæontologists.——Dr. J. Gwyn Jeffreys continues in the Proceedings of the Zoölogical Society his account of the deep sea mollusks procured during the *Lightning* and *Porcupine* Expeditions in 1866–70.——In the Bulletin of the U. S. Fish Commission, Mr. J. A. Ryder has a very interesting paper on the Protozoa and Protophytes considered as the primary or indirect source of the food of fishes. He has also found that the food of the very young shad consists almost entirely of very small crustaceans, the very youngest Daphnidæ, etc. Larger shad swallow small larval Diptera, besides Entomostraca. He says that the mode in which the young fish capture their entomostracan prey may be guessed from their oval armature. Most fish larvæ appear to be provided with small, conical somewhat backwardly recurved teeth on the jaws. "Rathke in 1833 described the peculiar hooked teeth in the lower jaws of the larvæ of the viviparous blenny, and Forbes has observed minute teeth in the lower jaw of the young *Coregonus albus*. I have also met with similar teeth in the lower jaw of the larval

Spanish mackerel." The mouth of the adult shad is practically toothless, and multitudes of small copepods are caught in the meshes of its branchial arches.——The new Acalephs from the Tortugas and Key West, and also from the east coast of New Zealand are described and well illustrated by Mr. J. W. Fewkes in the Bulletin of the Museum of Comparative Zoölogy. Vol. x. Nos. 7 and 8.

ENTOMOLOGY.[1]

REPELLING INSECTS BY MALODORANTS.—Mr. J. A. Lintner, State Entomologist of New York, has recently published an interesting paper, in which (assuming that the parent insect is guided to her food-plant, or to that destined for her offspring by the sense of smell), he advocates the use of strong-smelling or malodorous substances, as counter-odorants to prevent noxious species from laying their eggs on cultivated plants This theory is put forth as a "new principle, in protection from insect attack."

As remarked in a notice of the paper elsewhere, we have one serious criticism to make of it, viz: that it lacks both proof and substantial foundation in fact. To give force to the theory, Mr. Lintner has to assume that substances like kerosene, coal-tar, naphthaline, carbolic acid, gas-lime, bisulphide of carbon, smoke, etc., repel by their odor; whereas the ordinary belief that they repel because of their toxic properties seems to us far more reasonable. Our attempts to prevent the oviposition of the Cotton-worm moth, the Colorado potato-beetle, the apple-tree borers, and the Plum curculio, by the odor of carbolic acid and of coal-tar, of infusions of Ailanthus, Walnut, and decoctions of Horehound, or cabbage worms by the odor of creosote, have proved unavailing. Those of others in the same direction, and notably of Mr. I. W. Taylor, of Poland, N. Y., with such pungent odors as musk, camphor, spirits of turpentine, asafœdita, kerosene, etc. (*Rural New Yorker*, Nov. 2, 1872), used especially to prevent the oviposition of *Pieris rapæ*, equally failed of the intended result; so that, so far as experience will warrant an opinion it is adverse to the "new principle." The senses of sight, touch, and taste, which are more palpable and readily located, play their part in insect economy, and both experiment and observation would indicate that, except perhaps for certain special families, particularly of Lepidoptera, this part is greater than that represented by the sense of smell, even in guiding the female to lay her eggs.—*C. V. Riley.*

HABITS OF BITTACUS APTERUS.—Baron Osten-Sacken communicates in the *Wiener Entomologische Zeitung* (May number, p. 123) an interesting note on the above named Neuropterous insect, which is not rare in open grassy places in parts of California. He states that the insect replaces the want of wings by a great dex-

[1] This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.