BULLETIN

OF THE

NATURAL HISTORY SOCIETY

OF

NEW BRUNSWICK.

No. V.

CONTENTS.

PUBLISHED BY THE SOCIETY.

SAINT JOHN, N. B.
J. & A. McMILLAN, 98 PRINCE WILLIAM STREET.
1886.

BULLETIN

OF THE

NATURAL HISTORY SOCIETY OF NEW BRUNSWICK.

No. V.

SOME THOUGHTS ON SOCIAL SCIENCE.

Not long since two children were talking about the death of a little companion. One was overheard to say, "It was owing to the drain." In ascribing the death to a cause, the child was following an instinct which has always and universally prevailed in the race. It does not matter whether it is among the young or the old, among barbarous or civilized communities, wherever there is intelligence, this exercise of the mind, this necessity to ascribe every event to some antecedent, is displayed. It is not necessary to scrutinize from whence the faculty came, nor *how* it may have been developed. It is an universal and indisputable fact. I would not confine its action to the human mind, for I think it evident that the same principle is in operation among the lower animals. This conviction that every effect must proceed from a cause is the basis of all desire to enter upon philosophical investigations, and without it our every day life and work would be aimless and meaningless. In the case of the children alluded to above it was indicative—not merely of a natural faculty being exercised—but was a proof that the faculty was exercised in connection with a science which of late years has occupied the attention of thinking minds; and further, that the knowledge of principles which affect men in their social relationship was making its way even to the youngest members of society.

Though Social Science is of late growth, it is assuming large proportions. Some of the most important Philosophical gatherings take place in connection with it, and are assuming, not merely

national, but world-wide notoriety. This Science has to deal with all the conditions under which man acts upon man, and in which the *human will* shews itself a most important factor. In fact, it derives its name—Social—because it treats of the relation and dependence of each member to the whole of the community.

In other departments Science has to do with Physical elements, and the laws or forces which regulate their action. It is purely objective, inasmuch as it deals with matter which under similar conditions necessarily manifests similar results, whether it be the chemical relations of atoms—the physiology of the organs of life—the evolving geological phenomena—or the study of the vast universe, with its host of stars. All of these can be looked at as outside or independent of man himself; whereas, Social Science, whilst it may be closely connected with each and all these conditions or phenomena, has also to investigate the complicated conditions which result from life and are modified by the mind of man and its Protean changes.

It is not very long since the true method of investigating material phenomena has been followed, and it has wondrously progressed, yet there are labyrinthine intricacies still to unravel. But though the difficulties attending the relation of atom to atom are very great, they are infinitely outnumbered when they have added to them the uncertainties which necessarily attend the subtle combinations of the human mind. These combinations follow the action of the will, or controlling principle; and the *will* to act is called into play and determined by the surrounding circumstances; every faculty becomes more or less a factor in the ideas suggested, and every factor differs in its relative power in different persons, also in the same person at different times. Now, as the inductive system has to be followed in Social Science, as in that pertaining to Physics, we can form some slight idea of the difficulties which attend all investigations in subjects where the variable and disturbing elements form so large a portion of the data to be considered. We now readily admit that it is not wise to first adopt principles, and then endeavor to make facts conform to them. Such a method would prove destructive to progress in Physical Science, and cannot prove beneficial in that science which will some day regulate our social condition. Principles of

action not first based upon a series of observations, will mislead rather than advance true knowledge. Progress in Social Science must necessarily be slow, though the wisest of men bring their experience to the yearly meetings of Scientists devoted to that study. Now and then genius in the Physical department may leap to conclusions; but even then these conclusions require to be verified by long and accurate investigation of details before they can be accepted as correct, and as in accordance with a constant force power.

One branch of Social Science deals with man and his relation to the physical conditions around him. Under this head that which is called Hygiene may be treated. Our dwellings and their construction — their aggregation — their ventilation and drainage so as to get rid in a safe way of all the effete matters and exhalations which are poisonous to the living organism. These matters may appear very simple and of such a character that there could be no difficulty in determining what was best to be done, and yet, simple as they may appear, there is much difference of opinion respecting them, very much ignorance, still more dogmatism; and it will require much observation before anything can be determined so that municipal or national power can be made available for their regulation.

At the present time the size of drains is a disputed point. It might be supposed that such a material question should long since have been settled, and yet every Sanitary Engineer follows his own ideas, and not one established by a truly inductive method. It may be said that the size of drains in any place must depend upon the number of inhabitants and the grades of the locality. This admits the difficulty, and shows that in complicated circumstances a large amount of accurate observation must be made before any dogmatic rules can be approximated. The disposal of sewage is still a vexed question, and an enormous waste of useful material occurs for want of knowledge or from neglect of method, or from both causes.

Ventilation of buildings has had a good deal of attention given to it, and in some points is well understood. The quantity of air required for a certain period — the amount of deterioration, the injurious products continually being thrown off — the high rate of

mortality where the space occupied has been too small, and the supply of fresh air too limited. All these points are tolerably well ascertained; yet how to accomplish a perfect system of ventilation is far from being settled, and more or less injury attends not merely assemblies of people, in places of amusement and in our schools — but in our ordinary houses. One example of the many errors which still pervade society may be mentioned. Knowing that the carbonic acid gas formed in respiration was heavier than the atmosphere, some hygienists have insisted that the openings for ventilating a room should be at or near the floor — overlooking the law of the diffusion of gases, which causes the heavier and lighter gases to speedily mix, and that this warm mixed gas tends to ascend in the same way as common air. If progress is slow in these matters where man comes into contact with physical elements, how much greater must be the difficulties when we enter upon those questions which are associated with moral principles, and which deal with the criminal acts of the community. When men disregard physical laws there is a result more or less direct, and it may be personally experienced. These laws involve the consideration of matter in its different conditions, and as manifested by palpable effects. Compared with them the moral laws are more hidden, harder to unravel, and the factors much more subtle and uncertain. There are certain offences which are generally admitted to be such, and are at once condemned. Some of these are against the person, some against the community, some against the nation, some against the race — all these involve life and property and liberty. They are so palpable that men legislate for their suppression without any hesitation, yet there are acts which have all the conditions of crime which we justify, because they pass the border land of common rights — such, for example, as the destruction of an opponent in self defence.

We would naturally suppose that the punishment of crime would be a question easily solved. Yet here Social Science is merely beginning its work. Is the punishment of crime to be retributive, repressive, or reformatory; or, are all three of these principles to be recognized? Opinions upon this subject are vague and unformed; in fact, as varied as the human mind varies

in its constitution. The treatment of offenders is not the only subject in this connection in which confusion prevails. The very construction of prisons is a matter of debate. Then again arises the question: How can we deal with the exceptions which are caused by individual peculiarities? It may be said that we must be content with general laws. This, however, would admit that conditions exist to which the inductive system cannot be applied. But this, in fact, would be asserting that law ceases to reign, or that there is a point in Philosophical investigations beyond which the infirmity of man cannot pass.

There is one branch in which perhaps more accuracy has been attained than in any other social relationship—that is, life assurance. It has been and is based upon numerous observations, from which certain results have been determined. Given a number of lives at any age—and the probabilities of the time of the death of all have been so established that Insurance companies are able, with but little risk, to adapt their table of rates to ensure a fair profit from their policies. This is in reality the result of an inductive method, yet evidently superficial as regards the causes of death, and not founded upon a knowledge of the complicated condition of life. The relative longevity of different classes of society has been somewhat ascertained by the same means.

Social Science is further complicated with questions which differ in degree from those above alluded to, and add to the uncertainty necessarily connected with motives where self interest may be an inducement to action; principles which constitute political economy and affect the relationships of society.

A late review (the *Edinburg*) gives a list of several subjects which compose the creed of one section of the aspirants for political power; among them are the following:

(*a*) Abolition of the House of Lords
(*b*) Home Rule for England, Ireland, and Scotland.
(*c*) Abolition of Parliamentary Oaths.
(*d*) Graduated Income Tax.
(*e*) Radical Reform of Land Laws.
(*f*) Extinction of City Companies.
(*g*) Local Option.
(*h*) Elementary Education, free and non-sectarian.
(*i*) No further extension of Empire by war or otherwise.
(*k*) Triennial Parliamentary Elections.
(*l*) Taxation of Ground Landlords.

All these questions and many more of a similar character indirectly affect the social well-being of society, and as such partake to a certain extent of the nature of Social Science. It may be that long experience points to these as more or less correct in principle — that they are in unison with the instinctive impulses of a people; yet who cannot but see at a glance that they are demands more or less absolute, and whether they be correct or not can only be decided by extensive experience over long periods of time. To call them political economy or Social Science is to assert that they are conditions agreeable to or based on law!! That the philosophical method, (namely, that of induction) is as necessary for their establishment as it is for that of either physical or social relations, and that to assume them to be correct is to violate the principle which we use in the attainment of all our knowledge. There may be instances where the *instinct* of the many may be more correct than the reasoning of the few. There are certain propositions which the human mind accepts without questioning, such as the Divine command, "Do unto others as you would they should do unto you," a corollary of which is "all men are born to equal rights;" yet to carry out the working of such instincts or propositions requires a knowledge of many details — an immense amount of experience — a philosophical arrangement which must be inductive in character.

In the movements of society I would regard instinct and reason as complemental. One may be more correct in its work than the other, taken singly, but the greatest amount of truth will probably follow when both operate in the same direction.

We are so constituted, mentally and morally, that the physical, social, political and moral relationship shall move along contemporaneously, though by no means with equal velocities. We are conscious, from what has been determined, that law, or order, or governing principles, prevail in the movements and changing conditions of material substances. We feel assured that law prevails in the more ethereal department of being, ramifying through all the relationship of life. We would also claim that as material facts form the basis of physical laws and true philosophy, so also must the principles which are rightly to regulate the social-political well-being of man be *inductively* derived from properly

arranged data, rather than the guesses of the most gifted of the race — that laws undoubtedly must follow from the observance of sequences in both cases — that whilst "fools rush in where angels fear to tread," and pronounce dogmatically on the most abstract questions, the truly wise will calmly learn by testing and weighing, until the false is eliminated and the true established, and law reigns throughout the domain of existence. It has always been the case — and, perhaps, is as much so as ever it was — that the greater the amount of ignorance the more decidedly will a panacea be maintained which shall efface all the evils which afflict the world; and we feel assured that so long as ignorance exists, so long will nostrums be urged even in physics, but more especially in hygiene and in social problems, and most undoubtedly in political economics.

ARTICLE I.

Description of a Newly-Born Lynx.

Lynx Canadensis (Desm.) Raf.

BY DR. C. HART MERRIAM.

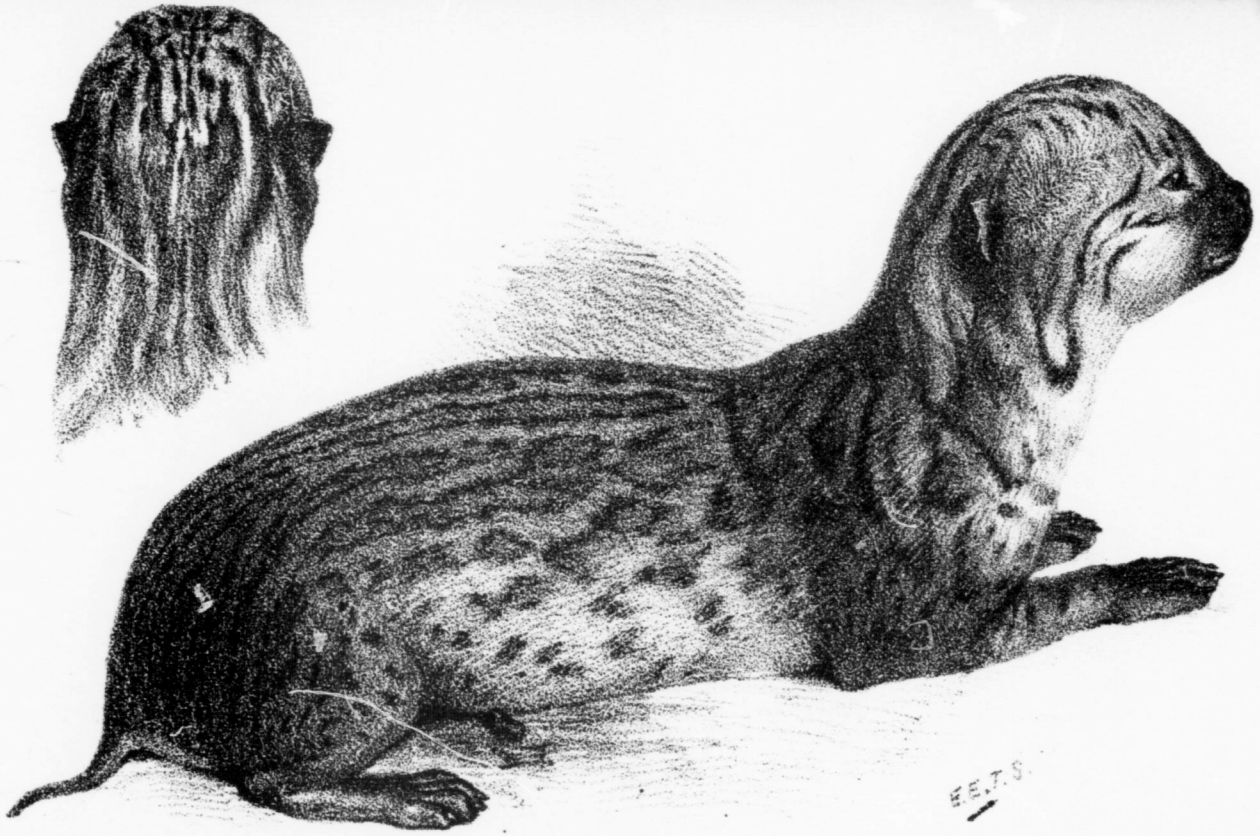
(Read 2nd February, 1886.)

Mr. Montague Chamberlain, of St. John, New Brunswick, has kindly sent me for examination and description, a mounted specimen of the newly-born young of the Canada Lynx. "It was dropped," writes Mr. Chamberlain, "on the 20th March, 1883, when the mother had been in captivity about a month. She gave birth to five (5) kittens, but this was the only one rescued from her unmotherly jaws. When the first was born she at once prepared to clean it, and seemed fond of it. After a short time, however, it gave vent to a weak squeal, which caused her to eye it curiously for a moment, when another squeal was delivered. This settled the kitten's doom—it was at once devoured. The mother did not exhibit any tenderness towards the other four, and the keeper made two unsuccessful efforts before he was able to get one away from her. This kitten lived two days, and then died from injuries received in its removal from the cage. Its 'mew' was something like that of a domestic kitten, but stronger and harsher; it was almost fierce and very penetrating. The general strength of the animal was greater than that of a domestic kitten. Two hours after birth it stood firmly on its feet and turned around in its box, but it did not show any inclination to fight when teased. The eyes were open at birth."

It is but a trifle larger than the young of the domestic cat at birth, and may have been born a little prematurely, though the fact that its eyes were open argues against this supposition. I am unable to give many measurements of value, since I did not see the specimen till after it came from the taxidermist.

Diagnosis.—Above, brown, paler below; back and sides with longitudinal stripes and blotches of dark sub-rufous brown; belly

NEWLY-BORN YOUNG OF THE CANADA LYNX, (Lynx canadensis,) NATURAL SIZE.



NEWLY-BORN YOUNG OF THE CANADA LYNX, (Lynx canadensis,)
NATURAL SIZE.

with a few small brown spots; cheeks brownish-gray; each side of the neck with a long vertical spot of grayish-brown, distinctly margined with brownish-black.

DESCRIPTION.—Size a trifle larger than that of the newly-born young of the domestic cat. Body slender. Head very round. Tail 22mm. (.85 in.) in length. Ears imperforate, the only visible portion consisting of a very thin, sub-triangular, hairless fold of integument, with a nearly vertical base 13mm. (.52 in.) long. The greatest height of the auricle is 4.50 mm. (.18 in.)

The entire upper parts and sides of the animal are well covered with hair, but the under parts are sparsely covered, and the inner aspects of all the legs are entirely naked. The throat is so thinly haired that in some places the veins in the skin are distinctly visible, and there is a bare patch surrounding the ear.

COLOR AND MARKINGS.—The ground-color of the body is light fawn, paler below, and inclining to buff on the sides. It is much obscured above by the stripes and rows of concatenating brown blotches, and below by small dark stripes.

The triangular area of the face included between the nose and eyes is of a uniform brown, without markings. The rest of the head is ash-brown, becoming light fawn-colored on the centre of the crown and over the occipital region, whence the same color extends over the whole back of the neck. The top of the head is ornamented with a number of fine dark spots and lines that extend over the occiput. Between the eye and ear, on each side, is a large oval spot of brownish ash, without markings. On each side of the throat, a little below the angle of the jaw, is a rather indistinct patch of soiled white—which color occurs nowhere else on the animal.

The cheeks, just under the eyes, are marked with a few dark lines. From just behind the outer angle of the eye two streaks of very dark brown extend downward, curving gently toward the throat, diverging slightly as they proceed, the posterior continuous, the anterior once interrupted, and then, turning abruptly, they meet on the side of the neck about an inch (25 mm.) below the eye, enclosing a light stripe which at the bottom (the widest part) measures 2.75 mm. (.10 in.) in breadth. This constitutes the most conspicuous marking on the animal. There is a short

line behind this, opposite the ear, and another in front of it, which latter slopes toward, but does not reach, the anterior border of the eye. There is, on each side of the head, behind, a stripe that extends from the crown almost to the shoulders. It curves in such a way as to present an outward convexity opposite the ear, and an outward concavity below it. It is dark brown above, inclining to rufous-brown below. It is sub-continuous anteriorly, with an interrupted line that runs forward over the side of the head, almost reaching the eye. The middle region of the head and neck, behind, is occupied by a broad sub-rufous-brown band, extending from above the level of the ears to the shoulders, and varying in width to adapt itself to the space between the two curved lines just described. Anteriorly it is ornamented with half a dozen more or less interrupted dark lines, which extend back to a point opposite the middle of the ears. These markings combine to produce a very symmetrical and handsome lyre, which reaches from the crown of the head to the base of the neck behind. (See plate.)

A little below the middle of the throat, in front, is an almost continuous brown collar, and below it still are indications of two others.

Sloping downwards and backwards from the base of the neck, over the shoulders, are three or four elongated blotches of different sizes. The fore legs appear to be of an almost uniform brown, with faint indications of spots, but are so sparsely haired that it is impossible to define the markings.

A line of concatenating blotches of very dark brown extends down the middle of the back, commencing just behind the shoulders. These blotches decrease in breadth posteriorly till they become lost in a narrow and very dark interrupted stripe, which extends out upon the tail. On each side, over the flanks, are four broader longitudinal bands, or rows of more or less confluent blotches, of sub-rufous brown, narrowly and somewhat irregularly bordered on each side by an interrupted line of dark brown. The second and third of these stripes run together anteriorly, so that the second is in reality dichotomous.

The three uppermost stripes are continuous, the fact that they are made up of confluent blotches becoming apparent only after a

critical examination of their dark borders; but in the lower line the blotches are distinct, the pale fawn color of the sides appearing between them. The belly is strewn with a number of small dark spots. The stripes of the back and sides become obscure in passing over the hips, their dark borders alone remaining distinct, so that the hind quarters present the appearance of an almost uniform reddish brown surface streaked with narrow interrupted lines of very dark brown.

Anteriorly, the lateral bands originate in the median line and the lowermost springs from between the shoulders, passing obliquely backwards immediately behind the post-scapular fold. Its narrow upper border, meeting its fellow of the opposite side, makes a dark V-shaped mark over the shoulders.

It is hardly necessary to call attention to the fact that this specimen is one of unusual interest, since its very decided markings, of which scarcely a trace remains in the adult animal, cast some light upon the genetic affinities of the genus to which it pertains. A critical study of these markings leads to the interesting conclusion that the genus *Lynx* was derived from the group of cats of which the Ocelot (*Felis pardalis*) is the nearest living representative.

ARTICLE II.

On Pre-Historic Remains, and on an Interment of the Early French Period, at Tabusintac River, N. B.*

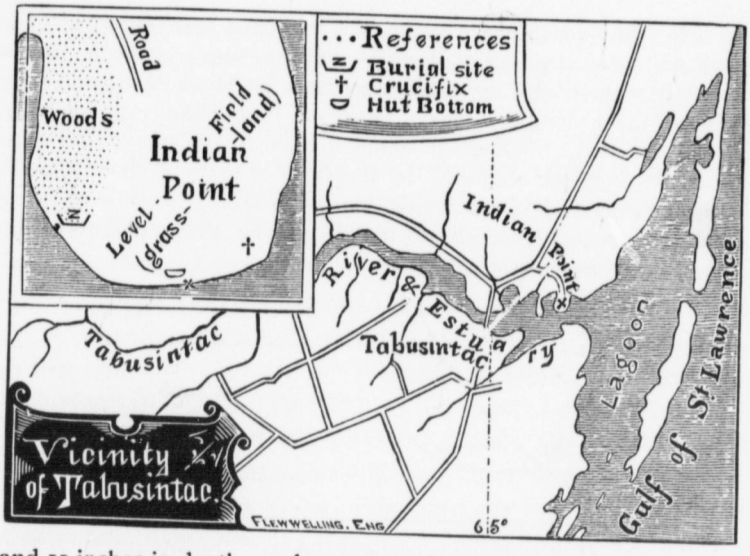
About three years ago Dr. A. C. Smith, of Newcastle, Miramichi, communicated to this Society information in relation to some pre-historic remains recently discovered at the mouth of the Tabusintac River. Since Dr. Smith's letters were written, Dr. J. Baxter, of Chatham, who obtained the relics of the early French period described by Dr. Smith, has very generously placed them in the Museum of this Society; and the information obtained from Dr. Smith and others, relative to the remains of the Stone and French periods at Tabusintac, is herewith presented.

The Tabusintac River is a small stream flowing through a flat country, and entering the Gulf of St. Lawrence at the north side of Miramichi Bay. The localities referred to in Dr. Smith's letters, as will be seen by reference to the sketch map accompanying this notice, are at the mouth of the stream, partly on the low shores of Tabusintac lagoon and partly within the entrance of the Tabusintac River. The remains of the stone period were found in the bank at the extreme point of land on the north side of the river; the crucifix on the shore outside the point to the North, and the remains buried with the copper kettles inside the point, at the side of a cove.

[*Extracts from a letter of* John Campbell (*Tabusintac, 3rd Nov., 1879*) to Dr. A. C. Smith.)

"*Dear Sir*,—I wish to acquaint you with a discovery made on Fri-
"day last by my brother Norman. He had gone down to Indian Point,
"at the mouth of the river, to note the effects of the late severe storm,
"and on his return noticed that the sea had washed away the bank in
"several places. Near the spot where I found the arrow-head I gave you,
"he observed something having a metallic appearance. On removing
"the earth it proved to be a copper boiler, 18 inches across the mouth

* The following extracts of letters and comments thereon have been prepared by a Committee of the Natural History Society to which these relics were referred.



"and 11 inches in depth; and two more beneath that one, about twice "the size of the upper one. They were all bottom up. On turning up "the lower boilers they found human bones and a mass of a dark color. "The uppermost boiler, the smallest, is in a fair state of preservation, ex- "cept an iron band around the upper part, which is nearly consumed "with rust; the other two are useless as boilers. The two large boilers "appear not to have been in use, as they are quite bright and appear "new, while the smaller one is black on the outside; this, the upper "one, was two feet below the surface, and must have been a long time "buried, as a tree of considerable size had grown above it."

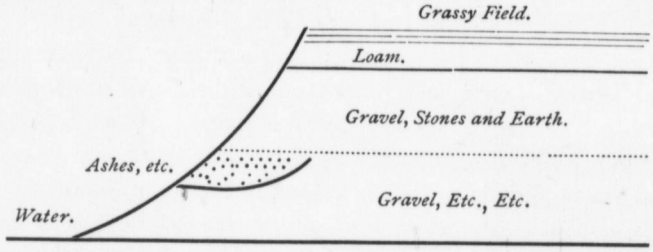
Extracts from Letters of Dr. A. C. Smith, *Newcastle, 29th Dec., 1882, 4th and 10th Jan., 1883, and 27th July, 1884.*

"*Dear Sir*,—I wrote to you concerning human remains found under- "neath copper kettles in Tabusintac. I visited the spot this Fall, and "found that the 'remains' and kettles had been removed to Chatham.* "A pine tree about nine inches in diameter had grown over the spot. "The place is said to have been the site of an Indian encampment "during 'untold ages.' A river flows past the grounds. I dug away the "earth from the edge of the bank in front of the ground, which had at "one time been under cultivation. At about 18 inches below the surface "I struck what my guide called '*the workshop*'; there was first about "three inches of loam, then about fifteen inches of gravel (or, to speak "more correctly, small stones mixed with earth or clay), then *ashes*. In

* They have since then been presented to the Society by Dr. J. Baxter, of Chatham. See donations to the Museum, Dec., 1884, in Bulletin No. IV.

"the ashes I found several stones which had been *burnt*, also an arrow-"head, and several pieces of stone of the same material as the arrow-"head. It seemed that the ashes were in a pit,* and did not form an "extended layer along the bank. The lower part of the bank, including "the ash-bed, had a thickness of about 18 inches, and beneath the ashes "consisted of gravel, etc., etc. In the layer of loam, a short distance "from the 'workshop,' I found a leaden cross.

"The accompanying diagram will exhibit the relations of the "several layers in the bank."



"The site of the old encampment (marked by the grassy field) is "very flat, and about four acres in extent, and the country is level for "many miles to the north and east. Behind the camp-site is the forest, "and on each side and in front, water. The copper kettles were found "(at the place marked _z_/ in the plan) at the rear of the camp-site. "Arrow-heads have been plowed up in different parts of this flat."

It is unusual in this Province to discover, at one locality, objects of interest showing an occupation of the country at periods so widely distant in time as these remains indicate, and this is sufficient cause for a more extended notice.

The leaden crucifix was found in the surface loam at a depth of three inches, where it might have been buried by the plough. In order to obtain further information in reference to this object Geo. Stewart, Jr., Esq., of Quebec, a corresponding member of the Natural History Society, was consulted, and he wrote in reply to the following effect:

"Rev. Abbé Laflamme, of Laval University, says that the leaden "crucifix was evidently given by the early Roman Catholic missionaries "to the Indians they were sent to evangelize. One of the Abbé's con-"freres in the Seminary has in his possession a leaden crucifix which is "absolutely of the same design. It was given to him as a souvenir of a "certain mission to which he was at one time attached. The inscription

* For ashes apparently accumulated in pits, see description and figure of ancient hut-bottoms at Bocabec, Bulletin No. III.

"'I. H.,' if complete, would be I. H. S., and is to be found on several cruci-
"fixes. Dr. Laflamme is of the opinion that the cross was at one time
"attached to a chaplet of beads, and later separated from it."

The information supplied by Abbé Laflamme is in accord with what is known of the History of Acadia during the French period, and we probably have in these relics evidences of the early contact of the French with the aborigines in this part of America, perhaps contemporary with the first attempts to colonize in the St. Lawrence Valley and the Bay of Fundy.

The ruder remains found in the bank at the extremity of Indian Point are of even greater interest, as proof of the earliest occupation by man yet recorded in this part of America.

At many points along the coast of New Brunswick, both on the beaches of the Bay of Fundy and the low shores of the Gulf of St. Lawrence, abundant indications are to be found of the presence of man prior to the advent of Europeans; but in all cases, camping sites and proof of human occupancy are strictly connected with the present surface of the ground, and are not buried beneath quaternary deposits, such as are stated to cover the hut-bottom explored by Dr. Smith at Tabusintac. The separation of these remains from those of the historic period by a bed of small stones, earth, and clay, of fifteen inches in thickness is a remarkable condition of entombment for this region; but its significance can scarcely be appreciated unless we recall the closing events of the post-tertiary time in this part of America.

From New Jersey to Prince Edward Island, along the eastern coast of America, indications are to be met with of a slow but steady subsidence of the land. This movement appears to have been as rapid here, or nearly so, as farther west. The buried forests in the marshes of the Annapolis Valley, and in Minas and Cumberland Basins, attest it, as well as sunken peat bogs in the coves along the northern shore of the Bay of Fundy. But the actual sinking at present in progress on the south-western shore of the Gulf of St. Lawrence, is more clearly seen in the peat bogs now being broken up at the mouth of the Miramichi River,* and submerged groves of white birch observed at Richmond Bay, on

* *Vide* Gesner, Reports on the Geology of New Brunswick.

the east side of Prince Edward Island, by a late Vice-President of this Society.*

The very fact of the unearthing at Tabusintac, by the encroachment of the sea, of the remains both of a prehistoric people, and also of those of the present race of aborigines, are additional proofs of the continued downward movement of this part of the continent. There is not a bay or river mouth along this shallow coast, from Shippegan to Pictou, except where the coast is unusually bold, which is not guarded by a range of sandy Islets, thrown up by the surf on this subsiding coast. This downward movement favours the formation of "lagoons" or shallow bays behind these beaches, and gives rise to the peculiarities of the coast at Tabusintac.

All this, however, goes to show that the preceding deposit at Indian Point, which is possibly an older beach, belongs to an earlier period in the history of geological changes than the existing barrier islets, for it indicates an occupancy of the land when near its present height above the sea. To admit of the covering of the old hut-bottom at this place by alluvial beds, the land must have sunk below the sea subsequently, so that the rude occupants of this and other huts were driven to the higher land, while the sea and river piled up the accumulated deposit which is spread out over the flat area of Indian Point.

The surface features along this part of the coast are not opposed to the existance of an old beach line along here, crossing the mouth of the Tabusintac River, as may be seen by reference to the accompanying plan of the district. A small pond near the shore of the main land, at the northern end of Tabusintac Lagoon, is connected by swales with the estuary of the Tabusintac within Indian Point, and these correspond to an indentation on the southern side of the Tabusintac estuary.

Subsequently to the formation of this flat the land was elevated so as to throw back the coast line outside of the line of sandy islands which now shelter Tabusintac lagoon, and after this the period of subsidence now in progress began.

We have no evidence that there has been any arrest in modern times to the subsidence now going on in the Bay of Fundy

* The late M. H. PERLEY.

area ; at least none of sufficient importance to impress itself on the marine marsh and river estuarine deposits that have accumulated in the indentations of this Bay. Yet these deposits have a depth at the head of the Bay of Fundy of twenty or thirty feet, as may be seen from the article on Chignecto Isthmus published in this Bulletin.

As on the Gulf of St. Lawrence, so on the Bay of Fundy; the period of subsidence was preceded by one of elevation. The elevatory movement differed from that of subsidence which followed, in that the upward motion of the coast line was spasmodic, and produced terraces both along the coast and in the valleys of the interior; the lowest of these flats is known as the fifteen feet terrace, and may possibly be contemporaneous with the beach line at Tabusintac, which has entombed the hut-bottom of the stone age at Indian Point. However that may be, an indication favouring the early presence of man in New Brunswick is the occurrence of charcoal buried in the shallow lacustrine deposit of the Southern Basin of Torryburn valley, mentioned in Bulletin No. II of this Society, page 18; this charcoal has the same relation to the terraces between 15 and 50 feet on the Bay of Fundy that the hut-bottom at Tabusintac has to the old and now elevated flat of land (beach?) of which Indian Point may be considered a remnant. The charcoal may have been produced by natural causes, but the hut-bottom at Tabusintac is an undoubted indication of early human occupancy of this region.

The arrow-head which Dr. Smith found among the ashes of the hut-bottom is symmetrical and well finished; it is of lance-oval form with a square base; the arrow-head is very neatly chipped, and has a slight twist or "wind," a not unusual feature in the arrow-heads from the Bocabec locality (Bulletin No. III). This arrow-head could not be distinguished from those used by the present aborigines, before contact with European civilization.

It is to be regretted that so little in the form of weapons or tools belonging to the older race which inhabited the northern shores of New Brunswick should have yet been found, but it can scarcely be doubted that a zealous search would yield results which, if not equal in interest to those obtained by Dr. Abbott in the valley of the Delaware, would at least give us a better knowledge than we now possess of these early autochthones.

ARTICLE III.

On the Physical Features and Geology of Chignecto Isthmus.

BY ALEX. MONRO, C. E.

(Read Feb. 3, 1885.)

There are but few places in the Maritime Provinces where nature and history combine so many points of interest as exist on the Isthmus between Nova Scotia and New Brunswick. The great rise and fall of tides in Cumberland Basin, submerged forests, and sea dikes, are subjects of much interest; and both nature and history point to this Isthmus as the chief highway occupied by the men of the *stone age* in their migrations from one side of the country to the other. Here, too, is the Missiguash River, tacitly acknowledged by England and France of old as the boundary between their possessions, and which is now the boundary between Nova Scotia and New Brunswick. On this Isthmus we can trace the outlines of forts, battle-fields, dykes, roads, and other land-marks of the early history of the country.

The hydrographical basin of the Bay of Fundy and the topography of the Isthmus are inseparable. This Bay and its two chief arms—one terminating in Cobequid Bay, at the head of the Basin of Minas; the other terminating in Cumberland Basin, are in the general range of the great tide-wave which sweeps to the north-east along the Atlantic coast of the United States. In consequence of the contraction of the sides of the Bay of Fundy towards its head, there is a convergence of the tidal wave, which causes a very great increase in its height. The vertical height of the tide in Cumberland Basin at high spring-tides, is fifty feet; at Cobequid Bay it rises still higher; while at St. John it rises only about half this height.

Around Cumberland Basin there are about forty thousand acres of marsh, enclosed by artificial dykes, the chief part of

which is on the Isthmus. This great plain is divided into sections, separated from each other—except at Cumberland Basin—by long spurs of upland, known as the Jolicure, Point de Bute, and Fort Lawrence ridges. On the east of the marshes, the town of Amherst, with its rich and picturesque scenery, spreads out before the eye; on the west, Sackville commands a view of one of the most extensive tracts of fertile land to be found in the Maritime Provinces; on the south lies *Beau Bassin*, the beautiful basin of the French pioneers; and northerly, long ranges of settlements stretch along the ridges, across the Isthmus to Baie Verte; the distance across, in the narrowest part, being fifteen miles. These ridges and marshy plains are joined to a narrow belt of upland near the head of Baie Verte. Jolicure is four miles in length; Point de Bute, nine; and Fort Lawrence, seven miles. The average width of each ridge is about a mile, and their summits do not exceed one hundred feet above the marsh. The terminal points of the two latter ridges are within a mile of Cumberland Basin. The three great arms of the marsh vary in width from one mile to four, and in length from seven to nine miles. Each is traversed by a lacustrine stream, which discharges by a deep channel into Cumberland Basin.

Nowhere in North America does nature exhibit more remarkable tidal phenomena than at this Isthmus. The proximity of the counter-tides gives force to this view. In Cumberland Basin the tide rises from thirty-five to forty-six feet over ordinary low water line, and at high spring tides over fifty feet. At times the water in Cumberland Basin is fully eighteen-and-a-half feet over that at Baie Verte; while at ebb tide the water in Baie Verte is nineteen-and-a-half feet higher than in Cumberland Basin. And at the head of the tideway in the rivers discharging into this Basin the tide rises to a still higher level. The time of high and low water is from two-and-a-half to three hours earlier at Baie Verte than in Cumberland Basin.

But how was this physical condition in the relation of land and water caused? Sir William Dawson, in his "Acadian Geology," says it was caused either by the "rupture of a barrier previously excluding the sea water, or an actual sinking or subsidence" of the land. He favors the subsidence hypothesis.

However, since the publication of his "Acadian Geology," a complete survey of the Isthmus has been made by order of the Dominion Government, with a view of uniting the waters of the Bay of Fundy with those of the Straits of Northumberland by means of a ship canal. The levels run across the Isthmus clearly show that Spring tides in Cumberland Basin are only twenty feet over the normal height of the tide in the Straits of Northumberland. That this elevation of the tide in Cumberland Basin over that of the Straits arises chiefly in consequence of the peninsular position of Nova Scotia, I have no doubt.

The original bed of Cumberland Basin may have been a shallow, fresh-water lake — a receptacle for the drainage waters of the Isthmus, which may have had their outlet over a rocky barrier to the westward. And when we consider the great depth of water in the Bay of Fundy compared to the depths farther seaward; and also in its arms, compared to the depth of water in the Straits of Northumberiand, I think it might be inferred that the present great depth of water in the Bay of Fundy and its arms is largely due to the deepening and scooping-out action, effected by the disintegrating force of the tide-wave, and not to the subsidence of the land. There appears to be a gradual increase in the elevation of the surface tide-wave, as it ascends towards the head of the tide-way in the bays and rivers, except where effected by local causes, while there is also a corresponding rise in the beds of these waters. In the Straits of Northumberland, between Cape Tormentine and Cape Traverse, where the Straits are narrowest, the ordinary depth of water at high water is only forty-two feet; in Cumberland Basin it is sixty-two feet at high water. The difference, twenty feet, being the height of the tides in the Basin above the tides in the Straits. Thus, it appears that the beds of these opposite waters have the same elevation above a common datum.

There are several places in Cumberland Basin where the tides rise and fall to a depth of twenty feet over some of the once forest-clad uplands of the country. And it is highly probable that large areas of the ancient forests underlie the adjacent marshes. Indeed, where canals for drainage have been dug, trees are met with several feet below the surface. One of the ranges of

submerged forests I surveyed in 1872 extends nearly half a mile along the northerly side of Cumberland Basin. At low water it had the appearance of being the southerly slope of an upland ridge, a part of which — Tongues Island — in the adjacent marsh, may be the summit. This submerged forest is from ten to twenty feet, vertically, below high water. I counted over two hundred stumps; in all about six hundred were counted. They appeared to be in the place of their growth, like an open forest. Some of the stumps were over eighteen inches in diameter. I observed several trees lying with their tops towards the head of the Basin. The trees were imbedded in clay, mud, and small stones. One tree measured fifty and another sixty feet in length. The wood consisted chiefly of spruce and fir, with a mixture of other kinds of wood such as now grow on the Isthmus. Judging from their remarkably good state of preservation, and making allowance for the preservative effect of the salt water, it is obvious that these submerged forests belong to a modern period in geologic time.

The lakes at the head of the marshes are shallow, and form chains of quiet expansions united by short discharging channels, which in some places are overgrown by shrubbery. Within the present century the Missiguash River and chain of lakes at its head were navigable for boats from Cumberland Basin. Within the last fifty years Indian canoes in large numbers followed this route to within three miles of the navigable waters of Baie Verte. This route has ceased to be navigable for canoes. Over the portages separating the counter-waters the Indians carried their canoes on their shoulders.

At the head of the easterly arm of the Missiguash valley the water shed between the counter tidal levels is two-and-a-half miles broad, and at the crowning part only thirteen feet above high water in Cumberland Basin, or about four feet above the Saxby tide of 1869; forming, as it were, an isthmus within an isthmus. Here two extremes, the low tides of the Straits and the high tides of Cumberland Basin, almost meet. This upland ridge is composed, to a depth of five feet, of soft alluvial matter, resting on clay. So slender, indeed, is this barrier, that a few rolls of a tide in winter, but little higher than the Saxby tide, might force the waters of Cumberland Basin across the Isthmus to a level twenty feet below.

And on the side of the Isthmus facing the Straits there are in places along the terraces, or narrow marsh levels of the rivers, lines of "sea dykes." These dykes are from eight to twelve feet broad, and three to six feet high. Probably they have been much broader and higher in prehistoric times. Except where streams are crooked the dykes are on both sides, but where very crooked they sweep from one side to the other. Their bases are generally on a level with the full spring tides of the present time. I observed one place, however, where the stream formed a sharp angle near the rising upland, that the base of the dyke was from five to eight feet above tide level. These dykes or mud walls are compactly formed of river mud and other superficial matter. In exposed places, where they are being worn down by the encroachments of the sea, stumps of trees and stones are exposed to sight. The stumps appear to be in the place of their growth, and in about the same state of preservation as those in Cumberland Basin. And, where the dykes are well sheltered from the sea, I have frequently observed large spruce, pine and birch trees growing on their tops.

ARTICLE IV.

Synopsis of the Fauna in Division I. of the St. John Group, with Preliminary Notes on the Higher Faunas of the same Group.

BY G. F. MATTHEW, M. A.

(Read 6th April, 1886.)

FAUNA OF DIVISION I.

For the purpose of giving a condensed view of the principal characteristics of the Cambrian fauna present in Division I. of the St. John group, the writer has prepared the following synopsis of the range of the genera and species through the several zones or bands of Division I. to supplement a short article on this fauna which appeared in the Bulletin of last year.

As will be seen, this assemblage of organisms consists of three sub-faunas, which at present appear to be distinct; but it is not improbable that further investigation and the gathering of more complete collections of the fossils will show a more decided blending of these three apparently independent groupings of species. The distinctness of the sub-faunas in this division of the formation may thus in part be due to defective knowledge of the range of the organisms in it; but a real distinctness nevertheless exists, due to the changing conditions which surrounded them during the time that elapsed from the period when the first beds of *b* were deposited until the fauna of *d* occupied the Basin in full force.

As far as known the first Band* or Zone of this Division (Band *a*) is devoid of organic remains; but there is a fairly representative assemblage of organisms in the next Band (*b*) and the relation of the several portions of Division I., so far as the

*For a more complete account of the characteristics of the several parts of this formation, see Bulletin IV.

organisms they contain exhibits the life of the period, may be gathered from the following summary:

Range of Genera.

Genera peculiar to *b*,	5		
" that pass from *b* to *c*,	5		
		— 10	
" peculiar to *c*,	7		
" that pass from *c* to *d*,	15		
		— 22	
			— 32
Deduct genera common to *b*, *c* and *d*,			5
			— 27
Add genera peculiar to *d*,			3
Total,			30

From the above proportions it might be inferred that there is a more decided line of separation between the first and second phases of this fauna than between the second and third, but there are several considerations which should influence our estimate of the value of this apparent break; first, the number of species known in Band *b* is small, and the addition of one half to the number known might greatly modify the proportion which this table presents.

The second phase of the fauna (in Band *c*) is that which was made known by the researches of Prof. Hartt and others twenty years ago, and in this only one-third of the genera are peculiar. This sub-fauna has been more fully investigated than the others, and in the large number of genera may be regarded as the typical phase of Division I. Its close relations with the next sub-fauna is evident in the large number of genera that pass upward from it to Band *d*.

In the Band *d* we have so far only three genera peculiar to it, but this number is likely to be largely increased, because so far only the lower beds have been worked; and because a cursory examination of the lower beds of the Cambrian formation in the next basin to the north exhibits its types intermingled with genera of a higher range.

When the proportion of species peculiar to these several sub-faunas are compared, it will be seen, as might be anticipated, that the distinctions between them is greater than when the genera are

made the basis for comparison. This may be gathered from the following statement:

Range of Species.

Species peculiar to *b*,	6		
" that pass from *b* to *c*,	5		
		— 11	
" peculiar to *c*,	29		
" that pass to *d*,	6		
" " " " *d* by varieties,	7		
		— 42	
			— 53
Deduct species common to *b*, *c*, and *d*,			4
			— 49
Add species peculiar to *d*,			16
Total,			65

In this comparison by species, we see more clearly the independence of the sub-faunas occupying the Bands *b*, *c* and *d* respectively. As regards *b*, the proportion of peculiar and outgoing species is much the same as of genera, but in Band *c* it may be observed that more than two-thirds consist of species peculiar to this horizon. And the distinction between *c* and *d* is more clearly established by the species than by the genera; for while only one-sixth of the genera found in the latter Band are peculiar to it, more than one-half of the species it contains appear here for the first time.

In the case of each of these three sections it is found that one half of the species are peculiar to it, and this seems sufficient justification for designating them as independent sub-faunas of Division I. The species which link the whole together are chiefly of the Classes Brachiopoda and Pteropoda. Of these, the first is well known for the tenacity of life possessed by many of its genera, and even species; and it might be expected that many of the species would have a wide range in time. Of the other order, viz., the Pteropoda, it may be that more extended knowledge of the species will show that some of the forms regarded as connecting varieties may prove to be separate species; but at present this does not appear.

The following table shows the several classes and orders of animals which are present in the fauna of Division I., together with the number of genera, species, and varieties appertaining to

each. The Protozoa are really of the rank of a sub-kingdom, but for the purposes of this paper may be ranked with the classes following:

CLASSES AND ORDERS OF DIVISION I.

WITH GENERA, ETC., IN EACH.

		Genera.	*Species.*	*Varieties.*
Sub-K.	PROTOZOA (Sponges, &c.),.....	3	3	1
Class	HYDROZOA (Graptolites, &c.),.....	2	2	0
Class	ECHINODERMATA (Seaurchins, &c.),.....	1	1	0
Class	BRACHIOPODA (Lampshells, &c.),.....	6	12	2
Class	PTEROPODA (Sea Butterflies, &c.),.....	2	5	4
Class	GASTEROPODA (Sea Snails, &c.),.....	2	7	0
Order	PHYLLOPODA?* (Phyllopod Crustaceans?)	2	3	0
Order	OSTRACODA (Ostracoid Crustaceans),.....	3	4	0
Order	TRILOBITA (Trilobite Crustaceans),.....	9	28	14
		30	65	21

As may be gathered from the above classification of the fauna of Division I., and by observation of the orders and classes of which it is composed, the fauna is thoroughly representative of the earliest Cambrian stage, and is more especially typical in the large number of genera and species of the trilobites, and in the inferior representation of the Brachiopods by small species, mostly with horny shells.

The trilobites lead off with nine genera and nearly half of the whole number of species known from this division. But perhaps the most remarkable feature in the fauna is the presence of Ostracoid Crustaceans of new and peculiar types. These belong to the oldest fossiliferous band of this formation (Band *b*). The organisms referred to the Phyllopod Crustaceans are little bivalves which, if they had more prominent umbos or less continuous or toothed hinge lines, might be suspected to be Lamellibranchs, a class which so far is known only from rocks at the summit of the Cambrian system.†

The gasteropods also contain some remarkable and peculiar types—notably Mr. Walcott's *Harttia*, and representatives of a minute univalve (*Stenotheca*) heretofore known only from the Menevian horizon in Wales and Newfoundland.

* These may be Lamellibranchs.

† Examples lately obtained exhibit stronger resemblances to the Lamellibranchs.

Among the Pteropods of this Division were species which obtained their food and apparently passed their lives in shallow waters along the sandy shores — situations where their supposed modern congeners, when living, are never found.

The Brachiopods are all thoroughly typical of early Cambrian times, and pre-eminently so in the great number of small species with sliding, or slightly articulated valves, and corneous or phosphatic shells.

Finally, there are the Graptolites, in the Hydrozoa, and the Sponges, in the Protozoa: the former, so far as the writer knows, now for the first time recovered in connection with so old a fauna. The Sponges are carried back a step further in connection with the Acadian development of Cambrian types, since the earliest exists in the Band *c*, which carries a fauna somewhat older than the Menevian, where the oldest type of this order hitherto described (Protospongia) was found.

The above classification of the species of the Saint John Group pertaining to Division I. is based upon collections made in the Saint John Basin at three different points, one at the western end, the second at the middle, and the third at the eastern end of the Basin. But in the next basin to the North — the Kennebeccasis Basin — certain beds are found which contain a number of species showing an admixture of the forms found in Section *d* of the Saint John Basin, with others of genera which elsewhere range upward to higher horizons in the Cambrian System. Many of these fossils are mere fragments, but they present an assemblage indicative of a higher horizon than has yet been found fossiliferous in the measures of Division I. These fossils are from the south side of Kennebeccasis Bay, and may be referred to the following genera and species:

Anopolinus? sp., (pygidium).
Parabolina? sp., (").
Anomocare? 2 sp., (").
Ptychoparia, 2 sp.
Agraulos socialis, Bill. var.
Microdiscus punctatus, Salter, var?
Agnostus acutilobus (cfr. *gibbus*).
A.—— (cfr. *Nathorsti*, Brögg).
Agnostus (cfr. *parvifrons*, Linrs).
A.—— *umbo.*
A.—— *Acadicus*, Hartt, var.
Hyolithes, sp.
Linnarssonia transversa, Hartt, sp.

There is a third Basin to the North of that from which the above fossils come, lying along the Long Reach of the River

Saint John. From the beds of Division I. in this basin the species obtained are essentially those of Bands *c* and *d*, for from one locality has been obtained:

Paradoxides, sp.
Clenocephalus Matthewi, Hartt, sp.
Conocoryphe elegans, Hartt, sp.
Ptychoparia Robbii, Hartt, sp.
Orthis, sp.

And from another a few miles to the westward:

Conocoryphe Robbii (*?*) and *Acrotreta Baileyi.*

PRELIMINARY NOTES ON THE HIGHER FAUNAS.

Observations on other horizons of the Saint John Group are entirely of a desultory and fragmentary kind.

I may first refer to certain fossils which have been found in the coarser beds in the city of Saint John, above the horizon of Division I., and which are characteristic of the Lingula Flags in Wales and Newfoundland. The existence of these forms and impressions at St. John has long been known. They occur both in Divisions 2 and 4, but no attempt to distinguish between the resembling forms of these two divisions of the formation has yet been made. The genera are:

Lingulella, 2 sp.
Histioderma, 1 sp.
Palœophycus, 2 sp.
Cruziania, 1 sp.

The heavy band of black slates which runs through the centre of the City of Saint John has yielded the following species, contained in calcareous nodules:

Clenopyge (cfr.) *spectabilis*, Brögg.
Orthis (cfr.) *lenticularis*, Dal.
Kutorgina (cfr.) *cingulata*, Bill.
K——*?*

These indicate a horizon in the upper part of the Lingula flags.

A series of slates are exposed along the north side of the Kennebeccasis Basin, whose fossils indicate that they also pertain to the upper part of the Cambrian system:

Conocephalites, a species with broad free-cheek, and flaring genal spine.
Ptychoparia, a small species.
Agnostus (cfr.) *pisiformis*, Ang.
A—— (cfr.) *Richmondensis*, Wal.
Kutorgina (*?*) sp.
Lingulella (cfr.) *Lepis*, Salter.
L——, sp.
Eophyton Linnæanum, Torrell var.
E——, sp.
Arthraria, sp.

In none of these groupings of species do we find any indication that the St. John Group contains any beds but such as are strictly referable to the Cambrian system. It seems now, however, sufficiently clear that both great divisions of this system are present; viz.,

The *Paradoxides Zone*, or Region B. of Angelin, the Swedish palæonthologist, equivalent to the (Cærfai?) Solva and Menevian Groups of Hicks; and

The *Olenus Zone*, or Region A. of Angelin, equivalent to the several groups of strata in the Lingula flags of Britain.

ARTICLE V.

Marine Algae of Bay of Fundy.

BY GEO. U. HAY.

(Synopsis of a paper read before the Society, Jan. 5th, 1886.)

In the present paper I shall confine myself to an enumeration of a few algae found in the neighborhood of the harbor of St. John, and about Frye's Island. The list is incomplete, because only the more prominent forms have been collected. It is meagre, because the rocky and bleak shores of the Bay of Fundy furnish a habitat only for the hardiest forms of marine vegetation. When we add to this the destructive force of the tides, the chilling influence of the polar currents, we may readily see that this Bay cannot be the home of those delicate sea-weeds found further south of us, or in the same latitudes of Western Europe. Few but the more enduring forms — the Fuci and Laminariæ — with smaller growths that are parasitic upon them, can withstand the strength of the tidal currents and waves as they sweep to and fro in the Bay. If we except some retired nooks and "back" bays, there are few situations on our southern coast where many of the striking varieties of sea weeds may be found. How closely does our algic flora correspond to that of the New England States? What are the winter and spring forms that exist on our coast? And what are the differences of vegetation on the shores of the Gulf of the St. Lawrence and the Bay of Fundy? are questions that should be solved as speedily as possible; and the writer earnestly requests those who may have opportunities to collect seaweeds to forward the less common forms to him in order that we may arrive at a more complete knowledge of our marine vegetation. All but the more delicate and perishable of the algae may be preserved by sprinkling them with a little fine sand, and drying them for a few hours.

I am indebted to Dr. FARLOW, of Cambridge, and Prof. A. B. SEYMOUR, of Madison, Wis., for aid in determining many of the species given below.

LIST OF ALGAE — 1885.

1. Ulva lactuca, *Le Jolis.*
2. U. enteromorpha, var compressa, *Le Jolis.*
3. U. enteromorpha, var ——?
4. Cladophora refracta, *Areschoug.*
5. C. gracilis, *Kütz.*
6. C. arcta, *Dillw.*
7. Scytosiphon lomentarius, *J. Ag.*
8. Desmarestia viridis, *Lam.*
9. Dictyosiphon foeniculaceus, *Grev.*
10. Ectocarpus viridis, *Harv.*
11. E. siliculosus.
12. Elachistea fucicola, *Fries*, (on Fucus Nodosus).
13. Chordaria flagelliformis, *Ag.*
14. Chorda filum, *Linn.*
15. Laminaria maxima, *Gauver.*
16. L. saccharina.
17. Agarum Turneri, *Post & Rupr.*
18. Fucus nodosus, L.
19. F. vesiculosus, L.
20. F. evanescens, *Ag.?*
21. Porphyra vulgaris, *Harv.*
22. Ptilota serrata, *Kütz.*
23. Ceramium rubrum, *Ag.*
24. Halosaccion ramentaceum, *Ag.*
25. Ahnfeltia plicata, *Fries.*
26. Chrondrus crispus, *Stack.*
27. Rhodymenia palmata, *Grev.*
28. Delesseria sinuosa, *Lam.* x.
29. Rhodomela subfusca, *J. Ag.*
30. Polysiphonia violacea, *Grev.*
31. P. urceolata. *Grev.*
32. P. fastigiata, *Grev.*
33. Corallina officinalis, L.

ARTICLE VI.

Summer Camp.

With Notes on the Marine Invertebrates of L'Etang Harbor and the Neighbouring Waters.

BY W. F. GANONG, B. A.

(Abstract of paper read Sept. 8th, 1885.)

The members of the second Summer Camp, held under the auspices of the Natural History Society, met in July last at Frye's Island, Charlotte Co. From the arrival of the first member, on the 7th, until the party broke up, on the 22nd, there were twenty persons present, some for a longer and some for a shorter time, four of whom were ladies. No systematic instruction of the younger members by the older was attempted, as had originally been intended, the exigencies of practical work preventing it. The former, however, took part in all excursions, and, doubtless, derived much good from so doing. Messrs. G. U. Hay and J. Brittain, assisted by other members of the party, made a systematic study of the flowering plants of the Island, and Mr. Hay gave especial attention to the collection of the cryptogams, particularly the marine forms. The results of these investigations are partially given in the Botanical Report and the paper on Algae (Article V). The Island, comprising an area of about 1000 acres, was found to have a flora of about 300 species of flowering plants, some rarer species of which were *Stellaria humifusa*, *Cuscuta gronovii*, *Comandra livida*, *Elymus mollis*, *Hierochloe borealis*. A sheltered bay on the west side of the Island is probably one of the best collecting grounds for sea weeds to be found on our Southern coast. The Island, so far as observed, was scarcely as rich in the cryptogamic flora as in the higher forms of vegetation, with the exception of ferns, 17 species of which were observed. These grew in the greatest luxuriance on the densely shaded hillsides and ravines of this beautiful Island.

Mr. BRITTAIN devoted the greater part of his time to ornithological work, one of the interesting features of which was his success in obtaining a remarkably fine specimen of the Raven (*Corvus corax*), which he shot on Bliss Island. Messrs. G. F. MATTHEW and W. J. WILSON were present for a few days, which they spent very profitably upon the geology of the neighboring islands and mainland.* The writer of the present paper had charge of the Marine Invertebrates, Zoology, and Dredging. The Camp was most successful in all respects, both the amount and nature of the work accomplished being very satisfactory. The physical comfort of the party was not a little enhanced by the attentions of Mr. HENRY FRYE, to whom, for his great courtesy and kindness, the members of the Camp cannot be too grateful.

Dredging operations were carried on in L'Etang, Bliss, Deadman's and Beaver Harbors, in the former case to an extent sufficient to give a very good general idea of the topography of the bottom and the character of the life inhabiting it. Particular attention was paid to the relation of the different species to the physical character of the district, the height of tides, strength of currents, lithological character of the prevailing rock-masses, etc. While a mere list of species collected and their localities would be of little interest to the Society, the facts determined will be of great importance in making generalizations upon the distribution of marine life upon our coast. The fauna of the whole region is essentially Arctic, the strong tides carrying the very cold water flowing northward from the Nova Scotia coast into every bay and inlet of Charlotte County. No new species were added to those catalogued by STIMPSON and VERRILL at Grand Manan and Eastport, the conditions being the same in all of these localities.

Among the more interesting forms observed during the progress of dredging operations may be mentioned that of very fine specimens of the red "sun-star," *Crossaster papposa*, on a bottom of small *angular* stones in L'Etang; two specimens of the brachiopod, *Terebratulina septentrionalis*, were dredged in Beaver Harbor; this species does not probably occur much further up the coast, as it lives in the clearest and coldest water. At the

* See "Summary of Meetings," Sept. 8, on a following page.

same place a few specimens of the Tubularian hydroid, *Corymorpha pendula*, occurred, while *Tubularia indivisa* was very abundant. Several species of sponges were found in L'Etang, where also the Brittle stars, *Ophiopholis aculeata* and *Amphiura squamata*, were large and common. Specimens of the common holothurian, *Pendacta frondosa*, of enormous size, were dredged at the mouth of the latter harbor, and at the weirs of Bar Island remarkably fine specimens of another holothurian, *Lophothuria Fabricii*, together with another "sun-star," *Solaster endeca*, were abundant. Another extremely interesting star-fish, *Ctenodiscus crispatus*, was found upon mud bottoms in Beaver and Bliss Harbors, and a single specimen of the remarkable genus, *Leptasterias?* at some point unknown. The mollusca which were dredged will be fully treated by the writer in a separate paper.

APPENDIX.

SUMMARY OF MEETINGS.

February 3rd.

Mr. MATTHEW read a paper on the "Earliest Forms of Life in the Cambrian formation at St. John," and also a paper by ALEX. MONRO, C. E., of Port Elgin, on the "Physical Geography and Tides of Chignecto Isthmus." (The latter is published in this Bulletin.)

March 3rd.

Mr. JAS. A. ESTEY read a paper on Physiology and Psychology, especially in relation to the brain in mammals and man.

April 7th.

Dr. L. W. BAILEY, of the University of N. B., read a paper on "A visit to the Anthracite region of Pennsylvania," giving an account of a journey through that area in company with a party of the American and British Associations of Science.

May 5th.

THE subject of consideration this evening was the selection of a suitable site for a summer camp for 1885, and discussion of the arrangements necessary in connection with holding the same. Frye's Island, in L'Etang Harbor, was decided on as a spot well suited for the purpose. On this evening a Field Club in connection with the Society was organized, for exploration around St. John, and to arrange the details of the operations at the proposed summer camp.

June 9th.

Mr. W. F. BEST, delegate to the Royal Society of Canada, gave a report of the meeting of that body held in May last, as witnessed by him on his visit to Ottawa as delegate.

September 8.

Mr. G. U. HAY gave an outline of the work carried on at the Summer Camp at Frye's Island. He also gave a sketch of the botany of the Island, stating that he had found about three hundred species of flowering plants there, and about seventeen kinds of ferns.

MR. W. F. GANONG gave an account of the dredging operations carried on. The locality was found to have some very rich collecting grounds.

Mr. G. F. MATTHEW gave a sketch of the geology of the Island, stating that he had recognized the same succession of Silurian strata as is found at the Mascarene shore of Passamaquoddy Bay; and that evidence had been obtained which showed that the belt of red conglomerates extending from Black's Harbour toward Eastport were Devonian.

October 6th.

Mr. G. F. MATTHEW gave an address on the Pteropods ("Butterflies of the Sea"), minute shell-fish which live in the open ocean; with references to their ancient relatives in Cambrian rocks at St. John.

November 17th.

Rev. T. F. FOTHERINGHAM read an essay on the bearing of modern discoveries in science on Paley's Design Argument. He considered that these discoveries did not invalidate the argument of Paley.

December 1st.

W. S. HARDING, M. D., read a paper on the "Isolation of Contagious Diseases," which elicited an interesting discussion, and was participated in by the physicians who were present.

January 5th.

Mr. G. U. HAY read an introductory paper on the Algae of New Brunswick, the substance of which appears as Article V. of this Bulletin.

January 26th.

THE PRESIDENT read his Annual Address—"A Few Thoughts on Social Science"—which is a part of this Bulletin.

REPORT OF THE COUNCIL.

THE COUNCIL of the NATURAL HISTORY SOCIETY OF NEW BRUNSWICK beg leave to present the following report of the operations of the Society for the year 1885-6 A. D.

The roll of membership as reported by the Treasurer is as follows:—

1 Honorary.
6 Life.
46 Ordinary.
50 Corresponding, and
41 Associate Members.

During the year 10 regular meetings were held, at which the following papers were read:—

Feb'y 3. "Notes on the Isthmus of Chignecto," by A. MUNRO, Port Elgin.

March 3. "A Talk on Physiology and Psychology," by JAS. A. ESTEY.

April 7. "A Visit to the Anthracite Regions of Pennsylvania," Dr. L. W. BAILEY.

May 5. Discussion on the choice of a site for the Summer Camp.

June 9. Report of Mr. BEST, delegate to the Royal Society of Canada; and a description of the Apatite Mines of the Gatineau, G. F. MATTHEW.

Sept. 8. Description of work done at the Summer Camp, G. U. HAY and W. F. GANONG.

Oct. 6. "Pteropods," G. F. MATTHEW.

Nov. 3. "Does Modern Science overthrow Paley's Design Argument," Rev. T. F. FOTHERINGHAM.

Dec. 1. "The Isolation of Contagious Diseases," Dr. W. S. HARDING.

Jan'y 5. Introductory paper on Algae, G. U. HAY.

The Council has held 12 meetings for the transaction of business.

The Curators report that the set of cases for geological specimens, after considerable delay, owing to the difficulty of obtaining the necessary locks and brackets, has been completed, and placed

in the Geology room. These cases are well adapted for the purposes for which they are intended, as they exclude the dust, and show the specimens to advantage. The Committee on Geology are now at work labelling and arranging the objects in these cases.

The most valuable additions to the Museum made during the past year are those received from the members of the Ornithological and Botanical Committees. From the former, in the specimens of native birds and eggs, which have been added to the collection from time to time; from the latter, chiefly in the valuable donations of Canadian plants received from Dr. BURGESS, of London, Ont.; Prof. FOWLER, of Kingston, Ont., and Mr. G. U. HAY, of St. John. In view of these latter donations, the Curators would again call the attention of the Council to the advisability of procuring a new case for the herbarium, the present Botanical case being insufficient for the collections now in the Society's possession. The Curators wish also to report that the Society's Rooms and Museum have been open for members and the public every Tuesday evening since the present sessions of the Society for 1885-6 began, and frequently on other nights as well. By the introduction of gas into all the rooms a great improvement has been effected, and objects in the cases can be seen to better advantage in the evening, than formerly. The chief work done in arranging the Museum has been in the departments of Geology, Ornithology, and Invertebrate Zoology (Mollusca).

The Committee on Ornithology report that they have added several nests and eggs of native birds to the collection during the past year, and have also added some specimens of birds, notably a Gyr Falcon (*F. rusticolus obsoletus*) taken within a few miles of this city. The Committee have besides this been occupied with gathering data of the distribution of the birds occurring in this Province, to be embodied in a revised catalogue, which will be issued when further information has been acquired. The Committee on Vertebrates have made some investigations into the distribution of the Mammals, especially regarding the extension eastward of the Red Virginian Deer (*Cariacus Virginianus*) and the returning of the Beaver (*Castor fiber*) to the streams from which it was, some years ago, driven by the operations of the lumberman.

The Committee on Botany report that a number of plants new to the Province have been found, and they furnish a list of such; and also a few localities in which rare forms have been found. This list is appended.

The Librarian reports that forty-eight volumes and pamphlets have been added to the Library during the year, some of which are of considerable value. The total number of volumes in the Library is 705.

The Treasurer reports that the total receipts for the year is $409.30, which with $209.98 on hand at the beginning of the year amounts to $619.28, and the expenditure is $472.95, leaving a balance on hand of $146.33. There are bills still unpaid amounting to $75.20.

Early in the Spring a Working Club was formed in connection with the Society. Under the direction of this club several rambles were undertaken in the vicinity of the city, when practical instruction was given to beginners.

The Summer Camp was also conducted under the auspices of the Club. This was held on Frye's Island, Charlotte Co., in July, at which about seventeen members were present. A very pleasant and profitable fortnight was spent in the study of Marine Zoology, under W. F. GANONG, of St. Stephen; and Botany, under G. U. HAY, of St. John. The locality chosen was a most beautiful one, and admirably suited for the pursuit of the various studies engaged in; and those who attended returned feeling that the Summer Camp of 1885 A. D. had been a real benefit to them, intellectually and physically. The Summer Camp is especially advantageous to the younger members, as it affords them an excellent opportunity to learn the practical field work of the Naturalist.

The Council again desire to acknowledge the kindness of the daily press of this city for the insertion of preliminary notices of meetings.

In conclusion, the Council feel that the past year has been one in which much valuable work has been done. Our publications are sought for by kindred societies—not only in Canada and the United States, but also in Europe—and thus our Province, with its natural resources, has been brought under the notice of

many who otherwise would have remained in ignorance of its advantages. Considering these facts, the NATURAL HISTORY SOCIETY ought to commend itself to all who take an interest in science, as well as to those who desire the material progress of the country.

Respectfully submitted.

W. J. WILSON,
Rec. Secretary.

REPORT OF COMMITTEE ON BOTANY FOR 1885.

OWING to the publication of a full list of plants in the Bulletin of last year, space can only be taken in this year's issue for the following: (1) A few accidental omissions from last year's list; (2) Plants new to the Province discovered during the summer of 1885; (3) A few localities in which rare forms have been found. The number given below corresponds to the number in last year's list. A number followed by a letter *a* or *b* indicates that the plant is new to the Province, or was not numbered in last Bulletin.

20*a*. RANUNCULUS HIRSUTUS, Curtis. Ballast Wharf, St. John, 1881, *G. U. Hay.*

68*a*. Viola sagittata, Ait. St. George, *J. Vroom.*

87. Stellaria uliginosa. Burton, Sunbury Co., *Hay.*

89. S. borealis, Bigel.; and

90. S. humifusa, Rottboell. Frye's Island, *J. Brittain.*

149. Hedysarum boreale, Nutt. Elgin, A. C., *Brittain.*

223. Myriophyllum tenellum, Bigel. St. George, *Vroom.*

250*a*. Heracleum lanatum, Michx. Common in moist rich grounds. Omitted from list, 1885.

287. Solidago squarrosa, Muhl. Elgin, *Brittain.*

312. Aster puniceus, L., var. laevicaulis, Gray, of the list 1885, should be Aster tardiflorus, L.

312*a*. Aster junceus, Ait. Moncton, *Brittain.*

312*b*. A. longifolius, Lam. Bass River, 1863, *Fowler.* Omitted from list, 1885.

316*a*. A. salicifolius, Ait. St. Stephen, *Vroom.*

350. TUSSILAGO FARFARA, L., and No. 440, SYMPHYTUM OFFICINALE, at Beaver Harbor, Charlotte Co., *Hay.*

392*a*. Vaccinium Vitis-Idæa, L. Omitted from list, 1885. Very abundant on rocky hills in lower counties. Rare in Northern counties.

399. Epigæa repens, L. Dalhousie, *M. Ross.*

433. Gentiana linearis, Fresl. Derby, *Rev. A. F. Fritz.*

437*a*. Polemonium cœruleum, L. Jacob's Ladder. "In rich woods on uninhabited side of Trout Lake, Charlotte Co., along a cold stream." *Brittain.*

447*a*. CONVOLVULUS ARVENSIS, L. The *number* omitted from list, 1885.

469*a*. VERONICA BUXBAUMII, Tenore. Near St. Stephen, *Vroom.*

507*a*. Littorella lacustris, L. Shore-weed. St. George, *Vroom.*

47*a*. Euphorbia maculata, L. Near St. Stephen, *Vroom.*

549. E. CYPARISSIAS, L. Lime kiln, St. George, *Hay.*

591*a*. Corema Conradii, Torr. Abundant in sphagnous bog, rear of Carleton, *Fowler, Hay.* Omitted from list, 1885.

672*a*. Juncus militaris, Bigel. Moore's Mills, Charlotte Co., *Vroom.*

730*a*. Scirpus eriophorum, Michx. Common. Omitted from list, 1885.

754. Carex norvegica Schk. Back Bay, Charlotte Co., *Brittain.*

755*a*. C. exilis, Dew. Trout Lake, *Brittain.*

758. C. scoparia, Schk., var minor, Boot. McAdam Junction, 1884, *Hay.*

759. C. lagopodioides, Schk., var moniliformis, Boot. Petitcodiac, *Brittain.*

766. C. torta, Boot. St. Francis River, 1882, *Hay.* "Very abundant along the banks of Tay Creek, York Co., its roots forming a mat in the soil almost impossible to tear up. Its succulent, grassy leaves are readily eaten by cattle." *J Moser.*

784. C. oligocarpa. Tay's Mills, *J. Moser.*

799. C. filiformis, L., var latifolia. Frye's Island, *Hay.*

810. C. retrorsa, Schw. Salmon River, Victoria Co., 1884, *Hay.*

831*a*. Phalaris arundinacea, L. Rather common in wet grounds. Omitted from list, 1885.

833. Hierochloe borealis, Roem. and Schultes. Frye's Island, *Brittain.*

833*a*. ALOPECURUS PRATENSIS, L. Meadow Fox-tail. Abundant on Frye's Island, *Hay.*

848. Cinna arundinacea, L., var pendula. Frye's Island, Bocabec, *Hay.*

858*a*. Brizopyrum (Distichlis), spicatum, Hook. Marshy ground at Shediac, *Brittain.*

875. Glyceria maritima, Wahl. Frye's Island, *Hay.*

883. LOLIUM PERENNE, L. Frye's Island, *Hay,*

888. Elymus Virginicus, L. Salmon River, 1884, *Wetmore.*

890. E. mollis, Trin. White Horse Island, *Brittain;* Frye's Island, *Hay.*

905. Scolopendrium vulgare, Smith, var marginatum (S. marginatum, Moore). Peter Jack, Esq., Halifax, to whom we are indebted for the discovery of *Scolopendrium vulgare* at Woodstock in 1881, writes under date of Feb. 20th, 1886: "I have received from Miss Connell, Woodstock, a variety of this fern, which I find corresponds exactly with *S. marginatum*, of Moore. It has the longitudinal excurrent membranes on the back of the frond; is irregularly lobed and crenate. The *sori* are continued on to the upper side of the frond, a singular feature, and are short and small compared with *S. vulgare.*"

923*a*. Woodsia glabella, R. Br. This species, found by P. Jack, Esq., at Grand Falls, is restored on his authority and that of Dr. Lawson.

931. Botrychium lunarioides, Swartz, var. rutaefolium, "Rapide des Femmes, Victoria Co., P. Jack."—*Macoun and Burgess.*

932. B. simplex, Hitchcock. Petitcodiac and Fredericton, *Bailey.*
Var. subcompositum, "Dalhousie—J. Fletcher."—*Macoun* and *Burgess;* Trans. R. Soc. II., 177.

G. U. HAY,
Chairman of Committee.

DONATIONS TO THE MUSEUM,

DURING THE YEAR ENDED JAN. 19TH, 1886.

DATE.	DONOR'S NAME, AND ARTICLES PRESENTED.
1885.	
Feb.	ALEX. MONRO, C. E.—Stone implements and weapons from Port Elgin, Westmorland Co.
	T. C. L. REED.—Box of native Fungi, from Fredericton.
April.	W. F. BEST.—Pelican (mounted), from Pelican Lake, Regina, N. W. T.
June.	M. CHAMBERLAIN.—Common Rail.
	G. F. MATTHEW.—Mica, Apatite and Tourmaline in crystals from Apatite mines on the Gatineau River, Ottawa.
Sept.	T. L. BOURKE.—Branch of tree, dredged at "Banks" of Newfoundland.
	C. M. GOVE, St. Andrews.—Shark's Tooth, South Carolina (Eocine); Ammonite, R. R. cutting, England.
Oct.	M. CHAMBERLAIN.—Nest and Eggs of Red-eyed Vireo.
Nov.	R. R. BARNES.—Remains of Plants and Fishes from Elgin shales (sub-carbonif.).
	W. D. MATTHEW.—Collection, 47 species Molluscs.
	M. CHAMBERLAIN.—Gyr-Falcon and Red-necked Grebe (mounted); Eggs and Nest of Bank Swallow; Eggs of Cow Bird in Nest of Red-eyed Vireo.
Dec.	ALFRED MORRISSEY.—Glass Sponge (Euplectella); Nests of Ruby-throated and Southern Humming Bird, "Old Squaw," Sea Pigeon (winter plumage), Woodcock (summer plumage).
	MARSHALL REID, Restigouche.—Granite, China Clay, Sandstone, from Scotland, &c.; nine species of Molluscs, W. coast of Scotland.
1886.	
Jan.	M. CHAMBERLAIN.—Bonaparte Gull, Razor-billed Auk.
	CAPT. RUFUS COLE.—Coral Cobra, S. America.
	J. B. WILLIAMS, Toronto.—Skulls of Red-eyed Vireo, etc. (3 birds).
	PROF. JAS. FOWLER, Kingston, Ont.—100 Canadian plants.
	DR. BURGESS, London, Ont.—150 Canadian plants.
	G. U. HAY.—40 species New Brunswick Algae.

DONATIONS TO THE LIBRARY,

DURING THE YEAR ENDED 19TH JAN., 1886.

DATE.	DONOR'S NAME, AND TITLE OF BOOK.
1885.	
Mar.	Rev. G. M. ARMSTRONG. — Reign of Law.
April.	BELFAST NATURALISTS FIELD CLUB — Proceedings of.
	NEW YORK MICROSCOPICAL SOCIETY — Journal of.
	CANADIAN INSTITUTE, Toronto — Proceedings of.
	ESSEX INSTITUTE, Salem — Bulletin of.
May.	ACADEMY OF NAT. SCIENCES, Philadelphia — Proceedings of.
	UNITED STATES GEOLOGICAL SURVEY — Monograph, "Comstock Mining and Miners."
	UNITED STATES AGRICULTURAL DEPARTMENT — Report of.
	PROF. J. MACOUN. — Catalogue of Canadian Plants, Parts I. & II.
June.	LINNEAN SOCIETY OF NEW YORK — Transactions, Vol. II.
	NOVA SCOTIAN INSTITUTE OF NAT. SCI. — Proceedings.
	CLIFFORD RICHARDSON. — Agricultural Grasses of U. States.
	ACADEMY OF NAT. SCIENCES, Philadelphia. — Proceedings, 1885.
	NEW YORK MICROSCOPICAL SOCIETY. — Proceedings, Nos. 1, 3 and 4.
	COLORADO SCIENTIFIC SOCIETY. — Proceedings, 1883-4.
	AMERICAN MUSEUM OF NAT. HISTORY, New York. — Bulletins, 1-5, Reports, 1-15.
	UNITED STATES GEOLOGICAL SURVEY — Third Annual Report, 1881-2; Monographs, Vol. 3.
Sept.	BROCKVILLE (IND.) NAT. HIST. SOCIETY. — Bulletin.
	BRITISH ASSOCIATION FOR ADV. OF SCIENCE. — Report, 1884.
	ESSEX INSTITUTE. — Bulletin, Vol. 16, Nos. 7-12.
	WYOMING HIST. AND GEOL. SOCIETY — Proceedings, Vol. II., Part I.
	ACADEMY OF NAT. SCIENCES, Philadelphia — Proceedings, Part II., May to Oct., 1884.
	OTTOMAR NOVAK, Prague. — Studies on Hypostomes.
	A. C. SMITH, M. D., Newcastle, N. B. — The Lobster.
	UNITED STATES GEOLOGICAL SURVEY. — Geology of the Comstock Lode; Silver Lead deposits of Eureka; Palæontology of the Eureka District.
	BOSTON SOCIETY OF NAT. HISTORY. — Proceedings, Vol. XXIII., Part I.
	NEW YORK MICROSCOPICAL SOCIETY. — Journal, Vol, I., Parts 6 and 7.

DONATIONS TO THE LIBRARY—(*Continued*).

DATE.	DONOR'S NAME, AND TITLE OF BOOK.
Sept.	CANADIAN INSTITUTE, Toronto.—Proceedings.
	CANADIAN RECORD OF SCIENCE.—Vol. I., No. 2.
	GEOLOGICAL AND N. H. SURVEY OF CANADA.—Report of Progress, 1882–4.
Oct.	ESSEX INSTITUTE, Salem.—Bulletin, Vol. 17.
	MINNESOTA ACADEMY OF NAT. SCIENCE.—Bulletin, 1884–5.
Nov.	PROF. J. H. PANTON.—Rambles in the North-West.
	AMERICAN MUSEUM OF NAT. HISTORY.—Bulletin, Vol. I., No. 6
	ACADEMY OF NAT. SCIENCE, Philadelphia.—Proceedings, Part II., April to July, '85.
	G. H. LIVINGSTONE.—Partial Catalogue of the New Brunswick Flora.
Dec.	A. T. DRUMMOND, Montreal.—Distribution of Canadian Forest Trees; Forest Preservation in Canada.
	UNITED STATES DEPART. OF AGRICULTURE.—Bulletins Nos. 6 and 7.
1886.	
Jan.	OTTOMAR NOVAK, Prague.—On Genus Aristozoe.

NEW MEMBERS ELECTED DURING THE YEAR ENDED 19TH JANUARY, 1886.

ORDINARY MEMBERS.

1885.
March. R. T. SAUNDERS, Student, (Carleton).
May. JAS. S. CLARKE, Student, (Carleton).
Nov. FRANK STARR, Clerk.

CORRESPONDING MEMBERS.

Sept. HENRY FRYE, Gentleman, Frye's Island, Charlotte Co.
1886.
Jan. C. HART MERRIAM, M. D., Washington, D. C., U. S.

ASSOCIATE MEMBER.

1885.
Sept. Miss CARRIE E. JORDAN.

Officers of the Society for 1886.

Patron, His Honor Sir Leonard Tilley.
President, LeB. Botsford, M. D.
Vice-Presidents, G. F. Matthew, Edwin Fisher.
Treasurer, Alfred Seely.
Corresponding Secretary, G. U. Hay.
Recording Secretary, W. J. Wilson.
Librarian, Alfred Morrissey.
Curators, M. Chamberlain, S. W. Kain, F. W. Daniel.
Members of Council, Jas. A. Estey, D. R. Jack, W. F. Best.

Standing Committees for 1886.

Physics and Chemistry, W. F. Best, G. U. Hay.
Meteorology, Gilbert Murdoch.
Mineralogy, W. F. Best, R. P. Starr, W. J. Wilson.
Geology, G. F. Matthew, R. Chalmers, W. J. Wilson.
Botany, G. U. Hay, J. E. Wetmore, J. Brittain, W. T. L. Read, J. Vroom.
Entomology, M. Chamberlain, G. Williamson, H. E. Gould.
Invertebrates, P. R. Inches, M.D., W. F. Ganong, D. R. Jack, R. T. Saunders.
Vertebrates, LeB. Botsford, M.D., M. Chamberlain, W. S. Harding M. D.
Ornithology, M. Chamberlain, A. Morrissey, F. W. Daniel.
Library, A. Morrissey, S. W. Kain, W. J. Wilson.
Essays and Lectures, G. F. Matthew, G. U. Hay, LeB. Botsford, M. D., J. A. Estey, E. Fisher, D. R. Jack.
Publications, M. Chamberlain, G. F. Matthew, G. U. Hay.
Hall, W J. Wilson, S. W. Kain, G. F. Matthew.
Finance, A. Seely, Edwin Fisher, W. J. Wilson.
Press, J. A. Estey, W. F. Best, S. W. Kain.
Delegate to Royal Society of Canada, J. A. Estey; *Alternate*, D. R. Jack.