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OF THE

NATURAL HISTORY SOCIETY

OF

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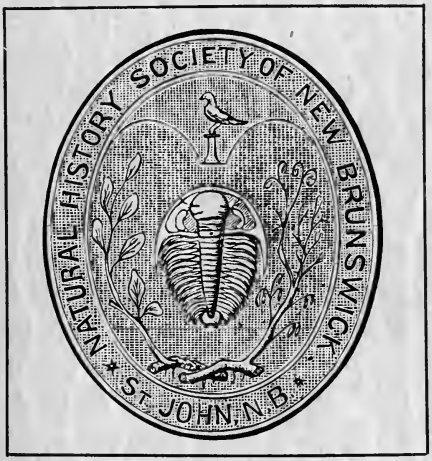

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ARTICLE I.

NEW SPECIES OF CAMBRIAN FOSSILS FROM CAPE BRETON.

By G. F. Matthew, LL. D., F. R. S. C.

(Read October 2, 1900.)

While engaged in the study of the Cambrian formation of Cape Breton, and in collecting fossils from this terrane in the summer of 1899, the writer met with some new species; these are of interest to the biologist as showing mutations of forms described from other areas, or as carrying previously known genera to lower horizons.

The Director of the Canadian Geological Survey, Dr. G M. Dawson, C. M. G., has kindly allowed the writer to publish these species in advance of a report on the work in Cape Breton.

The lower and middle zones of the Cambrian in Cape Breton are comparatively barren of fossils, and the species herein described are chiefly from the upper zones. They consist of Brachiopods of the orders Atremata and Protremata, with some few Trilobites. Other fossils were collected, but as they are of species already described, they are not included in this article.

Though the fossils herein described are referred to the three several zones of Parabolina, Peltura and Dictyonema, all in the Bretonian Division of the Cambrian, there is some uncertainty as to the references of the species *Lingula lens*, n. sp., to the Parabolina Zone. The exposures are very limited where this fossil occurs, and its position is fixed by the occurrence of a Peltura limestone band a little way above it. The fossil occurs in beds which are strongly ripple-marked, filled with worm burrows, and bear other marks of shallow-water deposition. Further observations, however, may show that these ripple-marked beds are within the Peltura Zone.

The band above, of the Peltura Zone (3 *b*), containing the three species of trilobites herein described, does not accord closely in its species with the strata of the same zone as known at St. John, but

the Dictyonema Zone on McLeod Brook, by its fossils, show a close affiliation with the zone 3 *c* at St. John, many species being identical with those of Cape Breton.

The zones of the Cambrian terrane where the fossils described in this article were found are the following: *

	Bretonian Division.		
	Parabolina Zone.	Peltura Zone.	Dictyonema Zone.
Linguella (?) Escasoni		×	
Lingulella concinna			×
Lingula (?) lens	×		
Acrotreta bisecta			×
Schizambon priscus			×
Agnostus trisectus, mut. ponepunctus		×	
Agnostus trisectus, mut. germanus		×	
Sphærophthalmus Fletcheri		×	
Parabolina Dawsoni		×	

DESCRIPTION OF THE SPECIES.

LINGULELLA (?) ESCASONI, n. sp. Pl. V., figs. 1*a–i*.

Corneous, but having a thin outer calcareous layer. The inside of the edges of the valves is flattened.

Ventral valve ovate, pointed at the apex, somewhat elevated from the umbo, along the axial line. *Interior.*—Cardinal area short, traversed by a depressed pedicle groove. The cavity within the umbo has impressions of two small, cardinal muscles, from which radiate two grooves, bordered outside by ridges that separate the lateral muscle scars from the visceral cavity. The print of the central muscle is oval or lenticular and transverse to the axis of the valve; it is divided lengthwise, half way, by a septum; the posterior half of the scar is again divided by a faint ridge at right angles to the septum named The "l" laterals are small triangular imprints in front of the outer part of the central muscles. In some valves the paired scars of the "k" laterals at the middle of the central group are small, and behind them extending toward the umbo is a sharp furrow enclosed between narrow ridges; in others they are wider and the ridges are not preserved. The grooves of the lateral muscles are discernable near the hinge on each side; the transmedian ("i") being external and on the

* A table at the end of this article shows the relation of these zones to the Cambrian succession as a whole.

inner edge of the flattened margin of the valve; the "j" laterals are on the slope of the valve within the flattened margin.

The vascular trunks extend forward in a regular arch from the middle of the valve a little within the flattened margin, which is creased transversely by about a score of closely set parallel grooves. In the anterior third these give place to grooves that are at right angles to the margin; these correspond in course to the faintly impressed sub-parallel grooves that extend from the front margin across the middle of the valve to the visceral callus. Faint traces of branches of the vascular trunks are seen on the slopes of the valves in the anterior half.

The *dorsal valve* is of an oval form. It is strongly arched down in the posterior half, but less so on the anterior slopes. *Interior.*—This shows at the cardinal lines a depression in which are a pair of circular pits, due to the cardinal muscles. Between these pits, on the axial line is a small pit from which two sharp low ridges run forward; at one-third from the back of the valve there is a minute scar between these ridges; and outside of them in the posterior half of the valve are the large oval prints of the central ("h") muscles; these are set somewhat diagonally to the axial line, having the fronts turned outward. At the anterior ends of the median ridges are the small scars of the anterior lateral ("j") muscles. Faint diverging ridges extend from the umbonal cavity toward the lateral margins of the valves; at one-third from the back, partly on and partly outside the ridges are the large but rather faint imprints of the posterior lateral muscles.

This valve, like the ventral, has flattened margins on which are imprinted minute, closely set, transverse grooves.

Sculpture.—The sculpture of the true outer surface of this species is not easily found; it is imprinted on a thin calcareous, fibrous layer, which is usually broken away, revealing the next layer of the shell. The outer layer is traversed transversely by closely set striæ, forming ridges of which there are about nine or ten in the space of a millimetre; some of these ridges have cross striæ at intervals, others anastomose, and all have a roughened surface; the ridges have a waving course over the middle third of the shell, but elsewhere are comparatively straight.

Beneath the outer shell is a corneous layer whose sculpturing conforms to that of the outer layer, but the striæ are wider and the inter-

vening ridges narrowed; this layer has a shining surface. Beneath this is a third layer on which the striæ run in an opposite direction from those of the one above, the sculpturing, especially along the central part of the valve, consisting of striæ radiating from the umbonal region to the front margin; these are crossed at intervals by undulations of growth concentric to the umbo; on the inside of this layer are impressed the surface markings of the interior of the valves.

Size.—Length, 5 to $5\frac{1}{2}$ mm.; breadth, 4 to 5 mm.; depth of each valve, about 1 mm. The ventral is about $\frac{1}{2}$ mm. longer than the dorsal. One dorsal has a length of 6 mm.

Horizon and locality.—In calcareous sandy layers with the Peltura fauna at McAdam shore, Escasonie, Cape Breton. This species was not found *in situ*, but in loose pieces of thin flag in the shingle of the shore where the trilobites occur; these pieces were very little worn, and therefore near or at the parent ledge. This species may be referred to the Peltura zone (3*b*).

This species is referred doubtfully to Lingulella as it has some characters of other genera. The weak cardinal development is like Leptobolus; as is the long lateral ridges and advanced ("j") laterals of dorsal valve. The spreading vascular trunks of the ventral valve are like Leptobolus and Obolus, as also the advanced "j" lateral. On the other hand the thick shell is quite unlike Leptobolus, but common in Obolus and Lingulella.

This pretty little species is easily recognized by its peculiar transverse sculpture. *Lingula teneola*, Hall, has a similar transverse ornamentation, but it is much larger, and flourished at a later period (Clinton group).†

Lingulella Ella, H. and W., has a somewhat similar sculpture, but is distinguished by its greater size, and the closer approximation of the vascular trunks of the ventral valve.

It is only in a few valves out of many that we find distinct muscle scars, enabling us to compare the species with others. Michwitz has determined that the exterior half of the great central muscle in the ventral valve of Obolus represents the "l" lateral of Lingula.* In this relation it is interesting to observe that the great muscle in *L. (?) Escasoni* also has a septum partly dividing it; but there is a separate scar, a small triangular one, at the anterior outer angle of

* Mem. Acad. Imp. des Sci. St. Petersbourg. Series VIII. Tom. IV., No. 2, p. 79.

† N. York State Geologists' Report. Hall & Clarke, 1891, pl. i, fig. 8.

the great muscle, which with more probability may be considered the external lateral or "l" muscle; the large oval muscle would then be the "h" central (with possibly the "k" lateral involved), but it would consist of three main strands; for beside the septum across the middle at the back, the scar is divided by a more obscure transverse ridge parallel to the long diameter of the scar. This muscle then may be compared to those of Lingula, etc., having divisional lines.*

In *O. (L.) cælatus*, Volb., we see an arrangement of muscle scars in the central group of the ventral valves similar to that in *L. (?) Escasoni.*† Here Mr. Walcott interprets the small scar as an external lateral ("l"), but the larger one as a middle lateral ("k"). Volbooth's figure of this species does not show the small scar, but he appears to allude to it in the text where he says that "the several laterals of the ventral valve are not so closely bound together as in the subgenus Euobolus." ‡

LINGULELLA CONCINNA, n. sp. Pl. V, fig. 2*a–b*.

Occurring in the dark gray shales of the Upper Cambrian on McLeod Brook are a few examples of a small Lingulella smoother than a species from the same beds referred provisionally to *L. lepis*, but ornamented, as that species is by concentric ridges.

The shell substance is quite thin towards the lateral and front margins, and is then flattened out by pressure. The beak is somewhat blunt, and the rounded lateral margins give the ventral valve an ovate form.

Sculpture.—Over the visceral space the surface of the valves is covered with very fine concentric somewhat lamellose ridges, visible with a lense; over the branchial area these ridges flatten down, and the valve has a shining granular surface; the ridges, however, remain distinct on the lateral margins, though there also the surface is bright.

Size.—Length of the ventral valve, 8 mm.; width, 6 mm. The dorsal valve is nearly 1 mm. shorter than the ventral.

Horizon and locality.—In the fine dark grey shales of Div. 3*c*, at McLeod Brook, Boisdale, N. B. Scarce.

*Introduction to study of Brachiopoda, Hall & Clarke. p. 229; fig. 23, and pl. 2, fig. 5.

† U. S. Nat. Mus. Proc. Vol. XXI., p, 385, Pl. xxvi., fig. 1.

‡ Imp. Acad. des. Sci., St Petersbourg. Ser. VIII., Tom. iv., No. 2. Pl. II., figs. 19*c* and 2 *c*

This species is like *L. bellus*, Walcott, in form, but is smaller; also the growth lines are finer and more sharply defined on the surface of the shell. It is proportionately a wider species than *L. Billingsiana*, Whiteaves.

LINGULA (?) LENS, n. sp. Pl. V, figs. 3*a–h*.

Shell substance calcareo-corneous. A broadly ovate species, with rather thin, smooth valves, having flattened lateral slopes in the ventral valve, and being somewhat tumid toward the umbo in the dorsal valve.

Ventral valves rather blunt at the umbo, whence for about one-third of its length the curve of the margin is somewhat straightened, for the rest of the border it is regularly rounded to the front; the greatest width is a little in front of the mid-length. The umbonal ridge extends about half of the length of the valve, whence to the hinge the sides of the valve are flattened; in front of the middle of the valve the slopes are evenly but flatly arched down to the margin. *Interior.*—The position of the central group of muscles is within the posterior third of the valve, and the position of the laterals is indicated by a bounding ridge; these features are very faintly marked.

The *dorsal valve* is broadly ovate, and its slopes are more strongly arched in the posterior half than elsewhere, otherwise it is like the ventral. *Interior.*—This has a sharp, low septem for half its length, and on each side a parallel ridge, extending to the middle of the valve; at half the length of these ridges are small lenticular scars, and at their outer ends the group of central muscles. The lateral muscles form a wide arch at the sides of the valves, opposite the middle of the median ridges.

Sculpture.—The outer (calcareous) crust in this species is normally smooth in appearance, but is beset with minute pits. The sculpturing of the layer beneath has impressed itself on the outer layer in different parts of the surface; at the sides and in front we find concentric ridges, and in the middle third the imprint of the vascular striæ that run toward the front margin. These markings are much more distinctly shown on the next (corneous) layer.

Size.—Length of the ventral valve, 15 mm.; width, 13 mm. The dorsal valve is 1 mm. shorter than the ventral.

Horizon and locality.—Thin calcareous layers in the flags of Div. 3*a* at McAdam shore, Escasonie, Cape Breton. The shells in these

layers are freely intermingled with small lumps and particles of calcium phosphate. The phosphate lumps are frequently moulded on the shells, or entirely enclose them; though some shells are enclosed in the phosphate, others are free, and with fragmentary shells are mingled with the sand. Other masses of the phosphate are entirely free of the shells, and are smooth and shining, as though rolled on the beach; yet the flat, oval, or rod-like pieces of the phosphate seem the natural form which the substance assumed when in a gelatinous condition. Probably the formation of the phosphate was co-temporary with the entombment of the shells.

It seems doubtful if this species was at all near the recent Lingula in structure, yet it appears to be no nearer to Lingulella or Obolus; it is therefore left provisionally in the first named genus.

In its outline it is like *L. Covingtonensis*, H. & W., of the Lorraine Shales of Ohio.*

ACROTRETA BISECTA, n. sp. Pl. V, figs. 5*a–g*.

Shell substance thin, calcareo-corneous. Outline of the valves, oblately circular.

Ventral valve elevated conical. Height about one-quarter less than the width. The umbo is about a quarter of the length of the valve from the posterior margin. The valve is somewhat flattened on the posterior slope at the cardinal area, which is nearly as long as half the width of the valve, and has a deltidial area, bounded by distinct furrows; elsewhere the valve slopes regularly to the margin. *Interior.*—The mould is always truncated and has a somewhat convex summit; in some examples there are traces of one or two diaphragms extending across or over this part of the valve, from the anterior slope. A crescent-like ridge extends around the back of the summit of the mould and down the lateral slopes. Towards the front of the valve a pair of low ridges radiate toward the front of the mould, but fade out at one-quarter from the anterior margin.

The *dorsal valve* is most convex at the back, where the slope is nearly vertical; it has a long flattened slope to the front. *Interior.*—The mould of this species is marked by a long, deep, narrow furrow (indicating a strong mesian ridge); this is somewhat broader in the anterior third than elsewhere; the mould also has two pairs of pits

* N. York State Geologist's Report, 1891, Hall & Clarke, pl. i, fig 7.

near this furrow, which perhaps indicate the position of the central muscles; the posterior adductors are indicated by bosses on the mould near the cardinal line, and the lateral muscles by depressions near the ends of the cardinal area. Fine radiating vascular lines are visible in the front half of the valve on each side of the median ridge. In young valves this ridge is only two-thirds of the length of that in the adult valve, the anterior third being smooth.

Sculpture.—The surface is marked by minute concentric beaded ridges, visible only with a strong lens; there are stronger growth lines at intervals.

Size.—Length, 3 mm. Width, $3\frac{1}{4}$ mm. Height of the ventral valve, one-fifth to one-quarter less.

Horizon and locality.—The fine dark grey shales of the Dictyonema beds (C. 3*c*) at McLeod Brook, Cape Breton.

On re-examining the specimens from this horizon at Navy Island, St. John, N. B., which I had compared with *A. Baileyi*, of the Paradoxides beds, I find it is identical with the species from McLeod brook. It is distinguished from *A. Baileyi* by the long, sharp median ridge of the dorsal valve; the convex summit of the mould of the ventral valve also distinguishes it from that species, in which the summit is concave, and proportionately smaller.

From *A. socialis*, Von Seebeck,* this species is distinguished by its somewhat larger size, and by the absence of the sharp wedge-shaped furrow in the top of the mould of the ventral valve; also by the absence of the strong lateral furrows in the mould of the dorsal valve of that species; also by the deeper and longer mesian furrow of the dorsal valve of the McLeod brook species.

From *A. gemma*, Walcott,† this species is distinct by the convex top of the mould of the ventral valve, by the absence of an area to the dorsal valve, and the enlarged posterior end of the median ridge in this valve.

From *A. gemmula*‡ this species is distinct by its larger size, convex summit of the ventral mould; and by the smaller scars of the posterior adductors and sharper and longer median ridge of the dorsal valve.

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* Brachiopoda of the Paradoxides beds of Sweden. G. Linnarsson Stockholm, 1876, p. 16 pl. iii, figs. 32-35.

† U. S. Geol Surv. Bull., No. 30. p. 98, pl. viii, figs. 1*a-b*.

‡ Roy. Soc. Can. Trans., vol xi, sec. iv, p. 87, pl xvi, fig. 2*a-d*.

SCHIZAMBON PRISCUS, n. sp. Pl. V., figs. 4*a–d*.

Shell substance firm, corneous (or calcareo-corneous ?). Outline orbicular, and valves lenticular and of moderate depth.

Ventral valve with a rounded umbo, the greatest depth in front of the umbo, about two-thirds from the front. About one-sixth or one-eighth from the posterior margin, the valve is perforated by an oval foramen, in front of which two narrow diverging ridges run forward to the front of the valve, where they are about as far apart as one-quarter of the length of the valve. There is considerable variation in the size and position of the foramen in the examples collected. *Interior.*—The foraminal passage is smaller within than at the outer surface of the shell, and is surrounded by a raised rim; from it two thread-like grooves run forward into the front of the umbonal cavity. (The ridges that run forward from the foramen on the outer surface of the shell are preserved as grooves on its inner surface.) The visceral callus, of a lenticular outline extends about half as far in front of the foramen as that is from the posterior margin; it is crossed by two faint diverging ridges on each side, and is bordered by two lateral stronger ridges, widely diverging, that mark the position of the lateral muscles; the length of these ridges is about one-third of that of the shell. Faint traces of vascular trunks are found in the lateral and posterior part of the shell and make a regular arch about one-sixth of the length of the shell, from its margin. The margin is flattened especially in the posterior half, toward the umbo.

The *dorsal valve* is flatter than the ventral, and its umbo somewhat removed from the posterior margin. The central part of the valve has a flattened triangular space extending back towards the umbo; as the lateral margins are flattened in the posterior half a low flattened ridge extends out on each side from the umbo to the mid-length of the valve. *Interior.*—This shows a broad flattened mesian ridge extending half way across the valve from the posterior margin, on each side of this about one-third from the back of the valve, and nearly that far apart, are obscure oval marks, probably indicating the position of the anterior adductor muscles. The margins of the valve are flattened behind. *Sculpture.*—This consists of sharply defined but very minute, concentric and radiating ridges that form a delicate cancellated pattern; on the highest part of the shell the concentric ridges are most distinct,

on the front part, the radiating ridges. No cicatrix marking the advance of the foramen was observed, but a progressive change of this kind is probably indicated by the paired thread-like ridges behind the foramen on the interior of the ventral valve.

Size.—Length and width each 4 mm. Depth about $\frac{2}{3}$ of a millimetre, that of the dorsal valve less.

Horizon and locality.—Fine dark grey shales of the Dictyonema beds (C. 3*c*) at McLeod Brook, Cape Breton.

This pretty little species is the smallest and oldest known of its genus. Mr. Walcott indicates for *S. typicalis* a calcareo-corneous shell, but while there may be an outer calcareous layer to *S. priscus*, it has not been detected.* From the former species which is Ordovician, it differs not only in its small size, but its orbicular form ; it differs also in having radiating as well as concentric striæ on the outer surface. It is much smaller than Dr. Ami's *S. canadensis* of the Utica shale.

In one example of the ventral in this species the foramen is in the umbo, but in the others it is in front of it. The ring around the inside of the foraminal opening is never prolonged into a tube as in Siphonotreta.

In re-examining the material from this horizon at Navy Island, St. John, I find that this species is present there also, but the surface markings are not well preserved ; however the form and size of the shell, and the foraminal opening, show it to be the same species.

AGNOSTUS TRISECTUS, Salt, mut. PONEPUNCTUS, n. mut. Pl. V, figs. 8*a-c*.

This form grows to a larger size than the type as figured by Tullberg, and differs in several respects. The reticulation on the head shield does not show a net-work near the glabella, but detached irregular furrows; opposite the posterior half of the glabella the ornamentation is scarcely more than small, sparse, irregular pits. The posterior end of the glabella is wider than that of the European form, and there are lateral lobes on the front of the main lobe.

In the pygidium there are also differences ; the sculpturing of the side-lobes is scarcely more than shallow, open pits, faintly visible, and there is a small tubercle at the end of the rachis, which overhangs the rachial furrow. Examples of the pygidium showing the inner surface have as many as nine paired pits along the inner furrow of posterio

* U. S. Geol. Surv., Monog. viii, p 70, pl. i, figs. 3, 3*a* to *c*.

lobe of the rachis, showing that that lobe is composed of numerous somites.

Size.—The shields of this mutation of *A. trisectus* attain a length of 8 mm.

Horizon and locality.—In bitumenous limestone bed at McAdam shore, Escasonie, Cape Breton. Band, 3*b*, Cambrian.

A singular condition of preservation of the test of this species is the rarity of remains of the thorax. Among two dozen heads and three dozen tails of this species, only one joint of the thorax was observed.

Larval characters.—The reticulation or furrowing of the cheeks, which is so obvious a character of adult head-shields, becomes less and less pronounced in the small heads, and disappear in minute ones. Faint furrows are impressed at the sides of the main lobe of the glabella, opposite the median tubercle, showing a somite here to which this tubercle belongs; the examples are $1\frac{1}{2}$ mm. long, in which this is apparent.

A pygidium $\frac{3}{4}$ mm. long shows a comparatively short rachis of two segments, of which the anterior is dominated by a low ridge-like tubercle; no true anterior lobe, such as is found in adult shields, can be detected at this stage. The posterior lobe, by faint tubercles at the sides, is shown to be composed of at least two somites, yet the trisected condition of the rachis is already apparent.

Mut. GERMANUS, n. mut.

This interesting form has many points of resemblance to *A. trisectus*, and is of nearly the same size, but yet is not trisected on the posterior lobe of the rachis of the pygidium. This form and mut. *ponepunctus* sometimes occur scattered over the same surface of rock, but more frequently are distributed on different surfaces. The smoothness of the slopes of the shields and the absence of trisection in the posterior lobe might lead one to think it a different species from mut. *ponepunctus* and from *A. trisectus*, type, but the tubercle at the end of the rachis of the pygidium, peculiar so far as the author knows to the Cape Breton forms, leads one to think they belong to one species.

Since writing the above I have received a letter from Prof. J. E. Marr, of St. John's College, Cambridge, who has had the examples of *A. trisectus* in the Woodwardian Museum examined, and also those of

the Geological Museum in Jermyn street, London; on none of these is there any trace of a tubercle at the extremity of the mid-lobe of the pygidium. This indicates a closer relationship between the two Canadian forms than is borne by either of them to the type, though the apparent difference seems to be greater; it appears also to show that the American mutations arose independently from the Longifront phylum. The indication is similar to that given by the development of *Anomocare stenotoides* from the Olenoid phylum, *i. e.*, a tendency to the independent development of similar forms at particular stages in geological history.*

The differences from *A. trisectus-ponepunctus*, are the following: The head shield is more strongly arched, stiffer and smoother; the pygidium is *not* trisected on the posterior lobe of the rachis, though faint furrows may sometimes be traced on one side or the other. It differs from the European type of *trisectus*, in that the median lobe traverses the middle part of the two anterior segments, thus interrupting the dividing furrow between these segments, and it differs also in its smooth, stiff shields.

This mutation shows a considerable resemblance to *A. princeps*, Salt † But Salter is emphatic in stating that there are no marginal spines to his species (nevertheless two of his figures show such spines, perhaps these are two species included under *A. princeps*). The figure of Salter's species which comes nearest ours is 1*b* of plate 5, but in that the tubercle on the glabella is represented as elongated and resting on the middle of the main lobe, while in the Cape Breton form it belongs entirely to the anterior segment or somite of the main lobe.

SPHÆROPHTHALMUS FLETCHERI, n. sp. Pl. V, figs. 7*a–f*.

General outline of the *middle piece of the head shield*, square, with a large, nearly cylindrical, glabella, which in front overhangs the narrow marginal fold. The glabella has a width two-thirds of that of the glabella and occipital ring together. A strong furrow divides off the posterior third of the glabella. The occipital ring is narrower than this lobe of the glabella, and bears a tubercle at the middle.

The fixed cheek is much drawn in behind and then arches downward and outward to the posterior margin. The front of the cheek is tumid and traversed by an ocular fillet directed diagonally backward.

* See Trans Roy. Soc. Can., vol. iv, sec. iv. pp. 140–148.

† Mem. Geol. Surv. G. Britain, vol. iii, p. 488, pl. 4, figs. 2 and 11*a*, and pl. 5, figs. 1*a* and *b*.

To the *movable cheek* is attached the large globular eye, placed near the back of the cheek, the cheek is prolonged outward into a flat spine of abnormal size; this spine is not narrower in the front quarter than the cheek itself, and curves backward in a regular arch at first, but toward the extremity becomes nearly straight.

Of the two ribs which traverse it, one is an extension of the posterior marginal fold, and the other is a prolongation of the elevated middle part of the cheek. The flattened area on each side of the spine is a special expansion of the anterior and posterior marginal folds, and towards the tip of the spine, narrows more rapidly than the area occupied by the ribs; of the flat areas, the outer is hollowed on the upper side, and the inner one somewhat convex, especially toward the base of the spine.

A young *hypostome*, imperfect at the front, which may belong to this species, has a narrow, elevated obconical anterior lobe extending two-thirds of its length; and an encircling, more depressed posterior lobe, occupying the rest of the hypostome; both lobes are convex, and no border fold is visible.

The *pygidium* of this species is broadly triangular, and has a strong obconical rachis of three segments, the third nearly as long as the two anterior. These latter have each an obscure lobe at the sides. The side lobes are narrow triangles, with a tubercle at the anterior outer corner. There is a distinct but narrow border fold at the sides and posterior end of the pygidium.

Sculpture.—This is exceedingly minute and appears to consist of very fine granulations, with a smooth, shining surface on the front lobe of the glabella; this part of the glabella shows occasional scattered small tubercles.

Size.— Length of the middle piece of the head shield 3 mm. width, 5 mm. Length of the movable cheek, 3 mm.; width, exclusive of the genal spine, $2\frac{1}{2}$ mm. Width of the genal spine, $2\frac{1}{2}$ mm.; length, 25 mm. Length of the pygidium, $1\frac{1}{2}$ mm.; width, 2 mm. Length of a young hypostome, $1\frac{1}{2}$ mm.; width, 1 mm.

Locality and horizon.—Limestone bed in Div. 3*b* at McAdam's shore, Escasonie, C. Breton.

This form is distinguished from the mutation *Canadensis* of *S. alatus*, found in the upper Cambrian shales at St. John,* by its long,

* Roy. Soc. Can. Trans, vol. xi, sec. iv, p. 107, pl xvii, figs. 11*a* and *b* an l 12*a* and *b*.

flat and very wide, falcate genal spine. It agrees nearly with a spine and free cheek figured by Linnarsson, but not referred to any species.* The cheek portion of *S. Fletcheri* is very small compared with the spine, which is stiffened by the two sharp ridges that run along the middle; these ridges occupy about a third of the width of the spine, the rest being flat.

The flatness and great width of the spine is one of the most obvious points in which this species differs from mut. *Canadensis* and from the type of *S. alatus*.

The pygidium of this species differs from that of the type of *S. alatus* as figured by Linnarsson in the possession of narrow side lobes (about as wide as the marginal fold); that author's figure gives no side lobes, the marginal fold being in contact with the rachis.†

For numbers this is the dominant species in the trilobite bed at McAdam shore, as will be seen by the following proportion of forms found on five square inches of surface of one of the layers.

Sphærophthalmus Fletcheri,	30 hds.	24 chks.
Agnostus trisectus, chiefly the mut. ponepunctus,	9 "	1 pl. 6 pyg.
Ctenopyge pecten,	8 "	3 chks.
Peltura scarabeoides,	1 "	4 pl. 1 pyg.
Parabolina Dawsoni,	1 "	

All the heads of Sphærophthalmus were not counted; several were so small that the generic characters were not well shown.

PARABOLINA DAWSONI, n. sp. Pl. V, figs. 6*a–f*.

The *middle piece* of the *head shield* is sub-trapezoidal in form, is strongly arched in front, where there is a narrow but prominent marginal fold, and has triangular projecting posterior angles. The glabella is cylindro-conical in outline, and is as broad as its length and half of the width of the occipital ring; it is as broad opposite the first furrow as at the occipital ring, and thence narrow more rapidly to the front, which is strongly arched; the front margin is correspondingly arched, and the intervening area of the fixed cheek is therefore of nearly even breadth around the front of the glabella; the width of this area on the median line is two-ninths of the length of the glabella. The glabella is marked by three pairs of furrows, nearly equi-

* Swedish Geol. Surv., Ser. C., No. 43, p. 26. Pl. 2, fig. 14.
† Sverig. Geolog., Undersokning, ser. c, No. 43, p. 7, tafl. 1, fig. 10.

distant, and having the inner extremities turned backward; the inner half of the posterior furrow is deeply indented, the middle furrow is more evenly impressed, and the anterior furrow is more distinct in the outer half, which is at the anterior corner of the glabella. The occipital ring is of nearly even breath, has a tubercle on the axial line, and has a triangular lobe at each end on the anterior side, due to a faint furrow that crosses the ring diagonally. The fixed cheek is triangular, and at the front of the eyelobe as wide only as two-thirds of the space between the glabellar furrows; the eyelobe is opposite the space between the second and third furrow of the glabella, and there is a short ocular fillet extending diagonally out to it from the anterior corner of the glabella. The posterior marginal furrow and fold are distinctly marked.

The *movable cheek* is more strongly arched in front than behind, and, like the middle piece of the headshield, has a sharp, narrow marginal fold; the area of the cheek is somewhat wider in front than behind, and the proportion in length of the three cords of the facial suture are 1, 1, $2\frac{1}{2}$. There is a narrow, sharp genal spine, of unknown length, projecting backward from the outer angle of the cheek.

The *thorax* has narrow rings with narrow pleuræ, having sharp backward-curved points. The thoracic rings have triangular lobes at the outer ends and a median tubercle, like the occipital ring. The pleuræ have a sharp, oblique furrow, extending to the geniculation.

A *hypostome* supposed to belong to this species has a large, oval anterior lobe, narrower behind; an upturned margin borders it at the sides, but at the back is broken away.

The *pygidium* has two well marked rings to the rachis, each surmounted by a tubercle, and a posterior lobe which is obscurely divided into two somites. The side lobes have two faintly marked ribs with diagonal grooves, and the borders of the side lobes are flattened. A small backward, outward projecting spine is placed at the anterior corner, on each side.

Sculpture.—The area in front of the glabella is ornamented with forking and anastomosing raised lines, radiating toward the anterior margin. The glabella appears smooth, but under a strong lens is seen to be minutely punctate, or even obscurely reticulate with raised lines. The movable cheek, like the area in front of the glabella, is ornamented with distinct raised lines, giving a reticulate surface; toward the marginal fold these lines are forked and directed outwards

The reticulation of raised lines is more distinct on the interior than on the exterior surface of the test. A similar but faint reticulation is visible on the front half of the fixed cheek. The surface of the glabella, seeming smooth, when viewed with a lens appears to be faintly marked with scattered pits or depressions. The front and lateral marginal fold of the head-shield, when viewed with a strong lens, is seen to be minutely striate lengthwise of the fold.

Size.—The head-shield figured is not the full size of this species, for some pleuræ shows that it grows to a size one-quarter longer.

This species is closely allied to *P. acanthura*, Ang.,* from which it differs in the following respects: The area in front of the glabella is wider and more strongly arched, and the fixed cheek is more pointed at the posterior outer angle. In the free cheek the rim is more strongly arched in front, and has less width behind. The joints of the thorax have tubercles, or, in some cases, spines on the rings. The pygidium has a median tubercle on each of the first two joints, and the marginal spines of which only one pair is known, are directed outward rather than backward. In other respects the two species, in so far as comparisons can be made with the imperfect material obtained, are much alike.

This species is distinguished from *Protopeltura acanthura*, var. *tetracanthura*,† by the broad area in front of the glabella, and by its broader pygidium with fewer joints. From *Parabolina heres*, var. *lata*,‡ it differs in the arched anterior border fold, and narrow fixed cheek. From *P. heres*, as depicted by Brogger, it differs in its shorter pygidium of fewer joints.†† From *P. acanthura*, as figured by the same author, in its more quadrate glabella, and in the tubercles on the rings of the rachis of the pygidium.‡‡ From *P. heres*, as shown by Moberg and Moller, in the absence of strong reticulation on the surface of the fixed cheek, and the fewer joints in the pygidium.§ From *P. acanthura*, as figured by these authors, in the arched front of the head-shield, and in the presence of tubercles on the rachis of the pygidium.‖

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* Palæontol. Scand., p. 49, pl. xxvi, fig. 9. Also Om Acerocare, Moberg & Möller, Stockholm, 1898, p. 259, tafl. 12, figs 1*a* and 4*a*.

† Roy. Soc. Can., Trans., vol. ix, sec. iv, p. 53, pl. xiii, figs. 8*a–c*.

‡ Roy. Soc. Can., Trans., vol. ix, p. 51, pl. xiii, figs 6*a–f*.

†† Die Silurish. Etag. 2 und 3, p. 101, tab. i, fig. 13*a*.

‡‡ Idem, p. 106, tab. 14, 14*c*.

§ Om. Acerocarezonen, Stockholm, 1898, p. 267, tafl. 12, figs. 8*a*, 11*a*.

‖ Idem, p. 259, tafl 12 figs. 1*a* and 4*a*.

From *Parabolinalla Plantii*, Salter, as figured by F. R. C. Reed, it differs in its arched front margin, broader glabella, differing glabellar furrows, and in possessing pygidial spines.*

If it were not for the pair of marginal spines at the front corner of the pygidium, this species, from the flattened side lobes of the pygidium and other features, would fall under Brogger's sub-genus Parabolinella.†

The following scheme of the succession of faunas of the St. John group in New Brunswick, Canada (amended to include later discoveries), is quoted from Vol. VIII., Sec iv., p. 129 of the Transactions of the Royal Society of Canada, to show the relation of these Cape Breton species to the Cambrian succession as a whole.

ACADIAN DIVISION (1).

Band *a* Fossils unknown.
b Zone of the Protolenus Fauna.
c, *d*, *e* } Three sub-zones of the Paradoxides Fauna.

JOHANNIAN DIVISION (2).

Band *a* No trilobites or brachiopods known from this zone—trails and markings only.
b Zone of Lingulella Starri.
c Zone of L. radula.
This division holds the position of the Olenus Fauna of Europe.

BRETONIAN DIVISION (3).

Band *a* Zone of Parabolina spinulosa.
b " Peltura scarabeoides.
c " Dictyonema flabelliformis.
d " Tetragraptus.
e Zone with small brachiopods of doubtful range.

DESCRIPTION OF THE PLATE.

FIG. 1. *Lingulella (?) Escasoni*, n. sp. —*a* Ventral valve; —*b* Interior of same; —*c* Longitudinal section; —*d* Dorsal valve; —*e* Interior of same; —*f* Longitudinal section all mag. $\frac{6}{1}$; —*g* Group of central muscles of ventral, mag. $\frac{10}{1}$; viz., "h" the main laterals showing the print of three strands of the muscles, "l" the anterior laterals, "k"

* Geol. Mag. New Ser., Dec. iv, vol. vii, p. 303, fig. 1.
† Geol. Mag. London. New Ser. Dec. iv, vol. iii p. 303.

laterals ? v. the heart shaped (lozenge shaped) depression ; —*h* Enlargement of the outer surface, mag. $\frac{20}{1}$; —*i* Sculpture of the second layer of the shell, mag. $\frac{20}{1}$. All from Div. 3*b* Escasonie, Cape Breton, N. S.

Fig. 2. *Lingulella concinna*, n. sp. —*a* The ventral valve ; —*b* Interior of the same, mag. $\frac{3}{1}$. Div. 3*c* McLeod Brook, Boisdale (C. B.), N. S.

Fig. 3. *Lingula (?) lens*, n. sp. —*a* Ventral valve ; —*b* Interior of same ; —*c* Longitudinal section ; —*d* Dorsal valve ; —*e* Interior of same ; —*f* Longitudinal section ; all mag. $\frac{2}{1}$; —*g* Sculpture at the margin of the valve, mag. $\frac{5}{1}$; —*h* Surface at the middle of the valve, mag. $\frac{5}{1}$. All from Div. 3*a* Escasonie (C. B.), N. S.

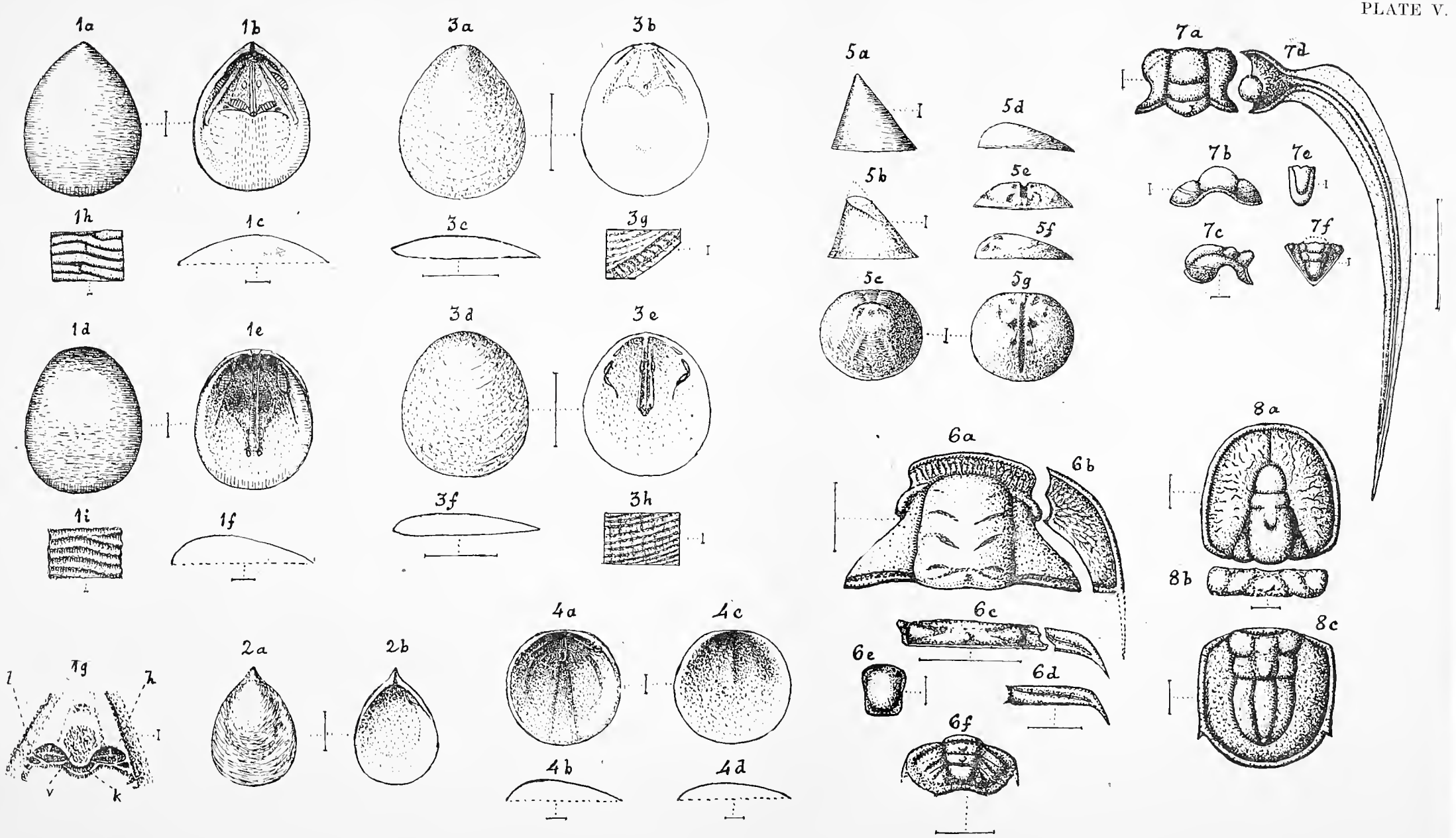
Fig. 4. *Schizambon priscus*, n. sp. —*a* Interior of the ventral valve; —*b* Longitudinal section ; —*c* Interior of the dorsal valve; —*d* Longitudinal section ; all mag. $\frac{6}{1}$, and from Div. 3*c* McLeod Brook, Boisdale, (C. B.), N. S.

Fig. 5. *Acrotreta bisecta*, n. sp. —*a* Ventral valve, side view ; —*b* Mould of interior of this valve ; —*c* Mould seen from above; —*d* Dorsal valve; —*e* Mould of the interior of the same seen from behind ; —*f* Same seen from the side ; —*g* Same seen from above ; all mag. $\frac{6}{1}$, and from Div. 3*c* McLeod Brook, Boisdale, (C. B.), N. S.

Fig. 6. *Parabolina Dawsoni*, n. sp. —*a* Middle piece of the head-shield ; —*b* Movable cheek ; —*c* An anterior joint of the thorax ; —*d* A pleura from the middle of the thorax ; —*e* Hypostome of a young individual ; *f*—Pygidium ; all mag. $\frac{2}{1}$, and from Div. 3*b* Escasonie, (C. B.), N. S.

Fig. 7. *Sphærophthalmus Fletcheri*, n. sp. —*a* Middle piece of the head-shield; —*b* Same seen from the front; —*c* Same seen from the side; —*d* Movable cheek ; all mag. $\frac{4}{1}$; —*e* Hypostome ; —*f* Pygidium ; both mag. $\frac{6}{1}$. All from Div. 3*b* Escasonie, (C. B.), N. S.

Fig. 8. *Agnostus trisectus*, mut. *ponepunctus*. n. mut. —*a* Head-shield ; —*b* A joint of the thorax ; —*c* Pygidium ; all mag. $\frac{4}{1}$, and from Div. 3*b* Escasonie, (C. B.), N. S.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ARTICLE II.

NOTES ON THE ARCHÆOLOGY OF NEW BRUNSWICK.

By Samuel W. Kain.

(Read December 4, 1900.)

These notes on the archæology of New Brunswick have been written for the information of the members of this society. Elsewhere much attention is being paid to this subject, and it behooves us not to lag too far behind our co-workers in other parts of Canada. I would have preferred that this work had fallen into abler hands, but such as it is, I think it will not be without interest.

The drawings from which the illustrations have been made were executed by Miss Jack, Wm. McIntosh and Charles F. B. Rowe. My thanks are due to them, and also to a number of others who have aided me with suggestions and information. I am in hopes that the publication of these notes will lead to an increased interest among our members in the collection and study of such remains of the aborigines as may be found in our province. The number of such objects now in museums is very small, and there can be no doubt that a diligent search by students would be amply rewarded.

Stone with Conical Holes.

The block of coarse sandstone (pl. vi) containing curious conical holes was found with a few others like it, in the summer of 1899, by Mr. Duncan London, at Ring Island, south-west side of Maquapit Lake, Queens Co., N. B.

It is rudely rectangular in shape, its greatest width being $8\frac{1}{4}$ inches, and its greatest length 11 inches. The block has an average thickness of $2\frac{1}{2}$ inches, and weighs $10\frac{1}{2}$ pounds. The name "cup stones" has been applied to stones with these cavities, and they are remarkable in that they are found in many parts of the world. In some parts of Europe they occur upon the megalithic monuments, and are often polished smooth. The cavities have been roughly made

by pecking, and occur only on one side. This specimen has on its surface 26 of these conical holes. These range in size from $1\frac{1}{8}$ of an inch in diameter, by $\frac{1}{2}$ inch in depth, to a size very much smaller. Though differing in size the holes are all similar, and apparently have been produced in the same way.

Dr. Rau has published a memoir* on these cavities, and inclines to give them a religious rather than a utilitarian character. It seems

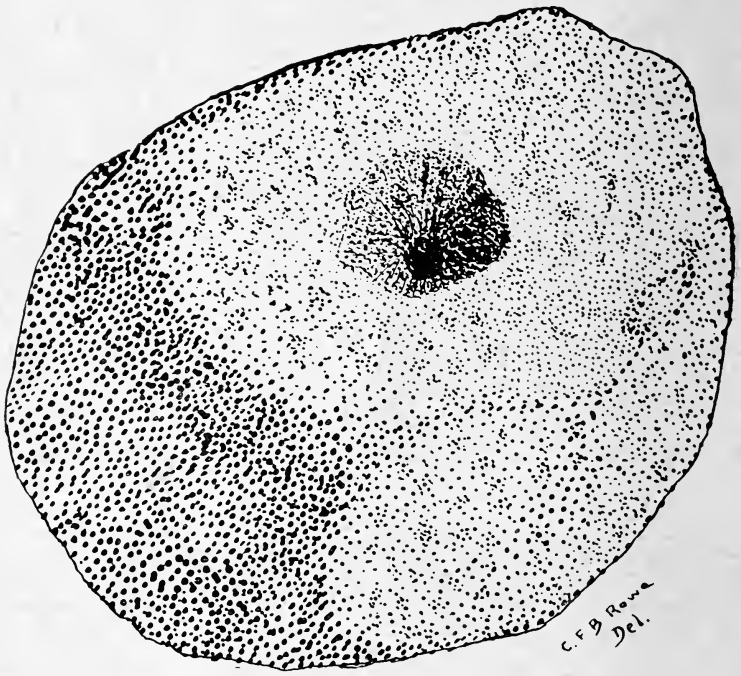

FIG. 1. PITTED STONE. (Natural size).

more probable, however, that they are the accidental product of some ancient manufacturing process. Sir John Evans† thinks that similar stones found in caves of the Reindeer Period of the South of France were probably used as mortars. The specimen I have here figured could have been readily held on the knee by a workman and used for such a purpose.

* Contrib. to North Am. Ethnology, Vol. V.
† Ancient Stone Implements, p. 220.

Dr. G. F. Matthew,* in his account of the excavations made at Bocabec for the study of the kitchen-middens there, states that the chipping of the lance and arrow heads was in some cases performed beside the fire-place, on stones or supports placed near the fire.

Mr. Harry Piers† informs me that no relic like the one here described has yet been found in Nova Scotia.

Pitted Stone.

Fig. 1 (p. 288) represents a roughly rectangular block of fine grained sandstone, with a conical hole pecked in obverse and reverse sides. The stone is about 4 inches long, 3 inches wide and 2 inches thick. It weighs 1 lb. 9 ozs. The pecking seems to have been done with a sharp flint, and the marks of the tool can be plainly seen. The holes are exactly like those referred to in the next preceding note. The depth of the holes is three-eighths of an inch. This stone could have been held with the thumb and forefinger and used as a hammer stone, but it shows no marks of having been used for such a purpose.

It was collected with two similar specimens by Mr. Duncan London on Ring Island, Maquapit Lake, in August, 1899, and by him presented to the Society. I am not aware that anything of this kind has yet been found in other parts of the province.

Grooved Axe.

Among relics of the stone age which have been found in the central part of New Brunswick, stone axes are the most common, and a good many specimens are to be found in collections. In other parts of the province, however, they are more rarely found, and at Bocabec, Dr. Matthew notes a remarkable scarcity of axes.

Dr. R. Nicholson, of Newcastle, has placed in my hands a grooved stone axe (fig. 2) which differs from any axe in our collections in the angular character of the groove and in the form of the head. It was picked up in about three feet of water in the Restigouche River, opposite Dawsonville, in the summer of 1888.

It is 4 inches long, the edge, which measures $2\frac{5}{8}$ inches, is rounded, and the elliptical head has a flat hammer-like surface $2\frac{5}{8}$ inches long

* Bulletin X. of this Society, p 17. † Letter to author.

and $1\frac{1}{2}$ inches wide. It weighs $17\frac{1}{2}$ ounces. The groove of the axe is smooth, except at the edges, and vertical to the shoulder, rectangular in shape and slightly rounded at the corners.

The owner of this implement could use it either as an axe or a hammer. It was produced by natural wear from a fine grained

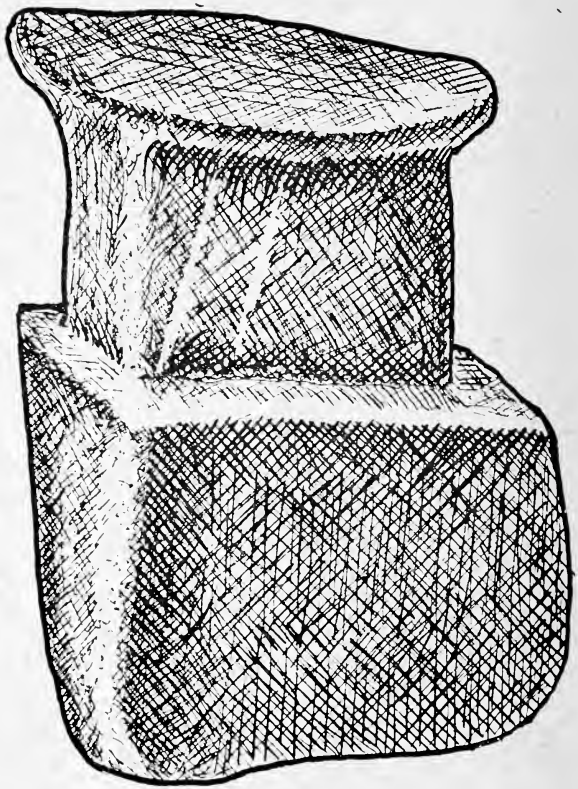

FIG. 2. GROOVED STONE AXE. (Natural size).

argillaceous altered sandstone boulder, which had a band in the upper part more calcareous than the rest.

When exposed to the weather the more calcareous material decomposed and was worn off, thus producing the groove, and in this condition it was found by a man of the stone age. His eye saw that with little labor it could be fashioned to suit his purposes, and when

he had done some pecking to the lower part of the groove, he possessed a finished axe. Thus nearly all the peculiarities of the axe are traceble to natural causes.

The remarkably flat poll of this axe distinguishes it from all other stone axes known to me, and is traceable to the causes referred to above. A number of specimens in our collections show this quickness on the part of the aborigines to pick from boulders forms that with small labor would answer their special purposes.

Pendants.

Different names have been given to the objects shown in plate vii. The terms gorget, tablet, breastplate and pendant, have been used by different writers. It is possible that such stones were worn as charms as well as for purely ornamental purposes.

The material from which the specimen shown in fig. 1, plate vii, has been made is a dark silicious clay slate, through which a thin band of quartz runs a little below the hole. This band of quartz stands out distinctly from the surface of the pendant, and as it must originally have been uniform with the surface it follows that the softer slate has been removed by weathering. This indicates that the specimen is of considerable antiquity, and not a product of more recent times.

The hole, which shows signs of wear, has been bored obliquely, and could have been readily done with a flint or quartz tool. The edges have been gently rounded, and its appearance indicates that it was a weather worn piece of stone, requiring little work to reduce it to the required form. It is 5 inches long, $\frac{1}{4}$ of an inch thick, and measures at its widest part $1\frac{5}{8}$ inches.

It was found in 1899 on a flat near the mouth of Cain's River, Northumberland County. The finder used it for some time as a whetstone, and then gave it to Professor W. F. Ganong.

In the museum of the University of New Brunswick are four pendants in a fragmentary condition, which Professor L. W. Bailey has kindly placed in my hands for description.

The first of these (fig. 2, plate vii) is made from micaceous slate, and shows two perforations. Both holes have been bored somewhat obliquely, but not so much so as in the case of the pendant first described. Two borings were started, but not completed. The borings were made from each side, and in the hole on the right hand

margin the boring was driven from the reverse side to within a short distance of penetration before a boring was started from the other side. In the case of the other hole, the borings meet about midway. The holes shows no signs of wear. The specimen is one-quarter of an inch thick, and was found at Ring Island, Maquapit Lake.

Fig. 3 (plate vii) represents a broken pendant of dark argillaceous slate bevelled so as to make three sides on each face. The central division has, cut into it, an ornamented design of short diagonal lines. The work has been very neatly done, and shows good taste on the part of the artist. The reverse side is not ornamented.

Fig. 4 is another pendant of dark argillaceous slate, and ornamented in the same way as fig. 3, but the diagonal lines are very close together. The object is bevelled so as to have three faces on each side. The ornamented face is one-eighth of an inch wide. Reverse side is not ornamented.

Fig. 5 is part of an ornament of greenish grey slate. It has a very characteristic Indian decoration, and, with the two preceding specimens, was found at Indian Point, on Grand Lake. It is bevelled so as to have three faces on each side, the central face being the widest This specimen is ornamented on all six sides.

Bone Harpoons.

Implements of bone and ivory which have been used by men of the Stone Age are not common in America. This is probably due to the fact that bone is a more perishable article than stone, and, unless protected from the weather, soon decays. In Europe a good many implements of this nature have been found in caves, but in America comparatively little has been done in that interesting field of exploration.

The implements of bone and ivory that have been found in this province have been for the most part recovered from the kitchen-middens of the southern coast, and do not exhibit any great variety. So far as I know, very few implements of bone have been found in the central or eastern parts of the province.

In 1869 Prof. Spencer F. Baird explored shell heaps in Charlotte County, and published,* in 1882, an account of his explorations that

* Proc. U. S. Nat. Museum, 1882, p. 292. He says, "The examinations of the shell beds in New Brunswick and Eastern Maine were made mostly in the summer of 1869."

aroused local interest in this work; and at this time a fine set of harpoons was found on the farm of Joseph A. Simpson, Oak Bay, Charlotte County. These are the property of Miss Vroom, of St. Stephen, and she has very kindly placed them in my hands for study. When found, these implements were neatly stored in a bone case, which was struck and partly split by the ploughshare which turned it up. The case (pl. viii, fig. 1) is a moose bone, which after it had been stripped of its flesh, and the marrow extracted by its aboriginal owner was roughly squared at each end and used as a convenient receptacle for the three harpoons. This case is $7\frac{3}{4}$ inches long, and at its base shows tool marks, indicating a desire on the part of its owner to take off the rough edges. Five lateral cuts, which occur near the base, may have been marks of identity. When found the opening of the case was roughly square-ended, but two triangular pieces have since been broken off.

As I have said, when found, the three harpoons were contained in this case, but in withdrawing them for examination one (pl. viii, fig. 4) was broken, and the larger portion of it has since been lost.

Figs. 2 and 3 (pl. viii) represent the only two perfectly preserved harpoons that have been found in this province, and differ somewhat from others that are known to us.

In the case of fig. 2, we have a well-formed straight implement with eight barbs on one side and a single barb on the other. This harpoon is $6\frac{7}{8}$ inches long, and at its widest part measures half an inch. The barbs are about one-quarter of an inch apart, with the exception of the fourth, which is only one-eighth of an inch above its predecessor.

In fig. 3 we have a simpler implement, six inches long, with a single barb on each side, though not exactly opposite each other. A channel $2\frac{1}{4}$ inches long occurs on the lower part of this harpoon.

Fragmentary remains of harpoons were found by Dr. G. F. Matthew in his excavations at Bocabec, but the specimens found there were barbed only on one side.

These harpoons were employed by the aborigines in the capture of fish, and were probably attached to a wooden shaft. We know from the records of the early explorers that to the natives of the Passamaquoddy region fish were an important article of food, a part of the province where indeed they still abound.

Pipes.

Of aboriginal remains the pipes used by the former inhabitants of this country are among the most interesting objects. On pipes the early races of America placed great store, and much care was given to their manufacture. The pipe had its place at the council, the great feast, and at ceremonial observances of various kinds.

In the United States, and in western Canada, many objects of this kind have been found, and large numbers have been placed in museums. In this province, however, very few pipes have been found. The museums at Washington, Ottawa, Toronto, Fredericton, and Chatham, contain no specimens from New Brunswick. It seems fitting, therefore, to figure and describe the few that have been found within our borders.

Father Pierre Biard, in his Relation of New France* (1616), gives the following reference to the smoking habits of our Indians, as observed by him. He says: "They also use tobacco * * * It is the sole delight of these people when they have some of it, and also certain Frenchmen are so bewitched with it that to inhale its fumes they would sell their shirts. All their talks, treaties, welcomes and endearments, are made under the fumes of this tobacco. They gather round the fire chatting and passing the pipe from hand to hand, enjoying themselves in this way for several hours. Such is their inclination and custom."

I am inclined to think that the use of the pipe had not been long introduced before the arrival of Europeans in this Province. In 1869 Professor Spencer F. Baird† made careful investigation among the shell heaps of some parts of Charlotte County, and he found no remains of pipes.‡ In 1883 Dr. G. F. Matthew,§ assisted by other members of this society, made a thorough investigation of some hut bottoms at an undisturbed Indian village at Bocabec, and he found nothing to indicate that the former inhabitants of this ancient village were smokers.

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* Jesuit Relations and Allied Documents, Vol. iii., p. 117, edition of Burrows Bros. Co., Cleveland, 1897.

† Aboriginal Shell Mounds of New Brunswick and New England. (Proc. U. S. National Museum for 1881, Vol. iv. (1882), pp. 292-297.) New Brunswick shell deposits treated on pp. 292-295.

‡ Letter from U. S. National Museum, February 6, 1900.

§ Bulletin of this Society, X., 1892, pp. 6-29.

Monitor Pipe.—Under the name of "monitor" pipes, Mr. J. D. McGuire has described and figured a style of pipe which has been found in many parts of eastern North America, and also among the aboriginal remains recovered from the mounds.

Fig. 3, plate ix, shows a pipe of this kind now in the collections of this society. It was found in 1897 on a gravel knoll on the farm of Francis Doherty, at New Ireland, Albert county (on the headwaters of the Upper Salmon River). It is made of dark green chlorite and is in a battered condition. Portions of the surface which have not been injured show a high polish and indicate that originally this was a handsome pipe. The bottom of the stem is flat, and at its widest part measures one and a quarter inches, narrowing to seven-eighths of an inch. On top the centre of the stem is marked by a well-defined ridge. The stem hole, one-quarter of an inch in diameter, is smoothly and evenly drilled, and Mr. McGuire considers that in these pipes the drilling has been done with steel tools. The rim of the bowl has been partly broken away; the interior, which is one and seven-sixteenths inches deep and thirteen-sixteenths of an inch in diameter, is elliptical in shape and perfectly smooth. The stem is ornamented with incised lines at right angles to it, and there are indications that the rim of the bowl has been adorned in the same way. The height of rim of bowl above ridge of stem is one and one-eighth inches; length of pipe two and one-quarter inches.

Micmac Pipe—This pipe (fig. 1, pl. ix) was found by one of our corresponding members, Dr. A. C. Smith, in the summer of 1899, at an old Indian camping-ground, on the land opposite South Tracadie Gully. Associated with it were a number of other articles of undoubted aboriginal manufacture, such as stone arrow-heads, spear-heads, etc., an account of which will be published in our next Bulletin.

This pipe is two and one-eighth inches in length, and the material of which it is made is a fine dark slate. It has a thin keel one-sixteenth of an inch in width at bottom, and thickening to one-eighth of an inch at junction with the stem. This keel has seven holes, apparently bored partly from each side, as the holes are largest at the surface and smallest at the centre. The first and second holes are somewhat larger than the others, and the boring has been done while the pipe was held an an angle to the body of the worker. The keel has

been broken away from the bottom of the sixth and seventh holes.

Guire* says that these holes, usually from one to six in number, were for the purpose of attaching tassels and strings to prevent loss in the snow. It is possible, too, that feathers may have been thrust through these holes for ornamental or ceremonial purposes.

Professor Perkins† has described a pipe from the Champlain valley with a perforated keel, but differing in other details from this pipe.

The opening of the stem hole has a diameter of five-sixteenths of an inch, gradually narrowing to about half that size. It was probably drilled evenly at first, and afterwards the opening enlarged by gouging to admit a stem of wood or bone. The bowl is missing, and was probably quite small. The boring connecting with stem hole is three-eighths of an inch in diameter and very evenly drilled. The upper part of the stem on both sides of the bowl shows, on close examination a number of small facets, while the sides are worn and smooth.

This pipe was probably smoked with the aid of a long wooden stem, and from the size of the bowl must have been more for ceremonial use than personal enjoyment.

This is a typical Micmac pipe, and one of the most pronounced types of aboriginal pipes.‡

Stone Pipe Bowl Without Stem.—Some months ago Mr. R. Jardine, a member of this Society, told me that a number of years ago at Sheffield, in Sunbury County, he had seen stone pipe bowls which he thought were of Indian origin. I had therefore thought it probable that specimens would be found. Not long afterward Mr. Archie Hay placed in my hands a stone pipe bowl (fig. 2, pl. ix) only partially completed, and so of very considerable interest. It was found by him on the site of the old Indian village of Meductic, and the material is a light brown argillaceous freestone (sandstone). The block from which it was formed gives evidence of having originally been part of a celt, though the material is not the best for such a purpose. In length it is $1\frac{1}{2}$ inches, in height 2 inches, and $1\frac{1}{4}$ inches wide. It was evidently the intention to reduce the height, but the work was only partially done. The bowl and stem hole have both been roughly

*Am. Aboriginal Pipes and Smoking Customs, 1899, p. 639.
†Pop. Science Monthly, Dec. 1893.
‡Am. Pipes and Smoking Customs, 1899, p. 630.

excavated, and the work on them was never completed. The bowl is so shallow ($\frac{5}{8}$ of an inch deep) that it is possible that part of the top has been broken away. The stem hole is $\frac{5}{16}$ of an inch in diameter narrowing to $\frac{1}{8}$ of an inch.

Unlike many similar stone pipes, this specimen shows no signs of having been made with the aid of metal tools. A flake of quartz or chert would work well on such material, and probably some such implement was used. When completed and ready for use the pipe would have been fitted with a stem of wood or bone.

Iroquois Pipe.—The pipe (Pl. ix, fig. 4) belonging to Professor Bailey is one of great interest. It was found some years ago in the basin below Aroostook Falls, and is in good preservation.

A description was given in a former Bulletin*, but as many copies of that number were issued without plates, I have thought it well to again draw attention to it.

It is a clay pipe, and on the inner side of the bowl, facing the smoker, the aboriginal artist imprinted a human face. It is a well baked piece of pottery, of which the body is dark grey, and rather coarse, and the exterior is covered with a reddish glaze, due to improper firing. A gloss has been produced on this paste, by rubbing, before the baking. In the depressions, however, round the mouth and eyes, there is no gloss, so the shining surface may be partly due to use. The color is reddish brown, but on portions of the bowl and stem dark patches appear. The interior of the bowl shows a fire crack on each side, nearly an inch long, produced in the baking of the pipe. The bowl is thick, and the bore of small capacity—$1\frac{3}{4}$ inches in depth—trumpet shape, and narrowing down from a diameter at rim of $\frac{5}{8}$ of an inch to $\frac{1}{4}$ of an inch where the stem hole enters. The rim is decorated with a lattice work pattern of incised lines about $\frac{1}{8}$ of an inch in length. The ornamentation is nearly obliterated by wear. This pipe clearly belongs to the type which McGuire calls "Iroquoian," from the observed fact that it is the type found distributed over that area of North America formerly inhabited by the northern Iroquoian tribes.

It is well known that the Mohawks were in the habit of making forays into this province, and on such an occasion this pipe may have been lost.

* Bulletin of this Society, No. VI.

Soapstone Pipe.—Figs. 3, 3*a* and 3*b* show side and end views of a dark soapstone pipe, neatly inlaid with lead and tastefully decorated with incised circles, curves, dots and geometric designs. Below the stem hole, near the base, a hole has been bored so that the bowl could be fastened to the stem to avoid loss in the snow. Prof. W. F. Ganong tells me that he has seen in two or three museums in Ontario dark soapstone pipes inlaid with lead in the same way as this specimen, though not of the same pattern. A specimen in the museum of the

Fig. 3. 3*a* 3*b*

Soapstone Pipe, inlaid with lead. (Natural size).

Natural History Society, Montreal, is labelled "Indian pipe, inlaid with bullet metal. Formerly used at the trading forts on the central plains."

This specimen is the property of Dr. I. Allen Jack, who has kindly placed it in my hands for study. It was given to him in 1871 by Mr. Geo. W. Rowley, at that time manager of the Bank of Montreal at Newcastle, N. B. I sent a drawing of this pipe to Mr. David Boyle, curator of the Ontario Archæological Museum, and, in a letter among other things, he says: "As far as I am aware, the specimen you figure is the most easterly find of the kind, and is valuable on that account. As Prof. Ganong's remarks indicate, such specimens

are common in the North West. We have several in our museum, but none having a similar pattern. We have them of soapstone, limestone and catlinite, all inlaid, and all from the North West. It is impossible to say how the pipe could have reached your part of the country; one can only guess. We know that some Indians travelled great distances from their habitat, and in this way the pipe may have come to you, or it may have been brought by some missionary or trader."

Miss Emma Jack has kindly furnished the drawings of this pipe.

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ILLUSTRATIONS.

PLATE VI.

Stone with pecked conical holes. Holes shows a pecked surface, and none of them are smooth, or show concentric striation. Size, $8\frac{1}{2} \times 11 \times 2\frac{1}{2}$.

PLATE VII.

Figure 1. Pendant of dark slate, from Cain's River, Northumberland County. Natural size.

Figure 2. Fragment of pendant or breastplate. Found at Ring Island. Natural size.

Figure 3. Broken pendant from Indian Point, Grand Lake. Natural size.

Figure 4. Ornamented pendant, of dark slate, from Indian Point, Grand Lake. Natural size.

Figure 5. Ornamented pendant, of greenish grey slate, from Indian Point, Grand Lake. Natural size.

PLATE VIII.

Figure 1. Hollow bone, in which the harpoons were encased when found at Oak Bay, Charlotte County.

Figure 2. Barbed bone harpoon, $6\frac{7}{8}$ inches long.

Figure 3. Barbed bone harpoon, 6 inches long.

Figure 4. Fragment of a bone harpoon.

PLATE IX.

Figure 1. Stone pipe of "Micmac" type, from land opposite South Tracadie Gully. Natural size.

Figure 2. Unfinished stone pipe bowl, from Fort Meductic. Natural size.

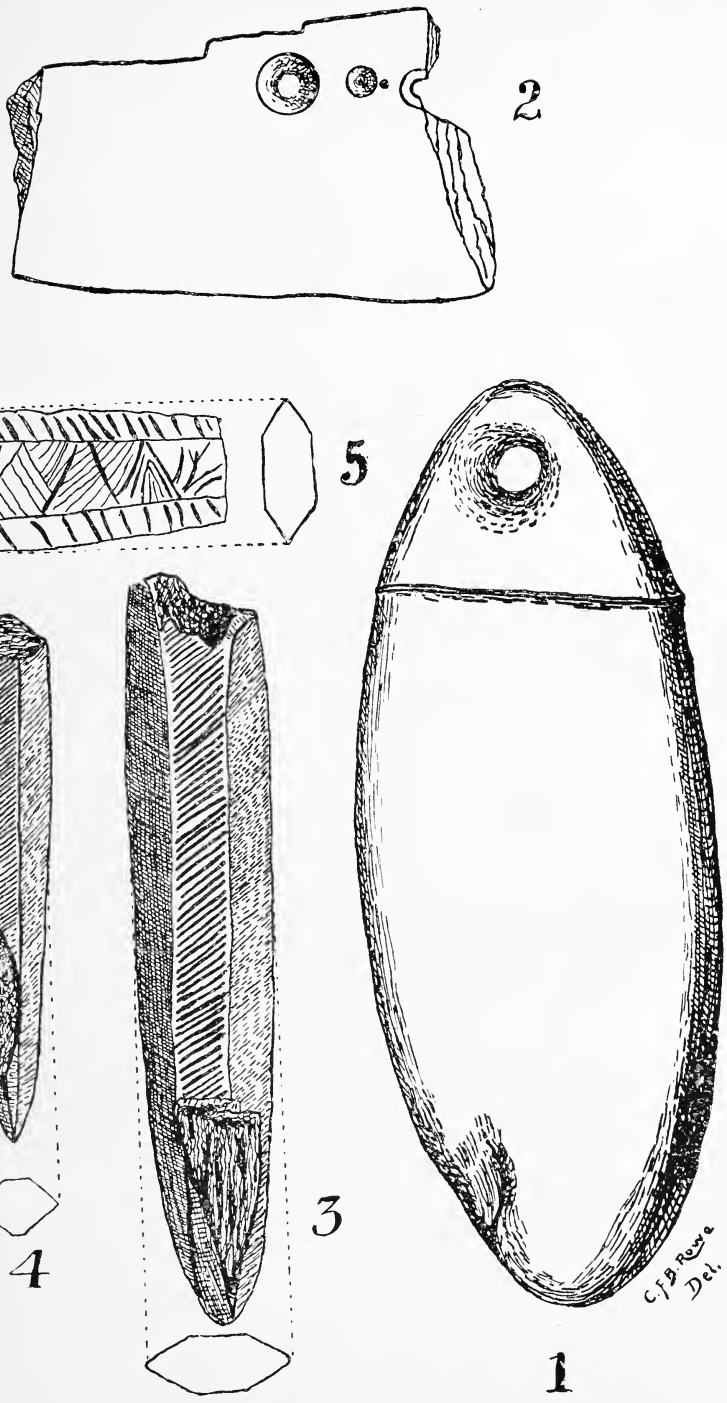
Figure 3, Chlorite pipe, of "monitor" type, from Albert County. Natural size.

Figure 4. Clay pipe, of "Iroquois" type. Natural size.

PLATE VI.

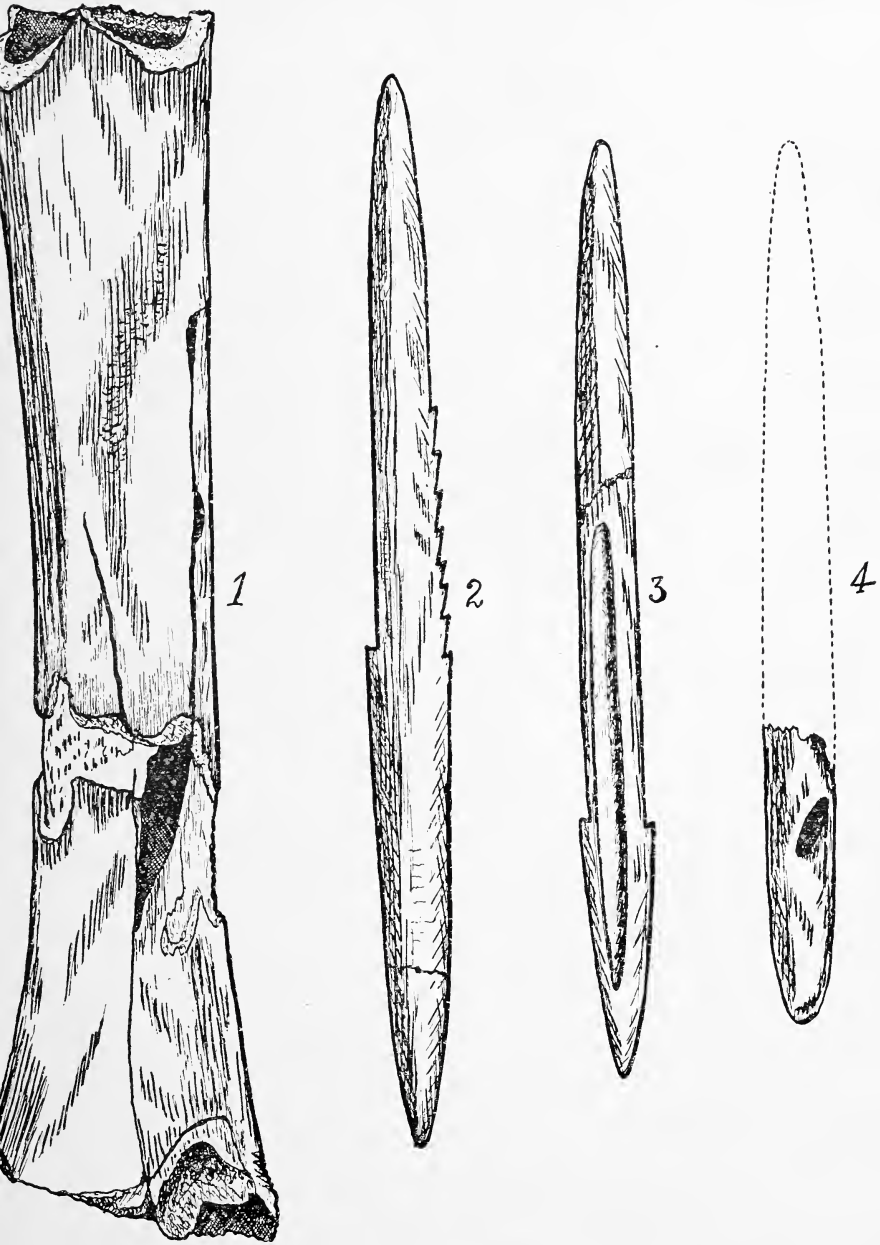
STONE WITH CONICAL HOLES. REDUCED.

PLATE VIII.



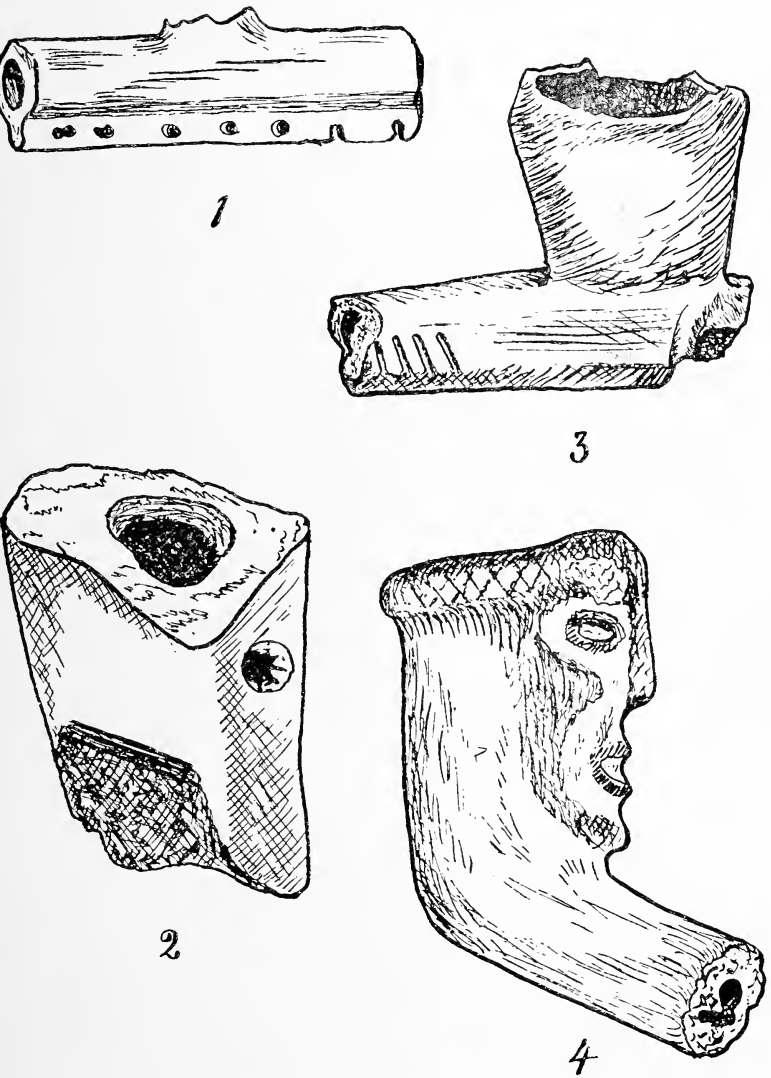
STONE PENDANTS. NATURAL SIZE.

PLATE VII.



Bone Harpoons. Slightly Reduced.

PLATE IX.



INDIAN PIPES. NATURAL SIZE.

ARTICLE III.

THE HAWK AND BOMBYCINE MOTHS OF NEW BRUNSWICK.—INTRODUCTORY LIST.

By William McIntosh.

(Read November 6, 1900)

The present paper constitutes my third article on the Lepidoptera of New Brunswick, and relates to the insects which are known as Hawk and Bombycine Moths.

The list is incomplete, being merely an enumeration of the more prominent species found near St. John.

I desire to express my obligation to Dr. James Fletcher, of Ottawa, and Dr. Herman Strecker, of Reading, Pa, for their determination of doubtful species.

SPHINGIDÆ.

MACROGLOSSINÆ.

Hemaris, *Dalm.*
Diffnis, *Bdv.*
Thysbe, *Fabr.*

CHŒROCAMPINÆ.

Amphion, *Hbn.*
Nessus, *Cram.*
Deilephila, *Ochs.*
Gallii, *Rott.*
Lineata, *Fabr.*
Ampelophaga, *Brem & Gray.*
Choerilus, *Cram.*

SPHINGINÆ.

Protoparce, *Burm.*
Celeus, *Hbn.*
Carolina *Linn.*
Sphinx, *Linn.*
Kalmiæ, *S. & A.*
Drupiferarum, *S. & A.*
Lucitiosa, *Clemens.*
Chersis, *Hbn.*
Ceratomia, *Harr.*
Undulosa, *Walk.*

SMERINTHINÆ.

Triptogon, *Brem.*
Modesta, *Harr.*
Smerinthus, *Latr.*
Geminatus, *Say.*
Cerisyi, *Kirby.*
Paonias, *Hbn.*
Excæcatus, *S. & A.*
Cressonia, *G. & R.*
Juglandis, *S. & A.*

SESIIDÆ.

Sannina, *Walk.*
Exitosa, *Say.*
Sesia, *Fabr.*
Tipuliformis, *Harr.*

AGARISTIDÆ.

Alypia, *Hbn.*
Octomaculata, *Hbn.*
Eudryas, *Bdv.*
Grata, *Fabr.*

SYNTOMIDÆ.

Lycomorpha, *Harr.*
Pholus, *Dru.*

CTENUCHIDÆ.

Ctenucha, *Kirby.*
Virginica, *Charp.*

LITHOSIIDÆ.

Hypoprepia, *Hbn.*
Fucosa, *Hbn.*

ARCTIIDÆ.

Crocota, *Hbn.*
Immaculata.
Utetheisa, *Hbn.*
Bella, *Linn.*
Platarctia.
Parthenos, *Harr.*
Arctia, *Schrank,*
Virgo, *Linn.*
Saundersii.
Virgincula, *Kirby.*
Phyrrharctia. *Pack.*
Isabella, *S. & A.*
Phragmatobia, *Steph.*
Rubricosa, *Harr.*
Leucarctia, *Pack.*
Acræa, *Dru.*
Spilosoma, *Steph.*
Virginica, *Fabr.*
Hyphantria, *Harr.*
Cunea, *Dru.*
Halisidota, *Hbn.*
Tessellata, *Harr.*
Maculata, *Harr.*

LIPARIDÆ.

Orgyia *Ochs.*
Leucostigma, *S. & A.*
Antiqua, *Linn.*

NOTODONTIDÆ..

Datana, *Walk.*
Ministra, *Dru.*
Nadata, *Walk.*
Gibbosa, *S. & A.*
Stragula, *Grt.*
Lophodonta, *Pack.*
Ferruginea.
Pheosia. *Hbn*
Rimosa, *Pack.*
Edema, *Walk.*
Albifrons, *S. & A.*
Schizura, *Doub.*
Ipomœæ, *Doub.*
Unicornis, *S. & A.*
Ianassa, *Walk.*
Lignicolor, *Walk.*
Heterocampa, *Doub.*
Guttivittata, *Walk.*
Biundata, *Walk.*
Manteo, *Doub.*
Umbrata, *Walk.*
Pulverea, *Walk.*
Cerura, *Schrank..*
Occidentalis, *Lint.*

PLATYPTERYGIDÆ.

Platypterix, *Lasp.*
Arcuata, *Walk.*
Dryopteris, *Grt.*
Rosea, *Walk.*

SATURNIIDÆ.

Attacus, *Linn.*
Cecropia, *Linn.*
Actias, *Leach.*
Luna, *Linn.*
Telea, *Hbn.*
Polyphemus, *Cram.*

CERATOCAMPIDÆ.

Dryocampa, *Harr.*
Rubicunda, *Fabr.*

BOMBYCIDÆ.

Clisiocampa, *Curtis.*
Americana, *Harr.*
Disstria, *Hbn.*
Var erosa, *Strech.*
Var sylvatica, *Harr.*

HEPIALIDÆ.

Hepialus, *Fabr.*
Argenteomaculatus, *Harr.*

ARTICLE IV.

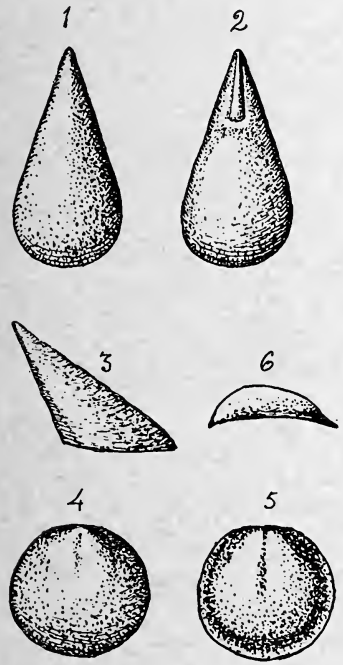
ACROTHYRA.

A New Genus of Etcheminian Brachiopods.

By G. F. Matthew, LL. D., F. R. S. C.

(Read January 8, 1901; published January, 1901.

In studying the earliest strata of the Eo-Palæozoic of the island of Cape Breton in Nova Scotia, Canada, the author has met with a form already described in the pages of this Bulletin as an Acrotreta,* but which from more perfect knowledge of the shape, habits and structure, he now thinks should be set off as a separate genus with the following characters:



Acrothyra proavia, mut. *prima*—1, Ventral valve—2, Mould of the same—3, Same in profile—4, Dorsal valve—5, Mould of the same—6, Same in profile. All magnified $\frac{1}{1}^{0}$ Upper Etcheminian Shale, C. Breton, N. S.

Quite small Brachipods having the ventral valve elongate-conical, with the apex either overhanging the cardinal line, or but little in front of it. Orifice nearly circular, often oblique. *Interior* with a long, narrow, or a quadrate visceral callus, extending forward from the foramen about a third of the length of the valve and widening as it goes.

A distinct, usually high, cardinal area extends from the foramen to the cardinal line.

Dorsal valve as in Acrotreta.

The difference in the form of the ventral valve distinguishes this genus from Acrotreta and is accompaniedby difference of habit, etc. In Acrotreta the visceral callus is

* Acrotreta proavia, this Bulletin, vol. iv., p. 203.

concentrated around the foraminal passage, and the shell appears to have been of sedentary habit, since the ventral valve in many cases is found fossil in such an attitude as to show that this valve stood in a vertical position in the mud of the sea bottom when the animal which inhabited it was living, the opening of the valve being uppermost. No such uniformity of attitude characterizes the dorsal valve.

We find that the ventral valve in Acrothyra assumes quite a different attitude. It lies in almost all cases on its side, and usually with the opening of the valve uppermost. Moreover, it is to be noted that on successive layers these valves lie with the umbo oriented in a fixed direction. From this it may be inferred that they give evidence herein of the action of a current, flowing in a definite direction and sweeping the valves in the direction towards which the current set. They may have swung in this direction by the pedicle while the animal was living; or when swept away by the flowing water, have presented the point of least resistance to the current, as they sank to the bottom. In either case we must regard Acrothyra as living under different conditions from Acrotreta, which, as we have remarked, apparently had the apex of the ventral valve buried in the mud.

It is in accordance with these conditions that we have in Acrothyra a visceral callus developed along the median line of the ventral valve, as is the case in Lingula and other allied genera; and Lingula, as is well known, had a long pedicle.

This genus is peculiarly Etcheminian, there being two species and several varieties or mutations in the strata of this age. It seems likely *Lingulella* (?) *inflata* of the Protolenus Fauna belongs to Acrothyra; if so, the genus ranges up into the base of the Cambrian.

Conotreta, of Walcott an Ordovician (Trenton) genus, is a later development from the Acrotretoid phylum, differing in the form of the visceral callus, which is pointed in front, in place of expanding, as in Acrothyra. Analogy, however, would lead us to infer that this genus also was free-floating, and not sedentary, like many species of Acrotreta.

This type of Brachiopod—Acrothyra—is one of the earliest known in the Palæozoic rocks of Canada, being found in shaly layers in the midst of the eruptives which mark the advent of Palæozoic Time in Eastern North America.

ARTICLE V.

SOME RELICS OF THE EARLY FRENCH PERIOD IN NEW BRUNSWICK.

By Samuel W. Kain and Charles F. B. Rowe.

(Read December 4, 1900.)

From time to time various articles relating to the early occupation of this province by the French have been deposited in the museum of this Society. Chief among these accessions are the articles donated by Dr. A C. Smith, of Tracadie, N. B., one of our most energetic corresponding members.

Jacques Cartier visited Miramichi Bay and Bay Chaleur in 1534, and from that time until the voyage of Champlain in 1604, there are many reasons for believing that numerous fishing and trading vessels visited our shores. These adventurous sailors carried on an active trade with the natives. The traders wanted furs, and for these they bartered iron tomahawks, knives, kettles, beads, etc. A brief account of such articles used in the trade as we have in our museum, with some others, may be of interest to our members and of some practical use to future investigators.

Kettles.

Before the arrival of Europeans the aborigines made rude earthen vessels. No perfect specimens of these have yet been found in New Brunswick, but from such fragments as have been recovered, it would appear that these articles were quite small. They were also heavy,* and, as Dr. G. F. Matthew has pointed out, were very fragile on account of being imperfectly burned. The metal kettle of the Europeans was therefore very much desired and highly prized.

* Bulletin of this Society, No. X., p. 14, 1892.

Champlain in his "Voyages" (Vol. II., pp. 83-84) narrates the following incident which occurred at Nausett Harbor, Mass.: "On the 23rd of July (1605) four or five sailors having gone on shore with some kettles to get fresh water * * * some savages coveting them, watched the time when our men went to the spring and then seized one out of the hand of the sailor," with the result that the kettle was lost and the sailor slain.

These kettles have been found in many parts of Canada and are generally made of copper or brass.

Three of these kettles were found in 1879 at Tabusintac interred with human remains. Dr. A. C. Smith brought the discovery before the Society and an account of the find was published.* In this connection it may be of interest to quote what Champlain says in his Voyages (Vol. II., pp. 191-192) about burial customs of the Indians at Quebec: "When a man or woman dies, they dig a pit in which they put all their property, as kettles, furs, axes, bows, arrows, robes and other things. Then they place the body in the pit and cover it with earth." In 1899, Dr. A. C. Smith sent to the Society an account of the finding of some graves of the early French period at Wilson's Point, Shippegan. Here stood an old French fort, now washed away, which has been described by Prof. W. F. Ganong† and is marked on his map as "Denys' Fort:"

The following is an extract from a letter by Dr. Smith to the Society, dated at Tracadie, Sept. 19, 1899: "Four circular depressions in the ground, about 100 feet from the shore, were noticed by two men who happened to pass through the woods. In one hole they found the copper kettle which I will forward in a few days. In the kettle they found the skull, arm bones and ribs, but the bones of the lower extremities were outside of the pot. Over the mouth of the vessel was the skin of some animal, and over the skin birch bark. I saw the circular skin covering, but it was too sodden to bring away. In the other holes were found pots, axes, a sword, knives, a harpoon, and a pair of bracelets. In a small pot were some beads."

In a letter written some days later he adds:

"The round holes were four in number; about three feet in diameter and about four feet apart. Clearly they were graves; and

* Bulletin V., pp. 14-19, 1886.

† Proceedings Royal Soc. Canada, Vol. V. (Sec. series) Sec 11, pp. 297-299, 1899.

there are no indications of anything else in the vicinity. Since writing you, I have found on special enquiry that there were human bones in two of the holes. A button was found with the bracelets; but I have failed to get either. From a *reliable* friend who saw the button, I learn that the button face 'which was as bright as gold, had a face of a man on it, surrounded by a halo, and a cross at the side of it.' About forty-five years ago a metal box, containing a written document, was found *about* a mile from these graves, but the writing could not be read as the paper was 'rotten.' The box had been cased in birch bark.

"About two years ago, an Indian grave was broken into not far from the site of the graves I write about. I visited the spot and found that the occupant had been buried in a sitting posture;* the hole was deep, but not more than three feet in diameter. The bones were very much decayed: nothing else was found in the hole."

We have in our museum three of these kettles from Tabusintac, and four from Tracadie. It has been reported that similar kettles have been found at Indian Point, Grand Lake. The kettle shown in plate x, fig. 4, was found by Dr. Smith, under the circumstances just described. It is of copper, 21½ inches in diameter, 12 inches deep, and has a capacity of 15 imperial gallons. The handle is of iron, rectangular in section and passing through copper ears, strongly fastened with three copper rivets to the body of the kettle. The bottom is nearly flat and gently rounded at the sides. This kettle weighs twenty pounds and Mr. Hevenor says the value of a similar vessel now would be about $10.00.

The other pots from Tracadie, three in number, are small, the smallest being six inches across the mouth and four inches deep.

The kettles from Tabusintac differ in some respects from those found at Tracadie. In the Tracadie kettles the sides are neatly turned over an encircling iron rod so that the rod is not seen. In the Tabus-

*Father Baird, in his Relation of New France, 1616 (Jesuit Relations and Allied Documents, Vol. iii., pp. 129, the Burrows Brothers Co., Cleveland, 1897) says: "They bury the dead in this manner: first, they swathe the body and tie it up in skins: not lengthwise but with the knees against the stomach and the head on the knees as we are in our mother's womb. Afterward they put it in the grave which has been made very deep, not upon the back or lying down as we do, but sitting. A posture which they like very much, and which among them signifies reverence. For the children and the youths seat themselves thus in the presence of their fathers, and of the old whom they respect. We laugh at them and tell them that way of sitting is the fashion with monkeys, but they like it and find it convenient."

intac kettle, the top sides of the kettle are flattened into a rim three-quarters of an inch wide, and beneath this the kettle is encircled by a broad iron band, to which are welded two circular iron ears for handles. All the Tabusintac kettles have the inner side of rim decorated with diagonal markings, and the handles are distinguished by a peculiar prolongation of the ends beyond the "ears," of from 3 to $3\frac{1}{2}$ inches, and at right angles to the sides, as shown in plate xi., fig 4. In two of the Tabusintac kettles, the shape of the bottoms is that of a compressed cone.

Sword.

The double-edged, sharp pointed sword, shown on plate 10, fig 1, was found by Dr. A. C. Smith, in 1899, along with other articles in one of the circular graves at Tracadie. It is very badly rusted. The length of the blade is 2 feet $1\frac{1}{4}$ inches, the handle, $3\frac{1}{2}$ inches, and the widest part of the blade measures $2\frac{3}{4}$ inches. This sword may have been a present to a chief from the French, or it may have been the sword used by a medicine man in his incantations.*

Knives.

Among the articles found by Dr. Smith, at Wilson's Point, were a number of knives, plate xii., figs. 4-5. They are all badly rusted and about six inches long. They have originally been mounted with wooden handles. Fig. 3 represents a knife in much better condition than the preceding found at Tabusintac in 1879. Knives seem very highly valued by the Indians, and Cartier† records that on his first voyage (1534) he gave some knives to the savages in the very region where our specimens were found.

Harpoon.

The badly rusted iron harpoon, shown in fig. 5, plate x., was found in 1899, by Dr. A. C. Smith at Wilson's Point, Shippegan, along with the articles described on a preceding page. It is ten inches long, and though badly rusted, shows evidence of having been a strong

* Jesuit Relations and Allied Documents, III., p. 119.

† "We sent two men ashore with hatchets and knives, beads and other merchandise, at which they showed great joy." Quoted by Prof. Ganong in Canadian History Readings, p. 14, 1900.

implement. It was probably fitted to a wooden shaft and used in the seal fishery which flourished during the period of the early French occupation.

Axes.

Before the arrival of Europeans, the natives used axes of stone. At the best, these were unsatisfactory tools, and in the European iron axe they recognized a good thing. These axes early became an important article of trade, and were sent to America in large numbers. Hundreds of these have been found in Ontario, but with us they are not so common.

Fig. 2, plate x., shows a badly rusted iron axe, found by W. C. Simpson, at L'Etang, Charlotte County, and now in our museum. The eye is oval in shape, the length of the axe is eight inches, and it weighs one and three-quarter pounds.

Fig. 3, plate x., shows a well preserved iron axe in our museum, labelled, "Tomahawk of Milicete Tribe." This poled form, Mr. David Boyle says, is not common in Ontario. In this specimen, the pole measures $2\frac{1}{2}$ inches, the length of the axe is $7\frac{1}{2}$ inches, the rounded cutting edge is $2\frac{3}{4}$ inches and the weight is one pound.

Iron Gouges or Scrapers.

Dr. Smith recovered from the graves at Tracadie three curved iron tools that may have been used as gouges or scrapers. They are all pretty badly rusted, but one specimen (fig. 1, pl. xii,) is sufficiently preserved to give a good idea of these tools. It is about $5\frac{1}{2}$ inches long, and the curved scraping edge is $1\frac{5}{8}$ inches wide. This specimen has a knob at the end of the handle. Mr. T. W. E. Sowter* has described and figured very similar implements from Lake Deschenes, in the Ottawa Valley. He says: "Mr. Boyle inclines to the belief that from the small bulb or knob at the end of the handles, they may have been used by means of pushing directly in the hand, perhaps as skin-dressers or flesh-scrapers.

The other specimen figured (fig. 2 and 2*a*, pl. xii,) is of different shape and badly rusted. The third specimen has a blade two inches wide.

* Ottawa Naturalist, January, 1900, p. 284.

Leaden Crucifix.

The earliest French traders and settlers who visited this province were accompanied by missionaries zealous to spread Christianity among the aborigines. Many converts were made, and doubtless to such would be presented crucifixes, of which a specimen is shown in fig. 6, pl. xii. This crucifix was found in 1879 at the mouth of the Tabusintac River, at a depth of three inches in the surface loam, and presented to the Society by Dr. Baxter, of Chatham. The exact spot where found is shown on a small map published in Bulletin V, p. 15.

The cross is $2\frac{3}{8}$ inches in height, and $1\frac{3}{4}$ inches in width. It is in one piece, the escutcheon holding the inscription and the figure have been made separately and afterwards soldered to the cross. There is a hole for suspension, and Monsignor Laflamme, who has examined the crucifix, is of the opinion that at one time a chaplet of beads was attached and later separated from it. The inscription is difficult to read, but Monsignor Laflamme considers that if complete it would be I. H. S., as such an inscription is found on several crucifixes.

Toy.

Prof. W. F. Ganong has in his possession a curious lead toy (figure 5, plate xi.) which was given to him by Prof. L. W. Bailey, in 1897. Professor Bailey bought two of them from a man who said he dug them up just below the mouth of the Oromocto. The specimen belonging to Prof. Bailey has on it the letters I. B. and a scratched "1740," which is probably modern. The toy represents an old time four-gun sloop of war, with high stern and ancient bowsprit. It would seem as if this object had been made in a wooden mould from bullet metal. The reverse side is perfectly smooth.

Beads.

The Indians were fond of beads for ornamental purposes. Before the advent of Europeans, they made them from shells, and in some cases from stone. Mr. Duncan London says that beads made from stone have been found in the vicinity of French and Maquapit Lakes, but we have no specimens in our museum. The women wore the beads strung around their necks, arms and wrists, and suspended from their ears.*

* Bulletin of N. H. S. of N. B., viii., 1889, pp. 12-14.

The early French traders introduced glass and porcelain beads in large quantities, and these soon displaced the native article. Most of the beads of this period to be found in the museum of this Society, and at the University, have been recovered from graves. Dr. Smith recovered a large number of colored beads of glass and porcelain from the graves at Tracadie. These were strung on fibres, which Professor Ganong determined to be the root fibres of the spruce. The various forms are shown on plate xi, fig. 2.

The museum of the University has a number of beads recovered from graves at Grand Lake, and very similar to those found by Dr. Smith. The large flesh-colored glass bead or pendant (plate xi, fig. 1) was found on the Washademoak River, and is in the University museum. It is octagonal in form and perforated from end to end.

Fig. 3, plate xi, shows a porcelain bead, evidently made in imitation of the old Indian wampum beads. Its surface is covered with cracks and the hole for suspension is very small. It was ploughed up in 1898, on his farm near Nerepis Station, King's County, by Geo. A. Harding, who gave it to the Society.

In early intercourse with our Indians, the belt or collar of wampum was used as a flag of truce, and served the same purpose as the pipe served in other parts of the continent.

Father Baird states* that beads were generally interred with the remains of women.

* Jesuit Relations, etc., Vol. III., p. 123.

ILLUSTRATIONS.

Plate X.

Figure 1. Sword, from Tracadie, 2 feet 5¾ inches long.
Figure 2. Iron axe, from L'Etang, Charlotte County, 8 inches long.
Figure 3. Milicete tomahawk, 7½ inches long.
Figure 4. Copper kettle, from Tracadie, 21½ inches wide and 12 inches deep.
Figure 5. Iron harpoon, from Tracadie, badly rusted. Length, 10 inches.

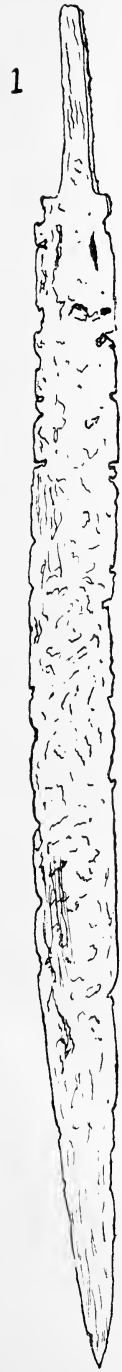
Plate XI.

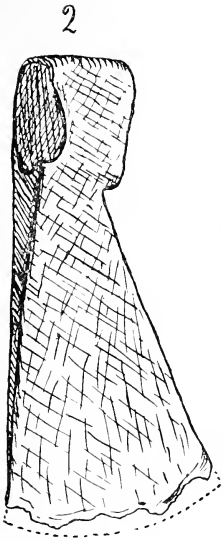
Figure 1. Glass bead or pendant, found at Washademoak. Natural size.
Figure 2. Beads, glass and porcelain, from Tracadie. Natural size.
Figure 3. Porcelain bead, from Nerepis. Natural size.
Figure 4. Copper kettle, from Tabusintac. Depth, 7¼ inches; width, 17½ inches.
Figure 5. Lead toy, from Oromocto. Natural size.

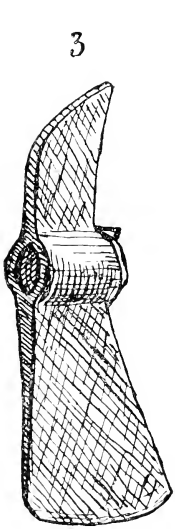
Plate XII.

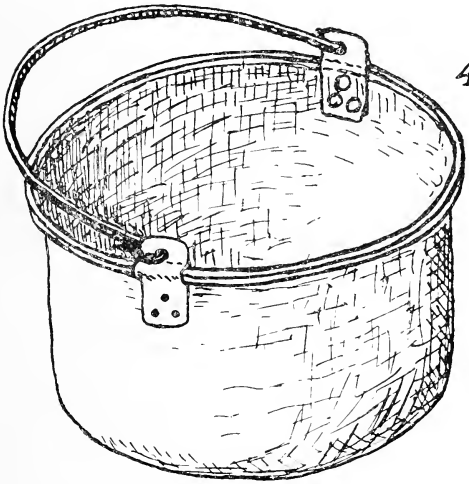
Figure 1. Front view of gouge, from Tracadie, 5½ inches long.
Figure 1*a*. Side view of figure 1.
Figure 2. Front view of gouge or scraper, from Tracadie, 4 inches long.
Figure 2*a*. Side view of figure 2.
Figure 3. Knife, from Tabusintac, about 6 inches long.
Figures 4-5. Knives, from Tracadie, about 6 inches long.
Figure 6. Leaden crucifix, from Tabusintac. Natural size.

PLATE X.









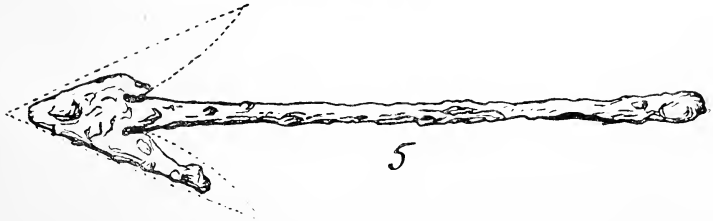


PLATE XI.

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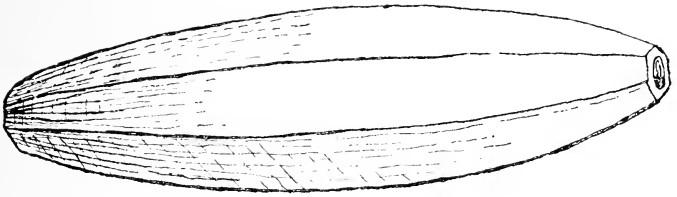

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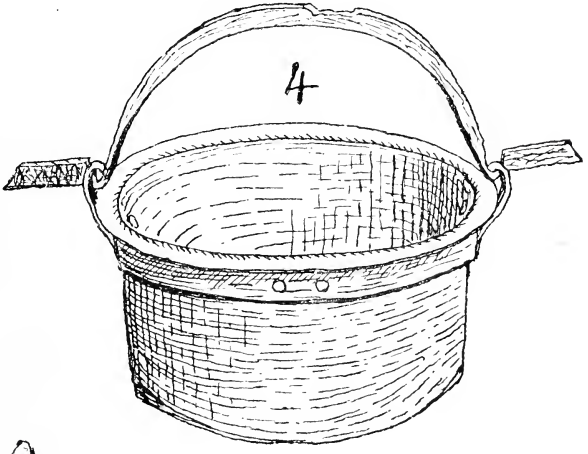

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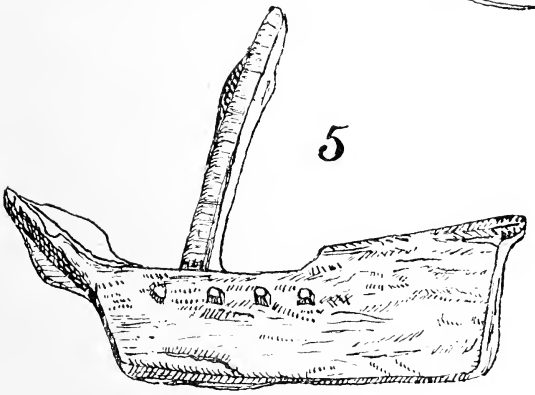

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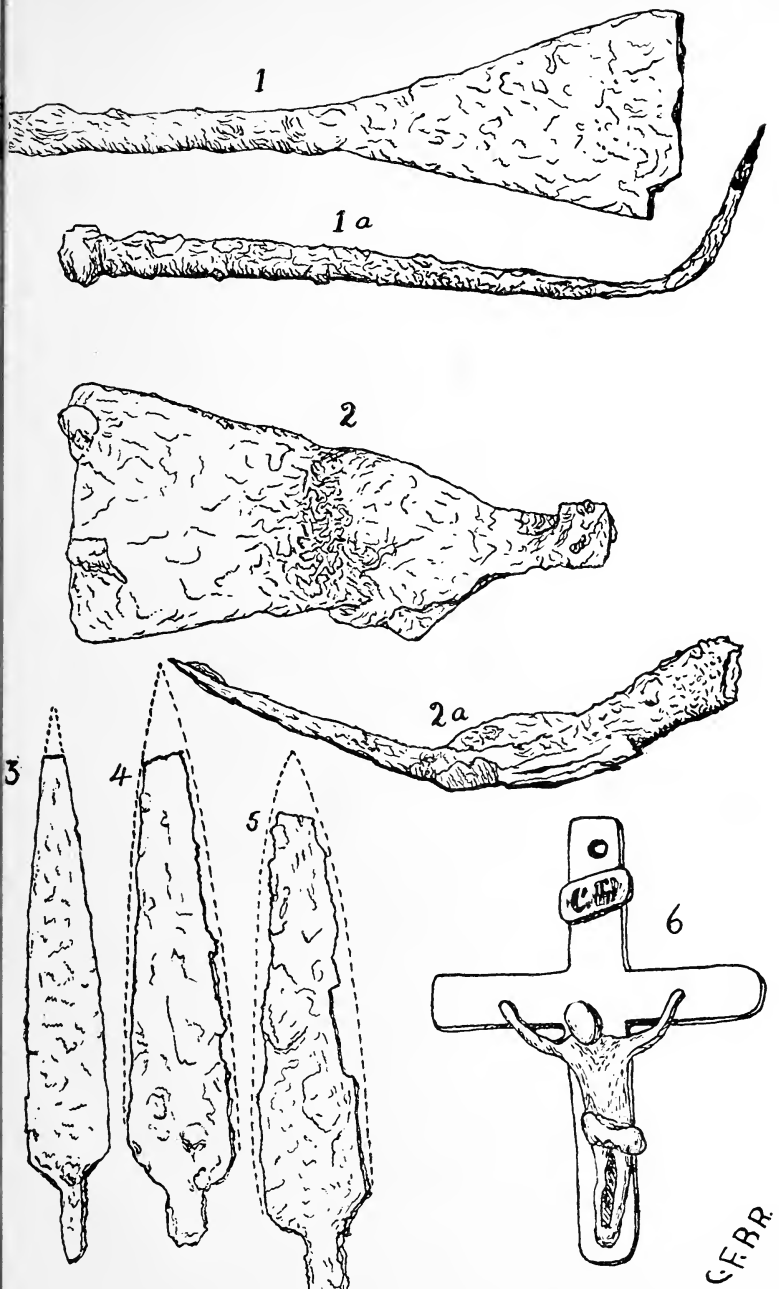
PLATE XII.



ARTICLE VI.

NOTES ON THE NATURAL HISTORY AND PHYSIOGRAPHY OF NEW BRUNSWICK.

By W. F. Ganong.

32.—The Physiographic Origin of our Portage Routes.

Everybody who has travelled much through New Brunswick by the primitive method, *i. e.*, the canoe, must have been struck by the remarkable arrangement of the rivers with reference to ease of travel in every direction. The St. John is the main artery of travel, and it sends large branches out to meet every large river on the Gulf and River St. Lawrence slopes on the one side, and to the branches of the Penobscot on the other; and between the streams which thus head together there are usually short and nearly level portages. Moreover, there are equally easy cross-communications between the smaller rivers, so that the province was covered by a network of these routes of travel, a fact brought out strikingly by a map recently published in the Transactions of the Royal Society of Canada (v, sect. ii, page 213). So remarkable is this heading together of the rivers, with the accompaniment of easy portages, that it must be the result of some fundamental and widely operating set of causes. These are found, without doubt, in past changes in our rivers, which are continually changing their valleys, moving their watersheds and robbing one another's basins. The easy portages in nearly every case follow former valleys of one or the other of the streams they connect, and the heading together of the rivers is a result of the fact that the heads of what are now two streams, formerly were parts of one. This is not true of all portage routes, but it is true of most of them, as the Kennebecasis-Anagance, the Salmon River-Richibucto, the Tobique-Nepisiguit, the Grand River-Restigouche, etc. New Brunswick has been so long under erosion that there has been time for innumerable changes in her valleys,

a subject of the greatest interest, to which I shall return in a future note.

In these easy portage routes, moreover, we have an excellent example of the correlation which exists between physiography and history. It was, for instance, the great ease of connection between the St. John waters and the Penobscot, and through the latter with other rivers to the southward, which allowed of those sudden and deadly forays of our Indians against the New England settlements, which in turn led to the voyages of reprisal by Church and others which play so large a part in the early history of the province.

33.—The Physiographic History of the Nepisiguit River.

In the whole of the attractive science of physiography, there is no subject of greater importance or interest than the changes which river valleys undergo in the course of their evolution. Rivers are forever extending their basins and moving their watersheds, while frequently they capture other rivers. Hence it comes about that some rivers are composites of two or more streams originally separate.

A river with a simple uneventful history would possess a fairly direct general course, a drainage basin of somewhat regular outline, and a valley increasing in width and decreasing in slope from source to mouth. Very different from this is the Nepisiguit. Twice in its course it bends permanently at right angles; it has a remarkably irregular drainage basin, and a valley which, through most of its extent, lessens in breadth and increases in slope towards its mouth. Such a river must have had a complicated history, and it is, I believe, a composite of four different river-systems. The evidence for this view will now be briefly presented, as worked out during the two trips I have made along its entire length.

The Nepisiguit shows four very distinct portions (see accompanying map),—first, the lakes at its source and its upper valley to Silver Brook; second, the portion thence to below Indian Falls, scenically by far the finest part of the river; third, the portion thence to Nepisiguit Brook; and fourth, the part thence to the mouth It will be convenient to consider these separately.

The Nepisiguit Lakes are about 1,000 feet above mean sea level, and stand about 150 feet above the Nictor Lakes, with which they are

connected by a narrow valley rising but slightly above the surface of Nepisiguit Lakes.* All the evidence seems to show, as Mr. Chalmers has clearly pointed out,† that the valley of these lakes in pre-Glacial times emptied by way of Nictor Lake into the Tobique, and with them must have gone the upper part of the Nepisiguit valley, at least to near the Third Fork Branch. There is also a low valley between these lakes and the Mamozekel, indicating perhaps a still earlier flow of these waters through that river. This part of the Nepisiguit was in all probability a part of one of the primitive valleys of the old pre-Cambrian streams flowing out of these highlands northwest into the pre-Silurian sea, which then occupied all of the northwestern part of New Brunswick.

We pass now to the second part of the river. From Silver Brook to Indian Falls the river flows amidst great hills swiftly but smoothly over gravel in a deep drift-bottomed valley, with some rips among boulders, but no ledges, at least none across the stream. Eastward the valley grows broader, gradually developing a flood-plain, until Portage Brook is reached. Portage Brook occupies a very broad, and evidently ancient, valley, by which there is a low and easy portage to Upsalquitch Lake, which lies 100 feet lower than the mouth of Portage Brook. This valley is a continuation of the valley of the main river, which here turns to the south, as far as the Main South Branch, which runs in a continuation of the same valley. It seems plain, then, that the Main South Branch, the main Nepisiguit to Portage Brook, Portage Brook itself, and Upsalquitch Lake all occupy a very ancient valley formerly emptying northward. Below the Main South Branch the river-valley still has a flood plain, is broad, and has the least rapid current of any part of the whole river; but it gradually narrows, and the flood plain disappears, until Indian Falls is reached. This part of the valley, therefore, broadens and shows greater age westward, though the part above broadens and shows greater age eastward. Now the peculiar relationship of the main river here to the great valley of the Main South Branch-Main River-Portage Brook-Upsalquitch, can only be explained by supposing that the latter valley was at one time the main stream emptying into the Upsalquitch, draining the pre-Cambrian highlands northward into

*See the map accompanying note No. 30 (Bulletin xviii, 250).
†See his Reports, Geological Survey of Canada, 1885, GG; 1887, N.

a pre-Silurian sea; and the present Nepisiguit above and below it were branches entering it at different points. (See accompanying map). This, I believe, was the case. The source of the west branch of this river would probably have been near the present Silver Brook, perhaps that brook itself. A branch must have eroded its way northward deeply enough so that the choking of the Nepisiguit Lake-Nictor Valley with Glacial drift (or possibly some earlier cause) turned the Nepisiguit Lake waters from the Tobique into the Nepisiguit, thus explaining the curious southerly bend of the valley at this point. Possibly the Third Fork Brook is the continuation of this branch. The source of the eastern branch must have been somewhere to the eastward of Indian Falls. In fact the valley continues to narrow eastward until, just below the Forty-mile Brook, the river bed nearly fills it; but probably the ancient source was not so far east. The geography of this upper part of the river appears to me not to have been altered materially by the Glacial period. The trains of boulders forming the occasional rips are no doubt remnants of old Glacial dams, the gravel of which is now distributed along the river bed. The great depth of this part of the valley has prevented the formation of Glacial falls.*

At Indian Falls the river drops a few feet amongst huge boulders and over ledges evidently in a post-Glacial channel. I could not identify the pre-Glacial channel, but from the top of Mount Denys (Bald Mountain) one can see what appears to be an old channel marked by a heath on the north bank.

Below Indian Falls the character of the river changes entirely. Its current is much swifter and more broken, both by huge boulders and by more frequent ledges. The country rapidly diminishes in elevation, soon becoming a great peneplain, into which the river has cut some 200 to 300 feet. The valley continues to narrow to somewhat below Forty-mile Brook, where, as already stated, the river bed nearly fills it. Below this it broadens a little, at least in places, until Nine-mile Brook is reached. Along this part of the river are some fine lofty gravel terraces culminating in a particularly fine one, specially mentioned by Mr. Chalmers, just below the mouth of that brook. Just below this terrace occur huge boulders in great number, forming

* On the relationship of depth of valleys to absence of falls. See earlier note 8, (Bulletin xvi, 52).

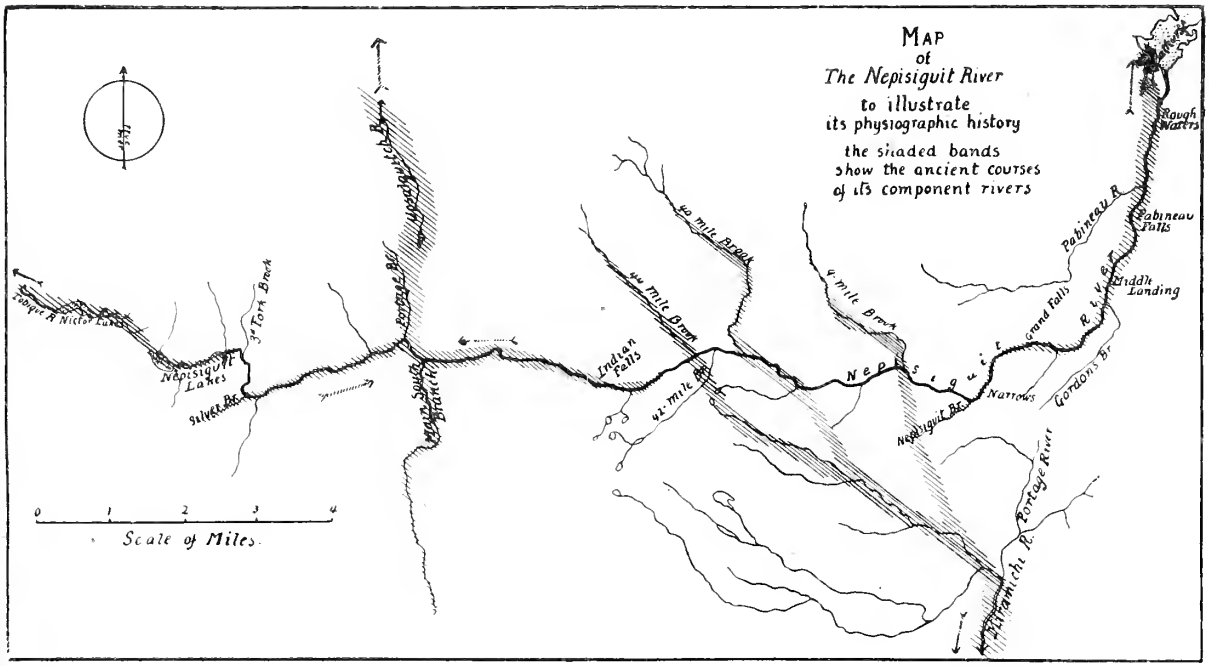
some of the worst rapids on this part of the river; but below, as far as Nepisiguit Brook, the terraces are very few and low. It seems clear, then, that this terrace and the boulders are remnants of a great Glacial dam at this point. That there was such a dam somewhere along this river is mentioned by Mr. Chalmers, but he puts it at the Narrows, a long distance below, an impossible theory as it seems to me, because of the different character of the terraces above and below this point. Below Nine-mile Brook, to near the Narrows, the valley becomes very narrow and the banks almost precipitous, so that one is inclined to consider this part of the river as post-Glacial. It is not, however, a true post-Glacial gorge, and the low terraces are against this view, but certainly it must be geologically one of the newest parts of the river,* indeed excepting only the post-Glacial gorges at the Narrows and at Grand Falls, the very newest part of the whole river. At Nepisiguit Brook, half a mile above the Narrows, the valley suddenly opens out and assumes the shallow, ancient appearance which it holds to its mouth. This part of the river, from Indian Falls to Nepisiguit Brook, is very puzzling, and I have not been able to form any clear idea of its probable mode of formation. Considering, however, the general parallelism of Forty-four-mile, Forty-mile and Nine-mile Brooks with the branches of the Northwest Miramichi, together with the extremely limited extent of the drainage basin of the river on the south side, it seems very probable that the aforementioned streams were formerly branches of the Miramichi, which have been captured to the Nepisiguit by the gradual backward extension of the lower Nepisiguit,† though I can form no idea as to the influences determining this peculiar extension. Certainly all this part of the main Nepisiguit must be comparatively new, much newer than the upper part of the river.‡

* This part of the river crosses a band of rocks considered by Ells to be probably pre-Cambrian, but this fact does not in itself explain the peculiar newness of this part of the valley. It is just possible that an older valley exists between Nine-mile Brook and the river below Nepisiguit Brook, or even between Nine-mile Brook and just above Grand Falls.

† One must not, however, put too great faith in the accuracy of the maps, for they have many errors. All such studies as the present are greatly hampered and rendered uncertain by the absence of a good map of the province based upon a unified survey.

‡ It is of course possible that the branches may have connected with the Miramichi, but by routes very different from those shown by the shading on the map. The other possibility is that there never was a connection of this river with the Miramichi, but the main river is a part of an ancient stream flowing eastward from the edge of the pre-Cambrian highlands across the Cambro-Silurian region into the Carboniferous sea; but the new part between Nine-mile Brook and the Narrows is very difficult to explain on this basis.

Passing now to the lowermost portion of the river, we must consider both its Glacial and its pre-Glacial history. Mr. Chalmers has expressed the opinion that much of the lower part of this river is post-Tertiary, a conclusion with which I cannot entirely agree. The Narrows is a typical gorge eroded out since the Glacial period, and the pre-Glacial valley is evident on the north bank. For about half a mile above the Narrows the valley is very open and apparently ancient, and possibly Nepisiguit Brook was the original source of this part of the river. Below the Narrows the same open character is kept, and a marked feature of the river are occasional isolated cliffs, marking ancient rock ridges through which the river long ago cut its way. The hills diminish in height until the Grand Falls is reached, where there is a fine fall and gorge. Mr. Chalmers states there is no pre-Glacial valley around this fall, a statement quite incomprehensible to me, for below the gorge is a large basin, from the north side of which a low drift-filled valley starts westward towards the head of the fall. It is true I have not followed it through, but the whole appearance at the basin is precisely that of a pre-Glacial valley now drift-filled. Below the Falls the valley for the most part is very broad and open, but it is broken at Chain of Rocks, at Middle Landing, at Pabineau Falls, at the Rough Waters, and a few minor points by bad rapids or falls over ledges; and at these points the valley is obviously post-Glacial. But these falls occupy only a part of its course, and between them the river is very different in character, and has all the appearance of an old partially drift-filled valley. The whole country here is a low peneplain, and the valley is very shallow; this shallowness has allowed of its easy damming in many places by Glacial drift and its deflection from its old course, whence the many falls. In places the river follows the contact line of the Lower Carboniferous and the Granite, and probably that was its course throughout in pre-Glacial times. I believe that this valley, though of course geologically newer than the upper part of the river, is much older than post-Tertiary. The course of its lower part is in line with the Northwest Miramichi, and both occupy a valley created by the rise of the country to the eastward. Indeed it is probable that this original Nepisiguit at one time headed near Portage River, for Gordon (or Portage) Brook continues it in a straight line on one of its bends (wrongly shown on the map), and is largely a sluggish stream connected by a low portage with the Miramichi. In


MAP
of
The Nepisiguit River
to illustrate
its physiographic history
the shaded bands
show the ancient courses
of its component rivers
Rough Waters
Pabineau Falls
Pabineau R.
Riddle Landing
R. Nepisiguit
Grand Falls
Nepisiguit
Narrows
Gordons Br.
Nepisiguit Br.
Portage River
Restigouche R.
40 mile Brook
40 mile Brook
42 mile Brook
Indian Falls
Portage Br.
Restigouche R.
South Branch
3rd Fork Brook
Nepisiguit Lakes
Silver Br.
Scale of Miles.
0 1 2 3 4

this case the part from Gordon Brook up to Nepisiguit Brook was at first but a short branch, which later worked back to its present position, and became the main stream. Below the Rough Waters comes the head of tide, three miles from the mouth of the river. Here the valley seems clearly pre-Glacial, but a mile below it becomes typically post-Glacial to its mouth, while the old valley may be traced, south of Bathurst, across the peninsula to Little River basin.

The Nepisiguit, then, I submit, is a composite of four rivers, a small portion from the Tobique system, a very large part from the Upsalquitch system, a part from the Miramichi system, while the lower portion is the true original Nepisiguit, which has worked back at its head, gradually capturing and making tributary to itself the aforementioned parts of the other systems.

I am well aware that these conclusions rest largely upon very scanty data, but I shall have accomplished one of my objects if I succeed in calling to these problems the attention of those better equipped than I am for their solution.

34.—On the Heights Above Sea Level of Nictor Lake and Neighboring Places.

In an earlier note of this series (No. 29) and on the map accompanying Note No. 30, the height of Nictor Lake is given as 864 feet. This figure is the average of those obtained by Wightman (corrected), Chalmers (on the Geological map) and myself. Mr. Chalmers calls my attention to the fact that the height of 878 on the Geological map is an engraver's or printer's error, and that the height as determined by him was really 828 feet, as given in his Geological Report (for 1885, GG, 17). I had noticed this discrepancy between map and report, but as the map with its 878 feet agreed so closely with Wightman's corrected figures, *i. e.* $777 + 100 = 877$, I concluded it was correct, and that the figures in the report were a misprint. This unfortunate error on the geological map does not, however, vitiate any of the figures given in my notes or maps except two, namely, the height of Nictor Lake itself, which should read 847 instead of 864, and Mount Gordon which should read 1552 instead of 1569. All other heights in that vicinity were compared with other datum levels, and hence are independent of the error as to Nictor Lake.

The most interesting and most important fact brought out by the measurements in the vicinity of Nictor Lake is that Mount Carleton is higher than Sagamook. In confirmation of the testimony of the aneroid measurements, I may add the following facts. Standing upon the highest point of Carleton one can look clear over the summit of Sagamook, and see the hills on the horizon beyond except in one small spot where they dip down below their average level; but as seen from Sagamook, Carleton stands out against the sky without anything showing beyond, though the hills are higher to the south than to the north. Again, in order to settle their relative heights, I took with me a spirit-level and tripod. When set level on the summit of Carleton and sighted upon Sagamook, the horizontal line of sight passed clean over it; when the same level was sighted from Sagamook upon Carleton, the horizontal line of sight struck Carleton considerably below its top. This evidence is conclusive as to the *relative* heights of the two.

35.—Peneplains and Monadnocks in New Brunswick.

As earlier pointed out (Note 26) we have in New Brunswick two good examples of great peneplains, the eastern Carboniferous plain and the Northern Silurian plateau. Peneplains frequently possess islands or remnants of the old materials left behind in the general planing down of the surface, and such islands are called monadnocks. Have our New Brunswick peneplains any monadnocks? When one stands upon the top of Bald Mountain (or Mount Champlain)* on the Kings-Queens boundary and looks off to the north-eastward, he will see what appears to be a very typical monadnock in the hill on which Marr Settlement is situated, which rises abruptly from the plain east of Grand Lake. It is not, however, a real monadnock, for, as Dr. Matthew informs me, though of Lower Carboniferous age, it is composed of a ridge of volcanic rocks, and hence remains, not because it is left behind in the general erosion, but because it resists erosion better than the surrounding rock. The larger elevation north of Grand Lake on which the Emigrant settlement stands is of similar nature. As to the Silurian plateau, there appears to be a typical monadnock in Green River Mountain, which stands up prominently

* On this name see the next note.

above the surrounding country. Possibly, however, the Geological map is not correct in making it of the same formation as the surrounding country, for it marks Squaw Cap and Slate Mountain in Restigouche as Silurian when they are really intrusive volcanic. Mars Hill is perhaps an imperfect monadnock. An example of a seeming, and perhaps a real, monadnock is Bald Head in Victoria County, which rises abruptly from a flat though limited plain It is of pre-Cambrian felsite, and now surrounded by later formations; but, not being intrusive, it must at some time have been isolated by erosion from the other felsite areas to the eastward.

36.—Further Suggestions Upon Nomenclature of Unnamed or Badly Named Places in New Brunswick.

The practical inconvenience arising from the repetition of the same name for different places in New Brunswick is not only at present considerable, but is sure to increase as the province becomes better settled. Attention was called to this subject not long ago in an editorial in the St. John *Telegraph*, which suggested that the mountains called Bald, so numerous in New Brunswick, should gradually be re-named. Practically, the best preliminary to this, is the suggestion of good alternative names. This has been done already by Governor Gordon for Bald Mountain on Nictor Lake which he called *Sagamook*, and the name has come into at least literary use; and lately the name *Denys* has been proposed as an alternative for Bald Mountain near Indian Falls on Nepisiguit (Note No. 30). Another Bald Mountain for which an alternative name is happily available, is that northeast of Harvey Station in York County. On a splendid manuscript map of New Brunswick, made in 1786, now in the Public Record Office in London, this mountain is called *Wadawamketch* Mountain, evidently an Indian name. For such natural features of the country as mountains, no names could be more appropriate than those of Indian origin, and they should be adopted in preference to all others whenever available. Another Bald Mountain which, however, seems to have no Indian name, is the fine one on the Kings-Queens boundary. An alternative name for it is certainly most desirable. What more appropriate name could it bear than that of the first great European explorer known to us to have gazed upon it, the discoverer of the St.

John, our first historian, a man as yet uncommemorated in any place-name in this province, *Champlain*. May it be known, for the future, as Bald Mountain or Mount Champlain.

Other names causing inconvenience by their repetition, are the Salmon Rivers. The Indian name for Salmon River flowing into Grand Lake is *Cheminpic* (Che-min'-pic) a not inharmonious name which would form an appropriate alternative.

There is yet another name which might have its use. There existed at one time a great Glacial lake, filling all the lower part of the valley of the St. John and its tributaries. Elsewhere such Glacial lakes are now named. Very appropriate for it would be the ancient Indian name of the St. John, after which it could be called *Glacial Lake Woolastook*. There is not likely to be any inconvenience in the use of this name for a Glacial lake and a physiographic district (Note 26).

37.—The Physiographic History of the Restigouche.

In an earlier note (No. 33) I pointed out what appears to be a very complicated history for one of our northern rivers, the Nepisiguit. Our northernmost river, the Restigouche, on the other hand, appears to have had a comparatively simple, though not uneventful, history. It rises in the great Silurian plateau some 500 to 600 feet above the sea, and flows easterly entirely through Silurian formation in a deepening, narrow, but very winding valley, lacking a flood-plain, unbroken by a fall and without even a bad rapid from source to mouth. The narrowness of its valley, the steepness of its walls, and the lack of a flood-plain (except for small intervales on some of the bends and at the mouths of some of the principal branches), show that it is a comparatively new river, while its winding course in its lower part shows that it must have originated in a very level country, on whose surface it wound about. Its upper part, however, above the Kedgewick, and especially above the Gounamitz or Little Fork, is somewhat different; it is there straighter and has less fall than the lower part, and runs in a very open country, into which it has not cut deeply. If, now, this upper part were being formed by extension backward of the lower river, it should, upon well-known principles of river-development, have a greater fall than the lower part. Moreover, the relation of the direction of the river to the Grand River through the low-lying Wagan

and Wagansis portages (see Geological map) makes it seem to me perfectly clear that the upper part of the river to beyond the Gounamitz formerly emptied into the St. John through the Wagan and Grand River, and it has been robbed from St. John waters by the backward extension of the Restigouche.* The great branches, Kedgewick and Gounamitz, must be subsequent rivers, and the Kedgewick, the largest of them, seems to have tapped the Rimouski system and appropriated its headwaters, as an inspection of the geological map shows to be probable.† The absence of falls and bad rapids is obviously due to the fact that the river has nowhere been turned out of its course by Glacial drift, and this in turn, for the lower part of the river at least, must be due to the depth of its valley; the drift could not fill it, and hence was easily washed out. The softness of the Silurian rocks and the ease of their erosion also probably have something to do with the freedom from rapids.

The Restigouche is probably therefore a composite river of three parts. By far the larger part is a comparatively new post-Silurian river, the main Restigouche; while the part above the Kedgewick has been robbed from the St. John, and a small portion of the Rimouski has been captured by the Kedgewick.

38.—On the Use of Mineral or Divining Rods in New Brunswick.

The use of divining rods in the search for hidden water, concealed mineral beds or buried treasures, is extremely ancient and widespread. The belief in their efficiency is very prevalent in New Brunswick, where they are generally known as "mineral-rods," and used not so much in seeking water (which is usually abundant enough in this favored province) as for locating suspected ore-beds or the treasure supposed to have been buried by Captain Kidd, the Acadian French or others. Odd or conspicuous places everywhere around the coast and on the lower courses of the rivers almost invariably show holes dug by credulous treasure-seekers, most of whom are known to have used the mineral-rod in their preliminary explorations. The subject

* Ells (Report, 1881, D. 18,) states that the river above the Patapedia occupies the crest of an anticline.

† This explains why the Kedgewick is so much larger than the main river.

has been investigated more or less thoroughly a number of times, and as a result, most scientific men consider, I believe, that there is no physical connection whatever between the performance of a mineral rod in the hands of an expert and the presence of minerals or water, but that the observed phenomena of movements of the rods, are all explicable upon known psychological principles of suggestion, association, etc. The expert users of the rods (for not all people are the proper kind of "medium,") are supposed to be those who combine great credulity with a power of subconscious observation and shrewdness in guessing probable localities, and this mental state reacts unconsciously upon the physical being, causing the rod to be turned downward in probable places. Hence the mineral-rods bend at certain places not at all from external (physical or objective) but entirely from internal (mental or subjective) causes. A somewhat different explanation, however, has recently been given, at least for the finding of water, by an English investigator, W. F. Barrett. He considers it possible that the user of the rod may hypnotize himself by the concentration of attention upon the point of the rod, and in that state become susceptible to influences from without to which others, and he himself ordinarily, are entirely insensitive, and that there may be some still unknown physical connection between the presence of water and the mental state of the user of the rod.

The origin of the belief in divining rods has been traced by Fiske in his "Myths and Myth-makers." Other important literature upon the subject may be found as follows: Nature, October, 1897, page 568, November, page 79; January, 1898, page 221; November, 1899, page 1. There is also a short article of interest in the St. John *Globe* for May, 15, 1900, and another in the same paper, Januuary 2, 1901. Most important of all are Barrett's two monographs in the Proceedings of the Society for Psychical Research, 1897 and 1900.

39.—On the Physiography of the Basin of the Negoot, or South Tobique, Lakes.

At the head of the south or "right-hand" branch of the Tobique River, in the very heart of the New Brunswick highlands, lies a group of lakes, which, while not including our most beautiful single lake (*i. e.* Nictor), nevertheless forms by far the finest group in the province.

They are entirely unsettled and wild, have been but little studied scientifically, and are imperfectly (in some cases, not at all,) mapped. Hence they form an attractive field for physiographic and natural history study.

History.— These lakes first make their appearance upon the Franquelin-DeMeulles map of 1686,* where two of them (one clearly Trowsers Lake, though no names are given,) are shown in about their proper relations with Little South-West Lake. Their next representation is upon the Lockwood map of 1826, on which they are laid down unnamed and very erroneously, but they are much better on the Baillie and Kendall map of 1832. In 1836–1838, however, the principal lakes, Trowsers (in part only), Long, Portage, Adder and Serpentine, were surveyed by Deputy Garden, and his results appear upon the later printed maps, especially Wilkinson's of 1859. The earliest printed reference to the lakes occurs in Governor Gordon's "Wilderness Journeys,"† in which the author's brief visit to Long and Trowsers Lakes in 1863 is described.‡ The next year Professor Hind visited the lakes; and he has given us in his well-known Geological Report of 1865§ a brief account of part of them, and his is the fullest description that has yet been published.

In 1884 the lakes were laid down on Loggie's large map with little or no improvement over Wilkinson, but in 1886 Mr. William McInnes, for the Geological Survey, visited the lakes, made observations upon their geology, took barometric measurements for their altitudes, and made a detailed micrometer survey‖ of Trowsers, Long and Serpentine Lakes, to which he added sketches of Gulquac, Milpagos and Milnagek Lakes, taken apparently from Hind's descriptions. Mr. McInnes' results are given briefly in the Report of Progress of the Geological Survey for 1887, and are embodied in the Geological map of the region, by far the best map published up to the present time. In the same year, Mr. John V. Ellis visited Trowsers Lake, and published a popular account of his experiences in three articles in the St. John

* On this map see Note 29 earlier, page 239.

† St. John, 1864. Also in "Vacation Tourists," Vol. III. London, 1864.

‡ The Indians were of course mistaken when they told Gordon he was the first white man to reach Long Lake, for Garden had surveyed it in 1838.

§ A Preliminary Report on the Geology of New Brunswick, Fredericton, 1865.

‖ I am indebted to Mr. McInnes for a copy of his map, resulting from this survey, on a scale of one mile to an inch. For the lakes mentioned it forms the basis of the map accompanying this paper.

Globe, August 10th, and later. In 1893 a party of naturalists from the American Museum of Natural History, New York, led by Mr. John Rowley, spent six weeks at Trowsers Lake studying and collecting the mammals of the region. Their results were published by J. A. Allen in the Bulletin of the Museum, Vol. VI, 1894 (99–106, 359–364). and these papers embody not only a valuable contribution to the natural history of that region, but one of the most important contributions that have yet been made to the mammalogy of New Brunswick. There are scattered references to other results of this trip in one or two special papers on mammals; but I am informed that aside from these no account of this expedition has been published. In July, 1900, I spent three weeks upon these lakes in company with Mr. G. U. Hay; and for a part of the time we were accompanied by Mr. M. I. Furbish, of Attleboro Falls, Mass., and his guide. Such results as we were able to obtain are presented in part herewith, and others are to follow.* I believe this exhausts the list of recorded explorations and publications relating to these lakes.

Place Nomenclature.—There is no name in use for this group of lakes as a whole, and hence I have ventured to apply to them the ancient Maliseet name of the Tobique River, that is, *Negoot.*† The names *Trowsers*, *Long*, *Portage* and *Serpentine*, appear to have been first placed on maps by Garden in 1836-38, though doubtless some of them at least were in use before his time. All are descriptive and self-explanatory, *Trowsers*, of course, being shaped like the garment of that name. *Adder* was used by Garden, but I do not know its origin. *Blind* appears first on McInnes and is descriptive of its lack of inlet or outlet. The names of the smaller lakes, *Gray's*, *Merithew's*, *Costigan's*, *Ogilvie's*, are in use by guides and seem to be for local guides and trappers;‡ they now appear on a map for the first time. *Indian* and *Trout* are sufficiently descriptive. Certain names are of Indian origin: *Milnagek*, with the *g* hard, (lake of many islands); *Milpagos*

* We went in over the Trowsers Lake portage road, passed through the chain, exploring from the heads of the larger lakes, and descended the Serpentine. A popular account of the trip is being published by Mr. Hay in the *Educational Review*.

† Familiarized from *Nay-goot* or more properly *Nay-goo-oot* (from a distance called *Nay-goo-oot-cook*). Its meaning is unknown, but I suspect it is connected with *Nik-taak*, Forks, in reference to the repeated forking of the Right Hand Branch.

‡ For a list of these names and for other information, I am indebted to Mr. Geo. E. Armstrong, head guide, Perth Centre.

(lake of many arms or branches, which well describes it ;*) *Gulquac* (meaning unknown); *Skut*, (fire). Certain other Indian names are given in reversed italic upon the map, though none of them are now in use: *Belchesogamook*, Maliseet name for Trowsers Lake (*Belches* is the Indian pronunciation of breeches, *i. e.*, trowsers, and *agamook* is lake; evidently this is but a translation of the English name and is not aboriginal) ;† *Quasquispac*, Maliseet name for Long Lake (meaning unknown); *Nalaisk*, Maliseet name for the Serpentine (meaning unknown); *Paquopsk* Maliseet name for the Right Hand Branch (means rough river); *He-be-se-kel*, Maliseet name for Portage Lake Stream (meaning unknown).‡ *Seguaque-kesk* is from Mr. McInnes' manuscript map. The name *Britt* Brook is in common use by lumbermen and Indians, but I cannot find its origin. *Lhoks* was given by Gordon, as he tells us, for the Indian nickname of one of his companions. *Campbell* was evidently given by Garden in honor of the then governor of the province, but it is only a map name not in use locally; *Don* was also given by Garden (perhaps with the English river of that name in mind). Four names of lakes on the map are new, and have been given by me; two fine lakes with no special names, but known to the guides simply as the second and third Adder Lakes, have been named *Hind* and *McInnes* for the two geologists who have visited and described or mapped the region (*Garden* is already commemorated in a mountain beside Nictor Lake). An hitherto nameless pretty pond at the very head of the chain of lakes emptying into Trowsers, is named *Furbish* for Mr. M. I. Furbish of Attleboro Falls, Mass., my companion in the mapping of Island Lake and other explorations in the region. Another little nameless lake on the inlet of Long Lake is named *Tangent* Lake because of the remarkable way in which the stream just touches it on one side.

Description.—The Negoot region is remarkably uniform in its character. Everywhere one is impressed by the innumerable smoothly-rounded hills and ridges of moderate height, by the splendid living forest which completely covers them, by the number and beauty of the lakes, by the swiftness of the streams, by the abundance of big animals

* Hind says the name does not well describe it, but he could not have seen the whole lake, for it is an extremely appropriate name. See map.

† The name Pechayzo given to Gordon by Indians and taken by him for Long Lake, is evidently a form of this name.

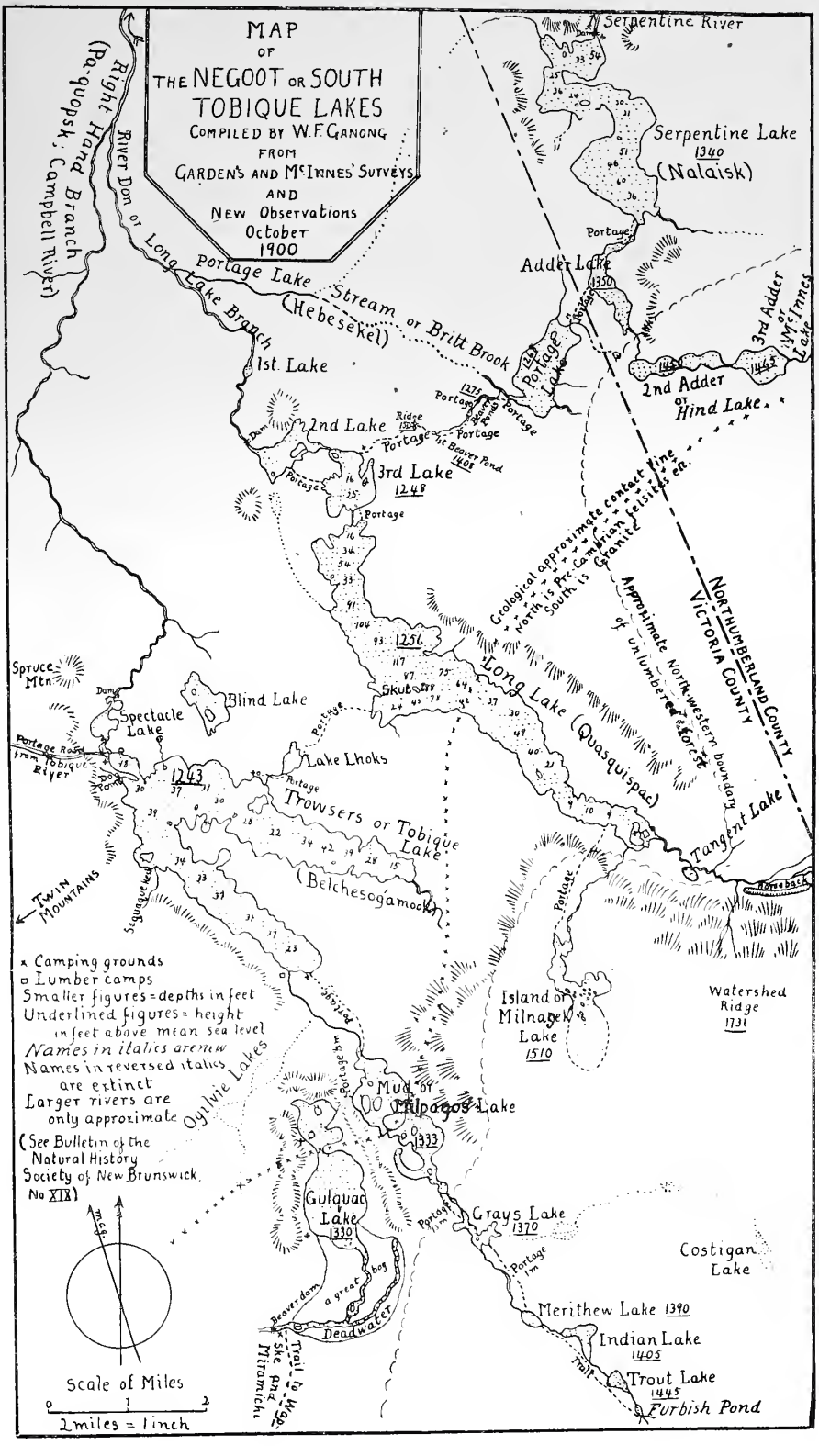
‡ Mamozekel is a corruption of Hebesekelsis, the Little Hebezekel.

moose, caribou, deer and beaver, by the all-pervading remoteness, wildness and primitiveness. The hills are never abrupt, nor have they bare tops nor sides; they are like great irregular green swells of the sea, suddenly fixed in stone. The forest is of the mixed sort, where the dark-green, spire-like tops of spruce and fir rise above the level of the brighter green of birch and maple. On the upper and smaller lakes, it has never been lumbered, and still is virgin and primeval. The lakes occupy valleys and hollows between the ridges, and show a considerable variety of character. Some (like Long Lake, Merithews and Indian Lakes) occupy deep and narrow valleys with rocky, wooded shores, while others (like Milpagos) lie in shallow basins, are greatly broken by points and islands, and are bordered by bogs; and there are all gradations between. The beauty of some of them is, however, marred by flooding, caused by dams, which gives their immediate shores a border of unsightly and well nigh impenetrable dead and dying trees. The lake shores are but rarely of sand or gravel (and then only at the ends of the longest and most exposed reaches), but they are almost invariably of loose boulders, which both extend up upon the hills and out into the lakes in long morainic peninsulas or islands. Indeed, ledge rock is a great rarity, and the prevalence of the boulders is a very characteristic feature of the region, though these occur by no means of the size and conspicuousness familiar to us about the lakes in the southwestern part of the province.

Altitudes.—The only measurements of altitudes hitherto taken in this region were those of Mr. McInnes, made in 1886. He gives an elevation of 1,360 feet for Trowsers Lake, 1,370 for Long Lake, and 1,450 for Serpentine. During our stay we made as many observations as possible with a good aneroid. These were taken synchronously with the readings at Fredericton, and have since been corrected for weather by comparison with these, and for error of the instrument.* They have given the following results, above mean sea level. All calculations are conservative, leaning rather to too low than to too high levels:

Trowsers Lake, mean of 15 observations, 1,243 feet.
Mud or Milpagos Lake, 90 feet above Trowsers, hence 1,333 feet.

* For a full set of readings from the Fredericton Meteorological Station, I am indebted to Dr. Harrison, of the University of New Brunswick. For regulating and calculating the error of my aneroid, I have to thank Mr. Hutchinson, of the Meteorological Station at St. John.


MAP
OF
THE NEGOOT OR SOUTH
TOBIQUE LAKES
COMPILED BY W.F. GANONG
FROM
GARDEN'S AND McINNES' SURVEYS
AND
NEW OBSERVATIONS
OCTOBER
1900
Serpentine River
Serpentine Lake
1340
(Nalaisk)
Adder Lake
1350
3rd Adder or McInnes Lake
2nd Adder or Hind Lake
Portage Lake
Portage Lake Stream or Britt Brook
(Hebesekel)
1st. Lake
2nd Lake
3rd Lake
1248
Right Hand Branch (Podopsk, Campbell River)
River Don or Long Lake Branch
Geological approximate contact line
North is Pre-Cambrian felsites & ea.
South is Granite
Approximate North-western boundary of unlumbered forest
NORTHUMBERLAND COUNTY
VICTORIA COUNTY
Long Lake (Quasquispac)
Tangent Lake
Spruce Mtn
Spectacle Lake
Blind Lake
Skutz
1256
Portage Road from Tobique River
1243
Lake Lhoks
Trowsers or Tobique Lake
(Belchesogamook)
TWIN MOUNTAINS
Sequaqueway
Camping grounds
Lumber camps
Smaller figures = depths in feet
Underlined figures = height in feet above mean sea level
Names in italics are new
Names in reversed italics are extinct
Larger rivers are only approximate
(See Bulletin of the Natural History Society of New Brunswick, No XIX)
Island of Milnagek Lake
1510
Watershed Ridge
1731
Ogilvie Lakes
Mud or Milpagos Lake
1333
Gulquac Lake
1330
Grays Lake
1370
Costigan Lake
Merithew Lake 1390
Indian Lake
1405
Trout Lake
1445
Furbish Pond
Deadwater
a great bog
Beaverdam
Trail to Mapsk and Miramichi
Scale of Miles
0 1 2
2 miles = 1 inch

Gulquac Lake. About the same as Milpagos, or a little less. A single measurement checked by comparison with Fredericton gave 1,328 feet, an excellent agreement,—say 1,330 feet.

Grays Lake, 20 feet above Milpagos, hence 1,353 feet. A single measurement checked by comparison with Fredericton gave 1,389 feet,—say 1,370 feet.

Merithews Lake, 20 feet above Grays, hence 1,390 feet.

Indian Lake, 15 feet above Merithews, hence 1,405 feet.

Trout Lake, 50 feet above Indian, hence 1,455 feet. A single measurement checked from Fredericton gave 1,438 feet,—say 1,445 feet.

Furbish Pond, 25 feet above Trout Lake, hence 1,470 feet.

Long Lake, mean of six measurements, 1,256 feet.

Island or Milnagek Lake, by direct aneroid measurement, 265 feet above Long, hence 1,521 feet. A direct measurement checked from Fredericton gave 1,495 feet. As the six measurements must be given more weight than the one of Milnagek, we can place the height at about 1,510 feet. This makes it the highest lake of any size in the Province of New Brunswick.

The crest of the ridge separating Long and Little Southwest Miramichi Lake is 475 feet above Long Lake, and hence 1,731 feet.

Third Lake. One measurement checked from Fredericton gave 1,248 feet. The fall from Long Lake must be at least 10 feet, hence the above must be about correct.

Crest of the ridge on the portage from Third Lake to First Beaver Pond, 260 feet over Third Lake, and hence 1,508 feet.

First Beaver Pond, 160 feet over Third Lake, hence 1,408 feet. A direct measurement checked from Fredericton gave 1,428 feet,—say 1,418 feet.

Second Beaver Pond is a few feet above Portage Lake, hence say 1,275 feet.

Portage Lake, mean of three measurements, 1,268 feet. Its relation with Adder Lake would seem to show that this is considerably too low.

Adder Lake stands considerably above Portage Lake,—say 50 feet, hence 1,323 feet. A measurement checked from Fredericton gave 1,327 feet. As this lake is, however, at least 10 feet higher than Serpentine, into which it flows, we must assign to it a greater height than the above figures signify,—say 1,350 feet.

Second Adder or Hind Lake, 100 feet above Adder, and hence 1,450 feet.

Third Adder or McInnes Lake, 15 feet over Hind Lake, hence 1,465 feet.

Serpentine Lake, mean of two measurements, 1,350 feet. The heights for Adder and Serpentine are inconsistent, as Adder flows into Serpentine by a swift broken stream. Hence we must lessen somewhat the height of Serpentine (despite the fact that McInnes makes it 1,460 feet), and we may call it 1,340 and Adder 1,350 feet.

Stillwater, mean of six measurements, 1,212 feet.

As this paper is in press, I have received Mr. Furbish's heights, obtained independently by him from his own aneroid, but checked by the same Fredericton readings used by me. He makes Trowsers as a mean of six readings,

1,229 feet; Milpagos, two readings, 1,272 feet; Gulquac, three readings, 1,331 feet (a remarkable agreement with my calculation); Long, five readings, 1,243 feet. The remainder of his measurements run much lower than mine. Nalaisk Mountain, 2,529 feet. (See next note).

It will be observed that my measurements of all altitudes measured by Mr. McInnes differ from his by a little over 100 feet, mine being that much lower. This discrepancy I am entirely unable to explain.* I have, however, made so many measurements, and checked them so carefully by synchronous readings at Fredericton, and they are, as a whole (with the single exception of Adder Lake above), so consistent, that I have confidence in their essential correctness.

Lake Depths.—The depths of the various lakes as found by our soundings are shown upon the accompanying map. Some of them, such as Milpagos, are very shallow. The greatest depth we found was near the middle of Long Lake, 117 feet. Although this depth is not very considerable, it is the greatest yet recorded for any lake in New Brunswick.† Of course the lakes are shallowest near their upper ends where streams enter.

Facts of Interest about Particular Places.—The source of the Right Hand Branch of Tobique River is at the head of the middle of the three tiny brooks flowing into the upper end of Furbish Pond. This pond is small and shallow, fringed with bog and is a great haunt of moose. Trout Lake is an isosceles triangle, with the stream flowing from the middle of its base, so, if a more distinctive name were needed, it might well be called Triangle Lake. Its shores are entirely composed of small flat boulders of a crystalline shistose rock weathering very white, unlike any other we noticed on our trip. Indian Lake is very beautiful with its high-wooded shores, while Merithews Lake is a gem. Oval in shape, with mostly rocky shores, and with high hills on the immediate west, it is one of the prettiest smaller lakes of the province. Grays Lake is much like Milpagos. Milpagos is a very shallow lake, broken into many arms, and with reeds and other water plants growing all over it. It is a great haunt of moose. Gulquac Lake is one of the prettiest of the entire group, made so by its hills and ridges, of which a particularly fine one is on the west. Its level

* Mr. McInnes writes me that he made about thirty aneroid readings at the times of the Fredericton readings, by which they were afterwards checked.

† Mr. J. W. Bailey tells me, however, that he has obtained 165 feet in Glazier Lake, on the St. Francis, near the New Brunswick side.

is kept a foot or more higher than normal by a huge beaver dam across its outlet. This dam was described by Hind, and his description is still applicable. The southern end of the basin is filled by an immense bog through which meanders the deadwater stream. It is more frequented by moose than any place I have ever seen. In one day we counted nine about it, while Mr. Furbish on another day saw no less than fourteen. Trowsers Lake is attractive, though injured by the dead trees killed by the dam at its outlet. This dam holds the water some six feet above its normal level, so that for natural depth the figures on the map are six feet too high. The Twin Mountains on the east cannot be seen from most of the lakes, but only from near the Long Lake Portage. Blind Lake is very pretty with high wooded banks. It seems about twenty feet above Trowsers Lake. It is said to have no inlet nor outlet, but probably it has both through the great boulders of which its basin appears entirely to consist. Lhoks Lake is a beaver pond, at least in part. The Portage from Trousers Lake is low, and appears to follow some ancient communication between the two valleys. Long Lake is by far the most beautiful of all the larger lakes. It has no dam at the outlet and hence the shores are unmarred. Bold headlands are numerous, while the hills are everywhere fine and the views up and down particularly grand. It is one of the few lakes in the province containing togue, a fish which seems to occupy only deep lakes. Off to the southward is the great watershed ridge, nearly 500 feet high, separating these waters from the Miramichi system. Island or Milnagec Lake lies over 250 feet above Long Lake, into which it tumbles by a very pretty brook in a series of cascades. It is extremely beautiful, with its many wooded islands and splendid wooded ridges about it. It occupies a great hill basin apparently on a height of land between the Long and Trowsers Lake valleys. It is wild and untouched in any visible way by the hand of man. It is at the same time the highest and one of the most charming of New Brunswick lakes. Third Lake resembles Long, but Second is spoiled by a new dam. The beaver ponds on the portage road to Portage Lake, are very typical and show new dams. Portage Lake is also attractive, the more so from the new beaver dams and houses at its upper end. Adder Lake has the usual high wooded shores. Into it, at the western end there falls by a series of cascades, a large stream. A mile up this stream lies Hind Lake, about which

the game trails are more abundant than I have seen them elsewhere in New Brunswick. One can walk around the lake with ease on these well beaten paths. Fresh beaver dams and houses are abundant. A little further on lies McInnes' Lake, also the haunt of much game. Looking across it to the south-east, one can see the high watershed ridge, and beyond that Cow Mountain looms up. The forest about these lakes is more open than elsewhere, and here and there are some open spots where the huge dry boulders are covered simply with reindeer moss, constituting a sort of small barren. Serpentine Lake is, like most of the others of the chain, hill encompassed. The points, so characteristic of the lake, are largely of boulders; hence the shape of the lake as seen on the map is not the true shape of the valley in which it lies, for the latter is much more regular.* Between most of the lakes are good portage paths, many of them well beaten, and probably used for ages. In some places, however, they have become confused by the lumber roads, and between Third Lake and Portage Lake the old trail has been partially abandoned, and the lumber roads are used instead.

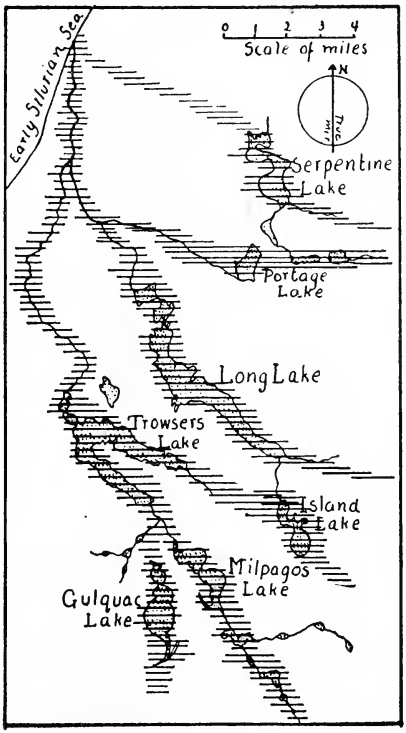
Geology.—All that is known of this subject is to be found in the reports of Hind, and Bailey and McInnes, already mentioned. We have nothing new to offer.

Natural History.—All that has been published is the work of Allen, already referred to. The botany will be treated from a floristic point of view by Mr. Hay. My own studies were entirely upon the plant-formations, an ecological study, upon which a report will later be offered.

The Origin of the Lakes.—An inquiry into their origin makes it at once clear that we are here dealing with a very typical group of Glacial lakes. A visit to the region, and even the inspection of the map, crude as it is, shows that the lakes lie in a series of nearly parallel or somewhat radiating valleys, into and across which masses of Glacial drift have been thrown. In some cases the drift formed a dam across the valley, leaving a part of it of its original depth, or nearly, as in the case of Long Lake, whose depth is thus explained. In other cases the valley has been well filled with the drift which, thrown down with great irregularity, has produced a shallow lake

*The dam at the outlet of this lake held the water up about two feet, and hence for natural depths that amount is to be deducted from the figures on the map.

broken by points and islands. An extremely good example of this type of lake is Milpagos, whose many points and islands are moraines. Indeed it would be difficult to find in the province two finer examples of the two extreme forms of Glacial lakes than Long and Milpagos. Of course there are all gradations between these types. Of morainic origin are the many islands in Island or Milnagek Lake, which have their long axes parallel and nearly northwest and southeast. The great peninsula dividing Trowsers Lake into two "legs" is largely, if not entirely, a huge moraine. The valley in which this shallow lake lies is evidently largely drift-filled.



So much for the origin of the present lakes. The question now arises as to the origin of the valleys in which they lie. Of these there are several, partially parallel, but with a tendency to a radiation southward and convergence northward, a fact brought out with the greatest clearness when we shade them along their approximate axes, as has been done in the accompanying map. Very distinct is the valley occupied by the chain of lakes from Furbish Pond to Trowsers Lake, and this is the longest and perhaps the main valley, into which the others fall. Gulquac occupies a parallel valley, and perhaps emptied by some of the Ogilvie Lakes into Trowsers. Possibly Island Lake belongs really to a smaller valley of the eastern leg of Trowsers, and its fall into Long Lake may be post-Glacial. Particularly distinct is also the Long Lake valley, and the depth of Long Lake shows how deep the valleys may have been.* Another is the Portage-Hind-

* Possibly this depth is due in part to the gouging action of glaciers, but damming of a deep valley seems more probable.

McInnes Lakes valley, which emptied probably in pre-Glacial times along Britt Brook. The Serpentine seems to occupy still another distinct valley. Since the Serpentine River has throughout its course the appearance of a comparatively new river, it is likely there was an older outlet of the lake valley into the Right Hand Branch. Possibly this occurred through the valley now occupied by the brook flowing into the extreme northern end of the Serpentine Lake, for I find on McInnes' large-scale map this legend on this brook "heads very near the left hand branch of Britt Brook." There appear then to be here three or four main valleys, with two or three minor ones, all converging northwards and uniting at different points, until, somewhere north of the Forks of the Right Hand Branch and the River Don, all have united into a single trunk valley. (See the map). I have not seen the valleys of these rivers below the lakes, but it is probable that, allowing for changes caused by Glacial drift, they show the characteristics of ancient valleys. Certainly this is the case with the portions occupied by the lakes, and above them. They all have a marked northern slope, and the smooth rounding of the hard pre-Cambrian rocks of their walls indicates great age. A very high watershed ridge separates them all from Miramichi waters. Gathering these facts together, then, we must conclude that these valleys are branches of an ancient river draining these highlands northward from very ancient times. Looking now at the geological map, we notice that the Silurian rocks of the great northern plateau approach near to the Forks of the Right Hand Branch and River Don, that is, near where all the valleys converge. It is altogether probable, then, that this ancient river is pre-Silurian, and in the Silurian period poured its waters from these highlands (of course then far above their present level) northward into the great Silurian sea, which occupied all the northern part of the province. Later, as the land arose, the present main Tobique River was formed by its drainage, and of course it received also the waters of our ancient valleys, which helped to make it, and swung them with it to the southwest. The valleys of these lakes, then, are pre-Silurian and much older than the main Tobique, and are among the most ancient in New Brunswick. The great height of the ridge separating them from the Miramichi system, and the evenness of the pitch northward of the valleys, would indicate that they are homogeneous streams, and have never captured the waters of other rivers, nor had

their own waters captured by any others, except, of course, by the main Tobique.

Economics.—A question of great importance now naturally arises as to the economic value of this Negoot region, a question which not only concerns members of this Society as citizens of New Brunswick, but as men of science, for the advancement of science is inseparably dependent upon the increase of material wealth. It is entirely and absolutely useless for the most part for agriculture, and it has shown few or no evidences of mineral wealth. There is, however, one service to which it is grandly adapted, namely, the growing of useful trees. It bears now one of the finest forests of New Brunswick, one which has never been burnt and which has not, as yet, been injured by injudicious lumbering. It is naturally one of the regions which the province would set aside for a forest reserve, to be managed upon good forestry principles, when the time arrives for such action, as it soon must. But unfortunately the greater part of it, all the part west of the county line and including all the Trowsers Lake and Long Lake systems, has passed out of the possession of the province. It is a part of the grant to the New Brunswick Railway Company, and is now the property of that corporation. Doubtless, however, mutually satisfactory arrangements between the province and the company for its management will be made in the future.

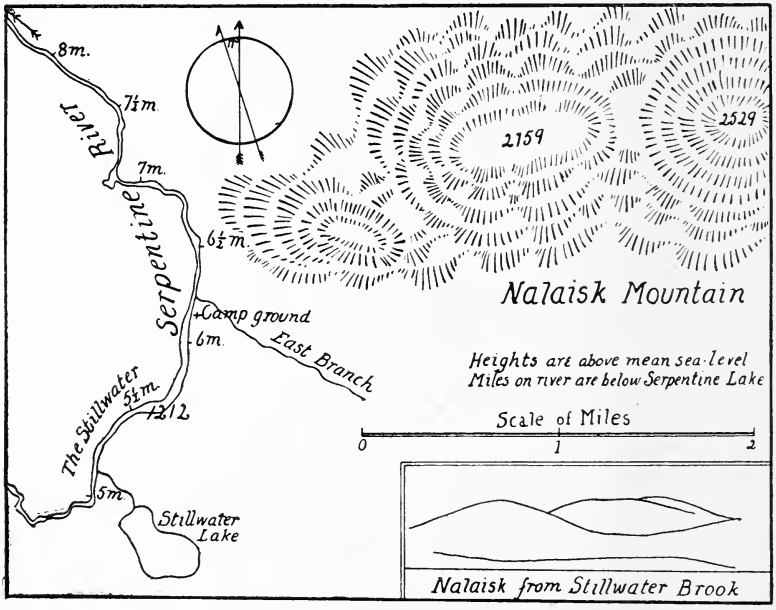
A second use of the region is as a game preserve. Its remoteness and difficulty of access have aided the laws to preserve the larger animals, with the result that these are now very abundant, as mentioned earlier in this paper. The waters also abound in large trout and Long Lake with togue. A continuance and extension of the present wise policy as to game preservation will make this region increasingly valuable as an attraction to sportsmen of wealth.

A third use of the region is as a camping and recreation ground for vigorous New Brunswick youth,—for its manly young men who love outdoor sport and nature, and the free, ennobling and health-giving life of the woods. There is no grander sport than the management of one's own canoe on these swift rivers and charming lakes, no greater feeling of triumph over obstacles than one has when, unguided and unaided, he makes his way from lake to lake, and river to river, seeking out his own paths, transporting his own outfit, exercising his own powers of generalship and ingenuity. There can be no greater

joy than the penetration on glorious summer days to the summits of great hills that have rarely indeed felt the foot of man, or into lakes unmapped and unsuspected. The influences of such life are altogether good, and the young men of New Brunswick enjoy exceptional opportunities for it. Why do they not rise oftener to their great privileges?

40.—On the Height of Nalaisk Mountain on the Serpentine.

As one descends the Serpentine River from the lake, he sees, as he nears the Stillwater, a splendid double mountain towering before him, which impresses him as not only the highest on the river,



but as one of the highest in the province. It stands east of the angle where the river first makes its great bend to the westward (see the accompanying map) and is shown without name, but not in quite the correct location, upon the Geological Survey map. In July last, upon a very favorable day, I was able to measure its height. It consists of two peaks; the western and lower is nearly bare and rocky, and commands one of the grandest hill and forest views in New Brunswick, while the eastern and higher is densely wooded. The western peak is

by direct aneroid measurement 947 feet above the Stillwater, which by a mean of six observations, made synchronous with and corrected by readings at Fredericton, is 1,212 feet above mean sea-level. The western peak is therefore 2,159 feet above the sea. But the eastern peak is by direct aneroid measurement 370 feet above the western, and hence 2,529 feet above the sea, thus making Nalaisk one of the greater mountains of the province. All of my measurements are conservative throughout, and below rather than above actual height; hence Nalaisk certainly belongs to the honorary 2,500 foot class of New Brunswick mountains.*

Some five miles away, bearing N. 22° east magnetic (from Bald Head N. 75° east magnetic) is another great mountain far back from the river, and seemingly higher than Nalaisk.

The name Nalaisk perpetuates the ancient Indian name of the Serpentine. It is unquestionably the mountain referred to by Lugrin, in an article in the St. John *Globe*, Feb. 10, 1886, when he states, after referring to Bald (Sagamook) Mountain and others, "the Indians say that Noll-isk Mountain on the Serpentine branch is higher than either of them."

41.— On a Remarkable Crateriform Spring near the Negoot Lakes.

Some four miles south-east of Long Lake, of the Negoot chain, and nearly on the county line, is a shallow valley with a tiny stream emptying towards the Little South-west Miramichi Lake. On the flat bottom of the valley, near the stream and amongst a dense growth of the usual hardwood swamp trees, lies a beautiful spring, very clear and very cold. It is nearly circular, and some two or three feet across and over a foot deep, and is especially peculiar in this, that its water surface stands a foot or more above the general level of the ground, held up to that height by a symmetrical wall forming a regular basin, as a lake may be held in the crater of a volcano. This wall was

* This class includes only Sagamook, Carleton, Big Bald, Nalaisk, that have been measured; but unquestionably there are very many others still unmeasured in less accessible places. Perhaps Cow Mountain belongs in the series, though Mr. W. B. Hoyt, of Andover, informs me that he has measured it by aneroid (unchecked for weather) and partly thus and partly by triangulation, has made it 2400 feet. Mr. Hoyt sends me a number of aneroid measurements made in that vicinity, but as they are unconnected from any fixed base, they can be but rough approximations.

evidently built by the spring itself. It seemed to consist chiefly, if not wholly, of vegetable matter, including many fine interlacing roots, possibly those of the neighboring trees attracted to this position by their hydrotropism. Unfortunately, conditions at the time of our visit (in July last) did not allow us to make a careful examination. The guide accompanying Mr. M. I. Furbish, my companion at the time, stated that he had seen somewhat similar, though much less perfect, examples in the hardwood regions in Maine. I do not myself recall having seen anything like it elsewhere.

42.—On a Strange Position for a Peat-bog.

In the angle between the Main Tobique River and its Right-hand Branch, some five miles back from both, rises Bald Head, in many respects the most striking, easily-recognized and mountain-like mountain in New Brunswick. It rises perfectly abruptly some thousand feet above a flat basin, and its steep bare top is a conspicuous and unmistakeable object from every direction. It is locally reputed to be simply a heap of loose stones, which well describes the impression it makes upon one, but the description is not correct, for the top is of ledge rock. The southern slope is inaccessible, but the northern is easy to climb, though it consists of large, loose, angular felsite boulders at as steep a slope as they can rest. This slope, measured by a protractor on one of Mr. Hay's photographs, is 30°; but, owing to the distortion produced by the camera, it must be considerably greater. Upon this northern slope, resting upon the loose rocks, lie several small living sphagnum bogs. It is a sight calculated to make any botanist rub his eyes and wonder if much study hath not made him mad. These bogs are from about half an acre in extent down to a few square yards. At their upper margins they consist of the ordinary dry turf formed by the roots of trees, etc., not infrequent over rocky places, but downwards this passes gradually over into sphagnum bog, bearing Kalmia, Ledum, dwarfed spruces, and the other characteristic raised-bog (Hockmoor) vegetation. The bog reaches its greatest perfection at the lower margin, where the red sphagnum occurs in dense rounded polsters, evidently with sufficient moisture for healthy

* The Geological Survey map makes it 1,866 feet above mean sea-level. In July, 1900. we made it by aneroid over 1,000 feet above the basin in which it stands, and 1,425 feet above the bridge at Riley Brook,

growth. Their aspect here is almost identically that of the raised bogs which have been described from other parts of New Brunswick.* At the lower margin they are most bog-like, some two feet thick, and they end downwards with an abrupt rounded edge. Evidently the water in them settles to the lower edge, promoting the more vigorous growth there, and causing them to grow down the slopes. Such bogs demand much pure water for their growth, and the question now arises as the source of supply in this case. Two explanations appear possible. First, the bogs may have formed when the whole slope was heavily forested (as the many blackened stumps show that it was until recently), and since then they have managed to soak in enough water from the rains to keep them growing, the northern abrupt slope of the mountain protecting them from great evaporation. In this case they would simply be the remnants, rapidly disappearing, of once extensive bogs. Against this view, however, is the fact that such bogs do not appear to grow upon forested felsite hills in this region. I have been upon a number of them and have never seen such bogs Moreover, even if they are such remnants, it does not explain the source of the water sufficient to keep such extensive bogs supplied, for rain alone could scarcely do it in such a perfectly drained situation. The other explanation is that there is some peculiarity in the structure of this mountain which produces the storage of water under the rocks in spots, allowing it to escape gradually after the manner of springs. But no trace of such a structure is to be seen. The subject is very puzzling.

43.—Evidences of the Sinking of the Coast of New Brunswick.

Several of our writers on recent geology, notably Gesner, Matthew and Chalmers, have given evidence to show that the New Brunswick coast is sinking at several points. The following facts are of interest in this connection :

In 1797 a very careful survey of Dochet Island was made by Thos. Wright, Surveyor-General of Prince Edward Island, in connection with the boundary controversies, and his map has recently been published.† One prominent and easily-recognized ledge has this

* Upon Raised Peat-Bogs in New Brunswick. Transactions of the Royal Society of Canada, iii, 1897, section iv, 131.

† Transactions of the Royal Society of Canada, v, 1899, section ii, 264.

legend: *High Ledge somewhat green at its top.* This green can, of course, only refer to vegetation, since the ledge is red. That ledge to-day bears not a trace of any vegetation, apparently because the sea now washes high enough to prevent it, though otherwise the situation is a favorable one for the lodgment of some plants. The evidence of ecology shows that vegetation tends, unless prevented by unfavorable outside influences, to increase, not to diminish, in such places.

Gesner states in one of his papers that the gateway of old Fort Monckton, once of course well-above sea level, was in his time washed by the sea. He must refer here to the approach of the sea against the Fort through the washing away of the coast rather than to an actual dipping of the ground level of the Fort beneath the sea level. The exact extent of the washing away of the coast at Fort Monckton since it was built is happily known. Two maps recently published* show the outline of the coast near the Fort when it was built, about 1751 (from a very careful survey made by the eminent French Engineer Franquet), and the outline in the year 1897. Comparison of the two shows that about thirty-five yards of the upland have been washed away on the north-east corner, and over double that amount on the south-east side. This washing away of the upland can only be explained by a marked sinking of the coast, though the amount of the sinking is not thereby determined.

* Op. cit. 289, 290.

ARTICLE VII.

PRELIMINARY LIST OF NEW BRUNSWICK FUNGI.

By G. U. Hay.

No list of fungi of the province has been published since Professor Fowler prepared a short list, more than twenty years ago. It has been felt for some time by the members of this Society that a systematic attempt should be made to study the fungi of this province. The difficulty of preserving many of the species and the want of suitable text-books to assist in identifying specimens, have been obstacles. Several of our members who have been interested in this useful class of plants have promised their assistance. It is thought advisable to publish the following preliminary list, which embraces the collections made by the Misses Van Horne, at St. Andrews, and by the writer at Ingleside during the past two seasons. The list is a small one, and takes in for the greater part only a few of those popularly known as Mushrooms or Toadstools, Puffballs, etc. It is hoped, however, that the list, imperfect as it is, will serve to draw attention to this important class of plants, and lead to a closer study of them throughout the province.

Care has been taken to have this list correct. All critical species collected by the Misses VanHorne were submitted to Prof. Peck, State Botanist of New York, for his decision, while those collected by the writer have been identified by Prof. Farlow, of Harvard University.

No attempt has been made, except in two or three well-known instances, to separate the poisonous from the edible species. To give directions which shall enable anyone to distinguish harmless species from those that are injurious, is practically impossible, as certain edible species resemble closely those that are poisonous. It is better, therefore, in selecting for the table, to avoid all except those that have been pronounced upon by expert authorities. The caution given by a

writer on mushrooms and toadstools should be remembered: "Any toad-stool with white or lemon-yellow gills, casting white spores when laid—gills downward—upon a sheet of paper, having remnants of a fugitive skin in the shape of scabs or warts upon the upper surface of its cap, with a veil or ring, or remnants or stains of one, having at the base of its stem—in the ground—a loose, skin-like sheath surrounding it, or remnants of one, should never be eaten until the collector is thoroughly conversant with the technicalities of every such species, or has been taught by one whose authority is well known, that it is a harmless species. . . . Safety lies in the strict observance of two rules: Never eat a toadstool found in the woods or shady places, believing it to be the common mushroom. Never eat a white or yellow-gilled toad-stool in the same belief. The common mushroom does not grow in the woods, and its gills are at first pink, then purplish-brown or black."—*McIlvaine.*

The advice, "Have nothing to do with any except those that are well known," is safe. But there is abundance of good wholesome food going to waste every year for want of a little knowledge about the common species of fungi, known as mushrooms or toadstools, that grow in our fields and woods. Should not our Society make an attempt to help people to secure some desirable information on this point?

A recent book on the subject—Studies of American Fungi: Mushrooms, Edible, Poisonous, etc., by Prof. Atkinson, of Cornell University, price $3.00, will be found attractive to the beginner and useful in determining the more common species.

HYMENOMYCETES.

AGARICACEÆ.

AMANITA MUSCARIUS, Linn. Poisonous. In woods, chiefly birch and fir. Common.

AMANITOPSIS VAGINATA, Bull. Var. *fulva*, Schaeff. Yellowish.
Var. *livida*, Pers. Leaden brown.

CLITOCYBE INFUNDIBULIFORMIS, Schaeff. Plentiful after rains.

C. OCHROPURPUREA, Berk. On clayey soil in woodlands.

COLLYBIA BUTYRACEA, Bull. Solitary and in clusters under coniferous trees.

C. ACERVATA, Fr. In clusters on decaying wood and among fallen leaves in woods.

PLEUROTUS PORRIGENS, Pers. Wholly shining white. On stumps, chiefly pine.

P. SEROTINUS, Fr. Dead trunks of deciduous trees.
OMPHALIA CAMPANELLA, Batsch. Debris of coniferous trees.
HYGROPHORUS MINUATUS, Fr. In open places.
H. EBURNEUS, Bull. Wholly shining white. Woods and pastures.
H. ERUBESCENS, Fr. In pine woods.
LACTARIUS DELICIOSUS, Fr. In woods.
L. PIPERATUS, Fr. In mixed woods.
RUSSULA HETEROPHYLLA, Fr. In woods.
R. EMETICA, Fr. In woods and open grounds.
R. AURATA, Fr. Cap brightly colored. In woods.
R. ALUTACEA, Fr. In mixed woods.
CANTHARELLUS CIBARIUS, Fr. Open woods and grassy places.
C. AURANTIACUS, Fr. Orange-yellow. On ground and very rotten logs.
MARASMIUS OREADES, Fr. Growing in circles or rows in lawns and pastures.
LENTINUS LEPIDEUS, Fr. On pine and other timbers.
PANUS STIPTICUS, Fr. Gregarious on stumps.
TROGIA CRISPA, Fr. On wood.
CLITOPILUS ORCELLA, Bull. In pastures and open places in wet weather.
CLAUDOPUS NIDULANS, Pers. On decaying wood in autumn. Not common.
CORTINARIUS VIOLACEUS, Fr. Gills, stem and cap violet colored when young.
C. ARMILLATUS, Fr. In moist woods.
C. CINNAMOMEUS, Fr., var. *semi-sanguineus*, Fr.
AGARICUS CAMPESTER, Linn. The common Mushroom. Pastures and open places.
A. SILVICOLA, Vitt. Woods, copses, or along their borders. Edible, but the poisonous Amanita may easily be mistaken for it.
COPRINUS ATRAMENTARIUS (Bull.), Fr. Growing singly or in clusters in rich soil by waysides.

POLYPORACEÆ.

BOLETUS PIPERATUS, Bull. Woods and open places. Common and variable.
B. EDULIS, Bull. Woods and open places.
B. LURIDUS, Schaeff. In moist woods.
B. VERSIPELLIS, Fr. Woods and open places.
B. SCABER, Fr. Appearing through summer and autumn.
B. CHROMAPES, Frost. Woods.
B. CLINTONIANUS, Peck. Mossy or grassy ground in woods or open places.
B. SUBTOMENTOSUS, L. Common and variable.
B. BOVINUS, Linn. Pine woods.
B. FLAVUS, With. Apparently rare.
POLYPORUS PICIPES, Fr. On trunks, especially willow.
P. BETULINUS, Fr. On living and dead birch.
P. ELEGANS, Fr. On trunks, chiefly birch.
P. RADIATUS, Fr. Very much imbricated, on hazel, alder, etc.
P. FOMENTARIUS, Fr. On trunks. Common.

P. VERSICOLOR, Fr. On dead wood. Exceedingly common.
P. FUMOSUS, Fr. On old stumps. Common.
P. PERENNIS, Fr. On the ground and stumps. Common.
P. LUCIDUS, Fr. On and about stumps. Summer.
POLYSTICTUS ABIETINUS, Fr. On fir. Common.

HYDNACEÆ.

HYDNUM IMBRICATUM, Linn. In pine and mixed woods.
H. RUFESCENS, Pers. "The Hedgehog Mushroom." Edible.
H. COMPACTUM, Pers. In fir woods and on heaths. Rare.

CLAVARIACEÆ.

CLAVARIA AMETHYSTINA, Bull. A handsome species. Violet color. Open woods and grassy places.
C. FASTIGIATA, Linn. In grassy places.
C. CORALLOIDES, Linn. In shady woods.
C. CRISTATA, Pers. Common in woods.
C. AUREA, Schaeff. "Occurs after heavy rains."—McIlvaine.
C. FORMOSA, Pers. Growing in large tufts.

TREMELLACEÆ.

TREMELLA MESENTERICA, Retz. Bright orange. An apparent exudation from sticks, branches, etc.

GASTROMYCETES.

LYCOPERDON PYRIFORME, Schaeff. Pear-shaped puff-ball. In dense clusters. Common.
L. GEMMATUM, Batsch. Gemmed puff-ball. Growing on ground and rotten trunks in woods.
SCLERODERMA VULGARE, Fr. Common. Under trees.

HELVELLACEÆ.

MITRULA VITELLINA, Sacc. Small. Very bright yellow. Gregarious. Delicate flavor.

APPENDIX.

PRESIDENT'S ADDRESS.

THE OUTLOOK OF OUR SOCIETY.

By G. U. Hay.

(Read at the Annual Meeting, January 16, 1900.)

After a four years' term of office as president, it is fitting, in giving place to my successor, to pass in review the work of our Society, to see if we are making progress, and to note whether that progress is substantial and serves to interest the whole community in the objects which we seek to further. In handing over the responsibilities as well as the pleasures of leadership, it is a source of the deepest gratification to acknowledge the cordial and diligent support you have given to me as president, and to ask for that same hearty co-operation of effort for my successor. While our members are few, and the number of our active workers still fewer, it is a cause for congratulation to note the unanimity with which every department of work is earnestly taken up and pushed forward from year to year. If differences of opinion have arisen, they have not for a single moment been allowed to interfere with the harmonious and useful work which the society is endeavoring to accomplish. Indeed, it must be that many of our members are called upon to make personal sacrifices in so unselfishly giving their time and abilities in furthering objects which have become very dear to us, and which, taken collectively, must be of some considerable material advantage to this province.

In a society such as ours, there are two distinct objects which should be constantly kept in view,—first, to stimulate by papers, discussions and by social intercourse an interest in natural history, and to educate and direct public interest therein; second, to carry on original research, so that not only our own people but the whole

world, may have some intelligent conception of the natural history and resources of New Brunswick. Both these objects are closely related; both are important. Our annual Bulletin, which contains a report of progress, shows that we do not content ourselves with lectures merely, and that our museum is not solely for the instruction of our members, the public generally, or children from the schools. Our bulletin sends forth a message every year to the scientific students of every country in the world where research is going on, informing them what the keen vision and working spirit of our members is accomplishing. The scientific visitor from abroad need not be in our museum many minutes before he finds out which we place most value upon—the products of other countries or the products of our own. By these tokens we should always be estimated. If we would continue to be known as a live society, we must continue to add from our province new material for scientific workers to draw new conclusions from, and to think about; not merely to turn over and re-discuss the facts of science that are already known. And if there is one thing that I would strive to impress on you more than another this evening, it is to urge you to fresh efforts along the line of original investigation. We have accomplished much. There is much more to be accomplished. We need more workers, it is true. But when we think that everywhere the work of the scientific explorer —that initial work that must be done in all countries such as ours— has been done by a few earnest investigators, we should take heart and each one press on in the special work he can do best. This involves sacrifice, for all of us are engaged in other affairs, and this extra duty that is undertaken voluntarily must be accomplished while others are taking rest or finding relief from their regular work in social recreation and pleasures. But there is a reward about it even in the life of self-denial that it entails,—much more, too, in the joy that there is in making discoveries that will benefit the world. I realized this a few months ago when I stood beside the chair of Sir Wm. Dawson in the twilight of a summer afternoon and heard him speak of some of the triumphs and hardships of a life that was just drawing to a close. He has since passed away, full of honors that come from continued effort, earnest self-sacrifice on behalf of science, and a diligent spirit. We delight to revere his memory for

these qualities,—incentives to every worker, no matter how limited may be his field of enquiry. Shall we not profit by his example? feeling that in the interest he always took in our society, he saw in it the evidence of a live spirit of research, and that bent for original investigation which characterized his own work.

It may be well to glance—and I shall do it very briefly—at some of the results of our investigations of recent years. It is well to pass in review occasionally the results of our work. It is a stimulus to increased effort in the future, because if we glance at present work alone we are apt to be discouraged at the small results accomplished in one season.

In geology Dr. Matthew has narrowed his work to the almost exclusive study of the fossil remains found in the slate beds that underlie the city of St. John. The results, published from time to time in our Bulletin, in the Proceedings of the Royal Society, and elsewhere, have attracted the attention of specialists throughout the world, the thoroughness and importance of the work being attested to by the large number of new species which have been added to science as a result of his investigations. This chapter of our geological history, when it comes to be written, will furnish a striking illustration of persistent and patient enquiry on the part of one of our members.

In botany scarcely a year has elapsed during the past twenty years in which some additions have not been made to the list of plants of New Brunswick. Many new areas have been examined and notes made of their agricultural capabilities, and of the species of plants found there. A new and revised edition of our flowering plants is greatly needed, and it is hoped that this will be prepared very soon. It is a sign of progress, also, to note that more attention is being given to the habits of plants, and how they adapt themselves to conditions of climate, soil, etc. A great impetus has been given in this direction by the publication of Prof. Ganong's papers on ecology and kindred subjects. Another indication of progress is seen in the beginning that has been made to study the flowerless plants of the province, especially the mosses, by Mr. John Moser, and the interesting list of fungi furnished to the Society by the Misses Van Horne and others. When one sees valuable food material such as exists in mushrooms, yearly going to waste for want of a better knowledge of

them ; when one sees destructive fungi and vile weeds causing the loss of valuable crops, he could wish that the intelligent study of plants were pursued by hundreds.

* * * * * *

A few years ago we knew little or nothing of the insects of our province, or what species were found here ; and there were few types in our museum that would help a student. Now we have some hundreds of species attesting to the activity and intelligent study given by Mr. McIntosh and his assistants to this important department. When we think how useful it is, not only to science generally, but to our agricultural industries especially, to have a minute and accurate knowledge of insects, particularly those that are beneficial or injurious to our agricultural interests, we cannot emphasize too much the importance of the work that is being done in this direction.

And here I may mention what our society has been aiming to do in its elementary work during the past few years, in throwing open its museum to the public, especially to the children of the public schools, and in giving elementary and laboratory instruction to all who choose to attend. We cannot estimate this work too highly, nor be unwilling to make some sacrifices to maintain it, even though popular interest is not fully aroused to take advantage of it. It will be aroused if we persistently keep at the work of elementary instruction, for in that, to a great extent, our future success is largely bound up. It is in interesting young people, especially in our Society and its objects, that we must depend for an increase of our membership ; and in carrying on our work when those who are now our active members shall lay down the burden.

And while I am speaking of our elementary work, I should refer to the interest taken in our regular monthly meetings and the subjects there discussed. Take, for example, the programme of our regular work for this winter. It is full to overflowing on topics that are live and interesting, each one of which is important as illustrating the various phases of work in which the society is engaged. Prof. Ganong's continued interest is a source of strength to us. His notes from time to time on the physiography of New Brunswick and kindred topics are of very great value to our members as well as to the province.

The collection of birds in our museum, chiefly the results in past years of the work of Mr. Chamberlain and his assistants is of great interest to visitors. Mr. Leavitt is not only increasing this important collection, but by his lectures on bird life and structure, their protection and migration, he is laying a good foundation for the study of bird life and habits.

With the exception of birds and insects, our department of zoology is rather weak. Mr Rowe and his fellow-workers have done some service in making us acquainted with a few native reptiles and amphibians; and I mention with pleasure the obligations we are under to Mr. W. A. Hickman, whose lectures and field work while with us have given an impetus in the study of zoology.

In the department of archæology a great interest has been aroused chiefly through the efforts of Dr. Matthew, Mr. S. W. Kain and Miss Jack. Our collection of native Indian relics is a very important one, and cannot fail, as the years advance, to become one of the most valuable portions of our museum.

We have seen during the past few years one branch of our society steadily growing in importance—the Ladies' Association. Owing to its exertions our library has been catalogued and improved, our museum thrown open to the public three times a week by engaging a competent assistant curator; our financial condition is improved, and a general air of refinement and homelikeness given to our surroundings.

There is a subject mentioned in the last two annual addresses to which I must make a passing reference in closing, and that is our pressing need of a new building, coupled with the equally pressing need of a stronger financial support for our society. We are doing a good work for the country; we are doing it in rooms so limited that we can no longer find suitable accommodation for our museum; and our finances are such that only the most rigid economy enables us to carry out and publish a meagre outline of what are the chief objects of this Society, namely, the carrying on original research in this province and publishing the results of it. With a new building and a larger income our society would enter upon a new era of usefulness.

REPORT OF THE COMMITTEE ON BOTANY.

The Committee on Botany report that during the past two seasons several districts of the province have been visited and notes taken of the flora, viz.: The country near the mouth of the Restigouche in the summer of 1899, visited by members of this Society and of the Summer School of Science; the Upper St. John and Aroostook rivers by Prof. Macoun and Mr. Hay in the fall of 1899; the South Tobique Lake region, including the Serpentine and Sisson Branch (branches of the Tobique), by Prof. Ganong and Mr. Hay in the summer of 1900. A list of the plants about Campbellton was made by Mr. Jas. Vroom, assisted by members of the Society and members of the Summer School. Some of the rarest or least known plants found there are named in the list appended.

The visit of that experienced botanist, Prof. Macoun, to the Upper St. John revealed the presence of quite a number of plants in localities where they have not hitherto been found in the province. Among other points which Messrs. Macoun and Hay tried to decide on their visit was, whether the fern *Scolopendrium vulgare*, reported from the vicinity of Woodstock some years ago by the late Peter Jack, Esq., of Halifax, is to be found growing wild there. After a careful search no traces of the plant could be found.

Prof. Ganong and Mr. Hay spent nearly four weeks among the lakes of the South Tobique basin during the month of July, 1900. The season was rather early to get the best results, but eight species and varieties of plants not hitherto known to the province were found. A descriptive account of the botanical features of the country has been prepared by Mr. Hay, which will be published at a later date. Other features of interest to botanists concerning this little known region are given by Prof. Ganong in his "Notes" of the trip, to be found in this number of the Bulletin.

In the list appended, the new species and varieties are printed in full faced type. The numbers correspond to Fowler's catalogue (Bulletin IV). The thanks of the Committee are due to Prof. Macoun and to Mr. M. L. Fernald, of Cambridge, Mass., for the determination of critical species.

3 Thalictrum occidentale, Gray. (T. dioicum of former lists).

4*a* Anemone parviflora, Michx. Aroostook Falls. Restigouche River.

6-7 A. riparia, Fernald. (A. Virginiana + A. cylindrica of former lists). Bull's Island, Woodstock.

43*a* Arabis perfoliata, Lam. Aroostook Falls.

66 Viola renifolia, Gray. Grand Falls.

69 V. canina, L., var. Muhlenbergii, Gray. (V. canina, L., var. sylvestris, Regel, of former lists). South Tobique Lakes.

170 Rubus idæus, L., var. strigosus, Maxim. (Rubus strigosus, Michx., of former lists).

183 Potentilla Monspeliensis, L. (P. Norvegica, L., of former lists). South Tobique Lakes.

194 Rosa blanda, Ait. South Tobique Lakes.

200*a* Amelanchier oligocarpa, R. and S. (Amelanchier Canadensis, Torr. and Gray., var. oligocarpa, Gray, of former lists).

265 Viburnum pauciflorum, Pylaie. South Tobique Lakes.

307 Aster Lindleyanus, Torr. and Gray. Aroostook Falls.

308*a* Aster Tradescanti, L. Meduxnakik Creek, Woodstock.

323 Antennaria Canadensis, Greene. (Antennaria plantaginifolia, Hook., *in part* of former lists). South Tobique Lakes.

329*a* **Ambrosia trifida,** L. Ingleside.

346 Artemisia Canadensis, Michx. (A. caudata, Michx., of previous lists). Bull's Island, Woodstock.

352 Arnica Chamissonis, Less. Sisson Gorge.

356 Arctium Lappa, L., var. **minus,** Gray. Near Campbellton.

363 Cichorium Intybus, L. Campbellton. Ingleside.

363*a* Hieracium aurantiacum, L. Near Campbellton.

363*b* H. præaltum, Vill. Very common about the lower Restigouche and Upsalquitch. A pest to farmers.

416 Primula Mistassinica, Michx. Restigouche River. Aroostook Falls.

423 Anagallis arvensis, L. Ingleside.

440 Symphytum officinale, L. Campbellton.

453 Hyoscyamus niger, L. Campbellton.

505*a* **Plantago Rugelii,** Decaisne. Ingleside.

535 Rumex Patientia, L. (R. pratensis, of former lists). Ingleside.

547*a* E. maculata, L. Railway track near Campbellton. Railway track along Aroostook River.

548 E. Helioscopia, L. Campbellton.

583 Salix nigra, Marsh. Ingleside.

591*a* **Ceratophyllum demersum,** L. Eel River, mouth of Chase Brook.

611 Listera cordata, R. Br. South Tobique Lakes.

617*a* Goodyera Menziesii, Lindl. Near Squaw Cap Mountain.

660 Zygadenus elegans, Pursh. (Zygadenus glaucus, Nutt., of former lists). Campbellton.

701*a* Potamogeton heterophyllus, Schreb. Aroostook River.

707 Potamogeton pusillus, L. Chase Creek, near Woodstock.

713 Naias flexilis, Rostk. Chase Creek, near Woodstock.

724 Scirpus cæspitosus, L. Aroostook River.

732*a* **S. atrocinctus,** Fernald, var. **brachypodus,** Fernald. South Tobique Lakes.

753*a* Carex canescens, L., var. **vulgaris,** Bailey. South Tobique Lakes.

754*a* **Carex trisperma,** Dewey. South Tobique Lakes.

756 C. sterilis, Willd. South Tobique Lakes.

756*a* C. sterilis, Willd., var. **excelsior,** Bailey. South Tobique Lakes.

756*b* **Carex interior,** Bailey. Ingleside.

758 C. scoparia, Schk., var. minor, Boott. South Tobique Lakes.

765 C. aquatilis, Wahl. South Tobique Lakes.

766 C. torta, Boot. South Tobique Lakes.

768 C. stricta, Lam. South Tobique Lakes.

768*a* C. stricta, Lam., var. **curtissima,** Peck. South Tobique Lakes.

769 C. lenticularis, Michx. South Tobique Lakes.

773 C. crinita, Lam., var. gynandra, Schw. and Torr. (C. gynandra, Schw., of former lists). South Tobique Lakes.

775 C. Magellanica, Lam. (C. irrigua, Smith, of former lists). South Tobique Lakes.

777*a* C. atrata, L., var. ovata, Boott. South Tobique Lakes.

784*a* Carex eburnea, Boott. Grand Falls.

799 C. filiformis, L. South Tobique Lakes.

809 C. rostrata, Stokes. South Tobique Lakes.

809*a* C. rostrata, Stokes, var. **ambigens,** Fernald. South Tobique Lakes. "Very slender, 3 to 5 dm. high, culms barely 1 mm. in diameter below the spikes: leaves 2 to 5 mm. wide: staminate spikes 1 or 2; pistillate 1 to 3, globose or short-oblong, 1 to 2.5 cm. long: perigynium as in the species.—New Brunswick, South Tobique Lakes, July 18, 1900 (*G. U. Hay*, no. 41): Maine, sandy shore of St. John River, St. Francis, June 18, 1898 (*M. L. Fernald*, nos. 2076, 2077). Habitally resembling *C. resicaria*, but with the stiffer habit, the spongy culms smooth and bluntly angled above, the nodulose leaves, and the perigynia of *C. rostrata.*"—*M. L. Fernald in letter.*

815 Carex oligosperma, Michx. South Tobique Lakes.

815*a* **C. vesicaria,** L., var. **jejuna,** Fernald. South Tobique Lakes. "Smaller and more slender than the species; leaves mostly 3 mm. wide: pistillate spikes thinner, 5 to 8 mm. thick: perigynium turgid, roundish-ovate, 4 or 5 mm. long, abruptly tapering to the beak.—Quebec, Lakes Edward and St. John, August, 1896 (*E. Brainerd*); New Brunswick, South Tobique Lakes, July 18, 1900 (*G. U. Hay*, no. 57): Maine, St. Francis, June 18, 1898 (*M. L. Fernald*, no. 2075); Madawaska Lake, August 2, 1900 (*E. F. Williams*): New Hampshire, North Conway, August 27, 1855 (*Wm. Boott*); Echo Lake, North Conway, June 8, 1878, near Gate of the Notch, July 7, 1878,

and between Bethlehem and Fabyans, July 5, 1879 (*E. & C. E. Faxon*): VERMONT, Island Pond, July 4, 1854 (*Wm. Boott*); Gardner's Island, Lake Champlain, June 26, 1877 (*C. G. Pringle*); East Wallingford and Bloomfield, 1899 (*W. W. Eggleston*, nos. 1659, 1667): MASSACHUSETTS, Framingham, July 7, 1897 (*E. C. Smith*, no. 654): RHODE ISLAND, banks of Seekonk River, June 15, 24, 1867 (*S. T. Olney*): CONNECTICUT, Hartford, June, 1879 (*C. Wright*): NEW YORK, Sand Lake (*C. H. Peck*; Raquette Falls, July 11, 1899 (Rowlee, Wiegand & Hastings): ONTARIO, Nipigon River, July 22, 1884 (*J. Macoun*)."—*M. L. Fernald in letter.*

824*a* Setaria Italica, Kunth. Bank of river, Woodstock.
833 Hierochloe borealis, Roem. and Schultes. Aroostook River.
842 Brachyelytrum aristatum, Beauv. Bull's Island, Woodstock.
843*b* **Sporobolus vaginæflorus,** Vasey. Aroostook River.
843*c* S. depauperatus, Vasey. Aroostook Falls.
847 Agrostis alba, L. Aroostook River.
867 Graphephorum melicoides, Beauv. Aroostook River.
889*a* Elymus Canadensis, L., var. **glaucifolius,** Gray. Aroostook River.
876*a* **Glyceria borealis,** F. W. Batchelder. South Tobique Lakes.
896*a* Equisetum variegatum, Schleicher. Aroostook Falls.
899 Adiantum pedatum, L. Islands in Restigouche River.
901 Pellæa gracilis, Hook. Restigouche River.
902 Asplenium viride, Hudson. Morrissey's Rock.
907*a* Phegopteris calcarea, Fee. Squaw Cap Mountain.
910 Aspidium fragrans, Swartz. Sisson Branch. Squaw Cap Mountain.
914 A. Filix-mas, Swartz. Bull's Island, Woodstock.
923 Woodsia hyperborea, R. Br. Morrissey's Brook. Restigouche River. Aroostook Falls.
923 Woodsia glabella, R. Br. Restigouche River. Aroostook Falls. Sisson gorge.
936 Lycopodium inundatum, L. South Tobique Lakes.
941*a* **Selaginella selaginoides,** L. Grand Falls.

Mr. Fernald, of the Botanic Gardens, Cambridge, Mass., writes (February 1st, 1901), that he collected several plants last fall, either at Van Buren, on the St. John, or at Fort Fairfield, on the Aroostook, which our botanists should find near at hand in New Brunswick territory, such as *Matricaria discoidea, Gentiana Amarella,* var. *humifusa, Salix adenophylla, S. glaucophylla, Listera auriculata, Juncus Dudleyi, Lycopodium sitchense,* and *L. sabinæfolium.*

G. U. HAY,
Chairman Committee on Botany.

OBSERVATIONS IN WILD GARDEN, INGLESIDE, 1900.

By G. U. Hay.

(Read November 6, 1900.)

The months of April and May, up to May 24th of this season, were very cold and backward, the rains and north-easterly winds retarding vegetation. On my first visit to Ingleside, May 12th, the following plants were just beginning to bloom: Viola blanda, Erythronium Americanum, Anemone nemorosa, Fragaria Virginiana, and these only in places fully exposed to the sun. Epigæa repens, Hepatica triloba and Acer rubrum were in full bloom.

May 24th (a warm, sunny day). Plants in full bloom: Taraxacum Dens-leonis, Fragaria Virginiana, Sanguinaria Canadensis, Claytonia Virginica, Houstonia cærulea, Erythronium Americanum. Just coming into bloom in places exposed to the sun: Viola cucullata, Viola canina, var. sylvestris. Amelanchier Canadensis, var. botryapium. Viburnum lantanoides, with the white marginal flowers expanding. The white birch, which is one of the first to come into leaf, and one of the last to lose its foliage in the fall, was unfolding its leaves under the influence of the bright sun and gentle winds of the day.

June 9th. Sunshine and frequent rains since May 24th produced that wonderful change which is so characteristic of our springs: In a few days' after weeks and months of weary waiting, plants seem all at once to burst into flower and leaf, each day producing a marked change in the face of nature.

Plants in full bloom: Trillium Erythrocarpum, T. erectum, T. cernuum (just out), Primula Mistassinaca, Cypripedium acaule) just beginning to bloom), Rhodora Canadensis, Cornus Canadensis.

June 14th. Cypripedium parviflorum, just opening its yellow flowers, as also Iris versicolor, Cratægus tomentosus; Cypripedium acaule in full bloom, and also Cornus Canadensis, Clintonia borealis, Trieatalis Americana, Arenaria lateriflora, Carum carui, Thaspium aureum, Potentilla Canadensis, Cornus stolonifera, Viola lanceolata, Vaccinium Canadense, V. Pennsylvanicum, Trifolium pratense, T. repens, Aralia nudicaulis. Apple trees (crab) were in height of bloom about 10th. Lilacs about 14th.

June 16th and 17th. A few ripe native strawberries were seen.

REPORT ON ZOOLOGY.

The Committee beg to submit the following notes: During the past season, Mr. Rowe has devoted much time to the study of fishes and fish culture, and has devised a hatching jar which is considered to possess advantages superior to those exhibited in any similar apparatus known to the committee. Mr. McIntosh has prepared a list of Bombycine and Hawk Moths which appears in this Bulletin, and Mr. Leavitt has made collections of fresh water shells and carried on some preliminary studies of our earthworms. Mr. G. W. Bailey has continued his investigation of our land shells and hopes to have his list ready for publication next year. The general subject has been brought before the Society in a number of papers.

Insects.

Last summer, owing no doubt to the exceptionally fine weather, injurious insects were unusually numerous. Locusts were very abundant and did quite an amount of damage.

Squash and cucumbers were almost entirely destroyed in some localities by the striped cucumber beetle (Diabrotica vittata, Fab).

Peas were very much injured by "worms" larvæ of weevils and a small moth, probably the Pea Moth (Semasia nigricana Steph.)

After the immense swarms of the Cranberry Moth (Caterva catenaria) which appeared in the autumn of 1899, it would seem natural to expect large numbers during the following season. But during the past summer scarcely a specimen could be found either in a larval or adult form.

One butterfly has been added to the New Brunswick list during the past summer (Amblyscirtes vialis) and (Erynnis manitoba), hitherto only reported from Jacquet River, was taken in some numbers in the Nerepis Valley.

WILLIAM McINTOSH,

Birds.

The numbers refer to the list of birds printed in Bulletin No. 1, 1883.

SECTION A.

Species which occur in St. John and King's Counties:

20 Black-throated Blue Warbler (Dendroica cærulescens). A rare summer resident and only three specimens reported.

Note.—I took a fine male at Nerepis, September 22, 1900.

76 Rusty Blackbird (Scolecophagus Carolinus), given as an irregular summer resident.

Note.—In addition to the male reported in Bulletin XVII, page 73, in looking over my specimens, I find a pair taken May 11, 1893, at Lily Lake, a male on April 6, 1895, at Red Head, a male at Little River on May 8, 1895, and a female at the latter place on September 26, 1896.

79 American Raven (Corvus Corax sinuatus) given as "now rarely seen"

Note.—I have two good specimens (both males) one taken at Dipper Harbor on April 12, 1896, the other at Chance Harbor on April 22, 1896.

83 Shore Lark, or Horned Lark (Otocaris Alpestris), given as "lately rather uncommon."

Note.—My records show a female taken April 12, 1895, at Red Head, four females at the same place on April 3, 1896.

104 Yellow-billed Cuckoo (Coceyzus Americanus), given as a rare summer resident.

Note.—During 1900, these birds appeared to be quite numerous, and have been reported from Riverside and several places along the C. P. R. between St. John and Welsford.

I identified specimens on the Sandy Point Road and at South Bay, and collected a male at Nerepis on August 8, and Geo. Hare, Esq., took a male on the Red Head Road, September 5.

106 American Long-eared Owl (Asio Wilsonianus), given as an occasional *summer* resident.

Note.—I have a fine female taken at Point Lepreau on December 17, 1895, so it is probably also an occasional *winter* visitant.

107 Short-eared Owl (Asio Accipitrinus), only three instances of its occurrence given.

Note.—I have a female taken at Point Lepreau, November 20, 1900.

131 Mourning Dove (Zenaidura macroura), only three of this species reported.

I have a female taken on the West Beach Road, on September 24, 1899.

142½ (This No. to put species in proper position on list), Piping Plover (Argialitis meloda).

This species does not appear in Section A., Bulletin 1 (it is No. 243 in Section B), but on page 40 of Bulletin 2, four takes are recorded.

Note.—I have a male taken at Red Head, August 31, 1898.

150 Bonaparte's Sandpiper, a white-rumped Sandpiper (Tringa fuscicollis), given as "an occasional autumn visitant."

NOTE.—From my records, I find I took a male at Red Head, October 7, 1897, a female at the mouth of Little River, October 16, 1897, a female at the latter place, August 27, 1898, a female at Red Head, September 30, 1899, and on each occasion several were seen. It would seem in order to now report this species as "a regular autumn visitant."

152½ (No. to place species in proper position in list). Curlew Sandpiper (Tringa ferruginea). This species does not appear in Section A (it is No. 244 in Section B.)

NOTE.—I took a male at Red Head Marsh, August 3, 1895. This is the first report of this bird for this county.

168 Virginia Rail (Rallus Virginianus), given as "a common summer resident."

NOTE.—As far as my collecting or notes go, I have never met with this species, nor have I known of any collected, with the exception of a female (now in my collection) and taken at Gardener's Creek, September 8, 1899, by J. J. Wallace.

169 Sora Rail (Porzana Carolina), given as "an uncommon summer resident."

NOTE.—It certainly is a common autumn visitant, for never in the fall have I been on any of our local marshes without seeing the Sora, and my records show two females taken at Red Head—one on September 14, 1895, and the other on the 21st, a female at Little River, October 19, 1895, and a male at the latter place on October 9, 1896. I do not think there is a local "snipe shooter" who has not taken the "Sora."

190 Harlequin Duck (Histrionicus Histrionicus, given as "a rare spring and autumn visitant."

NOTE.—A pair were collected on April 16, 1896, and a male on April 20, 1896, at Point Lepreau. I now have the two former, and the latter is in the collection of this Society.

193 King Eider (Somateria spectabilis), given as "a rare winter visitant."

NOTE.—I now have a fine female taken at Point Lepreau, May 2, 1896.

209 Great Black-Backed Gull (Larus marinus), given as "an uncommon resident."

NOTE.—Two fine males taken at North Head, Grand Manan, January 7, 1898, one I now have, the other is in the collection of this Society.

A. GORDON LEAVITT.

THIRTY-NINTH ANNUAL REPORT

OF THE

COUNCIL

OF THE

NATURAL HISTORY SOCIETY

OF

NEW BRUNSWICK.

Your Council beg leave to submit the following report for the year now ending:

Membership.

Nineteen members were added in the course of the year, but owing to losses caused by resignations and change of residence, our actual gain is not large.

Finance.

The Treasurer makes the following statement of receipts and expenditures for 1899 and 1900:

Income.

1899.	
Balance from 1898	$ 98 07
Membership fees	137 00
Sale of Bulletins	28 35
Donations	22 00
Interest on investments	204 00
Dividends Botsford estate	20 00
Government grant	125 00
	$634 42

Disbursements.

Printing and distributing Bulletins	$144 47	
Library, books and binding	43 65	
Maintenance of Museum	93 28	
Miscellaneous	136 63	
Balance on hand	216 39	
		634 42

Receipts.

1900.	
Balance from 1899	$216 39
Membership fees	122 00
Bulletins sold	10 10
Interest on investment	26 00
Donations	40 43
Government grant	200 00
Dividends Botsford estate	20 00
Prizes for exhibit at Exhibition	10 00
Amount received and held in trust for Ladies' Association	33 00
	$677 92

Expenditure.

Printing and distributing Bulletin XVIII.	$161 31	
Maintenance of Museum	160 16	
Library, books and binding	25 59	
Miscellaneous	100 45	
		$447 51
Balance on hand		$230 41

A very large part of this balance will be required to pay for Bulletin XIX, now in press.

Library.

The library shows a large increase. Not only have important additions been made by exchange, but a number of works on botany have been purchased, and a large number of volumes bound. The contents of the library have been labelled and re-arranged, thus not only decidedly improving the appearance of the library, but making works on the various departments of natural science of easy access to students.

Publications.

Bulletin XVIII contains a number of valuable articles by Dr. Geo. F. Matthew, Prof. W. F. Ganong, D. L. Hutchinson and W. McIntosh; also Reports of the Fredericton Natural History Society, King's County Natural History Society, and the Natural History and Antiquarian Society of Prince Edward Island.

Lectures and Essays.

Nine regular meetings were held, at which the following papers were read :

1900.

Jan. 2 Ornithological Notes of the Season of 1899, by A. Gordon Leavitt.
Entomological Notes of the Season of 1899, by W. McIntosh.
Notes on the Botany of New Brunswick, and Notes on a Wild Garden, by G. U. Hay.

Feb. 6 An Evening with the Microscope, by Dr. L. Allison.

Mar. 6 Notes on the Physiography of New Brunswick, by Prof. W. F. Ganong.
How Ice Acts in Large Quantities, by W. S. Butler.
Notes on Salamanders, by C. F. B. Rowe.
The Natural History of Money, by Prof. John Davidson.

April 3 Birds' Eggs and Birds' Nests, by J. W. Banks.
Note on the Physiography of New Brunswick, by Prof. W. F. Ganong.
Mountains, Lakes and Rivers, by Prof L. W. Bailey.

May 1 Mines and Minerals of Newfoundland, by Dr. H. G. Addy.

Oct. 2 New Cambrian Fossils from Cape Breton, by Dr. Geo. F. Matthew.
Note on Local Whirlwinds in New Brunswick, by S. W. Kain, published in U. S Weather Review, November, 1900.

Nov. 6 The Physiography of the South Tobique Lake Basin, by Prof. W. F. Ganong.
Observations in Wild Garden at Ingleside, by G. U. Hay.
Introductory List of Hawk and Bombycine Moths, by W. McIntosh.
Notes on Two Fragments of Aboriginal Pottery, by S. W. Kain.

Dec. 4 Notes on Some of our Freshwater Fishes, by C. F. B. Rowe.
Additions to the List of New Brunswick Fungi, by G. U. Hay.
Notes on the Archæology of New Brunswick, by S. W. Kain.

In addition to the regular lecture course, the following elementary lectures were delivered :

Zoology : G. F. Matthew, D. Sc.

Jan. 9 The Annelida or Worms.
23 The Brachiopoda or Lamp Shells.
30 The Entomostraca or Water Fleas.

Botany : G. U. Hay, M. A.

Feb. 13 Ferns. Their Habits, Haunts and Distribution.
20 Fungi. Their Nature, Uses and Distribution.
27 Lichens and Algæ.

Archæology.

During the year there has been an encouraging interest taken in the study of archæology. David Boyle, Duncan London, Dr. Smith of Tracadie, and others, have donated interesting specimens to the museum. Dr. Geo. F. Matthew read a paper on this subject at the May meeting of the Royal Society, which will be published in the next volume of Transactions. In another paper on the Rockwood Bog, the same author draws attention to certain evidences of the early appearance of man. This paper appeared in the Canadian Record of Science for July, 1900. Mr. S. W. Kain has also carried on archæological studies, and a paper from his pen appears in this Bulletin. In another paper, which also appears in this Bulletin, Messrs. Kain and Rowe figure and describe some relics of the early French occupation of the province. The Committee on Archæology state that a new case for their department is urgently needed.

Ornithology.

The Committee on Ornithology report several donations of birds to the museum. Two lectures have been delivered on Bird Life. The specimens in the museum have received the usual care; and much valuable field work has been done by members of the Society.

Entomology.

The Entomological Committee report that continued interest is taken in the study of insect life. During the past year much valuable work has been done in this branch of nature study. Systematic collecting has been carried on by members of the Society, particularly in the vicinity of St. John and in the Nerepis valley. About 450 specimens have been sent to experts for identification. Many of these have proved of extreme interest to entomologists.

Field Work.

During the summer three field meetings were held. The first was held at Ingleside. Among those present were Prof. W. F. Ganong and W. A. Hickman.

The second was held at Red Head. Here the fossils in the clay-beds were examined, and a well-defined example of post-glacial faulting was noted on a rocky point to the southward of Dr. H. G. Addy's summer residence.

The third meeting was held at Rockwood Park.

During the summer Dr. Geo. F. Matthew spent three weeks examining the Cambrian deposits of Cape Breton, and Prof. L. W. Bailey spent the season studying the metamorphic rocks of York and Carleton Counties.

Prof. W. F. Ganong explored some little known regions in the Tobique district, and some of the results of this trip have already been laid before you. He was accompanied by Mr. G. U. Hay, who made observations on the flora of the same region.

Messrs. McIntosh, Leavitt and Rowe made a number of trips to the Nerepis valley. Large collections of insects were made by Mr. McIntosh; Mr. Leavitt studied the bird life, and made a collection of the freshwater shells; and Mr. Rowe studied the fishes of the valley.

Centennial of the University.

The occupants of the chair of natural history in the University of New Brunswick (Dr. James Robb, 1837–1861, Prof. L. W. Bailey from 1862), have always been in active sympathy with the work of scientific investigation, and the present occupant of that chair has been one of our most loyal and talented workers. Thus there is a bond of common interest between the Society and our provincial university; and, on invitation, we sent a delegate to the centennial exercises, conveying congratulations and wishes for prosperity. Delegates were present on that occasion representing many of the great institutions of learning, and it was probably the most notable educational gathering ever assembled in this province. Mr. Samuel W. Kain represented our Society.

General.

The rooms of the Society are open to the public on Tuesday, Thursday and Saturday afternoons, and the large number who avail themselves of the opportunity of examining the collections prove the wisdom of opening the rooms to the public.

A great improvement will be seen in the library. The floor has been covered with linoleum, and a new table, chair and stove were kindly furnished by Dr. Matthew, thus adding greatly to the appearance and comfort of the room. These improvements are due, in a great measure, to the efforts of the ladies of the Society.

The conversazione and science supper held by the associate members was a brilliant success financially and otherwise. The temperance organization kindly permitted the Society to use their rooms. Addresses were delivered by President Addy, His Worship Mayor Daniel, Mr. G. U. Hay, and others. Supper was served by the ladies, and the evening was pleasantly and profitably spent in examining the Society's collections.

At the request of the Exhibition Association the Society occupied a space in the exhibition building. Geological, archæological, zoological and botanical specimens were shown, and attracted a great deal of attention. The live fish part of the natural history exhibit was the most popular feature of the exhibition, and reflected great credit on Mr. C. F. B. Rowe, who collected nearly all the specimens shown.

During the year a microscopy section was organized. Officers were elected and a number of meetings held, which were well attended. It is hoped that the interest will continue in this useful and important branch of the Society's work.

The Society tenders a grateful acknowledgment to the press of St. John for the free insertion of notices and reports of meetings, and also to those who have contributed to the various lecture courses.

The past year has been a progressive one for the Society. There has been a gain in membership; lectures have been delivered, and papers read on almost every branch of nature study; the meetings have been well attended, and valuable additions have been made to the museum and library.

Much important field work has been done by members, and the work of the Society has in almost every department been eminently satisfactory.

Respectfully submitted,

WILLIAM McINTOSH,
Secretary to Council.

Natural History Rooms, Market Building,
January 15th, 1901.

THE FREDERICTON NATURAL HISTORY SOCIETY.

(Instituted February 2, 1895).

The Society still holds its meetings in the High School building, but has changed the date from the third Monday to the second Monday of the month. The attendance during the year has been good.

Since last report, papers have been read (or addresses given) as follows:

1900.

Jan. 8 Leaves, by L. W. Bailey, Ph. D.
Feb. 12 Crystals, Gems and Precious Stones, by Dr. Bailey.
Mar. 12 The Pendulum, by Dr. Scott.
May 14 Rivers, Lakes and Mountains, by Dr. Bailey.
Oct. 14 Scenery and its Causes, by Dr. Bailey.
Nov. 12 Fire, by H. H. Hagerman, M. A.
Dec. 10 Forms of Energy, by Mr. John Brittain.

1901.

Jan. 14 Nothing but Leaves, by B. C. Foster, M. A.

The officers for the year ending February, 1901, are as follows:

L. W. Bailey, Ph. D., LL.D.....*President.*
G. N. Babbitt, Esq.....*Vice-President.*
B. C. Foster, M. A.....*Treasurer.*
John Brittain.....*Secretary.*
H. H. Hagerman, M. A.....*Curator.*

MEMBERS OF COUNCIL:

Geo. A. Inch, B. A., B. Sc., W. T. L. Reed, W. B. Coulthard, Mrs. W. B. Coulthard, Miss Ella Thorne.

JOHN BRITTAIN,
Secretary.

NOTE.—The editors regret that the reports from the Kings County Natural History Society and the Natural History and Antiquarian Society of Prince Edward Island were not received in time for publication.

DONATIONS TO THE MUSEUM, 1899-1900.

Date.	Donor's Name and Description of Article.
1899.	
Feb.	Mr. Marshall Reid, Dalhousie, N. B., Plants (dried).
Mar.	Mrs. J. H. Tillotson, Coral from Bermuda.
April.	Mr. Jas. F. Robertson, Octopus, Flying Fish, Cow Fish; West Indies.
	Mrs. A. McN. Travis, Hampton, N. B., Star Fish, two Meteoric Stones.
	Messrs. Smith & Tilton, Cards illustrating British Fauna and Flora.
	Dr. W. F. Ganong, Compound Microscope.
	Mr. G. U. Hay, 130 plants, Northern New Brunswick (mounted).
May.	Mr. S. W. Kain, Clay Vessel from Philippine Islands.
	Mr. J. S. McLaren, two cannon balls, Gowan Brae, near Bathurst, N. B.
June.	Capt. Aikman (of S. S. "Peerless") foot of one of Rameses' (the Great) Princess, from Assouan. Lizard, third Cataract of the Nile. Reed Flute, as used in time of Moses—Upper Egypt. Rose of Jericho. Seven coins from ruins of buried city, on site of which Pompey's Pillar stands. Eight coins from ruins of old Alexandria.
	Capt. E. C. Elkin, Specimen from Gold King Mine.
	Mr. T. H. Lawson, Branch of tree grown after being knotted; St. Martins.
	Dr. G. F. Matthew, Fossils—Ordovician—Maclurea, Orthoceras, Murchisonia, Graptolites. Spirefer, Endoceras, Lituites, Worm Burrows; from Port au Port, Newfoundland.
	Mr. S. W. Kain, Clay Flower Pot, Buenos Ayres.
Oct.	Mr. Thos. H. Lawson, Stone with oysters attached, Perth Amboy. N. J.
	Mr. Duncan London, Maquapit Lake, Queens Co.—Slab of Sandstone, with conical holes bored in it (see page 287). Pitted Stone (see page 289). Natural Axe-formed Boulder, partly grooved. Celt used as hammer or chest tool. Three Celt-shaped boulders that were used as hammers. Broken Celt, chafed andstriated on edges. Broken Axe. Hammer Stone bruised at ends. Chipped Boulder edged for Celt. Box of Stone Chips, Chalcedony, Carnelian, Jasper and Quartz. Box of pottery fragments, various patterns.
	Capt. W. J. Foster (Schooner "Abbie and Eva Hooper"), Magnesite from Greece.

DONATIONS TO THE MUSEUM — CONTINNED.

DATE.	DONOR'S NAME AND DESCRIPTION OF ARTICLE.
1899.	
Oct.	Dr. A. C. Smith, Tracadie, N. B.—1 Celt; 1 scraper or digger = hoe; 2 spear heads; 4 javelin points; 1 leaf-shaped weapon; 15 arrow heads (notched bases); 4 arrow heads (tined bases); 4 arrow heads (wedge bases); 1 rimmer; 1 base of a pipe.—South Tracadie Gully.
	1 kettle, site of French Fort, Shippegan Island; 1 large kettle; 2 small kettles; 1 sword; 1 harpoon; 1 skull; bottle beads; knives, etc. —Taken recently from Indian graves, Wilson's Point.
	Capt. Aikman (S. S. "Peerless"), Egyptian Snake, five feet long; 2 Egyptian Lizards; 5 Egyptian Beetles; 23 large Egyptian and other photos; Mummified Falcon from tomb of Rameses II.
	Dr. G. F. Matthew, Specimen of Peat with charcoal fragments, Rockwood Park. Natural slate pencils, Cape Breton.
	Mr. Jackson, large Cedar Burr.
	Mr. John Moser, Mounted specimen Arctic Tern from Canaan Forks.
Nov.	Mr. T. E. Colpitts, Fossils of Carboniferous Period.
	Mr. Joseph Allison, Relic of French Period.—Horton Landing, N. S.
Dec.	Mr. Wm. McIntosh, 150 specimens native Coleoptera.
1900.	
Feb.	Mrs. G. N. Golding, a number of Chinese curiosities.
	Miss Emma Titus, a large number of botanical specimens.
	John S. McLaren, a number of Fossils.
Mar.	Mrs. Geo. F. Matthew, on behalf of the Department of Vertebrate Palæontology of the Metropolitan Museum of New York, suite of photographs of the Great Dinosaurs and Dinotheres.
	D. Balmain, Indian Point, Queens Co.—Three Indian skin-scrapers.
	John Kerr, Bowl of Indian trade pipe of the seventeenth century, found at Old Fort, St. John, N. B.
April.	P. W. McNaughton, Fossil Fern from Joggins.
May.	David Boyle, Toronto.—Collection of flint arrowheads from Norfolk County, Lake Erie shore.
	Dr. H. Geo. Addy, Mounted specimen of Red-tailed Hawk.
Oct.	Prof. W. F. Ganong, Stone Implements.
	Duncan London, Sunbury County.—Aboriginal Stone Implements.

DONATIONS TO THE MUSEUM — CONTINUED.

DATE.	DONOR'S NAME AND DESCRIPTION OF ARTICLE.
1900.	
Oct.	W. A. Kain, Cannon Ball from the Restigouche.
	A. Gordon Leavitt, Clam Shells from Kings County and Harrigan's Lake; also specimens of Iron Pyrites.
	Miss Henrietta Calhoun, Albert Mines.—Mounted Birds in case.
	J. L. S. des Brisay, a Malformed Lobster Claw from Baie Chaleur.
Nov.	Mrs. G. R. Prichard, two Arrow or Spear Heads, portion of Fossil Tree, and Horseshoe Crab.
	Anonymous. Hercules Beetle from the West Indies, and one East India Beetle.
Dec.	Duncan London, Pieces of aboriginal pottery.
	Poole Pottery Co., Clay vessel to illustrate Indian pottery decoration.
	W. M. P. McLaughlin, Copper Ores from the Great Mammoth Mines, Index District, Washington.
	Ernest O. Thompson, Woodpecker's nest.

Dr. G. F. Matthew presented a walnut library table, an arm-chair and a stove, furnishings for the library.

DONATIONS TO THE FUNDS.

Anonymous	$20 43
"	10 00
"	10 00
	$40 43

DONATIONS TO THE LIBRARY, 1900.

Donor's Name.	Residence.	Work.
Academy of Natural Sciences	Philadelphia	Proceedings.
Academie Imperiale des Sciences	St. Petersburg.	Bulletins.
Acadia College Library	Wolfville	Report.
American Entomological Society.	Philadelphia.	Circulars.
American Journal of Science and Art	New Haven	Circulars.
American Museum of Natural History	New York	Bulletins.
American Philosophical Society.	Philadelphia	Report.
Anthropological Society of Washington	Washington	Transactions.
Astronomical and Physical Society of Toronto	Toronto	do.
Australian Association for Advancement of Science.	Sydney, N. S. W.	Bulletins.
Australian Museum	do.	Report.
Amherst College	Amherst, Mass.	do.
Belfast Naturalists' Field Club	Belfast	Bulletins.
Boston Free Public Library	Boston	Reports.
Boston Society of Natural History	do	Bulletins.
Bowdoin College Library	Brunswick, Me.	Reports.
Brazil National Museum	Rio de Janerio	do.
British Columbia Natural History Society	Victoria	Bulletins.
British Museum (Natural History)	London.	Reports.
Brooklyn Entomological Society.	Brooklyn	Circular.
Buffalo Society of Natural Sciences	Buffalo	Bulletins.
Bureau of Ethnology	Washington	Transactions.
California Academy of Sciences.	San Francisco	Proceedings.
Canadian Institute	Toronto	Transactions.
Cincinnati Society of Natural History	Cincinnati	Bulletins.
Cincinnati Museum Association	do.	do.
Colonial Museum	Wellington, N. Z.	Proceed. and Transac.
Colorado Scientific Society	Denver	Transactions.
Columbia College	New York	Report.
Comite Geologique	St. Petersburg	Bulletins, Reports, etc.
Connecticut Academy of Arts and Sciences	New Haven	Bulletin
Cornell University Library	Ithaca, N. Y.	Reports, Pamphlets, etc
Costa Rica National Museum	San Jose, C. R.	Transactions.
Davenport Academy of Natural Sciences	Davenport	Proceedings.
Director Royal Gardens	Kew, G. B.	Bulletins.
Department Inland Revenue	Ottawa	Annual Report.
Department Indian Affairs	Ottawa	do.
Education Office	Fredericton	Pamphlet.
Elgin Historical and Scientific Institute	St. Thomas	Bulletins.
Entomological Society	London, Ont.	Journal.
Essex Institute	Salem, Mass.	Bulletins.
Feuille des Jeunes Naturalists	Paris.	Journal.
Field Columbian Museum	Chicago	Reports and Bulletins.
Field Naturalist Club	Ottawa	Ottawa Naturalist.
Geological Society	Edinburgh.	Proceedings.
Geological Society	London.	do.
Geological Survey	Ottawa	Reports.
Gray Herbarium of Harvard University.	Cambridge	Bulletins.
Hamilton, Mrs. Geo. A.	St. John.	Six Volumes.
Hamilton Association	Hamilton	Journal.
Harvard Library.	Cambridge	Reports.
Historical and Scientific Society of Manitoba	Winnipeg	Bulletins.
Illinois State Museum		Report.
Iowa Academy of Sciences	Des Moines	Report and Circulars.
Iowa Geological Survey	do.	Report.
Indiana Department of Geology	Indianapolis	Proceedings.
Johns Hopkins University	Baltimore	Circulars.
Linnean Society	New South Wales	Report.
Literary and Historical Society	Quebec	Transactions.
Liverpool Biological Society	Liverpool	Proceed. and Transac.
Geological Society	Liverpool	do. do.

DONATIONS TO THE LIBRARY — CONTINUED.

DONOR'S NAME.	RESIDENCE.	WORK.
Lloyd's Museum	Cincinnati.	Reports and Bulletins.
Manchester Geological Society	Manchester	Proceed. and Transac.
Marine Biological Laboratory	Plymouth, G. B.	Journal
Marine Biological Laboratory	Wood's Holl, Mass	Report.
Meriden Scientific Association	Meriden	Bulletin.
Minnesota Academy of Natural Sciences	Minneapolis.	Bulletins.
Missouri Botanical Gardens	St. Louis	Report.
Museum of Comparative Zoology	Cambridge, Mass.	Proceedings.
Maryland Geological Survey	Baltimore	Annual Report.
National Museum Library	Washington	Report
Natural History Society	Glasgow	Bulletin and Proceed.
Natural History Society	Newport, R. I.	Report.
Natural History Society	Montreal	Can. Record of Science
Natural History Museum.	Vienna	Proceedings,
Natural Science Association	New Brighton.	do.
New York Academy of Science	New York	Journal and Proceed.
New York Public Library	New York	Report.
New York State Library	Albany	do.
Nova Scotia Institute of Science	Halifax	Proceedings.
Ontario Archæological Museum	Toronto	Reports
Peabody Museum of Archæology	Cambridge	Proceedings.
Philadelphia Museum	Philadelphia	Report.
Public Museum of Milwaukee	Milwaukee, Wis.	Reports
Public Museum	Wanganui, N. Z.	Proceedings.
Rochester Academy of Science	Rochester	Proceedings.
Royal Academy of Sciences	Stockholm	do.
Royal Colonial Institute	London	Journal.
Royal Geographical Society	do.	Journal.
Royal Geological Society of Ireland	Dublin	Proceed. and Transac.
Royal Society	London	Proceedings.
Royal Society of Canada	Ottawa	Proceed. and Transac.
Royal Society of Tasmania	Hobart Town	Proceedings.
Royal Swedish Academy of Sciences.	Stockholm,	do.
Royal University of Upsala	Upsala.	Bulletin.
Smithsonian Institution	Washington	Report and Proceed.
Societe Geologique de France	Paris	Report.
Societe Geologique du Nord	Lille	Transactions.
Societe Geologique de Belgique	Liege	do.
Societe Malacologique de Belgique	Brussels	Bulletin.
Societe Scientifique du Chile.	Santiago	Bulletin.
South Dakota School of Mines.	Rapid City.	Reports and Bulletins.
State Geologist.	Perth, W. A.	Statist.
State Zoologist.	Minneaoplis.	Report.
Tacoma Academy of Science	Tacoma	Proceedings.
Texas Academy of Science.	Austin	Bulletin.
The Honourable the Minister of Mines	Sydney, N. S. W.	Journal.
Tufts College	Mass	Studies.
University of California	Berkerley.	Bulletin.
University of Toronto	Toronto	Report.
U. S. Coast and Geodetic Survey.	Washington	Report.
U. S. Commissioner of Agriculture	....do	Bulletins.
U. S. Fish Commission	....do	Reports.
U. S. Geological Survey	..do	Reports and Bulletins.
Wagner Free Institute of Science	Philadelphia.	Report.
Wisconsin Academy of Science, Art and Letters	Madison	Bulletin.
Wisconsin Natural History Society	Milwaukee.	Proceedings.
Wyoming Historical and Geological Society	Wilkes-Barre	Bulletin.
Yorkshire Geological and Polytechic Society	Leeds	Report.

PURCHASED.

British Fungi (Hymenomycetes). Two Volumes. By Rev. John Stevenson.
American Fungi, 1900. By Charles McIlvaine.
Prehistoric Implements, 1900. W. K. Moorehead.

LIST OF MEMBERS.

Honorary Members.

Bailey, Prof. Loring W. ..... Fredericton.
Ganong, Professor W. F. ..... Northampton, Mass.
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Gillmor, Dr ..... Quaco.
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* Members since organization in 1862.

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* Member since organization in 1862

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Wetmore, Miss I.
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Wright, Miss
Yerxa, Miss Ivy

METEOROLOGICAL ABSTRACT FOR 1900.

OBSERVATIONS RECORDED AT ST. JOHN OBSERVATORY, LATITUDE, 45° 17′ N.; LONGITUDE, 66° 4′ W.

D. L HUTCHINSON, *Director.*

	BAROMETER.			TEMPERATURE.			Cloudiness: 0 = clear; 10 = wholly clouded.	Precipitation: Rain and melted snow.	WIND DIRECTION AND VELOCITY.																	Thunder Storms.
									N.		N. E.		E.		S. E.		S.		S W.		W.		N. W.				
	Mean.	Highest.	Lowest.	Mean.	Maximum.	Minimum.			Hours.	Miles.	Hours.	Miles.	Hours.	Miles.	Hours.	Miles.	Hours.	Miles.	Hours.	Miles.	Hours.	Miles.	Hours.	Miles.	Hours Calm.	Total Miles.	
January	29.96	30.81	28.90	22.1	48.2	— 7.5	6	5.52	131	1029	58	882	17	189	51	1042	24	420	187	3732	83	1080	171	2674	22	10,998	0
February	29.95	30.74	28.85	22.6	47.3	— 9.6	6	6.07	58	469	88	1333	71	843	40	827	7	94	59	1104	66	1010	268	4729	15	10,409	0
March	29.91	30 75	29.42	26 8	42.2	— 5.2	5	4.16	69	790	57	729	44	1060	45	916	51	690	103	1592	61	590	301	5191	13	11,558	0
April	29.86	30.45	29.32	40.1	63.5	22.3	5	4.01	35	549	104	1413	36	353	28	370	32	142	92	784	20	133	257	3367	116	6,911	0
May	29.94	30.32	29.43	47.1	86.7	31	6	6.14	26	186	68	671	59	268	94	925	77	461	156	1791	53	294	166	2151	45	6,747	2
June	29.92	30.32	29.53	58	82 6	40.9	5	4.98	14	47	75	640	31	172	76	660	173	1139	191	2108	27	211	107	1552	26	6,529	2
July	29.92	30.19	29.48	62.6	77.7	48.3	6	1 42	29	138	28	148	19	91	56	247	210	1002	182	1964	15	141	117	1380	88	5.111	2
August	30.01	30.32	29.60	63.1	88.6	48.4	6	2 19	61	345	127	1212	34	246	53	346	138	739	134	1260	12	60	109	1066	76	5,274	3
September	30.06	30 39	29.05	56.3	74	35	4	2.33	73	578	104	973	11	56	47	297	116	754	192	2035	19	47	83	1028	75	5,768	0
October	30 17	30.60	29.46	50.3	70.6	23.5	6	10.17	36	265	173	1749	32	221	48	287	77	358	100	882	47	418	122	1740	109	5,920	0
November	30.00	30 54	29.11	38.2	58.2	14	7	4.34	27	131	136	1710	17	96	64	797	29	297	128	2473	46	490	177	2547	96	8,541	0
December	29 97	30.50	29.27	23.7	45	— 6.6	5	6.87	96	585	91	1021	....	...	....	...	3	35	71	1058	92	664	273	3605	118	6,998	0

Barometer readings have been reduced to sea level and 32° Fahrenheit. The minus sign when used indicates temperatures below zero. The maximum temperature, 88.6, was registered on the 27th of August; the minimum, – 9.6, on the 27th of February. The total precipitation for year was 58.20 inches.

OFFICERS AND COMMITTEES OF THE NATURAL HISTORY SOCIETY FOR 1901.

Patron.

His Honor the Lieutenant Governor, Honorable A. R. McClelan, LL. D.

Council for 1901.

President — Honorable John V. Ellis, LL. D.
Vice-Presidents — Samuel W. Kain, Henry George Addy, M. D.
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Geological Map of St. John and Vicinity, by William D. Matthew, 1894	.10
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The Bulletins of the Society contain the following articles, among others:

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