

The distinctive Thysanurous character of the Symphyla, are the form of the head as a whole, that of the epicranium, and of the clypeus and the small labrum, as well as the mode of insertion of the antennæ, and their form. The mouth parts, *i. e.*, the mandibles, maxillæ and labium, have the essential form of Campodea; the caudal stylets are insectean. These characters do not remove them more than by one family from the Campodeæ and Japygidæ. They also have what is possibly a colophore; the spiracles are much as in Japyx, but situated between the legs, though the presence or absence of spiracles is so variable in the Thysanura as to be unimportant. The differential characters are the presence of five-jointed functional legs, and the dorsal scutes of the somites, the latter homonomous; but even here the claws are exactly as in Campodea, and we see an approach to the multi-articulate legs in Machilis, and the two pairs of long prolegs in Lepisma. Under these circumstances we should include the Symphyla as a suborder of Thysanura. At the same time we wish to bear testimony to the ability and good judgment shown by Mr. Ryder in dealing with a most difficult problem, and offer our own views for the consideration of zoölogists. None the less as pointed out by Mr. Ryder, is the view (we have also long held) well founded, that Scolopendrella is an ancestral, synthetic form. In this respect it stands side by side with the Campodea. The structure of this synthetic type also shows how close is the relationship between the hexapodous insects and the Myriopods, which are more closely related in most respects than the Hexapoda and Arachnida. We are also confirmed in the view that the Hexapods, Arachnids and Myriopods are too closely related to be regarded as independent classes, and should be regarded as subdivisions (subclasses) of Tracheata.

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AMERICAN WORK IN THE DEPARTMENT OF RECENT MOLLUSCA DURING THE YEAR 1880.

BY WILLIAM H. DALL.

SINCE the recorder prepared his last report on this subject (for 1879), Dr. James Lewis, of Mohawk, N. Y., well known for his researches into the natural history of land and fresh water shells of North America, has passed over to the majority. Fortunately the ranks of the working malacologists of America have

not sustained any other loss during the past year, though the death of Professor Haldeman recalls the excellent work done in that department by him, many years ago.

The recorder would particularly request from authors, early copies of any papers bearing on malacological topics,¹ in order that this record may, in future, be more promptly prepared. This is especially desirable when the article is published in any of the semi-scientific periodicals of small circulation and uncertain tenure of existence, which appear from time to time, fulfill a certain good purpose, but usually demonstrate their unfitness for serving as a medium of communication with the scientific world, by a pervasive eruption of advertisements in the text, a feverish craving for clippings and a rapid descent into an early grave.

The year has been marked by no extraordinary discoveries in the biology of mollusks, but a fair amount of creditable work has been done, of which, perhaps, a larger portion than usual is of a high character. Several investigations of great interest are in progress, but it has seemed best to confine the record to such as has been irrevocably placed before the scientific world by publication.

General Works.—Mr. Tryon's Manual of Conchology has progressed, during the year, to the first part of the third volume. Volume second contains the Muricinæ and Purpurinæ, comprising two hundred and ninety pages and four hundred and forty-two figures on seventy plates. Volume three, of which part one appeared in the last days of the year, is to contain the Tritonidæ, Fusidæ and Buccinidæ.

Anatomy, Physiology and Development.—The most valuable work in this department, in 1880 as in 1879, is due to the labors of Professor W. K. Brooks. "Studies from the Biological Laboratory of the Johns Hopkins University" (Vol. 1, Part IV), contains a memoir on "The development of the American oyster, *Ostrea virginiana* List." (pp. 1-104, pl. 1-x), which also appears in the Report of the Commissioners of Fisheries of Maryland for 1880; and an article on "The acquisition and loss of a Food Yolk in Molluscan eggs" (pp. 105-116, pl. XI). The researches on the oyster having been undertaken at the instigation of the Maryland Fish Commissioners, the first thirty-four pages of this memoir contain in untechnical, but quite sufficiently exact phrase-

¹ Which may be sent care of the Smithsonian Institution.

ology, a statement of the nature, method and extent of the observations and conclusions reached from them, with a few words of warning in relation to the inevitable ruin of the beds to follow excessive dredging; the laws relating to which, it may be noted—though Professor Brooks does not mention it—are practically ignored. He finds the average number of eggs in an oyster of ordinary size to be about nine million, against less than two million reported for the European oyster; while some American oysters may furnish sixty million. In the European, however, the young are believed to be protected, during their most precarious stages, in the parent shell, so that perhaps $\frac{1}{43000}$ of them come to maturity, while our American species undergo their development in the open sea, subject to fatal changes of temperature and unnumbered enemies, which must greatly diminish the proportion of survivors. The sex of individuals during the breeding season, contrary to the oystermen's opinion, cannot be distinguished without dissection, and they appear, for the time being at least, to be singly male or female only, and never hermaphrodite.

The second part of the paper discusses some of the more abstruse topics connected with the subject, and is written more for the embryologist, as the former part is for the general reader. Among the conclusions arrived at, are the singleness of sex in the individual; that the impregnation is external to the shell; that the segmentation is remarkable for its rapidity; its bilateral symmetry and marked alternation of periods of rest and periods of repose; both regular and rarely-recurring irregular processes of segmentation are described, and the conclusion is reached that the process of Lamellibranchiate segmentation is a survival from ancestral conditions which included few large eggs provided with food-yolks, these last having been lost as the eggs became smaller and more numerous, while the mode of segmentation has been retained perfectly by the oyster and incompletely by other Lamellibranchs. The evidence appears to the author to strengthen his previously expressed opinion that the Lamellibranchs must be regarded as a side branch from a main stem, of which the Gasteropods are a much more direct continuation, and that the phylogeny of the higher Mollusca cannot be traced through the Lamellibranchs to lower invertebrate forms. Of these views, the second paper on the acquisition and loss of a food-yolk (with a

comparative plate of embryo forms) is chiefly an amplification. The first memoir concludes with a discussion on the formation of the digestive tract, the shell and the mantle, and the relation of the facts observed to the *Gastræa* theory.

Apropos of the American oyster, a letter dated Gibraltar, June 14, 1880, from Mr. Francis Winslow, U.S.N., to Professor W. K. Brooks, appears in the January *NATURALIST* of the present year (p. 57), giving an account of an attempt made to fertilize some Cadiz oysters, and the unexpected agreement, so far as the observer was able to determine, of the development with that of the American form. Mr. Winslow says: "So far as these results go, they prove that the artificial propagation of the European oyster is practicable to just the same extent as our own, and I think it throws grave doubts on the theory that the embryo is protected within the shell, and that the impregnation occurs there and nowhere else."

The reporter in examining the exhibition of oysters at the Paris Exposition in 1878, saw shells of a species of oyster in the collections which was referred to as the "Portuguese" oyster, and which he could not distinguish from the shells of *O. virginiana*. These Portuguese oysters are regarded with contempt by the French oyster-cultivators, who advertise, as a merit, that their particular parks are free from contamination by this objectionable variety. They are said to be free from the coppery flavor of *O. edulis*, and to be larger and tougher—just the qualities ascribed to American oysters by those who are accustomed to the *O. edulis*. The observations on the embryology of the European oyster were all made on the *O. edulis*. If, therefore, these Cadiz native oysters were (as may be suspected) the "Portuguese" oysters of the French, and identical (as seems not impossible) with *O. virginiana*, the discrepancy would be explained without throwing discredit on the researches of those European naturalists who have examined the other species. Mr. Winslow, under the direction of the U. S. Coast Survey, made some very meritorious surveys of a part of the Chesapeake oyster beds in 1879. His report was published in the Report of the Maryland Fish Commission for 1880, by permission of the Superintendent of the Coast Survey; and its value, as we are informed, has since been recognized by the French Société d'Acclimatation, which has awarded a bronze medal to the author.

In the September NATURALIST (p. 674), Mr. J. A. Ryder describes the course of the intestine in *Ostrea virginiana*, which he found to have but one complete turn upon itself, and in the course of its (dorsal) flexure, to pass almost directly over the mouth, and to be provided with a pair of internal longitudinal folds.

Brooks in the *American Journal of Science* (Oct., 1880, p. 288) has a short article on the homology of the Cephalopod siphon and arms, in which he concludes that they are neither homologous with the velum nor the foot, but are independent developments.

In the Anniversary Memoirs of the Boston Society of Natural History (1880), Brooks contributes a paper on the "Development of the Squid (*Loligo pealii* Lesueur)," containing twenty-two pages and three plates. In this article he observes that while the squid embryo fails to give us any information as to how a typical mollusk has been modified to convert it into a Cephalopod, or the transformations undergone during the process, it nevertheless clearly shows the fundamental similarity of type which subsists between it and other Mollusca.

In last year's record allusion was made to Professor Verrill's "Cephalopods of the north-eastern coast of North America," Part I of which, including the gigantic squids and their allies, has since appeared in the Transactions Connecticut Academy of Sciences, v, pp. 178-257, with fourteen plates. Much of the material in this paper has been the subject of preliminary notices; *Stenoteuthis* n. g. for *Architeuthis megaptera* Verrill, and a large Bermudan squid, perhaps *Om. pteropus* Stp.; and *Lesoteuthis* for *A. kamschatica* Midd., from the North Pacific, are the only absolutely new names proposed here, but a large array of new facts, a thorough digestion of previous literature, a revision of the genera and a satisfactory illustration of the several species as far as known, give to the paper a monographic character. The principal among the species treated of and figured, are *Architeuthis harveyi*, *hartingii* and *princeps*, *Stenoteuthis megaptera*, *Histioteuthis collinsii* and *Enoploteuthis hartingii*, all of Verrill; *Architeuthis dux* and *monachus* of Steenstrup; and *Onychoteuthis robusta* Dall, the last being from the Aleutian islands. The paper will form the standard of reference for this interesting subject.

A synopsis of a lecture, by Professor A. Hyatt, given before the American Association, appears in the NATURALIST for December (p. 915-6); the subject being the transformation of *Planorbis*, as a practical illustration of the evolution of species. Although based on the study of the fossil forms of Steinheim, it is referred to here on account of its obvious bearing on the general subject.

A fully illustrated memoir on this subject is contained in the memorial volume of the Boston Society of Natural History.

In the NATURALIST (March, 1880), p. 207, Mr. R. Ellsworth Call has a note on reversed specimens of *Melantho* (*Campeloma*), and an examination of embryonic shells of several species, showing that from fifteen to twenty-five reversed specimens were found in every thousand, of which, however, it is believed by Mr. Call, only one-tenth per cent. survive to maturity. He suggests that the reversals may be due, as some other irregularities are, to crowding in the ovarian sac.

A circular has been issued by Messrs. R. E. Call and A. F. Gray, asking the coöperation of conchologists in providing material for a proposed monograph of the *Unionidæ* of North America, in which they propose to figure the anatomy of each species in detail.

The polymorphous forms of *Anodonta* found in the United States, are referred to in a note by Professor Call in the NATURALIST for July, p. 529. The existence, everywhere about us, of transition forms of animals, is now being generally recognized by naturalists, who formerly, under the blinding influence of the dogma of fixity in specific characters, wandered hopelessly from the extreme of naming every individual variation, to that of confounding every sort of minor characteristic under one specific name. Now that a certain amount of freedom in these matters has become habitual, we may look for the speedy recognition of the particular effects produced by at least the more simple features of the environment, of which several of our Western naturalists have already given us a foretaste.

In the AMERICAN NATURALIST for July (p. 522), R. Bunker notes that a specimen of *Lymnæa elodes* Say, from which a piece of shell the size of a half dime had been broken out, showed signs of reparation in three days, and in six weeks the injury was completely repaired, the mollusk meanwhile performing its usual functions in an aquarium.

In the AMERICAN NATURALIST for March (p. 214), Mr. Lockwood notes a case of extreme vitality in a specimen of *Helix aspera* (*aspersa*?), which lived thirteen months without food.

Geographical and Bathymetrical Distribution and Catalogues.—A valuable contribution to our knowledge of the geographical distribution of invertebrates on the north-west coast of America, is made by Mr. J. F. Whiteaves in the "Report of progress of the Geological Survey of Canada, 1878-9," pp. 190 B—205 B, Montreal, May 1, 1880; his paper being entitled "On some Marine Invertebrata from the Queen Charlotte islands." It is based on collections made by Dr. G. M. and Mr. Rankine Dawson in the summer of 1878, on the eastern and northern coasts of the group. *Macoma carlottensis* Whiteaves, a species much resembling *M. iridescens* Sby., and *Lepton rude* (Dall MS.) are described and illustrated by good woodcuts. Many species in the list have hitherto been known only from more southern localities. The depth and exact locality are precisely indicated; the mollusk fauna, as might be expected, is distinctively Oregonian in character. Several new species of Echinoderms are described by Professor Verrill, and two species of corals, a *Balanophyllia* and *Paracyathus* are noted, the latter of which was only previously known from Monterey, Cal.

In the Proceedings of the Philadelphia Academy for the current year (pp. 40-127, pls. 1-8, ix-xvi), Dr. R. Bergh, of Copenhagen, concludes his memoir on the Nudibranchiate Gasteropod Mollusca of the North Pacific ocean, with special reference to those of Alaska. This, with Part I, noticed in our last report, completes the revision of the species known to exist in that region, and is, without doubt, the most important contribution to the subject ever published in America. Too crowded with anatomical and other details to admit of intelligible condensation in the form of an abstract, it may be mentioned that the species described by Cooper and others are here for the first time referred to their true systematic relations, and enumerated under their proper genera. Several European species are recognized, and others are represented by closely allied forms, nearly all are subjected to minute microscopic dissection and appropriately figured in detail from camera lucida drawings. The new species described in the second part, are *Akiodoris lutescens*, Aleutian islands; *Lamellidoris* (var.) *pacifica*, Bering sea; *L. varians*, Aleutians,

and a variety of it; *L. hystricina*, same locality; *Adalaria pacifica* and *A. virescens*, Unalashka; *Acanthodoris cærulescens*, Bering sea; *Themisto (Palio) pallida*, Aleutians; and *Triopha modesta*, Shumagin islands, Alaska. For the last (at first referred to *Triopa*) the genus *Triopha* is proposed, and *Colga* is suggested for the group typified by *Doris lacera* Abildgaard (l. c. p. 112).

Brooks (Proc. B. S. Nat. Hist. xx, pp. 325-9) contributes a paper on "The development of the digestive tract in Mollusks," in which he records his views of the leading points in the development of pulmonates and of the oyster from the observations given in detail in the subsequently published memoirs on the fresh-water Pulmonates and on the oyster, elsewhere referred to.

In the Annals of the N. Y. Academy of Sciences, 1, No. 11, pp. 355-362, pl. xiv, xv, Mr. W. G. Binney continues his valuable investigations and notes on land shells of the United States, and on some exotic species. The following new species are described: *Macrocyclus hemphillii* (Olympia, Or.); *Zonites rugeli*; *Z. andrewsi*; and *Mesodon andrewsi*, from Roan mountain, N. C., collected by Mrs. Andrews. Notes on the anatomy and dentition as well as the synonymy of species already known, make up the balance of the paper. The genus *Tebennophorus* is now first reported from the Amazon, three hundred miles inland from Para, Brazil.

In the Bull. Mus. Comp. Zoölogy (vi, No. 3, Feb., 1880) the fifth report on the *Blake* dredgings in the Gulf of Mexico, comprises "General conclusions from a preliminary examination of the Mollusca," by W. H. Dall (pp. 85-93). The material considered embraced four hundred and sixty-two species of ninety-six genera (this term being liberally construed), ranging from a few fathoms to 1920 fathoms. A comparative table of the genera and number of species of the littoral and abyssal Gulf fauna is given, together with illustrations of the range of individual species, showing that many range from thirty fathoms to over eight hundred fathoms, a fact which had never been clearly indicated before, as most of the deep sea expeditions avoided carrying their investigations continuously from the abyssal into the littoral region. Pteropods and pelagic surface forms are not considered. The general conclusions are as follows: 1. The fact, already known, that certain species have a limited vertical range, forming respectively a littoral and an abyssal fauna, is supplemented by

the hitherto unrecognized fact that a fair proportion have a vertical range including both regions. II. Of the species with great vertical range, the smallest part (ten per cent.) belong to boreal or cold water forms; the next larger (twenty per cent.) to tropical or warm water groups, while more than sixty belong to groups not specially characteristic of the *littorale* of either region. III. Of the species found in the abyssal region, without regard to their range above it, ten per cent. may be termed boreal, thirteen per cent. tropical, and more than seventy-five per cent, uncharacteristic generic forms. IV. Since the tropical forms found belong to the same groups as the local littoral mollusk fauna, it is eminently probable that the abyssal regions have local faunæ proper to their various portions, and that a universal exclusive abyssal mollusk fauna does not exist. V. The specific characters of many of the strictly abyssal species appear to exhibit a very remarkable degree of variation between supposed specific limits, though it would seem as if the conditions under which they live must be remarkably uniform. This would indicate that the tendency to variation is less dependent upon changes in the existing environment than has generally been assumed, if not entirely independent of it; and, conversely, that under uniform conditions (where there can be hardly any struggle for existence) the innumerable variations which occur may coëxist with hardly any elimination, and the equilibrium of characters made temporarily stable by natural selection (which constitutes "species") may fail to be exhibited to a sufficient degree to permit us to take account of it.

In the *American Journal of Science* for November (xx, pp. 390-403), Professor Verrill treats of the remarkable marine fauna occupying the outer banks off the southern coast of New England. This article is a preliminary to the more extended paper in the Proc. U. S. Nat. Museum, hereafter alluded to, and contains brief descriptions of two new genera and three new species of Cephalopods, one new Pteropod, seventeen species and one new genus of Gasteropods, and two of acephalous Mollusca. Several of these appear to be of particular interest, and some seem remarkably close to those described from the *Challenger* collection by Boog-Watson. The *Calliostoma bairdii* V. and S., is the *Calliostoma psyche* of the recorder, named but not described in his preliminary report on the *Blake* dredgings off the gulf and Florida coasts in deep water. This lovely species was dredged

by the lamented Pourtalès many years ago on the Florida reefs. The species referred to in this article are, in part if not wholly, members of the deep sea fauna, strictly speaking. A number of the species mentioned in the article, are described as of "Verrill and Smith," in recognition of the labors of Mr. Sanderson Smith of the Fish Commission, upon the part of the collection embracing the Mollusca.

In the same journal (l. c., p. 284, April, 1880), Verrill gives a "Synopsis of the Cephalopoda of the north-east coast of America," with five plates. This is composed chiefly of notes or additions to knowledge in regard to species heretofore described.

In the Proc. U. S. National Museum (Vol. III, pp. 356-409), Professor Verrill publishes a "Notice of recent additions to the marine Invertebrata of the north-eastern coast of America, with descriptions of new genera and species, and critical remarks on others." This consists of two parts, the first (II) relating to the mollusks, with notes on annelids, etc., collected by the U. S. Fish Commission, and the second (III) comprising a catalogue of Mollusca recently added to the fauna of Southern New England. Although the latter part (pp. 401-409) did not appear until Jan. 10, 1881, the publication, which has also appeared separately, will here be considered as a whole, for the sake of convenience. Part of the new species had previously been published in the *Am. Journal of Science and Arts* for November, as already mentioned.

In this article one hundred and fifteen species of Mollusca are described as recent additions to the fauna of New England, which, almost without exception, have been obtained by the parties employed by the U. S. Fish Commission, directed by Professor S. F. Baird, and under the immediate supervision of Professor Verrill, who has been aided in the work by Mr. Sanderson Smith, Dr. A. S. Packard, Jr., Messrs. Richard Rathbun, H. E. Webster and several other well-known naturalists. Particularly rich results have been obtained in depths from sixty-five to five hundred fathoms, south from Narragansett bay extending to the margin of the so-called "coast shelf" of the continent in this vicinity, about ninety miles from the coast. It may be questioned whether all the forms obtained can be with entire accuracy denoted as belonging to the "New England" fauna, since some of them are, without doubt, members of the true deep sea fauna, and may be found hereafter to extend widely throughout the Atlantic sea-bed

without truly forming part of any of the local faunæ bordering upon it. Among the surprises was the discovery, in some numbers, of nearly fresh shells of *Argonauta argo*, though Lockwood (AMERICAN NATURALIST, XI, p. 243, 1877) recorded the capture of a living individual, probably of this species, on the coast of New Jersey. The species first named in this paper are *Bela sarsii* V. (for *B. cancellata* Sars non Couthouy); *B. hebes* V. from 500 fms.; *Pleurotoma (Pleurotomella) pandionis* V., 238 fms.; *Taranis pulchella* V., 487 fms.; *Neptunea (Sipho) cælata* V., and *N. arata* V., to 500 fms.; *Nassa nigrolabra* V., 155 fms.; *Lunatia levicula* V., 26 fms.; *Rissoa (Cingula) harpa* V., to 365 fms.; *Solarium boreale* Verrill and Smith, 115 fms.; *Acirsa gracilis* V., 100 to 365 fms.; *Aclis striata* V.; *Turbonilla smithii* V., 100 to 120 fms.; *Odostomia (Menestho) sulcata* V., 365 fms.; *Dendronotus elegans* V.; *Polycerella emertonii* V. n. g. et sp.; *Coryphella nobilis* V.; *Cratena veronicæ* V.; *Halopsyche* V. n. g., for *Psyche* Rang., preoccupied; *Lyonsiella gemma* V., 487 fms.; *Neæra multicostata* Verrill and Smith; *Avicula hirundo* L. (?) var. *nitida* V., and several undetermined species. It is of course impossible, within the limits of this report, to summarize fully a publication which is in itself chiefly a summary and a catalogue, nor is it possible fairly to criticise species or identifications from brief diagnoses without figures. It is to be hoped that the authorities of the Fish Commission and Professor Verrill will not allow much time to pass without giving to students good figures of all these new forms, which have been, during the existence of the Commission, from time to time necessarily so briefly and imperfectly described. This is the more necessary now that the investigations of the Commission are encroaching upon the abyssal fauna. Naturalists in several countries are working on similar material, and it is growing to be more and more widely recognized that a description, unless accompanied or soon followed by a good figure, or careful comparison with some well-known and well-figured form, is useless to any one who does not possess specimens for comparison. That the labors of Professor Verrill and his associates should bear their proper fruit and be placed permanently on a sound foundation, must be the wish of every American naturalist, and to bring this about, good figures of their hard earned treasures are indispensable.

One criticism may be permitted. The *Bela simplex* of G. O.

Sars being neither the *B. lævigata* Dall (from Bering strait), nor the *Pleurotoma simplex* of Middendorf, the identification of the species recorded under Sars' name may be considered as still in doubt.

In the November number of the *Valley Naturalist*, Mr. Calkins enumerates twelve species of mollusks additional to his list of marine shells of Florida of 1878.

Some notes on the molluscan fauna of Dominica, are given by A. D. Brown, in the *AMERICAN NATURALIST* (Vol. xv, No. 1, pp. 56-7), and relate chiefly to the land shells. Mr. Guppy's publications (*Ann. Mag. Nat. Hist.*, 1868) are criticised, and it is stated among the notes that *Amphibulima patula* possesses the power of completely contracting itself within its shell.

A list of "Land and fresh water mollusks of Muscatine county, Iowa," was printed, in 1879, in the *History of Muscatine county*, (8vo, 1879, pp. 332-3) by Professor F. M. Witter, who also printed a tract of four pages entitled, "Notes on Wyoming Hills," a paper read before the Muscatine Academy of Science, June 2, 1879, which includes notes on various species of recent and subfossil Pulmonata. These publications have not been seen by the recorder.

In the report of the work in 1879 (p. 434) reference was made to a criticism in *Science News*, by Mr. Stearns, of a paper on the shells of Florida by Mr. Calkins. In the same (now defunct) publication (June 15, '79, p. 255), Mr. Calkins replies, maintaining the probable accuracy of the disputed identification of a Floridian *Ranella* collected by him with *R. muriciformis* Brod., a West American species, rather than with *R. caudata* of Say, as Mr. Stearns would suggest.¹

It seems that there were also published by Mr. Calkins, in 1879, the following papers: "The terrestrial molluscan species of Florida, with notes of personal observation," in the *Journal of the Cincinnati Society of Natural History* in 1879, and "Note on a rare Californian marine mollusk," in *Science News* of July, 1879.

During the summer of 1880, Mr. T. A. Verkruzen visited the Banks and Newfoundland, and dredged there, beside collecting from several other sources, such as cod stomachs, etc. He pub-

¹ The specimens from Florida having been kindly submitted to the recorder by Mr. Calkins, and compared with authentic specimens of *R. muriciformis*, seem to be specifically different from that Pacific coast species, though belonging to the same general group, and, in general, not dissimilar in characters.

lishes in the January number of *Jahrbuch d. Deutschen Mal. Ges. f.* 1881 an account of his collections. Herein appear descriptions of several forms of *Buccinum*, which no one of our American students has yet thought of separating under a specific name, though very familiar to all. The limitations of species varying with different writers, it is sufficient to say that in this case specific limits seem to be contracted beyond precedent. None of the forms are figured and described but have been already several times named, according to the average view of such things. The figures are fortunately very good.

Introduced Species.—W. H. Ballou (*AMERICAN NATURALIST*, July, p. 523) states that *Bythinia tentaculata* L., was discovered at Oswego, N. Y., in June, 1879, and has more recently been found in the Champlain canal, at Waterford and Troy, and in the Erie canal, at Syracuse, N. Y.

Verrill (*Proc. U. S. Nat. Mus.*, III, p. 376) notes the occurrence at Newport, R. I., among the docks, of *Truncatella truncatula* Drap., with *Alexia myosotis*, *Assimineia grayana*, etc., in July.

Professor E. S. Morse, in the *Bulletin of the Essex Institute* (Vol. XII, 1880, Salem, Mass.), has a paper of six pages on "The gradual dispersion of certain mollusks in New England." In it some statistics are given as to the gradual spread of various species, especially *Litorina litorea* L., together with a small map and a figure of the shell.

In the *American Journal of Science* among the zoölogical notes, Professor Verrill alludes briefly (l. c. p. 250, Sept., 1880) to the occurrence of *Truncatella truncatula* and *Assimineia grayana*, at Newport, R. I. (The recorder believes that in 1871, during a brief visit to Wood's Holl, Mass., he obtained a few dead specimens of the former on the beach at that place; at least the specimens agreed with European specimens so named, so far as the shell was concerned.)

Another note (l. c. p. 251) refers to the rapid diffusion of *Litorina litorea* L., on our coast, this species having now reached as far south-west as New Haven, Conn.

In the *Valley Naturalist* (St. Louis) II, 1, Sept., 1880, Mr. L. B. Case speaks of the prevalence of *Zonites cellarius* Müll., in green-houses, where, however, it is not ascertained to do any damage; unlike an unidentified imported species of *Limax*, which is very destructive to Begonias and other tender-leaved foliage plants.

It may be noted that *Zonites* may be beneficial by destroying the Limaces, as it is believed to be carnivorous.

Descriptive and Miscellaneous Papers.—Very few exclusively of this character have been published during the year, although, as usual, several noted under previous heads, contain descriptive matter.

Octopus obesus and *O. lentus* are described by Professor Verrill as new to the north-east American coast (*Am. Journ. Sci.*, Feb., 1880, XIX, pp. 137-8) from specimens obtained by fishing vessels off Sable island and Le Have bank, and presented by their commanders to the U. S. Fish Commission.

Partula mooreana, from the Island of Moorea in the Pacific, is described as new by Dr. W. D. Hartman (*Proc. Acad. Nat. Sci.*, Phil., 1880, p. 229).

In the *Valley Naturalist* (St. Louis) II, I, Sept., 1880. p. 6, Mr. Calkins describes *Amnicola ferruginea* n. s., from the Calumet river, Ill., with a woodcut, and gives some "Notes on some Florida Uniones," in which he unites *Unio buckleyi* and *U. buddianus* Lea, specifically, beside considering the distribution of a nearly allied form, *U. blandingianus* Lea. In the December number (p. 53), he describes, with a good figure, *Zonites upsoni*, a new minute and interesting species from Illinois. Mr. Calkins also printed in July, 1880, an octavo catalogue of the Uniones in his cabinet, which comprises some four hundred numbers.

At the meeting of the Am. Assoc. for the Adv. of Science, at Boston, papers were read by Professor E. S. Morse entitled, "Observations of Japanese Brachiopods," and "Notes on Japanese Pulmonifera," but the reporter has not come across, as yet, any published synopsis of these papers, which it is to be hoped will appear in the annual volume.

Professor Alpheus Hyatt, in one of the Teachers' Science Guides (Ginn & Heath, Boston, 1880), has given an account of some of our commoner, economically important mollusks, such as the oyster and clam.

A book, by Mr. Emerton, on the animals of the sea-shore, which (like that of Professor Hyatt just referred to) has not been seen by the recorder, may contain some matter pertinent to this record.

Articles on the economical mollusks appear from time to time in the daily or weekly press. Some of these contain matter

worthy of preservation in more permanent form. Among those of this general nature, which have come under our observation during 1880, the following may be noted: *N. Y. Weekly Herald* of May 1st, On the Oyster business; *San Francisco Weekly Bulletin* Sept. 15th, On Oysters of the Pacific coast and the trade in them; the same Dec. 1st (in eastern correspondence), On the Oyster trade of Baltimore. In the *San Francisco Morning Call*, Dec. 1-12, 1880, appeared a series of letters on Mexican oysters and the possibility of utilizing them, attempts at which, from the vexatious customs regulations of Mexico, and the stupidity of the local officials who enforce them, have hitherto resulted in failure, though the oysters are easily obtained and of good quality.

The collections of shells belonging to various gentlemen in the vicinity of San Francisco, and especially that of Mr. R. E. C. Stearns, perhaps the most scientifically valuable of any *private* collection in the United States, form the subject of an article in the *Sunday Chronicle*, San Francisco, Dec. 26, 1880.

Two papers of real value on "Staten island and oysters," appeared in the *Scientific American* for July 31st and Aug. 7th. In the supplement to that publication for July 10th, J. W. Putnam, C. E., contributes an important essay on the preservation of timber, especially with reference to attacks by boring mollusks such as the *Teredo*.

The recorder may, perhaps, be permitted here to announce that having discovered that the name *Ceropsis*, used by him for a genus of *Carditidæ* of the Californian coast, in 1871, is preoccupied, he desires to substitute for it the name *Milneria*, in honor of the late Dr. J. W. Milner of the U. S. Fish Commission. The name *Candelabrum* (used by him in 1878 for a *Pleurotomoid* genus having the posterior surface of the whorls concave, and with the keel produced backward in spines like those ornamenting the varices of *Murex*), appears to have been used by Blainville for a radiate, but it does not appear whether Blainville's name has or has not been adopted into science. If a new name be considered desirable, *Ancistrosyrix* may be used. It comes from deep water off Florida.