

BULLETIN
OF THE
NATURAL HISTORY SOCIETY
OF
NEW BRUNSWICK.

No. VI.

(ANNIVERSARY NUMBER.)



PUBLISHED BY THE SOCIETY.

SAINT JOHN, N. B.
BARNES & Co., 82 PRINCE WILLIAM STREET.
1887.



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NATURAL HISTORY SOCIETY
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ARTICLE I.

ON THE RELICS OF THE STONE AGE IN NEW
BRUNSWICK.

BY L. W. BAILEY, M. A.

In the following article, and in another to be subsequently prepared by Mr. G. F. Matthew, it is the wish of the authors to bring together and to publish, for general information, such facts as are known with regard to the distribution, mode of life, and characteristics of the early or pre-historic races once occupying what is now the Province of New Brunswick.

It is hardly to be wondered at that a country possessing so many features likely to prove attractive to savage instincts—a river exceeded in length and volume by but one on the entire Atlantic coast, tributary streams and lakes most remarkable for their size and number, and giving ready access to vast areas abounding in every description of game, and, finally, a coast line not only of great length but of the most diversified character, and rich in the treasures of the sea,—should afford evidence of an aboriginal occupation long prior to the advent of Europeans to our shores. Yet, though implements of stone, chiefly in the form of arrow-heads, are not uncommon in many parts of the Province, and have been somewhat vaguely recognized as of "Indian" origin, no attempt has been made, up

to within a short time, to bring such materials together, to examine critically their mode of occurrence, or to make any comparisons between them and similar remains from other parts of the world. Indeed, with the exception of a single article, contained in the Proceedings of this Society, no publication bearing upon the subject of the early inhabitants of this region exists. The opportunities of the authors to supply this want have been less than they could wish, but the material already in hand has proved to be so large as to render impossible its full presentation in a single paper. In this article it is accordingly proposed to consider chiefly such information as has been afforded by inland localities, leaving for a second paper a description of such as are found upon the sea-board. Though such a division is not an exclusive one, a variety of similar articles being found in both situations, yet, as will hereafter appear, it is, to some extent, a natural one, as the conditions of life in the two cases were somewhat dissimilar, and there are many contrasts in the relics which they respectively furnish.

NATURE OF THE MATERIALS.

The articles to be hereinafter described, and all of which are believed to be of pre-historic origin, may be most conveniently classified with reference to the substances composing them, as follows:

Group I.—Implements, Weapons and Ornaments of Stone :

Arrow-heads.	Hammer-stones.
Lance-heads, spear-heads.	Net-sinkers.
Axes and hatchets.	Ornaments.
Gouges and chisels.	Idols and sculptured stones.
Celts.	Drilled stones.
Corn-crushers.	Flakes
Scrapers.	Hearth-stones.
	Slick-stones.

Group II.—Implements and Ornaments of Shell, Bone and Ivory :

Shell-beads or Wampum.	Bone awls or piercers.
Harpoons.	Bone needles.
	Fish-hooks,

Group III.—Implements of Clay or Earthenware :

Pottery.	Pipes.
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Group IV.—Food refuse :

Shell-heaps or kitchen-middens.	Fish remains.
Mammalian remains.	Invertebrate remains.
	Vegetable remains.

To these may be added remains of human skeletons, and descriptions of the sites of villages and summer encampments.

DISTRIBUTION AND MODE OF OCCURRENCE.

The relics above enumerated differ greatly in their relative abundance as well as in their distribution, but are alike in having been invariably met with only in the vicinity of navigable waters, either those of rivers and lakes or of the sea-coast. Of the former, as might be expected, the St. John River affords the most frequent examples; stone implements of various kinds being not unfrequently met with at many points along its banks, at least as far up as Grand Falls. Above this point we have been unable to learn of their occurrence, although both the main river, in its upper portion, and many of its tributaries, such as the Madawaska, Fish River, the St. Francis, and the Allegash, are of a character which would be likely to invite frequent visitation. The occurrence of cataracts, either from the difficulties offered by them to navigation or from the more favorable fishing to be found at their foot, are especially productive, and both the Grand Falls, the Arcostook Falls and the Meductic have yielded implements in considerable variety. But of all inland localities there is none which can compare, both for the number and the diversity of the objects yielded by it, with that of Indian Point and the adjacent waters of

the Grand Lake, in Queens County. There can be no doubt that this point was a favourite camping ground for the early races, as it continued to be for some time after the first settlement of the country by Europeans. Indeed it would be difficult to find a position more admirably adapted to meet the wants of a primitive people. Situated near the western extremity of the largest sheet of water in the Province, and at a point where this is connected by short thoroughfares with chains of smaller lakes (Maquapit and French Lakes), as well as with the St. John River through the Jemseg, it was at once a central position from which easy access might be had to a very large area, comprising all the central part of the Province, with rivers abounding even now in fish and game, and one easily capable of defence—the low, swampy character of the land separating it from the St. John River making difficult any hostile approach from that quarter. It is accordingly one of the few localities containing direct evidences of permanent occupancy, and from it many of the most interesting of the articles, to be hereinafter described, have been obtained.

Of the streams of the interior flowing to the so-called North Shore of the Province, we have at present but little information as to the occurrence upon them of pre-historic relics. The only locality known to us is upon the Miramichi River at the mouth of one of its principal tributaries, the Clearwater, of which particulars will be hereafter given.

In most instances the articles above referred to, being implements of warfare or of the chase, have been found simply scattered loose over the surface of the ground or sometimes turned out by the plough—their position being largely a matter of chance. This position has also, undoubtedly, in some cases, been changed from the original one by the agency either of water or ice. Where, however, they are abundant in limited areas, and especially where they are accompanied by heaps of fragments, by implements in various stages of manufacture, or by the blocks from which they were evidently derived, there can be little doubt that such localities were at least temporarily occupied. When, further, the articles found

at any one point exhibit much variety, and include objects of ornament, amusement and the like—or still further, when they are accompanied by layers of charcoal, by hearthstones, or by other portions of dwellings, as well as by the remains of animals used as food, there can be little hesitation in regarding them as places of frequent if not permanent resort. In a very few instances the articles found show by their character or associations that their positions are those of sepulture.

The articles found upon the sea-coast differ, both in character and mode of occurrence, from those of the interior and the river valleys. They are usually confined to particular sites, and these show beyond question that they were at least the positions of summer encampments, if not places of more permanent occupation. Their most marked feature is the occurrence of great numbers of refuse shells, forming "shell heaps" or kitchen-middens, similar to those now so well known as occurring along the entire length of the Atlantic coast, as well as in Denmark and other countries. The number of stone implements found in these heaps is much less than in the interior, while they appear to be much more productive of articles composed of shell and bone, as well as in the remains of animals such as may have been used for food. In one instance the remains of a pre-historic village, embracing evidences of a number of associated dwellings, have been observed, and after careful exploration by members of the Society, have been described in their Proceedings.

The articles to be described in the present paper are for the most part those of Groups I. and III. of the classification above given.

ARTICLES OF STONE.

ARROW-HEADS. These are probably the most common as well as the most widely distributed of stone implements. They are also those in which symmetry of outline and skill in workmanship are most conspicuously displayed. They differ, however, very greatly in this respect among themselves, as they do both in form, size and colour; passing insensibly,

as regards the former, into lance and spear-heads, and as regards the latter, from pure white through shades of grey, green and red, to black. The specimens selected for illustration, and contained in Plate I., exhibit their more particular outlines, among which are included leaf-forms (Figs. 5, 6, 7, 9, 11, 14, 30); triangular forms; forms notched at the sides, either broad (Figs. 8, 33), or narrow (Fig. 31); barbed forms (Figs. 30, 34); or forms which are stemmed (Figs. 14, 28), the stem being either straight, tapering or expanding; also lozenge shaped and rhomboid forms.

In all cases the material composing these articles is silicious, but in some it is a pure translucent or a white milky quartz, in others a red jasper, chalcedony, carnelian, brown or black hornstone, or black silicious slate. These materials are all of frequent occurrence among the rocks of the Province, but the first three are especially so, both in veins and as enclosed pebbles in various conglomerates. A large bed of pure translucent chalcedony and blood-red jasper occurs on the southern side of Washademoak Lake, but much of this material would seem to have been derived from the conglomerates of the Lower Carboniferous formation, or the debris of the latter.

In all cases the arrow-heads here described have been formed by a process of chipping or flaking, probably by the agency of pressure slowly applied. In no instance do they show evidence of grinding.

LEAF-SHAPED IMPLEMENTS. (Plate III. Figs. 15-22). These are implements of uncertain use, but may have been used for cutting, for scraping, or for splitting purposes. They vary from broadly oval to ovate and narrow lanceolate forms, and are usually quite thick along the medial line. They may be pointed at one or both ends, and in all instances have been formed by flaking.

AXES AND HATCHETS. (Plate III. Figs. 1, 4, 5, 6). These are among the most common of Indian relics and have been found at many different localities. They were especially abundant at Indian Point, from which, however, they have now been mostly removed.

In size, these articles vary from four or five to twelve

inches, and from three to five inches in breadth, the butt-end being an inch or more in thickness, but with a more or less defined encircling groove for the attachment of a handle. In addition to the differences of form, they also differ from the articles previously noticed, in having been shaped by pecking or grinding rather than by flaking, their surfaces being always smooth and occasionally somewhat polished. The cutting edge is usually dull or even rounded. The material of their construction is also different from that of the arrow and lance-heads, being composed usually of hard sandstone or quartzite, and occasionally of grey syenite, but in no instance of either pure quartz, jasper or chalcedony.

They are all oval in section, but in some the oval is greatly flattened, the maximum thickness not exceeding an inch, and bevelled to either end as well as to the sides; others exhibit a very thick or rounded butt, and from this taper abruptly to the cutting edge, thus combining, as in many modern implements, the use of the axe and hammer.

LANCE AND SPEAR-HEADS. (Plate II. Figs. 1, 5 and 10). The articles included under this head bear much resemblance to some of the forms of arrow-heads above described, both in general form and in material, but differ in being usually of considerably larger size, with a tendency to more elongated shapes, and less perfect accuracy of outline. They occur both with and without stems, and occasionally are notched at the base, those with stems having been perhaps fastened by mere insertion, and the notched forms with the assistance of thongs. Red and black jasper would seem to have been the favourite materials in their construction; but one very beautiful specimen in our collection, from the Tobique River, is a clear and almost transparent vitreous quartz, irregularly clouded with dark intersecting veins. It has a diameter at the base of two and a half inches, and is distinctly stemmed. Like the arrow-heads, these articles have all been made by a process of flaking.

CUTTING IMPLEMENTS. (Plate III. Fig. 12). Among the specimens possessing a general lance-like form, are some of which the size and weight suggest that they may have been

held directly or with a short handle, and have served for cutting or hewing rather than for purposes of projection. A fine specimen of this kind, composed of red jaspery slate, has a length of nine inches, tapering at one end to a rounded point and narrowed to a sort of handle at the other, while either side is bevelled from the median line to a rather sharp edge. Others are like arrow-heads in size and shape, but are left thick and blunt on one side, with a cutting edge on the other. They are always flaked.

ORNAMENTED STONES. (Plate II. Figs. 6, 7, 8). Among the articles found at Maquapit Thoroughfare, near Indian Point, Grand Lake, are several which are interesting as exhibiting attempts at surface ornamentation. In each case these objects are of a narrow lanceolate form, tapering at one end to a point and hence bearing some resemblance to spear or lance-heads; but in each case the flattened sides are markedly divided into three well-defined parallel zones, which run the whole length of the article and are inclined to each other at a considerable angle, while (on one side only) the central, or all three of these zones, is conspicuously marked and ornamented with incised lines. Where central, these lines run obliquely down from right to left at an angle of 45° , and are remarkable for their regularity, and in one instance, for their number and fineness; but when found on all three faces, those on the sides are uniformly oblique (downward from right to left), while those of the middle form a more complex pattern, inclining right and left alternately in zig-zag fashion. In two instances the material composing these ornaments is a fine black slate, in another a light colored and apparently magnesian slate. The fineness of the incisions points to the use of sharply pointed instruments and a considerable degree of skill in their manufacture. They are represented in Plate II., Figs. 6, 7, 8, but owing to the delicacy of the markings, these can scarcely be recognized in the photograph.

HAMMERS AND HAMMERSTONES. (Not figured). The articles included under this head are, from their nature, somewhat indefinite and variable, any stone, of whatever shape, having

been at times used, if convenient, for the purpose of hammering. In some instances the fact of their having been so employed is indicated only by the worn or indented edge of the surface used for striking; but in other cases the whole specimen has been artificially modified in form so as the better to adapt it to its purpose. Of the latter class we have several specimens (from Maquapit Thoroughfare), having a general wedge-like or axe-like form, but with one lateral edge thick and rounded, while the other is thin and at the same time distinctly lobed or crenate, as though from the effects of repeated blows, the stone being probably held in the hand by the narrow extremity. Others are simply rounded or ovoidal pebbles, more or less worn on the sides. The more typical forms are from four to five inches in length and are composed of a hard fine grained sandstone.

GOUGES AND CHISELS. (Plate III. Figs. 7, 23 and 25). Gouges are not of uncommon occurrence and are in many instances remarkable for the perfection and symmetry of their finish, the surfaces being regular, smooth and often even polished. They vary in length from four to eight inches, being about an inch or an inch and a half broad in the middle, whence they taper to a somewhat pointed extremity at one end and to an abruptly truncate one at the other. The gouge-like form is determined by a more or less broad and deep groove which, beginning with a slight depression at the narrower end, broadens and deepens towards the other, giving to the truncate extremity a sharp and crescentic cutting edge. These implements are usually composed of fine sandstone or slate and have been formed by a process of rubbing.

The chisels are of similar material and mode of manufacture, but are flat instead of crescentic in section, with one end rough and blunt, and the other rubbed down, more or less abruptly, to a fine cutting edge. Those in our possession are from four to six inches in length. Some of the articles thus designated may have been used as "scrapers."

CELTS OR WEDGES. (Plate III. Figs. 8, 9, 24, 26). These are much like the axes in general form, as well as in size and material, and may occasionally have been used like the latter,

but differ in being destitute of any encircling groove or other evidence of attachment. They are very common and were probably used, in connection with stone hammers or axes, for the splitting of trees. Among those possessed by us is one which is rather unique in being composed of a beautiful dark green jade and very highly polished. It was found upon the shore of the St. John River below Spoon Island.

CORN-CRUSHERS. (Plate III. Figs. 2 and 3). These implements are so called from their form, resembling closely that of a pestle, and their weight, showing that they must have been employed for pounding or crushing. They are not of very common occurrence, the only two specimens known to us having come from the same locality, viz., the neighbourhood of Grand Falls. The one now in our possession is twenty-one inches long and of cylindrical shape, having a general diameter of about three and a half inches, but having the larger or butt end rounded and the other narrowed just below its extremity to a sort of neck, apparently for convenience of handling. It is composed of a hard grey sand stone or quartzite and weighs not less than twelve pounds.

PENDANTS OR NET-SINKERS. (Plate II. Figs. 15-18). These objects were evidently designed for suspension, but whether for purposes of ornament or use, cannot always be readily determined. In general, however, their weight would suggest that they were employed for some other purpose than personal adornment, while their close resemblance in form to the modern plummet and to the sinkers used in fishing, render it possible that this was their chief use. Their general outline is pear-shaped, but while some are regularly rounded, others have more or less flattened parallel sides; and while some are broadest in the middle, tapering to either end, others, like plummets, are expanded below, and others again are bottle-shaped, possessing a distinct elongated square or quadrate neck. They all, however, possess the common feature of a groove around the narrow end, bordered externally by a sort of ring or collar, and thus adapting them to purposes of suspension. The material used is sometimes a fine hard sandstone, which has been shaped apparently by *pecking*, but

in several instances a bright red slate has been employed, the surfaces of which have been ground down and flattened by a process of rubbing.

PERFORATED STONES. Our collection contains several of these articles from Maquapit Lake, the purpose of which can only be conjectural. They are simply flat pebbles, of irregular form, and which would not attract attention were it not that they occur with other undoubted Indian relics, and show perforations which close examination shows to have been artificially made. They may have been employed as sinkers.

II.—IMPLEMENTS OF SHELL AND BONE.

1. SHELL BEADS OR WAMPUM. (Plate II. Fig. 1.) The only examples of the latter which have come under our notice were obtained some fifteen years ago from the Tobique River, in Victoria County, where they were found, in connection with human bones, apparently those of a child, and wrapped in bark, buried beneath several feet of soil. They are all circular and slightly concavo-convex, the outer diameter being about three-eighths, and that of the central perforation about one-eighth of an inch. They would appear to have been derived from the common fresh water clams (*Unio* and *Anodonta*) and, considering the circumstances under which they were found, were probably of true Indian and domestic manufacture, rather than imported or imitative products, such as were abundantly made for purposes of barter, in more thickly settled localities. Together with the accompanying bones, a large part of the shells obtained at the locality are now in the cabinet of the Smithsonian Institution at Washington, D. C.

2. The only implement of bone in the possession of the author was obtained from one of the shell heaps found near Oak Bay, in Charlotte County. It is apparently a fragment of a tibia, which at one point on the edge or stem shows a deep nick or lobe, cut in obliquely, and apparently with the object of producing a sort of bodkin by which threads might be caught and pulled through loops, as in the making of

netting and the like. In this and other shell-heaps of the coast, a considerable variety of such articles, in the form of needles, fish-hooks, harpoons, etc., occur, and will be fully described and figured in a later article.

III. IMPLEMENTS OF CLAY OR EARTHENWARE.

1. POTTERY. (Plate II. Figs. 12 and 14). So far as known to the authors, examples of aboriginal pottery have been found at three localities only, viz.: the Maquapit Thoroughfare, near Grand Lake, and two stations where shell heaps occur upon the coast. They were first brought to our notice along the Maquapit Thoroughfare by Mr. J. W. Bailey, in 1881, who, in visiting the locality in the course of a canoe voyage, and while collecting other Indian remains, was led to notice the occurrence of fragments of pottery mingled with the latter. In a subsequent visit to the locality by the author of this paper, a careful search of both shores of the Thoroughfare was made, and in addition to numerous other articles, chiefly of stone, many fragments of pottery were obtained. They were found to be confined to a very limited area, and this, too, only accessible at low water, being strewn over the surface of the soft muddy banks or imbedded in the latter. None of the fragments are sufficiently large to convey any certain idea of the form of the vessel from which they were derived, but, having undergone apparently but little change, they afford a good idea of the general composition of the aboriginal earthenware as well as of the modes and patterns of its ornamentation. The materials have usually about the texture of fine mortar, though some are much finer, and seem to consist of a mixture of clay with spangles of black mica and pulverized shells. The outer surface, except where indented, is usually quite smooth, and covered by a reddish ochreous glaze. The indentations are evidently designed for ornament, and are arranged in regular lines or rows, commonly straight and parallel, but occasionally curved, intersecting or zig-zag. Some consist of a succession of well defined triangular or rounded dots, others of continuous lines, the latter occurring

chiefly on what would seem to have been the rim or margin of the bowl-like vessels. In some instances the arrangement of the indentations bears some resemblance to net-work, but the form of the individual impressions would seem to show that they are not the result of cordage, as is sometimes the case with aboriginal pottery, but rather that of blunt toothed implements pressed against the sides of the article while the latter was still soft. The fragments are in most instances quite firm, but lack the hardness of real earthenware, and could hardly have been subjected to any great degree of heat. As stated, the fragments found have been too small to give any definite idea either of the form or dimensions of the vessels of which they formed a part.

2. PIPES. (Plate II. Fig. 9). We have but a single specimen of an aboriginal pipe, but this one of somewhat unique character and remarkably well preserved. It was given to Mr. J. W. Bailey by a person living near Aroostook Junction in Victoria County, and said by him to have been obtained from near the basin below the Aroostook Falls. Whether or not this is the exact locality of its first discovery, there can be no question as to its authenticity as an Indian relic, Major Powell, of the United States survey, and one of the best authorities on this subject, to whom it was shown, has stated that it is not only a genuine, but a typical example. The best idea of its form will be obtained from the figure representing it, the most noticeable peculiarity being the strongly marked Indian face, imprinted, not as usual upon the front, but upon the inner side of the bowl facing the stem. The material composing it is quite hard and of rather coarse texture within, but the outer surface is everywhere smooth or slightly polished, the whole looking like a fine sandstone but probably of artificial manufacture. In proportion to the whole size of the bowl (one and one-half inches high by one inch broad), that of the opening is very small, being only a little over half an inch where widest and abruptly narrowing to the diameter of a lead pencil. The stem end is a little over an inch long and makes with the bowl an angle of 120° .

ARTICLE II.

THE MARINE MOLLUSCA OF NEW BRUNSWICK.

BY W. F. GANONG.

PART I.—INTRODUCTION.

(Read November 2nd, 1886.)

Probably the very earliest published reference to the Invertebrate Zoology of this region occurs in "Les Voyages du Sieur de Champlain," written by Champlain, and published in Paris in 1613. He found on St. Croix Island (now Neutral or Dochet Island), in 1604, cockles, mussels, sea-urchins and sea-snails. His own words are: "Autour de notre habitation il y a de basse mer quantité de coquillages, comme coques, moules, ourcins & bregaux qui faisoient grand bien a chacun."* Another interesting early reference to our invertebrates is that of Nicholas Denys, who, in his "Description Géographique et Historique des Costes de L'Amérique Septentrionale," published at Paris in 1672, mentions the abundance of shell-fish (coquillages) upon our North Shore, and of oysters (huîtres) at Cocagne.

Many ear'y books on New Brunswick give short lists of the edible species of mollusca and crustacea, with an occasional isolated reference to the radiata. The greater number of these books, however, having been intended merely as guides for the information of immigrants, such a subject as the zoology of the Province could be treated only in the briefest and most practical way; but their writers evidently had no conception of the richness of marine life in our waters, and knew nothing of its study in a scientific sense. The chief lists, bearing marks of having been copied more or less the one from the other, occur in works by Robert Cooney (1832),

* A still earlier publication (Lescarbot's History of New France, 1609), in describing Champlain's voyage, mentions the abundance of mussels at St. Croix Island.

Rev. C. Atkinson (1844), C. L. Hatheway (1846), Abraham Gesner * (1847), W. H. Perley (1852 and 1854), and Alex. Monro (1855).

The first section of New Brunswick to be systematically studied by a naturalist, was the region about Grand Manan. William Stimpson, afterwards Dr. Stimpson, spent three months in the summer of 1852 at work upon the study of its marine invertebrate fauna. The results of that work, including the descriptions of many new genera and species, were published in 1854 in Vol. VI. of the Smithsonian Contributions to Knowledge. The publication of this list marks the beginning of the scientific study as well as of the scientific knowledge of the invertebrates of this Province. An earlier paper, by the same author, contains references to species found at Grand Manan and Eastport, but they are incidental, the paper not dealing specially with the fauna of these two places.

The next work of importance in which occur references to the mollusca of the southern coast is the second edition of "Gould's Invertebrate of Massachusetts," an illustrated edition comprising the mollusca only, published in 1870. The first edition of this work, published in 1841, contains no references to New Brunswick.

We owe much, too, to the investigations and dredgings of the United States Fish Commission. The latter have added very greatly to our knowledge of the distribution of species in the Bay of Fundy, particularly in the region about Grand Manan and Eastport. The various papers by Professor A. E. Verrill, embodying these results in so far as they relate to our waters, are mentioned at length below.

Of the molluscan fauna of the Bay Chaleur and Gulf of St. Lawrence coasts we have less knowledge. A paper published in the "Canadian Naturalist" in 1869, by Robert Bell, contains a few references to New Brunswick. This, together

* Upon this subject a note of Gesner's (in his "New Brunswick") is misleading. He says: "Of shells the number collected is 131; crustacea 27. These have been arranged according to the system of Lamarck by T. A. Greene, Esq., of New Bedford, and appear in the catalogue of the animals of Massachusetts." Upon consulting this list, which was published in the second edition of Hitchcock's Zoology of Massachusetts (1835), it will be found that it includes the mollusca of the whole New England coast, and is not a list of the shells of New Brunswick, as a reader of Gesner's work would naturally infer.

with three or four papers by J. F. Whiteaves, treating only incidentally of our waters, are all that have been published upon the fauna of the northern coast. Mr. Whiteaves has dredged in the Gulf of St. Lawrence; but by no means zoologically, even if geographically, can the latter be considered to be among the coast waters of New Brunswick. So different is the character of the life in Northumberland Straits and along the coast to and in the Bay Chaleur, that there is a natural separation of these waters from the Gulf of St. Lawrence proper, which gives a natural zoological division between the former, which certainly are coast waters of New Brunswick, and the latter which is not.

By New Brunswick students, practically nothing has been done. Mr. G. F. Matthew and Rev. C. H. Paisley have published lists of shells from the post-pliocene deposits of this Province; but aside from a popular and very incomplete paper by the writer, published in Bulletin No. IV. of the Natural History Society of New Brunswick, nothing has appeared upon the living forms. Very little is as yet known of the distribution and relative abundance of the species upon our coasts, and an attractive field here lies open to our young students of natural history.

The general character of the fauna of the southern coast is strongly arctic, though it is by no means of an extreme type. The great tides of the Bay of Fundy causing, as they must, strong currents, sweep the cold water of the northern Atlantic into the Bay, over amongst the Grand Manan Islands and against the New Brunswick and Maine coasts. The deep waters of this region have no chance to become warm, the constant influx and circulation of cold currents keeping the temperature always reduced.

But upon the "North Shore" there is a very different condition of things. The waters are shallow and the tides slight. There is no great influx of cold water and the waters easily become warm and retain their warmth. These conditions are favourable to the existence there of a more southern fauna than can live in the Bay of Fundy, and we find as a matter of fact that all along the coast in Northumberland

Straits and thence up to Caraquette and in the Bay Chaleur, the animal life is decidedly of a more southern type. Shells are found in these waters which do not thrive elsewhere north of Cape Cod, except at one or two isolated and very sheltered localities. A very conspicuous and familiar example of this is afforded by the oyster. It is abundant on the North Shore and formerly occurred at several points on the New England coast. It is now, however, altogether extinct north of Massachusetts Bay, with this single exception. The persistence of this assemblage of southern forms amid the cold northern waters, shut off as it is from the similar fauna far to the south, is readily explained by the physical conditions of the region mentioned above. But how it came to be there, or the conditions which determined its connection with and severance from the fauna now south of Cape Cod, have not been satisfactorily explained. We have then, literally, upon our northern shore a southern fauna, and upon our southern shore a northern fauna.

The following list is believed to include all works and papers of importance published up to the present time which relate to the marine molluscan fauna of New Brunswick. Papers which contain one or a few isolated references are omitted, but in the list of our mollusca which follows they are specially referred to when necessary. The following may be considered, then, to be comprehensive Bibliography of New Brunswick Malacology in so far as the latter relates to distribution.

- A. (1851). Revision of the Synonymy of the Testaceous Mollusks of New England. By William Stimpson. Boston, 1851. Contains a few references to species found at Eastport and Grand Manan.
- B. (1854). Synopsis of the Marine Invertebrata of Grand Manan: or the region about the mouth of the Bay of Fundy, New Brunswick. By William Stimpson. Smithsonian "Contributions," Vol. VI., 1854. An accurate and systematic catalogue with notes on the distribution, etc., of the invertebrates of these waters. It mentions 117 species of molluscs, to which number many have since been added by the explorations of the United States Fish Commission.

- C. (1859). On the Natural History of the Gulf of St. Lawrence, and the distribution of the Mollusca of Eastern Canada. By Robert Bell, Jr. "Canadian Naturalist," Vol. IV., page 197, June, 1859. Contains a few references to New Brunswick waters.
- D. (1869). On the Marine Mollusca of Eastern Canada. By J. F. Whiteaves, F. G. S., Etc. "Canadian Naturalist," new series, Vol. IV., page 48, March, 1869. Mentions some species as occurring in New Brunswick.
- E. (1870). Report on the Invertebrata of Massachusetts. Second edition, comprising the Mollusca. By Augustus A. Gould, M. D. Edited by W. G. Binney. Boston, 1870. By far the most complete work we have upon New England Mollusca. It is well illustrated and an invaluable work to students of our fauna. It refers frequently to New Brunswick waters.
- F. (1873). Report upon the Invertebrate Animals of Vineyard Sound and the adjacent waters, etc. By A. E. Verrill. Published in the report of the United States Fish Commission for 1871-72. Washington, 1873. Contains many references to the Bay of Fundy and Eastport harbour.
- G. (1873). Results of recent Dredging Expeditions on the Coast of New England. By A. E. Verrill. "American Journal Science," third series, Vol. V., January, 1873. Mentions the occurrence of some species in the Bay of Fundy.
- H. (1874). Report on Deep-Sea Dredging Operations in the Gulf of St. Lawrence. By J. F. Whiteaves. Report to the Minister of Marine and Fisheries, pamphlet form, Ottawa, 1874. Contains much of importance upon the life of the northern and eastern coast waters.
- I. (1874). On recent Deep-Sea Dredging Operations in the Gulf of St. Lawrence. By J. F. Whiteaves. "American Journal Science," third series, Vol. VII., page 210, March, 1874. Reprinted in "Canadian Naturalist," new series, Vol. VII., page 336, November, 1874. Very important as adding to our knowledge of the southern fauna of the northern and eastern coasts, but embodying many of the results of the last (H).
- J. (1879). Notice of Recent Additions to the Marine Fauna of the Eastern Coast of North America. By A. E. Verrill. "American Journal Science," third series, Vol. XVII., April, 1879. Refers to Bay of Fundy species.

- K. (1880). Notice of Recent Additions to the Marine Invertebrata of the North-eastern Coast of America, etc. By A. E. Verrill, "Proc. United States National Museum," Vol. III, page 356, 1880. Refers to Bay of Fundy species.
- L. (1880-81). The Cephalopods of the North-eastern Coast of America," Part II. The smaller Cephalopods, including the "Squids," etc. By A. E. Verrill. "Trans. Connecticut Academy of Arts and Sciences," Vol. V., June, 1880, August, 1881. A very complete work on the Cephalopods of the Bay of Fundy.
- M. (1882). Notice of Recent Additions to the Marine Invertebrata of the North-eastern Coast of America. By A. E. Verrill. "Proc. United States National Museum," Vol. V., page 315, 1882. Refers to Bay of Fundy species.
- N. (1882). Catalogue of Marine Mollusca added to the Fauna of the New England Region, during the past ten years. By A. E. Verrill. "Trans. Connecticut Academy, Vol. V., page 447, April-July, 1882." The following catalogue is intended to include all the mollusca now known to inhabit the New England region that are not included in Binney's edition of Gould's Invertebrata of Massachusetts, published in 1870. In the New England region I include, on the north, the coasts of Nova Scotia and New Brunswick and their outlying banks."
- O. (1885). On the Zoology of the Invertebrate Animals of Passamaquoddy Bay. By W. F. Ganong, B. A. "Bulletin Natural History Society of New Brunswick," No. IV., page 87, 1885. A brief paper, mentioning the occurrence of some common species.

To these, Tryon's "Manual of Conchology," a very comprehensive work, now being published in parts, might be added. It will assist the student in the identification of all of our species, and contains an occasional reference to our fauna.

In the following list, the order and arrangement, and as far as possible, the nomenclature of the species, follows those of Binney's Gould. This work, though now rare and expensive, is really the only one in existence which treats of our mollusca in a way of use to our students. Since its publication there have been some changes in nomenclature, but as the next sixteen years will probably see as many more, it has been thought best upon the whole to keep as far as possible to that of this work. In most cases, where there is a later and better

name, it is given along with the older one. In the list all of the names from Binney's Gould are printed in heavy type, all names printed in smaller type are those of species which are not referred to in the latter work, but are from others.

No synonymy of the species has been attempted, beyond what is absolutely required for a proper understanding of the authorities quoted. Where an author uses for a certain species a name different from that of Binney's Gould, it is of course necessary to give the former in full. In giving the authorities for the names used, the latest and best rule on the subject is followed, *i. e.*, the name of the first author to use the specific name is given in brackets, and after it that of the one who first used the combination of generic and specific names. Where the original describer of the species placed it in the genus in which it still remains, his name is given alone without brackets. A few errors in this regard in Binney's Gould have been corrected in the list, but the authority of names quoted from other papers are given as they occur in the latter. The capital letters refer of course in all cases to the corresponding papers in the bibliography above. The terms littoral, coralline, etc., used in describing the distribution in depth of the species, have their usual meaning. The littoral zone is the belt between high and low-water marks; the laminarian from low-water mark to fifteen fathoms, and the coralline from fifteen to fifty fathoms.

No sharp line can be drawn between those waters which are coast waters of New Brunswick and those which are not, which is at the same time geographical and zoological. For reasons already stated, the Gulf of St. Lawrence is not included among our coast waters. Eastport harbour belongs as much to us as to Maine, and is considered in the list as among our waters. Out of deference, however, to the geographical line, those species which occur in Eastport harbour, but nowhere else in New Brunswick, are given in a separate list. For all localities for which authority is not given, the writer is alone responsible.

PART II.

A PRELIMINARY LIST OF THE MARINE MOLLUSCA
OF NEW BRUNSWICK.

COMPILED AND EDITED BY W. F. GANONG.

Class CEPHALOPODA.

1.—OCTOPUS BAIRDII.—Verrill.

“From five different localities in the Bay of Fundy.”
“Off Head Harbour, Campobello Island, in seventy-five and eighty fathoms, shelly; off Herring Cove in sixty fathoms, muddy; off Grand Manan in one hundred and six fathoms, gravel and sand.” *Verrill* (G), also (L).

2.—LOLIGO PEALEI.—Lesueur. (Long-finned squid).

St. Croix River.

Neither this species nor its varieties *borealis* and *pallida* have, up to the present time, been reported from Maine or New Brunswick waters. Professor Verrill (L) says: “It has not been observed north of Cape Ann.” In June, 1886, the writer found two specimens either of this species or of its variety *borealis*, in a weir at Devil’s Head, in the St. Croix River. Mr. Henry Frye, of Frye’s Island, New Brunswick, a thoroughly practical observer, has told the writer that there are in our waters two kinds of squid, “the short-tailed and the long-tailed” The former is undoubtedly the next, (No. 3), of this list, and the latter must be either this species or the variety *borealis*. It, therefore, certainly belongs to our marine fauna, but its exact variety, its abundance, and its distribution are still to be determined.

3.—OMMASTREPHEs ILLECEBROSA.—Verrill. (Short-finned squid.)

Eastport and Bay of Fundy, *Verrill*, (F), (L). Passamaquoddy Bay, and all waters of southern coast.

This is the common squid of our waters. It is probably the one *Stimpson* (B), reports from Grand Manan and calls *Laligo Bartramii*; his mistake is explained by the fact that he did not see it himself, but knew it only from fishermen's descriptions. It is this species which *W. F. Ganong* (O), reports as abundant in Passamaquoddy Bay.

The descriptions and figures of Cephalopods in *Binney's Gould* (E), are nearly valueless for the identification of species. According to *Verrill* (F), (L), the figure of *Lillogopsis pavo* in that work is doubtless meant for *O. illecebrosa* and *O. Bartramii* for *Loligo Pealei*.

Class GASTEROPODA.

4.—ADMETE VIRIDULA.—(Fabr.) *Stimpson*.

Grand Manan, coralline zone, *Stimpson* (A), (B). Eastport, *Stimpson* (A), *Gould* (E). In stomachs of fishes (E).

5.—TRICHOTROPIS BOREALIS.—*Sowerby*.

Grand Manan, coralline zone, *Stimpson* (B). West Isles, *Stimpson* (A). Eastport, twenty f., *Gould* (E).

6.—CERITHIOPSIS COSTULATA.—(Möller). *Sars*.

Bay of Fundy, *Verrill* (N).

.—FASCIOLARIA LIGATA.—*Mighels & Adams*.

PTYCHATRACTUS LIGATUS. *Stimpson* (F).

Bay of Fundy, off Campobello, twenty to thirty f., gravel, *Stimpson* (A). Grand Manan, twenty-five f., *Stimpson* (B). Bay of Fundy, fifteen to sixty f., *Verrill* (F).

8.—TROPHON CLATHRATUS.—(Linn.) Stimpson.

TRITONIUM CLATHRATUM. Mull (A), (B).

Grand Manan, *Stimpson* (A), (B). Eastport, in fishes' stomachs, *Gould* (E).

9.—TROPHON CLATHRATUS var GUNNERI Lovèn.—(N).

TROPHON GUNNERI, Lovèn (G).

Bay of Fundy, off Grand Manan, *Verrill* (G).

10.—FUSUS DECEMCOSTATUS.—Say.

TRITONIUM DECEMCOSTATUM. Midd. (A), (B).

“Passamaquoddy Bay, in mud at low water,” *Stimpson* (A). Grand Manan, low-water mark to forty f., *Stimpson* (B). Eastport, *Gould* (E). L'Etang harbour and Passamaquoddy Bay, *Ganong* (O).

This handsome shell, which may be called the “ten-ribbed spindle-shell,” is abundant everywhere on the southern coast in clear water, on sand or mud bottoms. It is particularly large, fine, and abundant about low-water mark at Hospital Island, Passamaquoddy Bay.

11.—FUSUS PYGMAEUS.—Stimpson.

TRITONIUM PYGMAEUM. Stimpson (A), (B).

NEPTUNEA PYGMAEA (F).

SIPHO PYGMAEUS. Gould (I).

Eastport, six to fifty f., *Stimpson* (A). Grand Manan, *Stimpson* (A), (B). Bay of Fundy, low-water to one hundred f., *Verrill* (F). Northumberland Straits, *Whiteaves* (1).

12.—FUSUS ISLANDICUS.—(Gmelin), Martini. (Spindle-shell).

TRITONIUM ISLANDICUM. Lovèn (A), (B).

NEPTUNEA CURTA. Verrill (F).

Eastport, low water, *Stimpson* (A). Grand Manan, low-water mark to forty f., *Stimpson* (B). Bay of Fundy, low-water mark to eighty f., *Verrill* (F). Hospital Island, Passamaquoddy Bay, *Ganong* (O).

13.—BUCCINUM UNDATUM.—Linn, (Whelk).

Reported by all observers from all localities examined on southern coast. Northumberland Straits, *Whiteaves* (I). Littoral zone to one hundred f., *Verrill* (F).

This is one of the most common Gasteropods on the southern coast. It is found alive everywhere in the littoral zone; while dead shells are numerous above high-water mark, having been either washed up by the waves or carried by crows.

14.—NASSA TRIVITTATA.—Say.

TRITIA TRIVITTATA. Adams (F).

Grand Manan, (rare), *Stimpson* (B). "Plentiful in Bay Chaleur as far up as Dalhousie," *Bell* (C). Eastport, *Gould* (E). Bay of Fundy, three to thirty f., *Verrill* (F). Shediac and Northumberland Straits, *Whiteaves* (I). Passamaquoddy Bay, *Ganong* (O); also in L'Etang and Bliss harbours.

15.—NASSA OBSOLETA.—Say.

Bay Chaleur, *Whiteaves* (D). Point duChene, *Whiteaves* (H). Shediac, *Whiteaves* (I).

16.—PURPURA LAPILLUS.—Lamarck, (Purple shell).

Reported as abundant by all observers upon the southern coast.

It is one of the most common littoral species and is quite variable. The three-banded white and yellow varieties occur frequently, while the form and sculpturing of the shell are subject to much variation.

17.—COLUMBELLA LUNATA.—Sowerby.

ASTYRIS LUNATA Say. J).

Shediac, *Whiteaves* (I).

18.—COLUMBELLA DISSIMILIS.—Stimpson.

ASTYRIS ZONALIS. Verrill (F).

Eastport, *Stimpson* (A). Grand Manan, eight f., *Stimpson* (A), (B). Eastport, ten to sixty f., *Verrill* (F).

19.—COLUMBELLA ROSACEA.—(Gould), Stimpson.

ASTYRIS ROSACEA. H. and A. Adams (F).

West Isles, ten f., gravel, *Stimpson* (A). Grand Manan, deep water, *Stimpson* (B). Eastport, *Gould* (E). Bay of Fundy, eight to sixty f., *Verrill* (F).

20.—BELA PLEUROTOMARIA.—(Couthouy), Adams.

MANGELIA PYRAMIDALIS. Stimpson (B).

Grand Manan, *Stimpson* (A), (B). Eastport, *Gould* (E). Bay of Fundy, not uncommon, eighteen to sixty f., *Verrill* (F). Eastport harbour and Bay of Fundy fifteen to eighty f., *Verrill* (N).

21.—BELA CANCELLATA.—(Mighels), Stimpson.

MANGELIA CANCELLATA. Stimpson (B).

Grand Manan, twenty-five f., *Stimpson* (B). Bay of Fundy near Eastport and Grand Manan, ten to one hundred f., common, *Verrill* (M), (N). Northumberland Straits, *Whiteaves* (I), (H).

- 22.—BELA DECUSSATA.—(Couthouy), H. and A. Adams.
MANGELIA DECUSSATA. Stimpson (B).
Grand Manan, *Stimpson* (B). Eastport, Bay of Fundy,
“not rare,” twenty to one hundred f., *Verrill* (N).
- 23.—BELA VIOLACEA.—(Migh. and Ad.) H. & A. Adams.
BELA BICARINATA. (Couth.), *Verrill*, var VIOLACEA,
(Mighels & Adams) (N).
Eastport harbour and Bay of Fundy, ten to fifty f., *Verrill* (N).
- 24.—BELA HARPULARIA.—(Couth.), H. and A. Adams.
MANGELIA HARPULARIA. St. (A).
Eastport, *Stimpson* (A). Eastport and Bay of Fundy,
ten to ninety f., *Verrill* (F), (M), (N).
- 25.—BELA TURRICULA.—Stimpson.
MANGELIA TURRICULA. F. et H. (B).
BELA SCALARIS. (Möll), H. and A. Adams.
Grand Manan, twenty-five f., *Stimpson* (B). Eastport
and Bay of Fundy, ten to ninety f., *Verrill* (N).
- 26.—BELA EXARATA.—(Möller), H. and A. Adams.
Bay of Fundy, *Verrill* (K). Grand Manan, five to
eight f., *Verrill* (N).
- 27.—BELA RUGULATA.—(Möller), H. and A. Adams.
(BELA GOULDII. *Verrill* (N)).
Bay of Fundy, *Verrill* (K).

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28.—*BELA INCISULA*.—Verrill.

Eastport harbour and Bay of Fundy, five to one hundred and ten f., *Verrill* (M), (N). "Off Shediack, ten f., collected by J. F. Whiteaves," *Verrill* (N).

29.—*PLEUROTOMA BICARINATA*.—Couthouy.

Bay of Fundy, rare, *Verrill* (F).

30.—*BULBUS FLAVUS*.—(Gould), Stimpson.

NATICA FLAVA. Gould (B).

Grand Manan, fifty f., *Stimpson* (B). Eastport, *Gould* (E). Bay of Fundy, *Verrill* (F).

31.—*MAMMA* ? *IMMACULATA*.—(Totten), Stimpson.

NATICA IMMACULATA. Tott. (A), (B).

LUNATIA IMMACULATA. Adams (F).

Eastport, 5 f., mud, *Stimpson* (A). Grand Manan, low water to twenty-five f., *Stimpson* (A), (B). Bay of Fundy, five to eighty f., *Verrill* (F). Passamaquoddy Bay, L'Etang harbour.

32.—*NATICA CLAUSA*.—Brod. and Sowerby.

Eastport, *Stimpson* (A). Grand Manan, twenty-five f., *Stimpson* (A), (B). Bay of Fundy, "not uncommon," six to one hundred and nine f., *Verrill* (F).

33.—*LUNATIA NANA*.—(Möll), Sars.

Seal Cove, Grand Manan, *Verrill* (K), (N). Eastport, *Verrill* (K).

34.—*LUNATIA GRÆNLANDICA*.—(Möll.), Stimpson.

NATICA GRÆNLANDICA. Beck (B).

Grand Manan, very deep water, *Stimpson* (A), (B).

35.—LUNATIA TRISERIATA.—Say.

NATICA TRISERIATA. Say (B).

N. HEROS VAR. TRISERIATA. Gould (F).

Grand Manan, littoral zone and ten f., *Stimpson* (B). Bay of Fundy, one to forty f., *Verrill* (F). Northumberland Straits, *Whiteaves* (I), (H). Passamaquoddy Bay, *Ganong* (O). Abundant in sand everywhere on the southern coast.

The relations of this species to the following (*L. Heros*) have been much debated. At first considered the young of the latter or again a distinct species, it is now generally regarded as a variety of *L. Heros*.

36.—LUNATIA HEROS.—(Say), *Stimpson*. (Round whelk sea-snail).

NATICA HEROS. Say (B).

Grand Manan, *Stimpson* (B). Near Dalhousie, *Bell* (C). Eastport, *Gould* (E). Bay of Fundy, common, low-water mark to forty f., *Verrill* (F). Shediac, *Whiteaves* (I). Passamaquoddy Bay, *Ganong* (O). L'Etang and Bliss harbours, St. Croix River, and in fact abundant almost everywhere on the Charlotte County coast where there is sand.

The shells of this species, together with its saucer-shaped egg-masses, are among the most common objects of the sea-shore. The dead shells are washed up by the waves, and the broken and bleached shells so often found above high-water mark, are carried up while alive by the crows.

37.—LAMELLARIA PERSPICUA.—(Lin.), *Stimpson*.

West Isles, twenty-five f., rocky, *Stimpson* (A). Grand Manan, coralline zone, *Stimpson* (B).

38.—VELUTINA ZONATA.—Gould.

Eastport, off Friars' Head, fourteen f., *Stimpson* (A). Grand Manan, laminarian zone, *Stimpson* (B). Eastport, twenty f., *Gould* (E). L'Etang harbour.

- 39.—VELUTINA HALIOTOIDEA.—(Fabr.), Stimpson.
VELUTINA HALIOTOIDES. Möll, (A), (B).
Eastport, twenty f., rocky, *Stimpson*, (A). Grand Manan,
Stimpson (B). Eastport, twenty f., *Gould* (E).
- 40.—MENESTHO ALBULA.—(Fabr.), Möller.
West Isles, near Eastport, ten f., gravel, *Stimpson* (A).
Grand Manan, laminarian and coralline zones, *Stimp-*
son (B). Bay of Fundy, *Verrill* (F), page 660.
- 41.—TURBONILLA NIVEA.—Stimpson.
CHEMNITZIA NIVEA. Stimpson (A), (B).
Grand Manan, frequent in thirty-five f., *Stimpson*,
(A), (B).
- 42.—TURBONILLA INTERRUPTA.—(Totten), Stimpson.
Shediac, *Whiteaves* (H), (I). Northumberland Straits,
Whiteaves (I).
- 43.—ODOSTOMIA TRIFIDA.—(Totten), Gould.
Point duChene, *Whiteaves* (H). Shediac, *Whiteaves* (I).
- 44.—BITTIUM NIGRUM.—(Totten), Stimpson.
Shediac, *Whiteaves* (I). Point duChene, *Whiteaves* (H).
- 45.—APORRHAIIS OCCIDENTALIS.—Beck.
Off Campobello, 50 f., mud, *Stimpson* (A). Grand
Manan, thirty-five f., *Stimpson* (B). Eastport,
twenty f., Bay of Fundy, *Gould* (E). Passama-
quoddy Bay.
- 46.—TURRITELLA ACICULA.—Stimpson.
Grand Manan, low-water mark to four and forty f.,
Stimpson (A), (B).

47.—TURRITELLA COSTULATA.—Mighels and Adams.

ACIRSA COSTULATA. (M).

Eastport, thirty f., rocky, *Stimpson* (A). Grand Manan, in deep water, rare, *Stimpson* (B). Bay of Fundy, *Verrill* (M), (N).

48.—TURRITELLA RETICULATA.—Mighels and Adams.

Bay Chaleur, "from the stomachs of cod-fishes," *Mighels and Adams*, (Boston Journal Natural History, IV. 50). *Gould* (E).

49.—TURRITELLA EROSA.—Couthouy.

Off Campobello, fifty f., mud, *Stimpson*, (A). Grand Manan, forty f., *Stimpson* (B). Eastport, *Gould* (E).

50.—SCALRIA GREENLANDICA.—(Perry), Sowerby.

Eastport, ten f., sand; off Seal harbour, fifty f., *Stimpson* (A). *Gould* (E). Grand Manan, ten to sixty f., *Stimpson* (A), (B). Bay of Fundy, common, ten to one hundred and nine f., *Verrill* (F).

51.—ACLIS STRIATA.—Verrill.

Bay of Fundy near Eastport, *Verrill* (K), (N).

52.—LITTORINA PALLIATA.—(Say.), Gould.

LITTORINA LITTORALIS. F. et H. (B).

Reported by all observers as abundant upon the southern coast. Dalhousie, *Bell* (C).

This species exists all around the North Atlantic Ocean. It is indigenous to this country and is often called the "native periwinkle."

53.—LITTORINA LITOREA.—(Linn.), Menke., (Periwinkle).

Abundant in the waters of the Charlotte County coast. Northumberland Straits, *Sir Wm. Dawson*. South Shore of Prince Edward Island, *J. F. Whiteaves* (H) (I).

This species is an important food-mollusc in England. It has been a disputed question as to whether it is indigenous to our shores or has been recently introduced from Europe. In an article by the writer in the "American Naturalist" for November, 1886, the evidence upon both sides is summed up and the conclusion arrived at that it is introduced, not indigenous. It was not reported by Stimpson (A), (B), nor by Verrill until very recently (K). It is not mentioned in any early lists of New England shells, has not been found in any Indian shell-heap nor in the post-pliocene deposits of Canada, and has not been found in Greenland or Labrador, in all of which situations, *L. palliata*, which is undoubtedly indigenous and which has almost the same habitat as *L. litorea*, does occur. There is absolutely no evidence to show that the shell existed in America before the advent of Europeans, and though the evidence tending to show that it did not exist here is necessarily of a negative character, it very strongly points to the latter conclusion. It is but right to add that Sir Wm. Dawson considers the shell indigenous to America.

54.—LITTORINA RUDIS.—(Maton), Gould.

Reported by all observers as abundant upon the southern coast.

Occurs with the following, chiefly upon bare rocks and the piles of wharves, while the two previous forms prefer the sea-weed and rocks covered by the latter.

55.—LITTORINA TENEBROSA.—(Montagu), Gould.

With the last.

The form of this and the last species grade into one another. This is probably but a variety of the last.

56.—LACUNA NERITOIDEA.—Gould.

Grand Manan, *Verrill* (F).

57.—LACUNA VINCTA.—(Turton), Gould.

Grand Manan, *Stimpson* (B). Eastport, *Gould* (E). Very abundant in Bay of Fundy, *Verrill* (F).

58.—RISSOA CARINATA.—(Mighels and Adams), *Stimpson*.

RISSOA PELAGICCA. *Stimpson* (A), (B).

Grand Manan, coralline zone, *Stimpson* (A), (B).

It is altogether probable that this is but a variety of the last species.

The clam is the most abundant and most easily obtained of all our food molluscs. It is found in the mud of every cove and inlet on the Charlotte County coast, where it is an important article of food to the fishermen. The supply is almost inexhaustible and not utilized to one-tenth the extent of which it is capable.

Some one or more species of *Teredo* are unfortunately abundant on both our north and south coasts, but their affinities have not been worked out.

59.—RISSOA MIGHELSEI.—*Stimpson*.

(*RISSOA EXARATA*. *Stimpson* (F)).

Grand Manan, twenty-five f., *Stimpson* (B). Bay of Fundy, four to twenty f., *Verrill* (F).

60.—RISSOA ACULEUS.—(Gould), *Stimpson*.

Grand Manan, littoral zone, rare, *Stimpson* (B). Bay of Fundy, common, *Verrill* (F).

61.—RISSOA MINUTA.—(Totten), *Stimpson*.

PALUDINELLA MINUTA. (I).

LITTORINELLA MINUTA. *Stimpson* (F).

Bay of Fundy, *Verrill* (F). Shediac, *Whiteaves* (D).

- 62.—*RISSEOELLA? EBURNEA*.—Stimpson.

RISSEA EBURNEA. Stimpson (B).

Grand Manan, twenty-five f., *Stimpson* (B).

- 63.—*SKENEA PLANORBIS*.—(O. Fabi), Forbes and Hanley.

Bay of Fundy, very common, *Verrill* (F).

- 64.—*TROCHUS OCCIDENTALIS*.—Mighels and Adams.

Grand Manan, twenty-five to forty f., *Stimpson* (A), (B).

- 65.—*MARGARITA VARICOSA*.—Mighels and Adams).

Bay Chaleur, "from the stomach of a cod-fish," *Mighels and Adams*, (*Boston Journal Natural History*, Vol. IV., page 46), *Gould* (E).

- 66.—*MARGARITA ACUMINATA*.—Mighels and Adams.

Grand Manan, forty f., *Stimpson* (B).

- 67.—*MARGARITA OBSCURA*.—(Couth.), Gould.

Eastport, six f., mud, *Stimpson* (A). Grand Manan, laminarian zone, *Stimpson* (A) (B). Common in Bay of Fundy from low water mark to one hundred f., *Verrill* (F).

- 68.—*MACHEROPLAX OBSCURA var BELLA*.—(Verkr).

"This appears to be only a highly sculptured variety of *M. OBSCURA*," *Verrill* (N).

"The predominant form at Eastport, Me., and in the Bay of Fundy in ten to forty f., *Verrill*" (N).

- 69.—MARGARITA ARGENTATA.—Gould.
Grand Manan, four f., *Stimpson* (A) (B). *Gould* (E).
- 70.—MARGARITA HELICINA,—(Fabr.). *Stimpson*.
Grand Manan, on marine plants above low water mark,
Stimpson (B). L'Etang harbour.
- 71.—MARGARITA UNDULATA.—Sowerby.
Grand Manan, in shallow water, *Stimpson* (A), (B).
Eastport, *Gould* (E). L'Etang harbour and Passamaquoddy Bay.
- 72.—MARGARITA CINEREA.—(Couth.), *Gould*.
West Isles, ten f., gravel, *Stimpson* (A). Grand Manan,
deep water, *Stimpson* (A), (B). *Gould* (E), L'Etang
harbour and Passamaquoddy Bay.
- 73.—ADEORBIS COSTULATA.—(Möller), *Stimpson*.
Grand Manan, thirty and four f., *Stimpson* (A), (B).
Gould (E).
- 74.—CEMORIA NOACHINA.—(Lin.), *Gould*.
DIADORA NOACHINA. *Gray* (B).
Eastport, twenty-five f., rocky, *Stimpson* (A). Grand
Manan, low-water mark and deep water, *Stimpson* (B).
- 75.—CRUCIBULUM STRIATUM.—(Lay), *Stimpson*.
CALYPTRAEA STRIATA. *Say*, (B).
Eastport, four f., *Stimpson* (A). Grand Manan, *Stimpson*
(B). Bay of Fundy, common, low-water mark
to thirty f., *Verrill* (F). Very abundant in seven to
ten f. in L'Etang harbour.

76.—CREPIDULA PLANA.—Say.

CREPIDULA UNGUIFORMIS. Lam., (I).

Caraquette, *Bell* (C). Bay Chaleur, *Whiteaves* (D).
Shediac, *Whiteaves* (I). Not found on the southern
coast.

77.—CREPIDULA FORNICATA.—(Lin.), Lamarck. (Bon-
net limpet).

Dalhousie, Caraquette, (very abundant), *Bell* (C). Bay
Chaleur, *Whiteaves* (D). Shediac, *Whiteaves* (I).
Northumberland Straits and along the coast to Cara-
quette Bay, *Whiteaves* (H). Not found on the
southern coast.

78.—LEPETA CAECA.—Müller.

PILIDIUM CAECUM. (B).

Grand Manan, not unfrequent in littoral zone, *Stimp-
son* (B).

79.—TECTURA ALVEUS.—(Conrad), Stimpson.

LOTTIA ALVEUS. Conrad (I).

ACMAEA ALVEUS. Con. (H).

Point du Chene, *Whiteaves* (H). Shediac, *Whiteaves* (I).
Not found on the southern coast.

80.—TECTURA TESTUDINALIS. — (Müller), (Gould),
(Limpet).

Grand Manan, *Stimpson* (B). Bay Chaleur, *Bell* (C).
Passamaquoddy Bay, *Ganong* (O). Abundant on
the rocks everywhere on the southern coast.

81.—*ENTALIS STRIOLATA*. Stimpson.

DENTALIUM STRIOLATUM. St. (B).

Eastport, ten f., mud, *Stimpson* (A). Grand Manan, coralline zone, *Stimpson* (A), (B). Passamaquoddy Bay, *Ganong* (O). Abundant almost everywhere on muddy bottoms on southern coast.

82.—*CHITON MENDICARIUS*. Mighels and Adams.

Grand Manan, "a few fine specimens of this rare species," thirty-five f., *Stimpson* (B). *Gould* (E).

83.—*CHITON ALBUS*.—Montagu.

Eastport, at low water, *Stimpson* (A), *Gould* (E). Grand Manan, low-water mark to four f., *Stimpson* (B). Bay of Fundy, abundant, low-water mark to eighty f., *Verrill* (F). Pendleton's Island, *Ganong* (O). Abundant at latter point on under side of stones in tide pools.

84.—*CHITON MARMOREUS*.—O. Fabricius.

Grand Manan, very abundant on rocky bottoms just below low water mark, *Stimpson* (B). Eastport, *Gould* (E). Bay of Fundy, low water mark to forty f., common, *Verrill* (F).

85.—*CHITON RUBER*.—Lowe.

TRACHYDERMON RUBER.—Carpenter (F).

Grand Manan, with the last, *Stimpson* (B). Eastport, *Gould* (E). Bay of Fundy, low water mark to forty f., common, *Verrill* (F). Pendleton's Id., *Ganong* (O).

- 86.—LEPTOCHITON CANCELLATUS,—(Sby.), Gray; H. and A. Adams.

Bay of Fundy, *Verrill* (N).

- 87.—ALDERIA HARVARDIENSIS.—(Agassiz), Gould.

CANTHOPSIS HARVARDIENSIS.—Agass. (B).

Grand Manan, common in sheltered, muddy bays,
Stimpson (B). *Gould* (E).

- 88.—ÆOLIS DESPECTA.—Johnston.

TERGIPES DESPECTUS.—Adams (F).

Bay of Fundy, Eastport harbour, *Verrill* (F).

- 89.—ÆOLIS DIVERSA.—(Couthouy), Stimpson.

EOLIS DIVERSA.—Couth. (B).

Grand Manan, four f., *Stimpson* (B). *Gould* (E).

- 90.—ÆOLIS PURPUREA.—Stimpson.

EOLIS PURPUREA.—St. (B).

Grand Manan, under stones at low water, *Stimpson* (B).
Gould (E).

- 91.—ÆOLIS STELLATA.—Stimpson.

EOLIS STELLATA.—St. (B).

Grand Manan. under stones at low-water mark, *Stimpson* (B). *Gould* (E).

- 92.—*CORYPHELLA MANANENSIS*.—(Stimp.), Verrill and Emerton.

EOLIS MANANENSIS.—St. (B).

Grand Manan, thirty-five f., on gravel, *Stimpson* (B).
At low-water mark,—Eastport, and Grand Manan,
Verrill (N).

This species is undoubtedly the one referred in Gould's *Invertebrata of Massachusetts* to *AEOLIS RUFIBRANCHIALIS*.

- 93.—*AEOLIS PAPILLOSA*.—(Lin.), Loven.

EOLIS FARINACEA.—Gould, Ms. (B).

Grand Manan, on rocks above low-water mark, *Stimpson* (B). Very common in Bay of Fundy from above low-water mark to twenty f., *Verrill* (F).

- 94.—*DOTO CORONATA*.—(Gmelin), Loven.

Grand Manan, fifteen f., on rocks, *Stimpson* (B). *Gould* (E). Common in Bay of Fundy, low-water mark to fifteen f., *Verrill* (F).

- 95.—*DENDRONOTUS ARBORESCENS*.—(Müller), Alder and Hancock.

Grand Manan, low water and laminarian zone, *Stimpson* (B). *Gould* (E). Very common in Bay of Fundy, above low-water mark to sixty f., *Verrill* (F).

- 96.—*ANCULA SULPHUREA*.—Stimpson.

Grand Manan, under stones at low water and in laminarian zone, *Stimpson* (B). *Gould* (E).

- 97.—*DORIS PLANULATA*.—Stimpson.

Grand Manan, *Stimpson* (B). "Found at Grand Manan, and on stones at low water, Passamaquoddy Bay, in July," *Gould* (E).

98.—DORIS PALLIDA.—Agassiz.

ONCHIDORIS PALLIDA. Verrill (F).

Grand Manan, twenty-five f., gravel, *Stimpson* (B). Bay of Fundy, Eastport harbour, not uncommon, low-water mark to thirty f., *Verrill* (F).

99.—POLYCERA LESSONIL.—D'Orbigny.

Common in Bay of Fundy, low-water mark to twenty f., *Verrill* (F).

100.—BULLA SOLITARIA.—Say.

HAMINAEA SOLITARIA. Say (I).

Shediac, *Whiteaves* (I). Point du Chene, *Whiteaves* (I).

101.—CYLICHNA ALBA.—(Lovén), *Stimpson*.

BULLA TRITICEA. Couth. (B).

Grand Manan, common, *Stimpson* (B). *Gould* (E). Bay of Fundy, *Verrill* (F). Passamaquoddy Bay, ten f., *Ganong* (O).

102.—UTRICULUS PERTENUIS.—(Mighels), *Stimpson*.

BULLA PERTENUIS. Migh. (B).

CYLICHNA PERTENNIS. Migh. (I).

Grand Manan, ten f., sand, *Stimpson* (B). *Gould* (E). Shediac, *Whiteaves* (I).

103.—DIAPHANA DEBILIS.—(Gould), *Stimpson*.

BULLA DEBILIS. Gould (A), (B).

AMPHISPHYRA DEBILIS. Verrill (F).

Eastport, *Stimpson* (A). Grand Manan, six f., sand, *Stimpson* (A), (B). *Gould* (E). Bay of Fundy, not uncommon, six to fifty f., *Verrill* (F).

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104.—DIAPHANA HIEMALIS.—(Couthouy), Stimpson.

BULLA HIEMALIS.—Couth. (B).

Grand Manan, forty f., *Stimpson* (B). *Gould* (E).

105.—PHILINE LINEOLATA.—(Couthouy), Stimpson.

Eastport, *Stimpson* (A). Grand Manan, common in shallows, *Stimpson* (B). *Gould* (E).

Class LAMELLIBRANCHIATA.*

106.—ANOMIA ACULEATA.—Gmelin.

Grand Manan, rather common in deep water, *Stimpson* (B). Eastport, *Gould* (E). Bay of Fundy, very common, low water to eighty f., *Verrill* (F). Passamaquoddy Bay, *Ganong* (O).

106a.—ANOMIA EPHIPIUM.—Lin.

Grand Manan, roots of *Laminaria*, *Stimpson* (B). Eastport, *Gould* (E). Passamaquoddy Bay, *Ganong* (O).

But *Verrill* (F., page 697) says of it,—“not observed . . . in the Bay of Fundy.” “The specimens from Eastport, Maine, referred to *A. Ehippium* by *Gould*, were, undoubtedly, the smooth or squamous variety of the following (*i. e.*, No. 106 of this list) species.” It hence stands doubtfully in our fauna.

* In *Binney's Gould*, between this class (called in that work CONCHIFERA) and the GASTEROPODA is placed the class BRACHIOPODA. The Brachiopods, however, are now known not to be molluscs, but to belong to a separate group, the Molluscoidea. The class is, consequently, omitted from the present list. The only species found upon our coast is TERETRATULINA SEPTENTRIONALIS, Couthouy. It occurs at Grand Manan, *Stimpson* (B). Eastport, *Gould* (E). Passamaquoddy Bay, *Ganong* (O), and at Beaver harbour, (*Bulletin Natural History Society of New Brunswick*, No. V., page 35).

107.—OSTREA VIRGINIANA.—Lister. (Oyster).

Including OSTREA BOREALIS.—Lamarck.

“Caraquette to Baie Verte,” (*Perley*), *Whiteaves* (H) (I). Bay Chaleur, *Whiteaves* (D). Shediac, *Whiteaves* (H) (I), Cocagne, *Nicholas Denys*, 1672. Tabusintac, Shippegan harbour, Saint Simon’s Inlet, Buctouche, Richibucto, Burnt Church, “and other places,” *M. H. Perley*, Report on the Sea and River fisheries of N. B., 1882.

It is now generally considered that all of our oysters belong to a single species, and they are so treated in the present paper.

This important economic mollusc is rapidly growing less abundant upon our coast. This may be due in part to natural causes, the presentation of which would be out of place in the present connection. But it is certainly largely due to the reckless and improvident method of fishing the oyster-beds. Mr. J. F. Whiteaves (H), (I), has called attention to the present state and needs of oyster-culture in New Brunswick, and to his papers those interested may turn for further information.

108.—PECTEN ISLANDICUS. (Müller), Chemnitz.

Eastport, *Stimpson* (A). *Gould* (E). Grand Manan, twenty-five to forty (f.), shelly, *Stimpson* (B). Common in Bay of Fundy, low-water mark to one hundred f., *Verrill* (F). L’Etang harbour.

This species is seldom or never used for food. It is much smaller and less abundant than the following.

109.—PECTEN TENUICOSTATUS.—Mighels and Adams.
(Scallop).

PECTEN MAGELLANICUS. Lam., (B).

Grand Manan, ten to thirty f., rather rare, *Stimpson* (B). Eastport, *Gould* (E). *Verrill* (K). Common in Passamaquoddy Bay and Bay of Fundy, one to one hundred and nine f., *Verrill* (F). Northumberland Straits, *Whiteaves* (I). L’Etang and Chamcook harbours, *Ganong* (O). Mace’s Bay. (*Perley’s* Report on Fisheries of New Brunswick, 1852).

It would seem from the testimony of fishermen and others that this food-mollusc is not as abundant on our coasts as formerly. Mr. E. Ingersoll, in an article on "The Scallop and its Fishery," in the "American Naturalist" for Dec., 1886, says: "The great *Pecten tenuicostatus* of the coast of Maine and the Bay of Fundy was formerly highly valued by the people of that region, but now is too scarce to appear on the tables of even 'the rich' except at rare intervals." Its scarcity is exaggerated for New Brunswick waters at least, for it still exists in considerable numbers in L'Etang harbour, Mace's Bay, and at a few other points. No doubt wise regulations as to its fishery would make it of considerable economic importance.

110.—CRENELLA GLANDULA.—(Totten), H. and A. Adams.

MYTILUS DECUSSATUS. Mont. (B).

CRENELLA DECUSSATA. (Montagu), Macgillivray (N).

Eastport, four to forty f., sandy mud, *Stimpson* (A). *Gould* (E). Grand Manan, forty f., *Stimpson* (B); three to ten f., *Verrill* (N). Common in Bay of Fundy, three to sixty f., *Verrill*, (F). Bradelle Bank, (Gulf of St. Lawrence), *Whiteaves* (I). Passamaquoddy Bay, *Ganong* (O).

111.—MODIOLARIA CORRUGATA.—(Stimpson), Mörch.

MYTILUS CORRUGATUS. St. (B).

Eastport, forty f., sandy mud, *Stimpson* (A). *Gould* (E). Grand Manan, thirty-five f., gravel, *Stimpson* (B). Bay of Fundy, ten to one hundred f., frequent, *Verrill* (F).

112.—MODIOLARIA DISCORS.—(Lin.), Lovén.

MYTILUS DISCORS. Lin., (B).

MYTILUS LEVIGATUS. St. (B).

CRENELLA LAEVIGATA. (I).

Eastport, low water to twenty f., gravel, *Stimpson* (A), *Gould* (E). Grand Manan, low-water mark to forty f., *Stimpson* (B). Bay of Fundy, very common, low water to one hundred f., *Verrill* (F). Bradelle Bank, *Whiteaves* (I).

113.—MODIOLARIA NIGRA.—(Gray), Lovén.

MYTILUS DISCREPANS.—Mont. (B).

Eastport, five f., *Stimpson* (A). Grand Manan, common, *Stimpson* (A) (B). Common in Bay of Fundy, low water to sixty f., *Verrill* (F). Bradelle Bank, *Whiteaves* (I). Passamaquoddy Bay, *Ganong* (O). Bliss and L'Etang harbours.

114.—MODIOLA MODIOLUS.—Lin. (Horse-mussel).

MYTILUS MODIOLUS.—L. (B).

Grand Manan, on the shores, *Stimpson* (B). Shediac, *Whiteaves* (I). Pendleton's Id., Passamaquoddy Bay, *Ganong* (O).

115.—MYTILUS EDULIS.—Lin., (Edible mussel).

Grand Manan, very abundant, *Stimpson* (B). Bay Chaleur, *Bell* (C). Eastport, *Gould* (E). Bay of Fundy, littoral zone to fifty f., *Verrill* (F). Shediac, *Whiteaves* (I). Passamaquoddy Bay, *Ganong* (O). L'Etang harbour, and everywhere in great abundance along the southern coast.

Var. PELLUCIDUS.—Pennant.

Occurs sporadically with *M. edulis*, in the same situations.

This species is exceedingly abundant on our southern coast, where it occurs in immense beds between tide-marks. It is extensively used for food in Europe, but is altogether unutilized among us for any such purpose.

116.—LEDA TENUISULCATA.—(Couth), *Stimpson*.

Eastport, six f., *Stimpson* (A). Grand Manan, common on mud, *Stimpson* (B). *Gould* (E). Common in Bay of Fundy, six to eighty f., *Verrill* (F). Passamaquoddy Bay, *Ganong* (O).

117.—YOLDIA MYALIS.—(Couth.) Gould.

LEDA MYALIS.—St. (B).

Eastport, *Stimpson* (A). *Gould* (E). Grand Manan, twenty f., mud, *Stimpson* (B).

118.—YOLDIA SAPOTILLA.—(Gould), *Stimpson*.

LEDA SAPOTILLA.—(B).

Eastport, ten f., mud, *Stimpson* (A). *Gould* (E). Grand Manan, ten f., *Stimpson* (B). Common in Bay of Fundy, four to one hundred f., mud, *Verrill* (F). Northumberland Straits, *Whiteaves* (H), (I).

119.—YOLDIA THRACLÆFORMIS.—(Storer), *Mörch*.

LEDA THRACLÆFORMIS.—St. (B).

St. Andrews Bay, ten f. Head harbour, Campobello, forty f., *Stimpson* (A). Grand Manan, twenty-five f., mud, *Stimpson* (B). *Gould* (E). Bay of Fundy, not uncommon, ten to one hundred f., *Verrill* (F).

120.—YOLDIA OBESA.—(Stimpson), *Gould*.

Bay of Fundy, forty to one hundred f., rare, *Verrill* (F).

121.—YOLDIA LIMATULA.—(Say), *Adams*.

LEDA LIMATULA. St. (B).

Eastport, six f., mud, *Stimpson* (A). *Gould* (E). Grand Manan, six f., mud, *Stimpson* (B). Bay of Fundy, not common, four to thirty f., *Verrill* (F). Northumberland Straits, *Whiteaves* (H), (I).

122.—NUCULA DELPHINODONTA.—*Mighels*.

Grand Manan, twenty-five f., mud, *Stimpson* (B). *Gould* (E). Bay of Fundy and Eastport harbour, ten to one hundred f., mud, common, *Verrill* (F). Northumberland Straits, *Whiteaves* (I).

123.—*NUCULA PROXIMA*.—Say.

Grand Manan, four f., sand, *Stimpson* (B). *Gould* (E).
Bay of Fundy, common, four to eighty, f., *Verrill* (F).

124.—*NUCULA TENUIS*.—(Montagu), Turton.

Grand Manan, four to forty f., mud, *Stimpson* (B).
Eastport, *Gould* (E). Bay of Fundy, common, ten
to one hundred f., *Verrill* (F).

125.—*ARCA PECTUNCULOIDES*.

Bay of Fundy, off Grand Manan, *Verrill* (G).

126.—*ARCA PECTUNCULOIDES*.—Scacchi.

Var. FRIBLEI, (Jeffreys), *Verrill*.

Bay of Fundy, one hundred and eight f., *Verrill* (N).

127.—*ARCA GLACIALIS*.—Gray.

Bay of Fundy, *Verrill* (K).

128.—*CYCLOCARDIA NOVANGLIAE*.—Morse.

Bay of Fundy, not uncommon, three to forty f., *Verrill* (F).

129.—*CARDITA BOREALIS*.—Conrad.

CYCLOCARDIA BOREALIS. Conrad (F).

Eastport, three f., mud, *Stimpson* (A). *Gould* (E).
Grand Manan, common, *Stimpson* (B). Bay of
Fundy, very common, three to eighty f., *Verrill* (F).
Passamaquoddy Bay, *Ganong* (O).

130.—CARDIUM PINNULATUM.—Conrad.

Grand Manan, four f., sand, *Stimpson* (B). Eastport, *Gould* (E). Bay of Fundy, very common, two to eighty f., *Verrill* (F). Northumberland Straits, *Whiteaves* (I). Abundant in L'Etang harbour.

131.—CARDIUM ISLANDICUM.—Lin.

Eastport, six to sixty f., *Stimpson* (A). *Gould* (E). Grand Manan, twenty to forty f., mud, *Stimpson* (B).

132.—GEMMA GEMMA.—(Totten), Chemn.

TOTTENIA GEMMA.—Perkins (F).

Grand Manan, *Verrill* (F). Shediac, *Whiteaves* (I)

133.—VENUS MERCENARIA.—Lin. (Hard clam).

MERCENARIA VIOLACEA.—Schum. (I).

Caraquette, *Bell* (C). Bay Chaleur, *Whiteaves* (D). Shediac, *Whiteaves* (I). *Verrill* (F).

134.—CYTHEREA CONVEXA.—Say.

CALLISTA CONVEXA.—Say (F) (I).

Eastport, Maine, rare, *Verrill* (F). Shediac, *Whiteaves* (I). Northumberland Straits, *Whiteaves* (H) (I).

135.—CYPRINA ISLANDICA.—(Lin.), Lamarck.

Grand Manan, rarely found, *Stimpson* (B). Bay of Fundy, six to ninety f., *Verrill* (F). Northumberland Straits, *Whiteaves* (H) (I). Passamaquoddy Bay, *Ganong* (O).

136.—ASTARTE QUADRANS.—Gould.

Grand Manan, rare, *Stimpson* (B). Eastport, *Gould* (E).
Bay of Fundy, six to forty f., *Verrill* (F).

137.—ASTARTE SULCATA.—(Da Costa), Flemming.

ASTARTE UNDATA.—Gould (F), (H), (I).

Eastport, four to sixty f., mud, *Stimpson* (A), *Gould* (E).
Grand Manan, deep water, on mud, common, *Stimpson* (A), (B). Bay of Fundy, very common, five to one hundred f., *Verrill* (F). Northumberland Straits, *Whiteaves* (H), (I). Passamaquoddy Bay, *Ganong* (O).

138.—ASTARTE CASTANEA.—Say.

Bay of Fundy, five to twenty f., not common, *Verrill* (F).

139.—ASTARTE LENS.—(Dwarf var.)

Centre of Bay of Fundy, *Verrill* (Am. J., Sci. iii., V. 98) (K).

140.—CRYPTODON GOULDII.—(Phillippi), Adams.

THYASIRA GOULDII.—St. (B).

Eastport, five f., *Stimpson* (A), *Gould* (E). Grand Manan, four and twenty-five f., *Stimpson* (B). Bay of Fundy, five to sixty f., mud and sand, common, *Verrill* (F).

141.—TELLINA TENERA.—Say.

ANGULUS TENER.—Verrill (F).

Bay of Fundy, *Verrill* (F). Off Douglastown, *Whiteaves* (Can. Nat. vol. iv., 1869, p. 270).

142.—MACOMA PROXIMA.—(Gray), Gould.

TELLINA PROXIMA.—Brown (B).

MACOMA SABULOSA.—Mörch (F).

Eastport, *Stimpson* (A), *Gould* (E). Grand Manan, low-water mark, to four f., *Stimpson* (B). Bay of Fundy, four to eighty f., *Verrill* (F).

143.—MACOMA FUSCA.—(Say), Gould.

TEELINA GROENLANDICA.—(Rep. Geol. Surv., 1858, Bell).

TEELINA FUSCA.—Phil. (B).

Grand Manan, littoral zone, *Stimpson* (B). Bay Chaleur, *Bell*, (Report Can. Geol. Survey, 1858). Eastport, rare, *Gould* (E).

144.—PETRICOLA PHOLADIFORMIS.—Lamarck.

Shediac, *Whiteaves* (I). Northumberland Straits, *Whiteaves* (H), (I).

145.—PETRICOLA DACTYLUS.—Say.

PETRICOLA PHOLADIFORMIS *Var.* DACTYTUS (H), (I).

Shediac, *Whiteaves*, (I). Northumberland Straits, *Whiteaves* (H.), (I).

146.—SAXICAVA ARCTICA.—(Lin). Deshayes.

Grand Manan, occasionally in deep water, *Stimpson* (B).

147.—SAXICAVA RUGOSA.—(Pennant). Lamarck.

Grand Manan, large and common at low water, small in deep water, *Stimpson* (B). Passamaquoddy Bay, *Ganong* (O).

It is altogether probable that this is but a variety of the last species.

148.—*KELLIA PLANULATA*.—Stimpson.

Eastport, Maine, eight to fifteen f., B & J of Fundy,
Verrill (F).

149.—*MACTRA LATERALIS*.—Say.

Ten miles north of Shediac, *Whiteaves* (H). Northum-
berland Straits, *Whiteaves* (I).

150.—*MACTRA SOLIDISSIMA*.—Chemnitz, (Hen clam).

Eastport, *Stimpson* (A). Grand Manan, in sand at low
water, *Stimpson* (A), (B). Bay of Fundy, low-water
mark to ten f., sandy, *Verrill* (F). Point du Chene,
Whiteaves (H). Shediac, *Whiteaves* (I). Very large
and abundant at Hospital Island, Passamaquoddy
Bay.

151.—*MACTRA OVALIS*.—Gould.

MACTRA PONDEROSA.—Phil. (A), (B).

Eastport, *Stimpson* (A). *Gould* (E). Grand Manan,
with *M. solidissima*, *Stimpson* (B). *Verrill* (G).

152.—*THRACIA TRUNCATA*.—Mighels and Adams.

Grand Manan, ten f., coarse sand, *Stimpson* (B). Bay
of Fundy, *Verrill* (F).

153.—*THRACIA MYOPSIS*.—Beck.

Grand Manan, *Stimpson* (B). *Gould* (E).

154.—THRACIA CONRADI.—Couthouy.

Grand Manan, rare, *Stimpson* (B). *Gould* (E). Eastport, six f., *Verrill* (F). Point du Chene, *Whiteaves* (H). Shediac, fine and frequent, *Whiteaves* (I). Bliss harbour, (misplaced in Passamaquoddy Bay), *Ganong* (O).

155.—COCHLODESMA LEANUM.—(Conrad), Couthouy.

Eastport, Maine, rare, *Verrill* (F). Near Douglastown, *Whiteaves* (Can. Nat., Vol. IV., 1869, page 270).

156.—ANATINA PAPYRACEA.—Say.

PERIPLOMA PAPYRACEA.—*Verrill* (F).

Eastport, *Gould* (E). Bay of Fundy, not uncommon, ten to one hundred f., *Verrill* (F).

157.—LYONSIA HYALINA.—Conrad.

Grand Manan, ten f., sand, *Stimpson* (B). Eastport, *Gould* (E). Bay of Fundy, common, low-water mark, to thirty f., *Verrill* (F).

158.—PANDORA TRILINEATA.—Say.

CLIDIOPHORA TRILINEATA.—Carpenter (F).

Eastport, five f., mud, *Stimpson* (A), *Gould* (E). Grand Manan, five f., mud, *Stimpson* (B). Bay of Fundy, low-water mark, to 30 f., *Verrill* (F). Shediac, *Whiteaves* (I). Northumberland Straits, *Whiteaves* (H), (I).

159.—NEAERA PELLUCIDA.—Stimpson.

NEAERA OBESA.—Lovén (N).

Grand Manan, 40 f., mud, *Stimpson* (B), *Gould* (E).
Bay of Fundy, *Verrill* (M), (N).

160.—NEAERA GLACIALIS.—G. O. Lars.

Bay of Fundy, *Verrill* (K), (N).

161.—MYA TRUNCATA.—Lin.

Eastport, *Stimpson* (A), *Gould* (E). Grand Manan, low-
water mark, *Stimpson* (B). Shediac, *Whiteaves* (I).

162.—MYA ARENARIA.—Lin. (Clam).

Grand Manan, common in the coves, *Stimpson* (B). Bay
Chaleur, *Bell* (C). Bay of Fundy, half tide mark,
to forty f., those dredged being young, *Verrill* (F).
Shediac, *Whiteaves* (I). Passamaquoddy Bay, very
abundant, *Ganong* (O).

The clam is the most abundant and most easily obtained of all our
food molluscs. It is found in the mud of every cove and inlet on the
Charlotte County coast, where it is an important article of food to the
fishermen. The supply is almost inexhaustible and not utilized to one
tenth the extent of which it is capable.

163.—PANOPAEA ARCTICA.—(Lamarek), Gould.

PANOPAEA NORVEGICA.—Lovén (B).

Grand Manan, forty f., (dead), *Stimpson* (B), *Gould* (E).

164.—SOLENSIS.—Lin. (Razor fish, Razor clam).

ENSTATELLA AMERICANA. Verrill (F).

SOLENSIS, *Var.* AMERICANA. (I).

Grand Manan, at low water, in sand, rare, *Stimpson* (B). Eastport, *Gould* (E). Bay of Fundy, low-water mark to twenty f., sandy, *Verrill* (F). Shediac, *Whiteaves* (I). Hospital Island, Passamaquoddy Bay, *Ganong* (O).

165.—ZIRFAEA CRISPATA.—(Lin.), Adams.

PHOLAS CRISPATA. L. (A), (B).

ZIRPHAEA CRISPATA. Adams (F).

Eastport, *Stimpson* (A). Grand Manan, very rare, *Stimpson* (B). Bay of Fundy, eight to seventy f., in hard clay, *Verrill* (F).

166.—TEREDO DILATA.—*Stimpson*.

“Principal Dawson informs me that great damages have already been done to the woodwork of wharves and harbours in Nova Scotia and New Brunswick by this species of *Teredo*.” *Whiteaves* (H).

167.—TEREDO NAVALIS.—Lin.?

Shediac, in a spruce log, *Whiteaves* (I).

Some one or more species of *Teredo* are unfortunately abundant on both our north and south coasts, but their affinities have not been worked out.

Part III.—SUPPLEMENTARY LISTS.

(a). A list of species of Mollusca reported from Eastport, Maine, but not as yet from New Brunswick waters proper.

1.—BELA PINGELII.—(Möller), H. and A. Adams.

Twenty to ninety f., in small numbers, *Verrill* (K), (N).

2.—BELA DECUSSATA.—(Couth.), H. and A. Adams.

Var TENUICOSTATA. *Verrill*.

Moderate depths, *Verrill* (K), (N).

3.—LUNATIA LEVICULA.—*Verrill*.

Very rare, *Verrill* (K), (N).

4.—MARSENIA GLABRA.—*Verrill*.

Not uncommon, *Verrill* (K), (N).

5.—MARSENIA PROBITA.—(Lov.), Bergh.

Verrill (K), (N).

6.—MARSENIA AMPLA.—*Verrill*.

Verrill (K), (N).

7.—CINGULA CASTANEA.—(Möll), *Verrill*, Sars.

Verrill (N).

8.—EULIMELLA POLITA.—Verrill.

Twenty f., *Verrill* (N).

E. VENTRICOSA of (K).

Is probably this species.

9.—ACANTHODORIS ORNATA.—Verrill.

Low-water mark, *Verrill* (N).

10.—ACANTHODORIS CITRINA.—Verrill.

Low water mark, *Verrill* (N).

11.—ACANTHODORIS STELLATA.—Müller.

Verrill (Am. Jour., Sci. iii., XVII., p. 313).

12.—ADALARIA PROXIMA.—(Ald. and Han.), Bergh.

Low-water mark, *Verrill* (N).

13.—LAMELLIDORIS MURICATA.—(Müller), Ald. and Han.

Low-water mark, *Verrill* (N).

14.—LAMELLIDORIS DIAPHANA.—Ald. and Han.

Low-water mark, *Verrill* (N).

15.—DOTO FORMOSA.—Verrill.

Low water mark, to fifty f., *Verrill* (N).

16.—COPYPHELLA RUTILA.—Verrill.

Low water mark, *Verrill* (N).

17.—AEOLIS SALMONACEA.—(Couth.), Gould.

CORYPHELLA SALMONACEA.—(Couth.), Verrill.

Low water, to fifty f., *Verrill* (K).

18.—CORYPHELLA STIMPSONI.—Verrill.

Low water mark, to fifty f., *Verrill* (N).

19.—ALEXIA MYOSTIS.—Pfeiffer.

Common, *Verrill* (F).

20.—DORIS BIFIDA.—Verrill.

Low water mark, *Verrill* (F).

21.—CERONIA ARCTATA.—Adams.

Rare, *Verill* (F).

22.—DENTALIUM DENTALE.—Lin.

Ten to twenty f., *Gould* (E).

23.—ASTARTE CREBRICOSTATA.—Forbes.

Gould (E).

(b). A list of species dredged on Orphan and Bradelle banks, Gulf of St. Lawrence, by J. F. Whiteaves (I).

These two banks lie off the entrance to Bay Chaleur, and "seem to be outliers, so to speak, inhabited by a purely arctic fauna, and surrounded almost entirely by a more southern assemblage." While geographically these banks come among the localities included in the scope of the foregoing list, zoologically they do not. The species found on them are therefore given in a separate list, those which occur upon the southern coast also being marked with an asterisk.

From Orphan Bank.

*SAXICAVA ———.

*ZIRPHEA CRISPATA.

AMICULA EMERSONII.—(Couth).

*MAMMA IMMACULATA.—(Totten.)

TROPHON CRATICULATUS.—(O. Fabr.)

BUCCINUM TENUE.—Gray.

NEPTUNEA SPITZBERGENSIS.—(Reeve).

TRITONOFUSUS, KROYERI.—Möll.

ASTYRIS HOLBOLLII.—Beck.

ASTARTE LACTEA.—Brod. and Sowerby.

[ASTARTE SEMISULCATA.—(Leach), Gray].

From Bradelle Bank, (almost due south of Orphan Bank.)

ASTARTE LACTEA.—Brod. and Sowerby.

[ASTARTE SEMISULCATA.—(Leach), Gray].

ASTARTE ELLIPTICA.

ASTARTE BANKSII.

VENUS FLUCTUOSA.—Gould.

[TAPES FLUCTUOSA.—(Gould), Deshayes].

CARDUM GRÆNLANDICUM.

[APHRODITE GRÆNLANDICA.—(Chemn.), Stimpson.]

*CRENELLA NIGRA.

[MODIOLARIA NIGRA.—Gray].

*CRENELLA LAEVIGATA.

[MODIOLARIA DISCORS.—(Lin.), Lovén].

*CRENELLA GLANDULA.

*MACOMA CALCAREA.

[MALCOMA PROXIMA.—(Gray), Gould].

*PANOPAEA NORVEGICA.

[PANOPAEA ARCTICA.—(Lam.), Gould].

CYRTODARIA SILIQUA.

[GLYCYMERIS SILIQUA.—(Chemn.). Lam].

TRITONOFUSUS LATERICEUS.—Möller.

VOLUTOPSIS NORVEGICUS.—Chemn.

(c) An additional list of species reported from the warm waters of the southern part of the Gulf of St. Lawrence, though not from New Brunswick proper—From Verrill's Report, F., and from an article on "The Shells of Prince Edward Island," by F. Bain, in the "Canadian Science Monthly" for March, 1885.

1.—BUCCINUM CINEREUM.—(Say), Gould.

UROSALPINX CINEREA. Stimpson (F).

Southern part of the Gulf of St. Lawrence, *Verrill* (F).
South shore of Prince Edward Island, *F. Bain*.

2.—CREPIDULA CONVEXA.—Say.

Gulf of St. Lawrence, *Verrill* (F).

3.—UTRICULUS CANALICULATUS.—(Say), Stimpson.
South shore of Prince Edward Island, *F. Bain*.

4.—MODIOLA PLICATULA.—(Lam.), Gould.
Southern part of the Gulf of St. Lawrence, *Verrill (F)*.
South shore of Prince Edward Island, *F. Bain*.

5.—TELLINA POLITA?
South shore of Prince Edward Island, *F. Bain*.

6.—CUMINGIA TELLINOIDES.—Conrad.
South shore of Prince Edward Island, *F. Bain*.

MARINE ALGÆ OF THE MARITIME PROVINCES.

G. U. HAY, PH. B.

Last year I published in the *Bulletin* a partial list of the marine algæ of the Bay of Fundy, amounting to thirty-three species. During the season of 1886, through the kindness of Professor Macoun, Government Botanist, and Mr. Robert Chalmers, of the Geological Survey, I was permitted to accompany the latter gentleman on a canoe trip which he made in July last, along the coasts of Caraquet and Tracadie, and around the islands of Shippegan and Miscou. Later in the season I visited Grand Manan, examining the algæ of Dark Harbor, Southern Head and other points. On proposing to Mr. MacKay, of Pictou Academy, to make this list include the marine algal flora of the Maritime Provinces, that gentleman heartily responded, and has sent me not only the result of his own observations, but a record of those plants collected on the Nova Scotia shore by Dr. Harvey and described in his "*Nereis Boreali-Americana*," together with some observations made by Dr. Jeans, of Prince Edward Island, and contributed to Dr. Harvey's work. To these may be added a short list published in 1879 by Professor Fowler, of Queen's University, in his addenda to the New Brunswick flora, and these are referred to in the subjoined list. A collection of marine algæ made by the late Professor C. Fred. Hartt on the shores of the Bay of Fundy has just been placed in my hands, but too late to have the results of his investigations incorporated. It is, no doubt, the earliest collection of New Brunswick algæ.

Both Mr. MacKay and myself have been too busy with regular work to give much more than a passing notice to this

branch of our flora. Our aim has been to gather up the knowledge that has been attained of our marine forms of vegetation, and incorporate it in the form that follows, hoping that it will serve as a guide to the more careful study in future of these interesting plants.

I desire to express my obligation to Mr. J. E. Humphrey and Dr. W. G. Farlow of Harvard University for their determination of critical species.

St. John, March, 1887.

INTRODUCTORY LIST OF THE MARINE ALGÆ OF THE MARITIME PROVINCES, WITH NOTES, BY G. U. HAY, PH. B., SAINT JOHN, AND A. H. MACKAY, B. A., B. SC., F. S. SC., PRINCIPAL OF PICTOU ACADEMY, N. S.

ORDER I.—CRYPTOPHYCEÆ.

1. *Clathrocystis roseo-persicina*, Cohn. On mud in brackish pond, Pictou harbour, *MacKay*; on decaying algæ along shore of Gulf of St. Lawrence, *Hay*.
2. *Oscillaria subtorulosa*, (Bréb). On floating balls of *Polysiphonia*, in Pictou harbour, *MacKay*.
3. *Lyngbya majuscula*, Harv. Pictou harbour, *MacKay*.
4. *L. æstuarii*, Liebm. In brackish pond, Pictou harbour, *MacKay*.

ORDER II.—ZOOSPOREÆ.

5. *Ulva lactuca*. (Linn.) Le Jolis, Pictou harbour, *MacKay*.
 - (a). Var. *rigida*, (Ag.) Le Jolis, and
 - (b). Var. *lactuca*, Le Jolis, are common in tide pools along the southern coast of New Brunswick, *Hay*.
 - (c). Var. *latissima*, Le Jolis. Richibucto River, *Fowler*. Common in brackish waters along the whole coast of New Brunswick, *Hay*.
6. *U. enteromorpha*, Le Jolis, also
 - (a). Var. *lanceolata*, Le Jolis, and
 - (b). Var. *compressa*, Le Jolis. Pictou harbour, *MacKay*; Frye's Island, St. John, *Hay*.
 - (c). Var. *intestinalis*, Le Jolis. Very common, Richibucto River, *Fowler*; St. John, *Hay*.

7. *U. clathrata*, Ag. On *Zostera marina*, Pictou, *MacKay*; Miscou Island, *Hay*.
8. *U. Hopkirkii*, (McCalla) Harv. Pictou harbour, *MacKay*.
9. *Ulothrix collabens*, (Ag.) Thur? Grand Manan, *Hay*.
10. *Chaetomorpha melagonium*, (Web. & Mohr.) Kutz. Halifax harbour, *MacKay*.
11. *C. Picquotiana*, (Mont.) Kutz. Halifax, *Harvey* in *N. B.-Am.*
12. *Rhizoclonium tortuosum*, Kutz. Halifax, *Harvey* in *N. B.-Am.*; Shippegan Island, *Hay*.
13. *Cladophora arcta*, (Dillw). P. E. Island, *Dr. Jeans*; Halifax, *Harvey*; Grand Manan and Frye's Island, *Hay*.
14. *C. lanosa*, (Roth) Kutz, Var. *uncialis*, Thuret. P. E. Island, *Jeans*. Halifax, *Harvey*.
15. *C. rupestris*, (Linn.) Kutz. Shippegan Island, *Hay*.
16. *C. refracta* (Roth) Areschoug. Frye's Island, *Hay*.
17. *C. glaucescens*, (Griff.) Harv. Halifax, *Harvey*; North Miscou, *Hay*.
18. *C. flexuosa*, (Griff.) Harv. Miscou Island, *Hay*.
19. *C. gracilis*, (Griff.) Kutz. Frye's Island, *Hay*.
20. *Phyllitis fascia*, Kutz. Halifax, *Harvey*.
21. *Scytosiphon lomentarius*, Ag. Halifax, *MacKay*; Frye's Island, Caraquet, Grand Manan, *Hay*.
22. *Punctaria latifolia*, Grev. Halifax, *Harvey*. Var. *zosteræ*, Le Jolis. Mouth of Pictou harbour, *MacKay*; Halifax, *Harvey*.
23. *P. plantaginea*, (Roth) Grev. P. E. Island, *Jeans*.
24. *Desmarestia aculeata*, Lam.x. Pictou, *MacKay*; Kouchibouguac Bay, *Fowler*.
25. *D. viridis*, Lam.x., Halifax, *Harvey*; Frye's Island, Grand Manan, Miscou, *Hay*.
26. *Dictyosiphon fœniculaceus*, Grev. Pictou, *MacKay*. This species has been found growing as regular branches from a stem formed of the filiform frond of *Chordaria flagelliformis*, at Pictou, in such a manner that the whole appeared to be but one plant. The conundrum was—how can the microscopic section of the branch show the structure of *Dictyosiphon*, while that of the stem shows with equal distinctness the structure of *Chordaria*? Further examination, of course, demonstrated the character of the interesting union. Frye's Island, Grand Manan, Miscou, *Hay*; Kouchibouguac Bay, *Fowler*.
27. *Ectocarpus tomentosus*, (Huds.) Lyngb. P. E. Island, *Jeans*.
28. *E. confervoides*, (Roth) Le Jolis. P. E. Island, *Jeans*. Var. *siliculosus*, Kjellman. Pictou, *MacKay*; Frye's Island, Caraquet, Miscou, *Hay*.
29. *E. littoralis*, Lyngb. Pictou, *MacKay*; Grand Manan, Miscou, Shippegan, *Hay*.

30. *E. fasciculatus*, Harv. Caraquet Bay, *Hay*.
31. *E. brachiatus*, Harv. P. E. Island, *Jeans*.
32. *E. ———* (?) (A still undefined species). Shippegan Isla
Hay.
33. *Elachistea fucicola*, Fries. Pictou, *MacKay*; Halifax, *Harvey*;
Frye's Island, Miscou, Grand Manan, *Hay*.
34. *Leathesia difformis*, (Linn.) Areschoug. Halifax, *Harvey*.
35. *Chordaria flagelliformis*, Ag. Pictou, *MacKay*; Halifax, *Harvey*;
Frye's Island, Caraquet, *Hay*.
36. *Mesogloia divaricata*, Kutz. Pictou, *MacKay*; Frye's Island,
Hay.
37. *M. vermicularis*, Ag. Halifax, *Harvey*.
38. *Castagnea Zosteræ* (Mohr.) Thuret. Halifax, *Harvey*.
39. *Chorda filum*, Linn. Pictou, *MacKay*; Frye's Island, Gulf Shore,
Fowler, Hay.
40. *Laminaria longicruris*, De la Pyl. Halifax, *MacKay* and *Harvey*.
Stipes three or four yards long have been observed. Prof.
Lawson, of Dalhousie College, says that on taking charge of
chemistry on his arrival at Halifax he could get no rubber tubing
in the city. While his order was coming he used the hollow
stipes of this sea-weed, which is always cast up in abundance on
the Halifax coast, and found it to answer splendidly for the con-
duction of gas.—*MacKay*. A specimen of this plant thrown on
the Caraquet beach measured seventeen feet in length, and the
widest part of the blade from two to three feet wide. But in the
masses of sea-weed thrown on the southern shores of Shippegan
and Miscou still larger specimens were observed. One measured
twenty-eight feet, while the stipe of another which was all
that could be pulled from the debris, measured fifteen feet.
This species makes up the great portion of the laminariæ grow-
ing along the gulf shore of New Brunswick. It is distinguished
by its hollow stipe. Around Grand Manan and the southern
coast of New Brunswick the forms of laminariæ are far more
variable and confusing, the two following species (*L. saccharina*
and *L. digitata*) being most abundant.—*Hay*.
41. *L. saccharina*, (Linn.) Lam.x.? Pictou, *MacKay*; Halifax, *Prof.*
Lawson; Frye's Island, Grand Manan, *Hay*; Gulf St. Lawrence,
Fowler.
42. *L. digitata*, Lam.x. Pictou, *MacKay*; Halifax, *Harvey, Lawson*;
Grand Manan, *Hay*. (The stipes of this species are used by
surgical instrument makers in the manufacture of sponge-
tents.)
43. *Saccorhiza dermatodea*, De la Pyl. Halifax, *Harvey*; Grand
Manan, *Hay*.

44. *Agarum Turneri*, Post. and Rupr. Halifax, *MacKay, Harvey, Lawson*; Grand Manan and Frye's Island, *Hay*.
45. *Alaria esculenta*, Grev. Halifax, *MacKay, Harvey, Lawson*; Grand Manan, *Hay*. (This species is used as food in Scotland and Ireland, where it is called badder-locks, henware, murlins,—and also in Iceland, but it is not eaten with us—*Dr. Farlow*).

ORDER III.—OOSPOREÆ.

46. *Ascophyllum nodosum*, Le Jolis. Pictou, *MacKay*; Halifax, *MacKay* and *Harvey*; very common on southern coast of New Brunswick, *Hay, Fowler*.
47. *Fucus vesiculosus*, L. Pictou and Halifax, *MacKay*; Halifax, *Harvey*. The varieties of this species are very abundant between tide marks on the southern shores of New Brunswick, *Hay*; Gulf shore, *Fowler*.
48. *F. serratus*, L. Pictou, *Fowler*; Pictou and Pictou Island, *MacKay*. Not found elsewhere in N. E. America.
49. *F. evanescens*, Ag. Frye's Island, Grand Manan, *Hay*.
50. *F. furcatus*, Ag. Growing on the low, flat shores northwest side of Miscou Island, beyond low water mark, *Hay*.
51. *Vaucheria* ————— (?) Pictou, *MacKay*.

ORDER IV.—FLORIDEÆ.

52. *Porphyra laciniata*, Ag. Pictou, *MacKay*; Halifax, *Harvey*; Frye's Island and Grand Manan, *Hay*.
53. *Bangia fusco-purpurea*, Lyngb. Halifax, *Harvey*.
54. *Callithamnion Rothii*, Lyngb. Halifax, *Harvey*.
55. *C. Pylaisæi*, Mont. Southern Head, Grand Manan, washed ashore in great abundance at the base of the cliffs, *Hay*.
56. *C. Americanum*, Harv. P. E. Island, *Jeanes*; Halifax, *Harvey*.
57. *C. corymbosum*, Lyngb. Halifax, *Harvey*.
58. *Ptilota elegans*, Bonnem. P. E. Island, *Jeanes*.
59. *P. serrata*, Kutz. Halifax, *Harvey*; Grand Manan, Frye's Island, Shippegan, *Hay*.
60. *Ceramium rubrum*, Ag. Very abundant. Pictou and Halifax, *MacKay*; Frye's Island, Shippegan, *Hay*; Kouchibouguac Bay, *Fowler*. Var. *proliferum*, Ag. Little Shippegan Bay, *Hay*.
61. *C. circinnatum*, Kutz. Little Shippegan Bay, *Hay*.
62. *C. tenuissimum*, (Lyngb.) Ag. Pictou, *MacKay*.
63. *Halosaccion ramentaceum*, (L.) Ag. Halifax, *MacKay*; Frye's Island, *Hay*.
64. *Phyllophora Brodiaei*, Ag. Halifax, *Harvey*.
65. *Ahnfeldtia plicata*, Fries. Pictou and Halifax, *MacKay*; Caraquet, Frye's Island, *Hay*; Gulf St. Lawrence, *Fowler*.

66. *Cystoclonium purpurascens*, Kutz. Halifax, *MacKay*; Miscou Island, *Hay*.
67. *Chondrus crispus*, (Linn.) Stack. Pictou and Halifax, *MacKay*; Meogone Island, Frye's Island, *Hay*; Gulf of St. Lawrence, *Fowler*.
68. *Rhodomenia palmata*, (Linn.) Grev. Pictou and Halifax, *MacKay*. Very abundant on the Gulf shore and southern coast of New Brunswick, *Fowler, Hay*. (This and *Chondrus crispus* form the only sea-weeds on our coasts collected for edible purposes. *Chondrus crispus* (Irish moss) yields a gelatine that is nutritious as food, and on the coasts of Ireland and Scotland helps to lengthen out the food supply in times of scarcity. *Rhodomenia palmata* (dulse) is largely exported from St. John and other ports in the Bay of Fundy to the United States and Upper Provinces. About fifty tons were exported from St. John last season, with probably an equal amount from all the other ports on both sides of the Bay. At Dark Harbour, Grand Manan, in August last, I found the fishermen to the number of forty or fifty, engaged in gathering dulse of very fine quality, for export. As the season occurred during a slack time in fishing, this new industry was found to be very profitable, the dulse selling from three to five cents a pound. It is eaten, says Dr. Farlow, by sailors and the Irish population of sea-port towns; but others appear to be cultivating a taste for it. It possesses anthelmintic properties.
69. *Rhodophyllis veprecula*, J. Ag. Halifax, *Harvey*; Grand Manan, *Hay*.
70. *Euthora cristata*, J. Ag. Halifax, *Harvey*; Grand Manan, *Hay*.
71. *Polyides rotundus*, Grev. Pictou and Halifax, *MacKay*.
72. *Delesseria sinuosa*, Lam.x. Halifax, *Harvey*; Frye's Island, Miscou, *Hay*.
73. *D. alata*, Lam.x., Var. *angustissima*, Harv. Very abundant on south side of Miscou and Shippegan Islands where it is cast ashore with the larger sea-weeds, *Hay*.
74. *Gracillaria multipartita*, J. Ag. Pictou, *MacKay*; Kouchibouguac Bay, *Fowler*.
75. *Odonthalia dentata*, Lyngb. Halifax, *Harvey*. Pictou, *MacKay*, Kouchibouguac Bay, *Fowler*. Shippegan and Miscou, *Hay*. Not reported south of the Maritime Provinces.
76. *Rhodemela subfusca*, Ag. Halifax, *MacKay*; Frye's Island, Grand Manan, Miscou, *Hay*. Var. *gracilior*, J. Ag. Kouchibouguac Bay, *Fowler*.
77. *Polysiphonia urceolata*, (Dillw.) Grev. Halifax, *Harvey*; P. E. Island, *Jeans*; Pictou, *MacKay*; Miscou and Shippegan, *Hay*. Var. *formosa*, Ag. P. E. Island, *Jeans*.

78. *P. Olneyi*, Harv. Pictou and Halifax, *MacKay*.
79. *P. Harveyi*, Bailey (?) Pictou, *MacKay*.
80. *P. fibrillosa*, Grev. North Miscou, *Hay*.
81. *P. violaceæ*, Grev. Halifax, *Harvey*; P. E. Island, *Jeans*; Pictou, *MacKay*; Kouchibouguac Bay, *Fowler*. Common along the whole coast New Brunswick, *Hay*.
82. *P. nigrescens*, Grey. Halifax, *Harvey*; P. E. Island, *Jeans*; Pictou, *MacKay*. Var. *fucoides*, Ag. Caraquet beach, Miscou gully, *Hay*.
83. *P. fastigiata*, Grev. Pictou and Halifax, *MacKay*; Frye's Island, *Hay*.
84. *Corallina officinalis*, L. Halifax, *Harvey*. Common on southern and eastern coasts of New Brunswick, and usually found on shells thrown ashore by the waves, *Fowler, Hay*.

ARTICLE IV.

A PRELIMINARY NOTICE OF A NEW GENUS OF
SILURIAN FISHES.

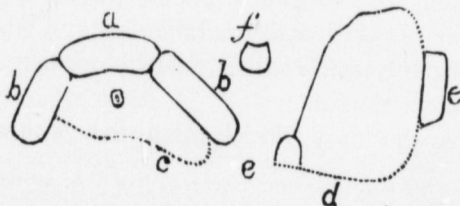
BY G. F. MATTHEW, M. A., F. R. S. C.

(Abstract from the Report of the Field Meeting held in July, 1886; read 5th
October, 1886.)

The fish remains of the Silurian age are of two different kinds, one consisting of small spines with fluted surfaces, which resemble those borne by certain sharks and by siluroid fishes. The second consisting of oval and rectilinear plates or shields, with curved surfaces, and which from their form and appearance are not easily recognized as parts of fishes. These plates covered the head and the anterior parts of the body, while the posterior part was protected by scales only, or entirely unarmed. Hitherto all the fishes of this family (Pteraspidae) have been spoken of as having plates on the head, back and sides only, but the one I am about to describe had ventral plates as well, and in this respect corresponds to the remarkable armoured fishes of the Devonian age.

The most obvious character by which these Silurian fish plates can be recognized is a fine but very distinct ridging of the surface, the details of the ornamentation being governed by the position of the plate in the series of plates with which the body was covered.

The accompanying woodcut shows the outlines of these plates:



Covering plates of Diplasp's *Acadica* (n. gen.)

a is the rostral plate on which the little ridges are arranged parallel to each other, but transverse to the axis of the body. *b, b*, are the two anterior lateral plates on which the ridges are also parallel to each other throughout, and to the longer diameter of the plates. *c* is the dorsal scute, of which only a part is preserved, and in which the circular spot at the anterior end perhaps marks the position of the eye. On this plate the triangular area in front of this circular mark, extending forward to the rostral plate, is also marked by ridglets which are transverse to the axis of the body of the fish, but are not so regular, or so generally parallel to each other as those on the rostral plate. Behind the anterior triangular area on this plate, the little ridges extend backward, parallel in a general way to the axis of the body, to the posterior end of the plate: many of these ridglets are looped at the anterior end, where they are in contact with the triangular area of the plate above described; but going backward they become more distinctly parallel, and one can distinguish two sets, one of smaller and the other of larger ridges; there are about four or five of the more minute ridges between the larger ones; and the latter are not continuous, but result from a greater prominence being given to certain of the minute ridges for a limited distance. This two-ranked arrangement does not characterize the ridges over the whole surface of the plate, but the margins on each side are marked, for a limited width, with parallel ridglets of uniform size, similar to those on the rostral and lateral plates.

d is the ventral plate or scute on which the ridglets are similar in their size and arrangement to those on the dorsal scute. In the example found, one side of this plate is wanting. *e, e*, are portions of two lateral plates, which appear to have been posterior in position to the laterals *b* and *b*. *f* is a fragment of a plate on which the ridglets are curved; the position of this plate is doubtful.

As this is the only Pteraspidian fish known which is

armoured above and below, it will be the type of a new genus for which the name *Diplaspis* will be appropriate.*

In *Pteraspis* (Kner), which, however, is a Devonian and not a Silurian genus, there is a considerable resemblance in the ornamentation of the shield, and generally in the dorsal armature, to the covering plates of the Acadian fish; but if we attempt to compare the different plates of which the shield of our Pteraspidian fish is composed with those of *Pteraspis*, they will be found to differ widely from that genus. On the other hand, if the plates *a*, *b*, *b*, and *c*, be compared with those of the genus *Cyathaspis* (Lankester) the correspondence of parts is striking.

In Prof. E. Ray Lankester's monograph on the fishes of the Old Red Sandstone † we appear to have only one example of this genus (*Cyathaspis*) described, for although *Cyathaspis* (?) *Symondsi* is described under this head, it seems very doubtful whether it should be so referred; and Prof. Lankester appears to have placed it here provisionally only. The typical species, *C. Banksii* (Huxley and Salter), is Silurian, and possesses a set of plates quite analogous to the dorsal covering of the Acadian fish. There is also on the central plate ("dorsal scute") a tubercle, indicated in Prof. Lankester's figures, which holds the place of a similar circular elevation on the shield of the Acadian fossil (see plate c.) In Prof. Lankester's examples of *C. Banksii*, the surface markings appear to have been obscure, except on the rostral and lateral plates; we do not know, therefore, how far the markings on the main plate of each of these two fishes were similar.

Curiously enough, the plate *d* possesses characteristics analogous to those of the scute of the genus *Scaphaspis* (Lankester). The markings on the surface of this plate are almost exactly parallel to those of the "dorsal" scute of *Scaphaspis truncata* (Huxley and Salter), in the fine example figured by Prof. Lankester (plate II., fig. 3, Memoirs cited), and the plate is similarly a little asymmetrical.

* The specific name has already been given, as it has been described in the "Canadian Record of Science" under the name of *Pteraspis* (?) *Acadica*. 1886. pp. 251 and 252 and 323-5.

† Memoirs of the Palaeontographical Society, London. Vol. XXI.

The association of these two types of fish plates at several localities may not be altogether without significance. Thus, in the Downton sandstones of England there are *Cyathaspis Banksii* and *Scaphaspis truncata*, and in the Onondaga variegated shales of Pennsylvania, Prof. E. W. Claypole has found *Palaeaspis* * *bitruncata* and *P. Americana*. So far as the form indicates a relationship, it may be said that the former is comparable with the dorsal scute of *Cyathaspis*, as Prof. Claypole has observed, while the latter is not unlike the shield of *Scaphaspis* in outline. It should be remarked, however, that in the course of the surface markings as figured and described by Prof. Claypole, *Palaeaspis Americana* differs both from the *Scaphaspis* of the Downton Sandstone and from the ventral plate of our Acadian species.

In one respect the Acadian Pteraspid is decidedly of archaic type. The plates *c* and *d* possess the two ranks of striæ, or ridglets, which, according to Prof. Lankester, distinguish the Silurian from the Devonian Pteraspidian fishes; the contrast between the larger and the smaller intermediate set of ridges is more marked on *d* than on *c*, and the borders of these plates, as also the whole of the lateral plates and the rostral plate, differ in having the ridges of uniform size. The superior prominence of certain of the striæ in our species (and probably in others) belongs therefore only to the two larger plates of the dermal covering, but it is a useful character to distinguish these older fishes from the more typical Pteraspids of the Devonian Age, in which no part of the dorsal scute presents these strikingly unequal ridges or striæ.

The fineness of the ridglets on the plates of the Acadian fish is quite up to the highest standard of tenuity in the fish plates of Prof. Lankester's Memoir, there being from 150 to 200 of them in the width of an inch.

The plate *c* is abundantly dotted with minute pits apparently marking the sites of mucous glands, which Prof. Lankester mentions as a feature of the shields of Pteraspis: from this he infers that a secreting membrane probably covered

* Quart. Jour. Geol. Soc. London, Feb. 1881. This genus is separated from the other Pteraspidian fishes on account of organic differences in the structure of the plates and not because of difference of form.

the surface of the calcareous plates of *Pteraspis*. If his reasoning is correct, the plates of the Acadian fish were also probably clothed with a similar covering.

These fish remains were taken from beds of the Silurian System which are found on the southern slope of the Nerepis Hills, in Kings County, New Brunswick. The beds are of very fine texture, being evenly banded, silicious mud rocks or hardened shales. They are similar in aspect to the strata of No. 2 in the Silurian Succession at Passamaquoddy Bay in Charlotte County. No. 3 contains in that neighbourhood a marine fauna similar to that of the Lower Helderburg Formation (equivalent to the Ludlow of England). These fish remains would therefore seem to be as old as the oldest known in Great Britain, though perhaps not quite so old as some found in Pennsylvania by Prof. Claypole.

The beds from which the Acadian fish was taken abound with carapaces of a small species of *Ceratiocaris*, and also contain the remains of a limuloid crustacean allied to *Hemiaspis*.

The genera of Pteraspidian fishes known to the writer are the following:—*

Palæaspis (Claypole) Scutum simplex, ovale †—Silurian.

Scaphasis (Lankester) Scutum simplex, ovale—Silurian and Devonian.

Cyathaspis (Lankester) Scutum in quatuor partes divisum ovale—Silurian.

Diplaspis (nov. gen.) Scuta in dorsum et pectorem, in septem (?) partes divisa, ovalia—Silurian.

Pteraspis (Kner) Scutum in septem partes divisum, sagittiforme—Devonian.

* The diagnoses of the second, third and fifth genera are taken from Prof. Lankester's Memoir, cited.

† See footnote opposite.

ARTICLE V.

THE CRAY-FISH IN NEW BRUNSWICK.

Cambarus Bartonii (FABR.) GIR.

BY W. F. GANONG.

(Read 4th May, 1886. Revised April, 1887).

The only species of Cray-fish or "fresh-water lobster," at present known from New Brunswick waters, is the above-mentioned *Cambarus Bartonii* (Fabr.) Gir. In Maine it occurs in the valleys of the Kennebec and Penobscot Rivers,* but has been supposed to be rare in this Province.

In the Museum of Comparative Zoology at Cambridge, Mass., there is a specimen labelled "St. John, N. B., C. F. Hartt." This is the most easterly point from which the species is known. During the summer of 1885, Mr. S. W. Kain and the writer found it in the St. John River just above Grand Falls, and we have since learned of its occurrence at several points in the St. John River valley. Mr. John Babbit says it is abundant in Green River; Professor Bailey has seen it in Mill and Garden's Creeks, near Fredericton; Mr. J. W. Bailey, on the authority of Mr. Charles Beckwith, reports it from a spring draining into the Nashwaaksis; Mr. Scovil Neales has found it in a stream twenty miles above Fredericton, and Mr. A. T. B. Howard in Long's Creek, twenty-five miles above the same city. It is probably to be found, therefore, almost everywhere in favorable localities in the St. John and its tributary streams.

But it is not confined to this one river. Mr. R. W. Ells, of the Geological Survey, writes that he "caught cray-fishes in the Restigouche and the Upsalquitch Rivers in 1879, in which streams they are quite plentiful." The former locality

* *A Revision of the Astacidae.* By Walter Faxon. Mem. Mus. Comp. Zoology, Cambridge, Mass. 1885. p. 62.

is the most northerly point now known to naturalists of the occurrence of this species. Mr. Charles Beckwith tells the writer, through Mr. Bailey, that it is exceedingly abundant in the South-west Miramichi also, particularly at the mouth of Gillman Brook. Nothing further is at present known of its distribution in New Brunswick.

The Cray-fish has probably been introduced into this Province by way of the Allegash from the head-waters of the Penobscot. "The St. John and Penobscot are connected by a canal from Telos Lake to Webster Pond, and the divide between the head-waters of the Penobscot and the Kennebec is so low that it is said that in very wet seasons their waters intermingle."* It has probably spread into the Restigouche by way of Grand River, and into the Miramichi by way either of the Nashwaak or of the Shiktehawk or Beccaguimec. Where the sources of these streams are so near each other and interlock in such a fashion as they do, there would be little difficulty in the animal spreading from one to the other, particularly where the divide is low. It is probable that it will be found also in the Nepisiguit and the St. Croix, but extremely improbable that it occurs anywhere in Nova Scotia or Prince Edward Island.

As its distribution is a matter of great interest, the writer would be very glad if anyone knowing of its presence in the waters of the Maritime Provinces would communicate the fact either to the Natural History Society or to him.† It is very desirable, too, that specimens preserved in alcohol should be collected from as many localities as possible, for while it is probable that we have but this one species, it is not impossible that there are more; and if so, they are not unlikely to be new to Science. The Cray-fish inhabits fresh water only, and cannot be mistaken for any other animal. It resembles the lobster very closely in all respects, except size and color; being much smaller than the latter (three to four inches long) and somewhat lighter in hue.

* Thoreau, *Maine Woods*. Quoted in *Revision of the Astacidae*, *op. cit.*, p. 62.

† Address, St. Stephen, N. B.

APPENDIX.

THE REPORT OF THE COUNCIL OF THE NATURAL HISTORY SOCIETY OF NEW BRUNSWICK.

JANUARY 18TH, 1887.

The Council of the Natural History Society of New Brunswick, in presenting a report of the work done during the year just closed, would congratulate the Society on the prosperous condition in which it is, and on the steady progress it has made in the past.

MEMBERSHIP.

During the year there were added to the membership one honorary, two life, five ordinary, five corresponding, and two associate members.

MEETINGS.

Since the last Annual Meeting eight (8) regular meetings have been held, at which the following papers were read:

- FEB. 2. A Communication Describing Human Remains found on the Miramichi near Newcastle.—By A. C. Smith, M. D.
“ Distribution of Arctic Plants.—By Prof. James Fowler.
- APR 6. Social Science—Treating of Primary Education.—By James A. Estey.
- MAY 4. Insect Life During Winter ---By J. V. Ellis, M. P.
“ The Cray-fish of New Brunswick.—By W. F. Ganong, A. B.
“ The Kames and Terraces of New Brunswick.—By Robert Chalmers.
- JUNE 1. Destruction of Birds.—By M Chamberlain.
- OCT. 5. Report of Field Meeting held first July, with Preliminary Notice of a New Genus of Silurian Fishes.—By G. F. Matthew, M. A.
- NOV. 2. Marine Mollusca of New Brunswick.—By W. F. Ganong, Ph. B.
- DEC. 7. Giant Trilobite, found near St. John.—By G. F. Matthew.
“ The Botany of St. John City.—By G. U. Hay, Ph. B.
“ The Birds and Plants of Petitcodiac.—By John Brittain.
- 1887.
- JAN. 11. The Mosses of New Brunswick.—By John Moser.
“ Natural History Portion of the Colonial and Indian Exhibition.—By. W. F. Best.

The Treasurer's Report, for the year ending 18th January, shows the receipts to be \$475.33, and the expenditure \$242.96. The expenditure has been chiefly for the publication of the Bulletin of 1885-6 (No. V.), and for furniture and material for the museum.

About eighty books and pamphlets have been donated to the library, and several volumes of the *American Journal of Science and Art* purchased to fill deficiencies in the series.

Some valuable additions to the museum have been made during the past year, and among others a collection of the Marine Invertebrates of the Atlantic coast, received from the National Museum at Washington. A variety of other objects have been given of which mention is made in the list of donations. The work in the museum during the past year has been chiefly in the arrangement of part of the geological collections, and in revision and re-arrangement of the mollusca. The museum is very deficient in collections from Mesozoic and Cenozoic formations.

The Botanical Committee have given the results of their work during the season in the Report published herewith. The chairman of this committee has also prepared for the Bulletin a list of the Marine Algæ of the Maritime Provinces, which includes the observations of A. H. MacKay, B. A., of Pictou, N. S. The chairman also reports that valuable assistance was received from Messrs. John Brittain, J. Vroom, W. F. Ganong, C. H. Livingston, and J. Moser.

The Committee on Ornithology report that they have continued their observations on the migrations of birds, and have also added to their knowledge of the distribution, within the limits of the Province, of the species which are known to occur here. The committee desire to acknowledge the efficient assistance that has been afforded them in both branches of their work by Mr. John Brittain, Petitcodiac, Mr. Philip Cox, Newcastle, Miramichi; Mr. Louis M. Todd, Calais; Mr. Howard H. McAdam, St. Stephen; and Mr. Gabriel DeVeber, Gagetown.

The society had no "summer camp" during the past season, but on 1st July a field meeting was held at Nerepis,

Station. The most important observation made was the discovery of a fossil fish, which is noticed in one of the articles in this Bulletin. Another geological discovery made during the past year by a member of the Society was that of a very large trilobete (*Paradoxides*) found near St. John.

The Council has appointed a custodian for the rooms during the winter months, who will be in attendance every Tuesday and Thursday evenings, and on Saturday afternoons, for the purpose of showing the collections to visitors. Members are specially invited to visit the rooms and bring with them any friends who take an interest in natural history.

The Council would again thank the daily press for inserting preliminary notices of meetings.

Among the objects which are worthy of consideration in this Anniversary year, is the establishment of a Public Museum. The limited means at the disposal of your Council have not enabled it to undertake the erection of an edifice suitable for such a purpose, but it has steadily kept in view this public need; it has accumulated much material for furnishing a public museum, and has procured cases and other furniture suitable for protecting and exhibiting the collections in its hands, trusting that public liberality, or private munificence, will eventually provide the building required.

The Council feel it their duty to remind you that this Society has entered upon the twenty-fifth year of its existence. During the past quarter of a century it has passed through some vicissitudes and has not always been as prosperous as at present, but another generation is now coming forward to take up the work begun by the gentlemen who originated this Society twenty-five years ago. Not a few of these have gone to their rest, but a large number still fill prominent and useful positions in the community, and among them our worthy President, who has been at the head of this Society (except for a few years) since its foundation.

Respectfully submitted,

W. J. WILSON,

Secretary.

REPORT OF BOTANICAL COMMITTEE.

The following list embraces additional localities for those plants marked rare, or those for which only one or two stations are given in Fowler's list of 1885; also those new to the Province, found during the past season. The latter are printed in full-face type. It will be seen that nearly twenty species and varieties of flowering plants, new to the Province, have been found during the season. Such investigations are every year leading to increased and more accurate knowledge of the distribution of our flora. Our botanists are by no means confining their attention alone to plant distribution in this Province; one member of the committee has published a list of plants of what must be considered the most interesting botanical section of the Province; others are giving their attention to the cryptogamous flora of the Province.

A closer scientific study of our plants with their economic value is pressing itself upon the attention of our botanists. The student of our plants should be the co-worker of the horticulturist and agriculturist in all those questions in which the latter are deeply concerned: the better protection of fruit and other trees from the ravages of fungi, better plans for the extermination of weeds, the increased cultivation of our native plants and fruits, a more thorough knowledge of the qualities of our medicinal plants. These and other practical questions are becoming of more and more interest to our botanists, and indicate what results may be accomplished by a practical application of plant study.

The numbers below correspond to those in Fowler's list of 1885.

GEO. U. HAY,
J. VROOM,
JOHN BRITAIN, } *Botanical
Committee.*

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ADDITIONS TO LIST OF PHANEROGAMS OF NEW BRUNSWICK.

12. *Ranunculus multifidus*, Pursh. Hampstead, Queens County, and Lakeville, Carleton County, *Brittain*. Tay's Mills, York County, *Moser*.
39. *Nasturtium officinale*, R. Br. St. Stephen; apparently native, *Vroom*.
73. *Polygala Senega*, L. Richmond, Carleton Co., *Vroom*.
83. *Cerasteum arvense*, L. St. Andrews and Fredericton; apparently introduced in both places, *Vroom*.
85. *Stellaria longifolia*, Muhl. St. Croix River, *W. F. Ganong*.
87. *S. uliginosa*, Murr. Nashwaaksis, *Vroom*. Quaco, *Brittain*.
89. *S. borealis*, Bigel. St. Andrews and St. Stephen, *Vroom*.
92. *Arenaria peploides*, L. Miscou Island, *Hay*.
94. *Sagina nodoza*, Fenzl. Frye's Island, Caraquet, *Hay*.
97. *Spergularia salina*, Presl. Shippegan and Caraquet, *Hay*.
121. *Impatiens pallida*, Nutt. Florenceville, Carleton Co., *Brittain*.
163. *Prunus serotina*, Ehrh. Not uncommon about Florenceville, Carleton Co., *Brittain*.
174. *Rubus hispidus*, L. North Head, Grand Manan, *Hay*.
192. *Rosa Carolina*, L. Probably rare in New Brunswick. "Easily recognized by the fine serration of the leaflets, in connection with narrow stipules and usually hooked spines." Watson says (*Proc. Am. Acad.*, Vol. XX.), "I have seen no specimens from Canada; . . . specimens from New Brunswick, sent as such, prove to be *R. lucida*." He has since referred to this species one found at St. Stephen, *Vroom*.
193. *R. lucida*, Ehrh. (not *R. parviflora*). Flowers two weeks earlier than the last. This is probably our common wild rose throughout the Province; though some specimens which have been placed here may belong to either of the next two species.
- 193a ***R. humilis***, Marsh. (*R. parviflora*, Ehrh). Low; outer sepals always lobed; spines usually slender, always straight. Reported along the shores of the St. Croix River, near St. Andrews, *Ganong*.
- 193b. ***R. nitida***, Willd. Usually low and very prickly; sepals entire. Frye's Island, *Hay*; Digdeguash and Canoos, *Vroom*.
195. *R. rubiginosa*, L., includes *R. micrantha*, Sm. Roadsides and fences.
218. *Drosera intermedia*, Drev. and Hayne, var. *Americana*, D. C., North Head, Grand Manan, *Hay*; Titusville, *Brittain*.
221. *Hippuris vulgaris*, L. Abundant on Miscou Island, *Hay*; Canoos River, Charlotte Co., *Vroom*; shores of Albert Co., common, *Brittain*.

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- 266a. *Viburnum acerifolium*, L. Sprague's Falls, St. Croix River, June, 1886, *Ganong*.
289. *Solidago bicolor*, L., var. *concolor*, Torr and Gr. Simonds, Carleton Co., *Brittain*.
319. *Erigeron annuus*, Pers. Hampstead, Queens Co., Lakeville, Carleton Co., *Brittain*; Clifton, *Wetmore*.
351. *Petasites palmata*, Gray. Richmond, Carleton Co., *Rev. F. W. Vroom*; Canaan Forks, Queens Co., *J. Moser*; *Petitcodiac, Brittain*.
389. *Vaccinium Pennsylvanicum*, Lam. A few white berries of this species were seen at St. Stephen in 1885; and a number of them from different localities, mixed with the common blueberries in the market in 1886, *Vroom*.
416. *Primula Mistassinica*, Michx. A reduced form at Grand Falls, *Vroom*.
420. *Lysimachia thyrsoiflora*, L. Canaan Forks, *Moser*; Oak Hill, Charlotte Co., *Vroom*; *Petitcodiac, Brittain*.
427. *Fraxinus pubescens*, Lam. Hampstead, Queens Co., *Brittain*; Sprague's Falls, St. Croix River, *Ganong*; Clifton, *Wetmore*.
433. *Gentiana linearis*, Fresl. Var. *latifolia*, Gray (= *G. alba*, Muhl. in part). Rolling Dam, Dumbarton, *Ganong*; Oak Hill, St. James, *Vroom*. [Concerning this interesting plant Dr. Gray writes Mr. Vroom as follows: "I identify it with the Lake Superior plant, which I, in the Flora, and earlier in the Manual, referred to *G. alba*. I call it now *G. linearis*, var. *latifolia*, and shall soon be publishing it under that name with reference to your and Mr. Ganong's discovery."]
460. *Ilysanthes gratioides*, Benth. St. Stephen, *Vroom*; Bloomfield, *Petitcodiac, Brittain*.
- 481a *Utricularia resupinata*, Greene. Phipp's Lake, Long Reach, K. Co., July, 1886, *C. H. Livingstone*.
484. *Verbena urticæfolia*, L. Florenceville, *Brittain*.
493. *Hedeoma pulegioides*, Pers. Keswick Ridge, York Co., and common in Charlotte Co., *Vroom*; Grand Manan, *Hay*.
507. *Plantago lanceolata*, L., St. Stephen, *Vroom*.
523. *Polygonum hydropiperoides*, Michx. St. Stephen, *Vroom*.
536. *Rumex orbiculatus*, Gray, with *R. crispus*, L., and *R. obtusifolius*, L. St. Stephen, *Vroom*.
546. *Comandra livida*, Richardson. Bliss Island, *Brittain*.
548. *Euphorbia helioscopia*. St. Stephen, *Vroom*.
552. *Humulus lupulus*, L. At the Falls of the Nashwaaksis, a mile or more beyond the farthest cultivated field. Possibly native, *Vroom*.
567. *Betula pumila*, L. Miscou Island, *Hay*; Lakeville, Carleton Co., *Brittain*.

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676. *Salix humilis*, Marshal. St. Stephen, *Vroom*; Petitcodiac, *Brittain*.
 577. *S. discolor*, Muhl., var. *eriocephala*, Anders. St. Stephen; (probably this variety is the common form in New Brunswick), *Vroom*.
 593. *Juniperus communis*, L., var. *alpina*, L. North Head, Grand Manan, *Hay*.
 611. *Listera cordata*, R. Br. Nashwaaksis, *Vroom*; Frye's Island, *Ganong*; Petitcodiac, *Brittain*; Clifton, *Wetmore*.
 678a ***Sparganium eurycarpum***, Engelm. Shediac and Hillsboro, *Brittain*.
 395. *Potamogeton natans*, L. Clifton, *Wetmore*.
 702. *P. praelongus*, Wulfen. St. Stephen, *Vroom*.
 708. *P. pectinatus*, L. Clifton, *Wetmore*.
 710. *Ruppia maritima*, L. St. Andrews, *Vroom*; Pokeseudie Gully, Gloucester Co., *Hay*.
 715. *Cyperus diandrus*, Torr. Riverside, Kings Co., *Wetmore*.
 739. *Rhynchospora fusca*, Roem. and Schultes. Hampstead, *Brittain*; Trout Lake, Charlotte Co., *Brittain*.
 740. *R. alba*, Vahl. Charlotte Co., *Vroom*; Hampton, *Brittain*.
 740a ***Cladium mariscoides***, Torr. Potter's Lake, near St. Stephen, *Vroom*.
 746. *Carex vulpinoidea*, Michx. Near Andover, Hampton, *Brittain*.
 749. *C. arcta*, Boot. Moss Glen, Kings Co., *Brittain*.
 749a ***C. chordorhiza***, Ehrh. Shippegan, *Hay*; Lakeville, Carleton Co., *Brittain*.
 754. *C. Norvegica*, Schk. Whale Cove, Grand Manan, *Hay*.
 755a *C. exilis*, Dew. Lakeville, *Brittain*; Trout Lake, near St. George, *Brittain*.
 760. *C. cristata*, Schw. Canoes River, 1883, *Vroom*.
 764. *C. vulgaris*, Fries. St. Andrews, *Vroom*.
 774. *C. limosa*, L. Kendrick's Lake, 1882, *Vroom*; Miscou Island, *Hay*; Trout Lake, Charlotte Co., *Brittain*; Portage Lake, Westmorland, *Brittain*.
 781a ***C. Conoidea***, Schk. St. Stephen, *Vroom*.
 782. *C. gracillima*, Schw. Frye's Island, *Hay*; Petitcodiac and Clifton, *Brittain*.
 782a ***C. plantaginea***, Lam. St. John River, between Florenceville and Andover, *Brittain*.
 782b ***C. retrocurva***, Dew. St. Stephen, *Vroom*.
 784. *C. oligocarpa*, Schk. Long Island in the Kennebecasis, *Brittain*.
 784a ***C. eburnea***, Boot. Tobique Narrows, *Brittain*.
 789. *C. Pennsylvanica*, Lam. St. Stephen, *Vroom*; Petitcodiac, *Brittain*.
 802a ***C. comosa***, Boot. (*C. Pseudo-Cyperus*, Schw. and Torr., var. *comosa*, W. Boot.) St. Stephen, 1884, *Vroom*; Lakeville, *Brittain*.

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807. *C. lurida*, Wahl. (*C. lupulina*, Muhl.) St. Croix River near Little Ridge, St. James, *Vroom*; Petitcodiac, *Brittain*.
820. *Panicum dichotomum*, var. **nitidum**. St. James, *Vroom*.
829. *Leersia oryzoides*, Swartz. Charlotte and Carleton Counties, *Vroom*; Kings County, *Brittain*.
834. *ALOPECURUS GENICULATUS*, L. St. Andrews, *Vroom*.
835. *A. aristulatus*, Michx. Charlotte Co., *Vroom*; Petitcodiac, *Brittain*.
838. *Milium effusum*, L. Between Florenceville and Andover, *Brittain*.
840. *Muhlenbergia Mexicana*, Trin. Simonds, Carleton Co., *Brittain*.
842. *Brachyelytrum aristatum*, Beauv. Charlotte Co., *Vroom*; Frye's Island, Petitcodiac, Florenceville, *Brittain*.
- 843a **Sporobolus** (*Vilfa*) **cuspidatus**, Torr. Simonds, Carleton County, *Brittain*.
858. *Eatonia Pennsylvanica*, Gray. Charlotte County, *Vroom*; Titusville, *Brittain*.
- 859a **Poa alsodes**, Gray. Between Florenceville and Andover, *Brittain*.
867. *Graphephorum melicoides*, Beauv. Simonds, Carleton County, *Brittain*.
869. *Glyceria elongata*, Trin. St. David, Charlotte County, *Vroom*; Titusville, K. C., *Brittain*.
879. *Festuca nutans*, Willd. Bellisle, Bairdsville, *Brittain*.
891. *Asprella Hystrix*, Willd. Between Florenceville and Andover, *Brittain*.
896. *Equisetum hyemale*, L. Portage, K. County, Bairdsville, Simonds, Carleton County, *Brittain*.
- 896a **E. variegatum**, Schleicher. Rare. Near Andover, *Brittain*.
921. *Onoclea sensibilis*, L., var. *obtusilobata*, Torr. Clifton, *Wetmore*.

DONATIONS TO THE MUSEUM.

DATE.	DONOR'S NAME, AND ARTICLE PRESENTED.
1886	
Feb.	A. C. SMITH, M. D. Newcastle, N. B.—Portions of skulls, brass kettle and glass beads, from graves on S. W. Miramichi River.
	MISS E. TURNBULL.—Owl, mounted.
	A. M. HAMILTON.—Fresh-water clams, (<i>Unio</i>), from Red River, Manitoba.
	D. McL SMITH.—Coal plants of six genera, from Lingan, C. B.
	T. C. MILES, Copper, silver and lead ores, from Montana, U. S.
Apr.	W. M. SMITH.—Walrus tusks, Eskimo gloves, harpoon head and line, etc., from Hudson's Bay. Plank eaten by sea-worms, from Pictou, N. S.
	JAS. W. BANKS.—Eggs and nests of several birds, from St. John Co.
	M. CHAMBERLAIN.—Ostrich egg.
	JAS. F. ELLIS.—Bark, wood, leaves and cones of the great red-wood tree of California, (<i>Sequoia</i>).
	D. McL. SMITH.—Specimens of New Brunswick plants.
	HENRY POOLE, C. E.—Block of oil coal, from Stellarton, N. S.
	W. F. Best.—Glass sponge, (<i>Euplectella</i>), from East Indies.
	W. H. MAXWELL.—Native flax, (<i>Phormia tenax</i>), from New Zealand.
May	W. K. CRAWFORD.—Stone implements, from Kings Co. Fossils, from U. S., etc.
Oct.	U. S. NATIONAL MUSEUM.—Crustaceans, (26 species). Marine worms, (11 sp.) Marine Molluscs, (29 sp.) Tunicates, (10 sp.) Polyzoa, (4 sp.) Echinoderms, (16 sp.) Corals, (10 sp.) Sponge, (1 sp.) All from the Atlantic coast of the United States.
	GEO. S. PURDY.—Corn pestle, broad celt and grooved axe, from Purdy's farm, Queen's Co.
	CLARENCE V. WOOD.—Two stone celts and a fossil tree, (<i>Dadoxylon</i>), from Baie Verte, Westmorland Co.

DONATIONS TO THE MUSEUM.—(Continued.)

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Oct.	<p>W. C. SIMPSON —Iron tomahawk, from L'Etang, Charlotte Co.</p> <p>DONALD HARPER.—Tusk of Sea Cow or Walrus, from Miscou harbour, N. B.</p> <p>GEORGE HARVEY.—Diatomaceous earth, from Seal Cove, Grand Manan.</p> <p>CHARLES BAILLIE —Felted mass of stubble and lakes weed, made by colonies of worms in eight to thirteen feet water, from Little Kedron L , Charlotte Co</p> <p>ROBERT MURRAY.—Fossil plants, <i>Lepidodendra</i> and <i>Calamites</i>, from Joggins, N. S</p>
Nov.	<p>A. B. SHERATON.—Baltimore oriole.</p> <p>JER HARRISON —Centipede, from West Indies.</p> <p>JOHN BAXTER, M. D , Chatham —Two sets of birds' eggs</p>
Dec.	<p>W. F. BEST.—Saurian vertebra and three species of molluscs, (gen. <i>Gryphæa</i>, <i>Lima</i>, and <i>Modiola</i>), from the Lias formation, Stockton, G. B Three molluscs, (gen. <i>Belmontites</i> and <i>Ammonites</i>), one radiate, (<i>Pentremites</i>), from the Oolite, Oxford, G. B. Two echinoderms, (gen. <i>Galerites</i> and <i>Ananchytes</i> (?)) from the chalk formation, Winchester, G. B. Shark's tooth, from Red Crag, Norfolk. Raw Silk, from Bengal, India</p>

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DATE.	DONOR'S NAME, AND TITLE OF BOOK.
1886	
<i>Feb.</i>	<p>DIRECTOR GEOLOGICAL SURVEY, UNITED STATES —Bulletins of United States Geological Survey, Nos. 7, 8, 9, 10, 12, 13 and 14; April—Nos. 15, 16, 17, 18, 19, 20, 21, 22 and 23; October—Nos. 24, 25, 26, 27, 28 and 29.</p> <p>UNITED STATES WAR DEPARTMENT —Expedition to Point Barrow, Alaska.</p> <p>NATURAL HISTORY SOCIETY, Montreal —Canadian Record of Science, vol. I., No. 4; vol. II., No. 1; May, vol. II, No 2; October, vol. II., No. 3.</p>
<i>Apr.</i>	<p>A. H. MCKAY, N. S., Pictou.—Notes on the Fresh Water Sponges of Nova Scotia.</p> <p>NEW YORK MICROSCOPIC SOCIETY—Journal, vol. II., No. 1; May, No 2; October, Nos. 5 and 6; November, No. 7.</p> <p>FIELD NATURALIST CLUB, Ottawa—Transactions, 1884-5.</p> <p>R. W. W. FRINK.—Birds of Brazil, and Portfolio of American Aborigines.</p> <p>J. F. WHITEAVES, Ottawa — Contributions to Canadian Palaeology, vol. I</p> <p>UNITED STATES FISH COMMISSIONER — Report of the the United States Fish Commission, for 1882 (1884).</p>
<i>May</i>	<p>TRUSTEES OF AMERICAN MUSEUM OF NATURAL HISTORY, New York—Annual Report; October, Bulletin No.</p> <p>J. H. PANTON, Winnipeg.—Transactions of Historical and Scientific Society, Manitoba, No. 20.</p> <p>SOCIETY MALOCOLOGIQUE DE BELGIQUE—Proceedings 1885, January to December.</p>
<i>Oct.</i>	<p>NATURAL HISTORY SOCIETY, Glasgow.—Proceedings, vol. I, part 2.</p> <p>BROOKVILLE SOCIETY NATURAL HISTORY SOCIETY—Bulletin No. 2.</p> <p>LITERARY AND HISTORICAL SOCIETY OF QUEBEC.—Transactions, No. 18.</p>

Appendix—Donations to the Library. 87

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Oct.	<p>GEOLOGICAL AND NATURAL HISTORY SURVEY OF CANADA.— Summary Report for 1885.</p> <p>GEOLOGICAL SURVEY OF UNITED STATES —Brachiopods and Lamellibranchs of the cretaceous bed of New Jersey.</p> <p>J. H. PANTON, Winnipeg.—Geology of the Islands of Lake Winnipeg.</p> <p>OTTOMAR NOVAK, Prague.—New Phyllopod Crustaceans in Bohemia.</p> <p>E. GILPIN, C. E., Halifax.—Quarterly Journal Geological Society, London, Nos. 166 and 167.</p> <p>BOSTON SOCIETY OF NATURAL HISTORY.—Proceedings, vol. I., Nos. 2 and 3.</p> <p>NATURAL HISTORY MUSEUM, Vienna—Annals of, Nos 1 and 2.</p> <p>JAS E. BRIGGS —New England Reported.</p> <p>ESSEX INSTITUTE, Salem.—Bulletin Nos. 4, 5, 6, 7, 8, 10, 11 and 12; November—Nos 1, 2, 3, 4, 5 and 6.</p> <p>CANADIAN INSTITUTE, Toronto.—Proceedings, vol. II., No. 4</p> <p>PEABODY MUSEUM, Cambridge.—Report, vol. III., Nos. 5 and 6.</p> <p>UNITED STATES DEPARTMENT OF AGRICULTURE.—Third Re- port on American Cereals.</p> <p>ACADEMY OF NATURAL SCIENCES, Philadelphia.—Proceedings, Part I., Jan. to March, 1886; December, Part II.</p> <p>NOVA SCOTIAN INSTITUTE OF NATURAL SCIENCE.—Proceedings.</p> <p>COLORADO SCIENTIFIC SOCIETY, Denver.—Proceedings.</p> <p>I. ALLAN JACK.—Letters on Elements of Botany.</p>
Nov.	D. McL. SMITH, Philadelphia.—Lincoln's Lectures on Botany.
Dec.	G. F. MATTHEW.—Pamphlets on the Cambrian Fauna of Scandenavia.

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