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VOL. IX, No. 3.

# THE OTTAWA NATURALIST.

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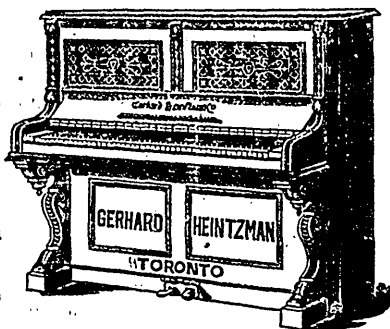
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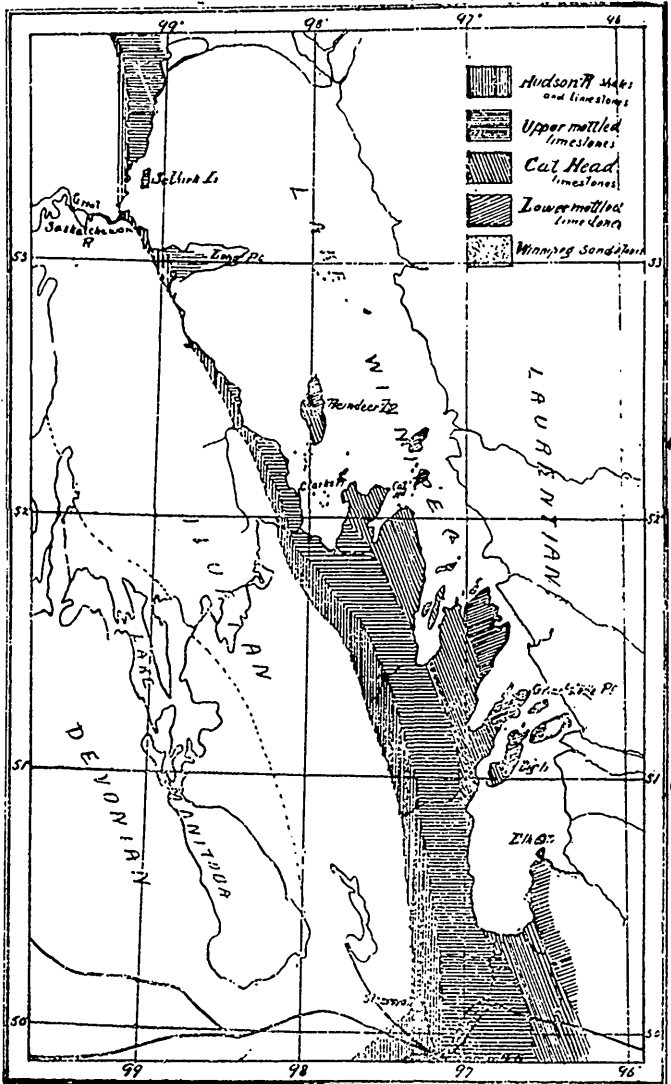
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SKETCH MAP OF LAKE WINNIPEG,  
Showing Sub divisions of the Cambro-Silurian of Eastern Manitoba.

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## NOTES ON THE STRATIGRAPHY OF THE CAMBRO-SILURIAN ROCKS OF EASTERN MANITOBA.

By D. B. DOWLING, B. A. Sc..

(By permission of the Director of the Geological Survey.)

Along the western edge of the great Archæan area which lies north and west of Lake Superior, stratified deposits are found lying unconformably on the irregular surface of these older rocks.

As early as 1819 they were recognized by Sir John Richardson, who accompanied Sir John Franklin on his overland expedition, to be similar in age to those of the Black River formation of eastern Canada. Numerous papers have since been published on observations made in other localities, and prominent among these is the report by Prof. H. Y. Hinde, of the Saskatchewan Exploring Expedition. The general conclusions from all these reports and papers is, that there is a definite series found in the district, which represents the Hudson River formation, but the beds in the lower part of the section have become rather confused, owing to a lack of definite knowledge as to their sequence.

During the seasons of 1890 and 1891, Mr. J. B. Tyrrell, with the writer as assistant, was engaged in a survey of the geological features of Eastern Manitoba, having special reference to the exposures of the rocks on the shore of Lake Winnipeg. A part of the writer's duties consisted in making an examination of the exposures on the islands and western shore of the lake, in order to follow as closely as possible, the sequence of beds and determine the probable thickness and extent of the formation. The present paper is intended to give in outline, the field relations of the several exposures visited and examined by either Mr. Tyrrell or the writer. A full detailed account will be found in the forthcoming Report by Messrs, Tyrrell and Dowling in the Annual Report of the Geological Survey Department.

The fossil remains collected from these beds have shown many new forms, and many of them have already been described by Mr. Whiteaves the Paleontologist of the Survey. But apart from the paleontological evidence, which, so far, is not very definite, the series might provisionally be divided under the following heads, on purely lithological distinctions.

*Hudson River Shales* consisting of reddish and yellowish limestones, dolomites and shales.

*Upper Mottled Limestones*, Magnesian limestones.

*Cat Head Limestones*, fine grained cherty limestones. (Magnesian)

*Lower Mottled Limestones*, very similar to the upper mottled.

*Winnipeg Sandstones*, friable sandstones with shaly bands.

These several divisions are represented on the accompanying sketch map and section, and are seen to be exposed in regular sequence from the lowest beds on the east, to the highest on the west. The whole formation seems to have a slight dip, south of west which is seen on Lake Winnipeg very plainly, by following the division between the sandstone, and the overlying limestone beds. This line is quite distinct, and the several measured sections in which it occurs, when plotted, show that the surface of the sandstone or lower face of the limestone, instead of being a plane, is gently undulating or waved, the distance between the crowns of the undulations being from eight to sixteen miles, while the variations in height run somewhere near twenty feet. The direction of the axis of the folds is with the dip towards the W.S.W., so that the intersections of this crumpled plane, with the horizontal one of the lake, forms a waving line, extending from Elk Island northward to near Dog Head.



SKETCH SECTION THROUGH STONEWALL, E.N.E., TO THE WINNIPEG RIVER.\*

The floor on which these rocks were laid is the uneven surface of the Archean rocks, seen on the eastern side of the lake. In the

\*For index of shading see sketch map accompanying this paper.



southern portion. the general inclination of this uneven floor, is possibly about parallel to the bedding of the overlying series, but farther north it is more abrupt, as at Dog Head, where a narrow channel has been eroded, and is kept free by currents in the lake, through the soft underlying sandstone, a depth of 112 feet has been reached at a little over one half mile from the Archean rocks of the east shore.

#### THE WINNIPEG SANDSTONE.

The basal beds of this series of Cambro-Silurian rocks, is, on its eastern outcrop, a sandstone, which is probably a shore deposit of an advancing sea, and therefore, not altogether similar in age, to those to the south, at the base of the Cambro-Silurian in Minnesota, but may possibly be a trifle later. The fossils found, so far, are rather indefinite, and would seem to be much the same as species in the next overlying series of limestones. Mr. Whiteaves, the paleontologist of the Geological Survey, intends making a study of these in the near future. The exposures on the lake show a thickness of about 100 feet of friable fine grained sandstone with a few feet of dark grey green shales toward the upper part of the section. The lower half resting on the Archean, is seen on the eastern end of Punk Island as a pure, clean fine grained sandstone, lightly cemented, and very friable. In several places it is somewhat harder, and of a reddish colour, from a staining of iron oxide, derived from the Huronian beds immediately underlying portions of the island. On Deer Island, to the west of this, the upper part of the sandstone is seen, overlaid by limestone. The sand is interbedded with shaly bands, and the sections exposed at several points, show an irregularity in the deposition of this dark material. The sections of this sandstone and shale at the several localities on the lake are all near the eastern edge of this deposit, and probably near the ancient shore line.

Comparisons with sections elsewhere made in Manitoba in drill holes, show an increasing deposit of the shaly beds in the upper part of the sandstone. For example, at Selkirk, the drilling extended 36 feet below the limestone, through shales and soft rocks, before striking a porous layer of pebbles and sand. Again at Rosenfeld,\* a much greater

\*On certain borings in Manitoba and the Northwest Territories by Dr. G. M. Dawson, Trans. Royal Society of Canada, Vol. IV, Pt. IV, 1886.

distance from the eastern outcrop, 75 feet of shale is recorded above the sandstone, which is there, 50 feet in thickness, thus it is probable that these shales were being deposited at the same time as the upper part of the Winnipeg sandstones. The localities at which examples of these sandstones may be seen are, Elk Island, Black Island, Deer Island, Punk Island, the shore from Little Grindstone Point to Grindstone Point, the shores near Bull Head, and the lower part of the cliffs near Dog Head.

#### LOWER MOTTLED LIMESTONE.

Just above the sandstone, horizontal beds of thin bedded mottled limestone form the principle part of the sections at Grindstone Point, Dog Head, Black Bear Island, Tamarack Island., Jack Head Island, and Swampy or Berens Island. The section given by these several exposures amounts to over 70 ft. The lowest beds are those seen at Deer Island and Grindstone Point, capping the sandstone. Immediately above are the beds occurring at Dog Head. followed by the upper part of the Black Bear Island exposure. Those on Tamarack and Jack Head Islands are evidently higher, but belong to the same series, and form, altogether, a section of 65 feet. To the north of this line of section, on Swampy Island and Little Black Island, just to the west, small cliffs of this same mottled limestone occur. The upper part of the cliff on Little Black Island seems to be more fossiliferous than those previously seen, and are probably not represented in the foregoing section, or fill the gap between the Tamarack Island and Jack Head Island sections. This might possibly add a few feet to the total given there, making a total thickness for this series of 70 feet. The character of the beds in this division is quite uniform and varies only in a slight degree in color. The lowest beds are somewhat darker and contain more earthy impurities, but they all have similar fucoidal markings on the surfaces of beds and through the section dark brownish streaks and blotches of finer grained material. The mass of the rock is made up of the debris of shells, etc., many very badly preserved. At Grindstone Point examples of a large cephalopod, probably a *Poterioceras*, have been partially preserved in a vertical position so that frequently slabs of the thin bedded limestone contain sections of the body chamber over

12 inches in diameter. These break out readily, forming circular discs much resembling crude grindstones. The name for this prominent point on the lake may possibly have been derived from the finding of these "grindstones" on the shore as well as from the fact of there being there the material (sandstone) from which grindstones could be manufactured.

#### CAT HEAD BEDS.

Above the lower mottled limestone are seen several sections of a fine grained evenly coloured yellow dolomitic limestone with numerous concretions of dark coloured chert filling cavities, apparently left by the decay of corals or soft bodied animals. Examples of these beds are seen in the high cliff at Cat Head and along the shore to Lynx Bay. At the western end of the section three miles west of Cat Head the cherty concretions attain large dimensions. Several are over a foot in length and one measured 2 feet by 10 inches. The lower beds are fine grained, resembling lithographic stone and are very rich in fossil remains.

The total thickness of these beds, as observed on the lake, is 68 feet. This includes the top beds of Cat Head and Outer Sturgeon Island which are similar in colour but coarser in texture, becoming finely crystalline.

The area outlined on the sketch map is proposed as a diagram of the theoretical outcrop of these rocks, but owing to the mantle of drift exposures are not always to be had, thus in the southern part east of Selkirk no exposures of this series at the surface so far are known, but the existence of similar beds is shown below the Selkirk rock in the drilling made for a well at Selkirk. Similarly no exposures west of Big Island are known, but on the beach on the westward side south of Icelandic River numerous fragments of the fine grained rocks are found. On Fisher Bay loose fragments are found on the islands, but the shores are all low and there are no rock exposures. The south point of Reindeer Island is probably underlain by these rocks and fine grained yellow beds exposed at the base of cliffs on the mainland southwest of this island may probably also belong to this series. The eastern end of Long Point is covered with drift deposit, but near the northern end of the lake at the

"First" and "Second" "Rocky Points" the upper part of the Cat Head beds are plainly seen in the lower beds of the cliff.

#### UPPER MOTTLED LIMESTONE.

Just above the yellow limestone beds, referred to as the Cat Head beds, there is found a series of mottled limestones somewhat similar to the lower limestone member. At the north end of the lake the beds are very much harder and more dolomitic than farther south. The section there is evidently much thinner, as between the base of the cliffs at the first Rocky Point and the Silurian rocks at the mouth of the Great Saskatchewan there can be only a very thin section which must include not only the upper mottled limestone but the Hudson River shales, etc. Farther to the south the section is slightly altered, the lower beds of these mottled limestones resemble those to the north, but higher up in the section the beds become darker in colour and are there only impure earthy limestones which are evidently grading up to the shales of the overlying Hudson River series. These lower beds are to be found at a point about nine miles north from Clark's Point, while at Clark's Point are seen the upper earthy limestones which with those at the mouth of the Little Saskatchewan River, form the transition beds to the Hudson River shales. The top of the upper mottled limestones is thus somewhat similar in appearance and constitution to the lowest member of the lower mottled and the top beds of the latter to the lower beds the former. These upper beds are thus described by Dr. R. Bell\* as they occur on the Little Saskatchewan:—

"At the head of the four-mile rapid there is a small exposure of thinly bedded flat lying limestone; on the south side of the river and at the foot of the rapid, limestone interstratified with shale is seen on both sides of the river. It is of yellowish and greenish grey colour and has a magnesian character. I noticed a large obscure *Orthoceras* in one of the beds and collected a tolerably well preserved *Plectotomaria* and a *Rhynchonella* resembling the Hudson River form of *R. imbricatus* (Hall).

On the Fisher River the only beds seen are near the mouth and they appear to be near the base of the upper mottled limestones not far above the Cat Head beds. They are light coloured mottled limestones very much like those at East Selkirk and Lower Fort Garry.

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\*Report by Mr. R. Bell, Report of Progress, G.S.C. for 1874-5, pp. 38.

The exposures at the latter places have been frequently described and the building stone from these quarries has been largely used in constructions in Winnipeg, they are therefore well known. The principal difference between these beds and those of the lower mottled limestone consists in the very white nature of the lighter portions, as also the general soft or chalky texture of the uncrystalline particles scattered throughout the whole mass leaving chalk or lime marks on the hands after handling. The mottling is of a light brown and is in irregular patches, but so general as to affect the whole of the beds giving them a general yellowish tint. It dresses easily and makes very fine building and ornamental stone. The papers by Prof. Pantou\* and Mr. McCharles† give graphic and full details regarding this stone. As to the thickness of the formation here, we were at first obliged to depend on a calculation based on the known dip of the beds at Grindstone Point of about 50 feet in six miles--assuming, however, that this dip is approximately the same at the south, the thickness of the limestone below Selkirk would be the total dip given in about 30 miles or 250 feet. Since the field work was finished a well has been drilled for the fish hatchery at Selkirk West and the bottom of the limestone passed through was found at 262 feet. Deducting then the thickness of the lower beds seen on Lake Winnipeg leaves about 110 feet of the upper mottled rock of Selkirk. To this may be added about 20 feet for beds between Selkirk and Winnipeg of the transition type as at Clark's Point. There is a strong probability that the beds at East Selkirk and Lower Fort Garry are brought up by a small fault running east and west very near the northern limits of the former.‡ The amount of the upthrow is very uncertain and we can assume that the main part of these exposures are to be added to the thickness given in the drilling. I would not hesitate therefore in calling the thickness of these beds down to the recognized yellow beds of the Cat Head type, at least 150 feet, making a total of 290 feet of the limestone series. To the north the upper

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\*Transactions No. 15, 20 and 27, Man. Historical and Scientific Society, Winnipeg.

‡The foot-steps of time in the Red River Valley by A. McCharles, Transactions No. 27, Man. Historical and Scientific Society.

Beds are found to decrease greatly in thickness and as noted before gradually thin out to less than one hundred feet north of the mouth of the Saskatchewan.

Farther to the south at Rosenfeld, the evidence of drilling gives a thickness of limestone, undoubtedly the same series, of 305 feet,\* thus showing a slight tendency to increase in that direction.

#### HUDSON RIVER BEDS.

Under the city of Winnipeg, red, impure limestones are reached in drilling for wells. The surface of the underlying rock slopes very abruptly to the east, the depths at which it is found varying from 60 feet on the west, and under most of the city, but increasing suddenly to 112 feet at the outer end of Point Douglas † This seems to be about the extent of these soft beds to the east. They extend west, and are to be found at Little Stony Mountain in an undisturbed state, capped by beds of an ashy coloured dolomite. The thickness of this part of the formation is indefinite, but part of the section has been recorded by Prof. Pantou, from the exposure at Stony Mountain. Here the dolomite seen at Little Stony Mountain, appears at the surface on the top of the hill, dipping slightly to the southeast, showing a tilting up of the underlying beds, and a consequent break in the section between this place and Stonewall. The section recorded amounts to 110 feet.

‡“The following is a vertical section of the rock, as observed during the digging of a well at the southwest part, upon which the Provincial Penitentiary is located.”

- 1--20 feet solid hard stone like that at the quarries
- 2--4 feet thin layers of the same.
- 3--2 feet solid rock.
- 4--6 feet thin and broken.
- 5--8 feet yellowish rock, quite ochreous.
- 6--10 feet reddish layer, full of fossil shells.
- 7--60 feet, a mixture of yellow and red, containing some flinty material.”

Between the top of the Stony Mountain beds, and those at Stonewall, where the rocks appear to be Niagara, there are no exposures, but at the latter place the section in the quarry seems to be very similar in

\*Trans. Royal Society, Canada, Vol. IV. 1886.

†Transactions No. 27, Manitoba Historical and Scientific Society, Winnipeg.

‡Transactions No. 15, season 1894-5, Manitoba Historical and Scientific Society, Winnipeg.

some respects to the upper part of the Stony Mountain section, but the fossils found are quite distinct. They evidently belong to a higher horizon. The gap in the series is evidently made up of soft shaly beds with possibly some sandstone at the base of the Niagara.

The section given by Dr. G. M. Dawson for the Rosenfeld well\* I would be inclined to interpret as passing through the equivalent of the Stonewall beds as well as the Hudson River, of Stony Mountain, referred by him to the Maquoqueta shales of Wisconsin, and would arrange part after the following :

7—limestone, . . . . .	15 feet	} Niagara.
8—red shale . . . . .	5 feet	
9—grey shale . . . . .	10 feet	
10—limestone . . . . .	30 feet	
11—fine grey sandstone, . . . . .	40 feet	} Hudson River of Stony Mountain.
12—chalky limestone . . . . .	30 feet	
13—red shale . . . . .	160 feet	} Winnipeg limestone, Trenton and Galena Winnipeg sandstone and associated shales.
14—cream colored limestone, . . . . .	305 feet	
15—red shales . . . . .	75 feet	
16—soft sandstone . . . . .	50 feet	

This would leave the Hudson River section with a thickness of 190 feet, which is not far from the probable thickness in the southern part of the province as this formation thins out toward the north, and is not seen in the section on either the Little Saskatchewan or Great Saskatchewan rivers. If we had a series containing several successive beds of limestone, there would, in all probability, be something seen of it on the northwest shore of the lake, between Saskatchewan river and Selkirk Island, where we have the Silurian or Niagara beds, and the top of the upper mottled or Galena limestone. On the Little Saskatchewan the probable representative is in the shales recorded by Dr. Bell at the head of the four mile rapid. A summary, then, of the several beds could be placed in the form of a section, in descending order, giving the total thickness for the Cambro-Silurian of this district, as less than six hundred feet :

Cambro-Silurian	{	Hudson River Shales . . . . .	190 feet
		Upper Mottled Limestone . . . . .	150 feet
		Cat Head Beds . . . . .	70 feet
		Lower Mottled . . . . .	70 feet
		Winnipeg Sandstone . . . . .	100 feet
			580 feet

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\*Trans. Royal Society of Canada, Vol. IV, 1886.

## THE WELL AT SELKIRK.

In the spring of 1894, a supply of water for the Selkirk fish hatchery, other than that of the Red River, being required, a well was drilled and a supply obtained after penetrating three hundred feet. The first or upper part was through 97 feet of till, then to a depth of 264 feet in limestone, reaching a dark shale, in which sandy layers, containing gravel, gave a sufficient supply of water. The specimens obtained from the drilling, show that the limestone through which the drilling was made, consists in the upper half of semi-crystalline light yellow beds, similar in a great measure to those rocks exposed at Selkirk and Lower Fort Garry.

At a depth of 185 feet, or 88 feet below the top of the limestone, a series of beds about 9 feet in thickness, were called by the drillers, sandstone, but it is found from the specimens to be mostly a band of fine grained limestone, through which cherty masses are scattered. The percentage of silica is low, being under ten. Examples of this rock are very probably to be seen at Cat Head, on the west shore of Lake Winnipeg, where the cliff is of a fine yellow magnesian limestone, and the lower beds well pitted with small cherty concretions.

The specimens from the lower part of the limestone in the well, are all of a light colored limestone, somewhat coarser in texture than at the middle of the section, and are, no doubt, similar to the limestone of the shores of the lake at Grindstone Point and Dog Head. The thickness from the cherty layer to the base of the limestone was 79 feet, or a trifle more than that measured on the lake.

## EXCURSION No. 2., O. F. N. C.

**Excursion to Galetta.**—Arrangements are nearly completed for the Club's second Excursion, which will be held on SATURDAY afternoon, 15th June, 1895. **Galetta**, a charming village on the Mississippi River, about thirty miles from Ottawa, along the Ottawa, Arnprior and Parry Sound Ry., is the place selected. This is one of the most interesting and newest localities visited by the Club, and collectors of plants, insects, shells, rocks or other objects of Natural History, will find Galetta a perfect treasure land. There is excellent fishing, besides interesting outcrops of crystalline limestone and many beautiful bits of woodland, forest and stream scenery for members of the **Camera Club**.

**Rates, etc.**—Excursion train with Naturalists', etc., leave at 1.30 p.m., reaching Galetta at 2.30 p.m., return at sundown. Members tickets, fifty cents; non-members, sixty cents; children, half-price. Tickets to be obtained at the station or from members of the Council or of the Excursion Committee.



## THE ROYAL SOCIETY OF CANADA.

The **fourteenth** meeting of the **Royal Society of Canada** was held in Ottawa, May 15th, 16th, and 17th, under the presidency of Mr. J. M. Le Moine, of Quebec. The meeting was full of interest. A large attendance of fellows at the various sittings of the different sections for the reading of papers, coupled with an unusually large attendance and increased interest in the public lectures and entertainments, mark this meeting as one of the most successful in the history of the Society.

The four sections of **French Literature**, etc., of **English Literature**, of the **Mathematical, Physical and Chemical Sciences**, of the **Geological and Biological Sciences**, met in the Provincial Normal School. There were **thirty** titles and abstracts of papers to be read before these sections, according to the programme, viz: *six* in section I; *eight* in section II; *nine* in section III; and *seven* in section IV.

Of the papers read, the following fall more or less directly in line with researches carried on by members of the Ottawa Field Naturalists' Club, and are here noted:

1. *The Geology of the proposed Ottawa Ship Canal.* By R. W. Ellis, LL.D., and A. E. Barlow, M.A.

The route of the proposed ship canal, via the Ottawa, the Mattawa and French Rivers, and Lake Nipissing, is of great interest, both from the geological and commercial standpoint. It furnishes a comparatively short waterway between the great lakes and the head of ship navigation on the St. Lawrence, and crosses, for several hundreds of miles, the great series of Laurentian or Archaean rocks, nearly at right angles to their strike. In the eastern portion of this Laurentian complex is included the typical area described by Sir William Logan as the Grenville series, which includes foliated and stratified gneisses, granites, syenites, crystalline limestone, anorthosites, etc. These extend westward along the Ottawa for nearly two hundred miles, while in the western part of the section, these characteristic rocks have given place to a great development of granites and syenites, in places, foliated, but frequently massive. From their characters, as seen both in the field and under the microscope, these latter are clearly intrusive, and in large part are more recent in age than the crystalline limestone and associated gneisses which they have replaced. Areas of Huronian rocks, known as the Hastings series, also occur, while the sedimentary formations from the Potsdam to the Utica, both inclusive, have an extensive development along the lower Ottawa, and occasional small outliers of fossiliferous limestone are seen in the vicinity of Mattawa, and on the islands in the eastern portion of Lake Nipissing. Heavy deposits of sand, gravel and clay also occur at various points along the several river channels, and form an important geological feature.

2. *Note on the occurrence of Primnoa Reseda on the Coast of British Columbia.* By J. F. Whiteaves.

*P. reseda* is a large tree-like Alcyonarian coral, which was known to Pallas and Linnaeus more than a hundred years ago. On the eastern side of the Atlantic its

ascertained geographical range is from the Cape de Verde to the Polar Sea, and on the western side of that ocean a few specimens of it have been dredged in deep water in the Bay of Fundy and on St. George's Banks, by the U.S. Fish Commission, between the years 1864 and 1872.

Hitherto it has not been recorded as occurring in the Pacific. In the fall of 1894, however, Mr. Otto J. Klotz, D.T.S., of this city, presented to the museum of the Geological Survey Department a fine specimen of a coral, collected by himself at Work Inlet, near Fort Simpson, B.C., which Professor Verrill has identified with this species. The specimen is upwards of three feet in height, and a little more than two feet in the maximum spread of its branches. Another specimen of *P. veseda* which is said to have been collected on the north coast of the Queen Charlotte Islands, has recently been given to Professor Macoun by Mr. C. F. Anderson, of Comox, V.I.

3. *Note on Tertiary Fossil Plants from the vicinity of the City of Vancouver, B. C. By Sir William Dawson, F.R.S., &c.*

The paper relates to a series of beds holding lignite and vegetable fossils and estimated at 3,000 feet or more in thickness which occurs in the southern part of British Columbia, between Burrard Inlet and the United States boundary. These beds have been noticed in the Reports of the Geological Survey by Messrs. Richardson, Bowman, and by Dr. G. M. Dawson, and are believed to be newer than the Cretaceous coal-measures of Nanaimo and Comox, and probably equivalent to the "Puget Group" of the United States geologists in the State of Washington.

Collections of the fossil plants have been made at various times by officers of the Geological Survey, who are mentioned in the paper, and more recently by Mr. G. F. Monckton, of Vancouver, who has kindly placed his material in the hands of the author, along with that previously entrusted to him by the Geological Survey.

The species contained in the several collections are mentioned in the paper, and are compared with those of the Puget group, as described by Newberry and Lesquereux, and with those of other localities in British Columbia and the United States. The conclusion as to the age of the flora is similar to that arrived at by Newberry for the Puget flora, or that it is equivalent to the Upper Laramie or Fort Union group. It thus intervenes in date between the Upper Cretaceous of Nanaimo and the Oligocene or Lower Miocene of the Similkameen district, already noticed in the Transactions of the Royal Society, and is therefore of Eocene age, filling a gap hitherto existing in the mesozoic flora of the West Coast.

Much undoubtedly remains to be known of this interesting flora, and as the formation containing it, which seems to be estuarine in character, extends over a wide area in British Columbia and Washington, and is of considerable thickness, more especially in its extension south of the Canadian boundary, it may prove to include several sub-divisions representing the long interval between the Cretaceous and the Middle Tertiary.

4. *Account of Investigations on the psychic development of young animals, and its physical correlation. By Prof. T. Wesley Mills, M.A., M.D., etc.*

The account of investigation on the psychic development of young animals and its physical correlation, which was begun last year in a paper on the Dog, will be continued in a series of papers, to be presented at the meeting of this year. These will embrace reports of investigations on: I. The Mongrel dog, and the Mongrel and the pure-bred dog compared. II. The Cat. III. The Dog and the Cat compared. IV. The Rabbit and the Guinea Pig. V. Birds.

In these papers the same plan will be followed as in the paper on the Dog presented to the Society last year, *i.e.*, after an introduction there will follow a diary or daily history of progress in development, and final remarks on the latter, with some of the main conclusions to be drawn from the facts stated in the diary. An attempt will be made throughout to correlate physical development with psychic development.

5. *Organic Remains of the Little R. Group, No. 4.* By G. F. Matthew, D. Sc.

This is a short article describing the remainder of the air-breathers, so far known, from the Plant Beds of the Little R. Group, to consist of one Insect, three Arachnids, and one Crustacean.

The insect is a wingless one belonging to the order Thysanura, and is related to the modern Springtails. No similar insect of anything like such great antiquity has been known hitherto.

Only one of the Arachnids is sufficiently well preserved to give a fair idea of the structure of the animal; in the other two only the abdomen is preserved. The most complete of these Arachnids is something like *Anthracomartus* of the coal-measures, but has a wider and shorter cephalothorax.

The crustacean described is *Amphipeltis paradoxus*, Salter, which is referred provisionally to the Isopods.

6. *Note sur l'ouvrage de J. Cornut, intitulé: "Canadensium Plantarum Historia. Par Mgr. J. K. Leflamme.*

Valeur scientifique de cet ouvrage. Par qui les plantes étudiées par Cornut ont-elles été transportées du Canada en France? Et, comme la plupart ont été décrites d'après des échantillons vivants; où Cornut a-t-il vu ces échantillons!

7. *Some Variations in Epigæa repens.* By Mr. G. U. Hay.8. *The Chemical Composition of Andradite from two localities in Ontario.* By Prof. B. J. Harrington, B.A., Ph.D.

The paper gives the results of the examination of a black garnet, (**Andradite**) which occurs in association with the magnetic iron ore of the "Paxton Mine," Lutterworth, Ontario; and also of a brown andradite which is present in the Nepheline Syenite of Dungannon. The first was found to be free from titanium, while the latter is titaniferous.

9. *The Present Position of American Anthropology.* By Prof. John Campbel, LL.D.10. *On the Estimation of Starc's.* By Thomas Macfarlane, Chief Analyst of Canada.11. *Viscosity in Liquids, and Instruments for its Measurement.* By Anthony McGill, M.A. Presented by Mr. Macfarlane.

## NOTES, REVIEWS, AND COMMENTS.

**Entomology.**—Ormerod, Eleanor A. F., R. Met. Soc., et c.—Report of Observations of Injurious Insects and Common Farm Pests, during the year 1894, with Methods of Prevention and Remedy. Eighteenth Report,

Our illustrious Corresponding Member gives evidence in this very valuable report, of her continued devotion to the study of Economic Entomology, and of her excellent ability to clearly describe the results of her investigations. A large number of the more injurious insects are treated of at considerable length; the report consisting of 122 pages

and an appendix of 62 pages, on the Warble Fly or Ox Bot fly, besides index, etc. A very interesting chapter deals with the development and injuries of four species of Belworms, or Threadworms, and the account of a serious attack of certain Ground-beetles, or Carabidæ, upon strawberry plants, is most interesting, because insects of this family are, in general, predaceous in their habits, and beneficial rather than obnoxious.

The Caterpillars of two moths are described as apple pests, and that of a butterfly, as attacking cherry. Currants suffered from the attacks of the moth, *Sesia tipuliformis*, which is also injurious to this plant in Ottawa, and the Red Spider infested the gooseberry. Mangolds suffered from Millepedes of several species, and turnips from insects belonging to several orders. It is regretted that a fuller synopsis cannot be given of this admirable report, which will add to the reputation already gained by the author for reliable and thoroughly scientific work.—W.H.H.

**Ornithology.**—A WELL MARKED BIRD WAVE.—The White-crowned Sparrow (*Zonotrichia leucophrys*) is a sparrow which generally keeps well together in its northward migration, the interval between the first and last observed individuals seldom covering more than 10 or 12 days, during the whole of which their pretty mating ditty can be heard almost hourly. This year the advance guard reached this region during the warm spell which made the second week in May seem so much like July. The first record was made on the 6th, and stragglers were seen up to the 11th, when the sudden drop in the temperature repulsed them wholly. Not a Whitecrown was seen or heard—except a solitary one on the 16th—until Sunday, the 20th, when with a slightly warmer and hazy weather, they suddenly re-appeared in full force. On Sunday, Monday and Tuesday they literally swarmed about the gardens and weedy vacant lots. Their song could be heard incessantly as long as daylight lasted. Even the House Sparrows were outnumbered, and their pugnacity overawed. The two species could be seen feeding peacefully side by side, the first instance, perhaps, of any native bird establishing a *modus vivendi* with this little bully.

In a solid body as they came, the White-Crowns appear to have passed on to their northern breeding grounds: on Wednesday, the

22nd May, two or three only were observed and since that none. The genus is represented here in summer by the white-throated Sparrow or Peabody bird (*Z. albicollis*) whose full, pure song "Old . . . Tom . . . Peabody, Peabody, Peabody" rising from ravine or moist thicket, is so familiar all summer long. Another rendering common in the Gatineau country is "Jim . . . Jim . . . Sow-the-wheat, sow the-wheat, sow the-wheat. The song of the White Crown while beating some family resemblance to this, has not the same clearness and fullness of tone, but approaches nearer to that of the Vesper and Savanna sparrows.

A. G. KINGSTON.

**Natural Science Association, Iroquois.**—The Natural Science Association, in connection with the High School, at Iroquois, Ont., has, of late, come into immediate touch with several members of the Ottawa Field Naturalists' Club. This association has for its object\* "the encouragement of original scientific investigation and mutual assistance in the study of the Natural Sciences, by discussions, lectures, papers, and critical readings from scientific authors, and by the supply of such periodicals, magazines, etc., as shall be deemed advisable." During the past winter a very interesting and instructive programme has been carried out. The association is really alive to the fact that natural science studies help in developing the mental, moral, as well as the spiritual and even the commercial side of man. The following are the officers of the Association:

*Honorary President*, ARTHUR FORWARD, B.A.; *President*, J. A. JACKSON, B.A.; *Vice-President*, MARY MCGINN; *Secretary*, JAMES WARREN, B.A.; *Treasurer*, DAVID COLLISON; *Science Master*, R. H. KNOX, B.A.; *Councillors*, HERBERT DONNELLY, CYRUS MUNROE, CARRIE MOORE; *Curator*, GEORGE CLARKE; *Patrons*, JOHN HARKNESS, M.D., H. H. ROSS, M.A., M.P., W. A. WHITNEY, M.A.

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\*Sect. 1, Part 3, of the Constitution. Iroquois Nat. Sc. Assoc.

**Excursion No. I.**—As announced, the first field day of the O.F.N. Club for the season of 1895 was held on Saturday, 18th May. It has generally been found that the country lying immediately south of the first range of the Laurentides shows the effects of advancing spring earlier than any other portion of the *Ottawa district* and consequently some point in that neighbourhood has always been in favour for the May excursion.

This year Chelsea was chosen. A special train on the Ottawa and Gatineau Railway, starting at 1.30 p.m., carried nearly 200 members of the club and their friends. By invitation there were present several members of the Royal Society of Canada, the annual meeting of which had closed on the preceding day, as well as a large contingent of the Ottawa Camera Club and of the students of the Provincial Normal School. Upon reaching Chelsea, about 2 o'clock, the party, as usual, divided into several sections, each accompanying its own leader to the point of greatest interest in some favourite branch of natural history. The Geological section under Dr. R. W. Ells visited Old Chelsea and a mica mine on the mountain side above that little village. The Botanical and Entomological sections under Mr. Jas. Fletcher and Mr. W. H. Harrington took the woods in the direction of the Gatineau; while the rocky gorge of that river and the picturesque rapids above Messrs. Gilmour & Hughson's mills attracted most of the members of the Camera Club.

Everywhere, vegetation, even the native plants and trees, showed unmistakable signs of having suffered from the recent severe frosts, following the treacherously warm spell of the 5th to the 11th May.

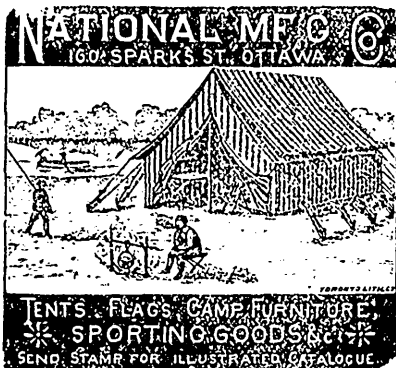
The afternoon, though breezy, was pleasant; but unfortunately the hour set aside for the examination and remarks of the leaders upon the specimens collected was marred by a slight rainstorm. Many of the party sought the shelter of the cars, but a fair audience braved the weather on the open platform of the station, where short addresses were delivered by Dr. A. R. C. Selwyn, president of the Royal Society, Prof. Goodwin, of Queen's University, and Mr. Kane, of St. John, N.B.

The botanical specimens collected were then named and commented upon by Messrs. R. B. Whyte and J. Craig, the insects by Mr. J. Fletcher and the rocks and minerals by Dr. Ells.

The party returned to Ottawa about 7 p.m.

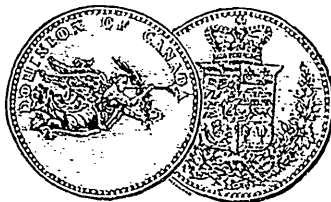
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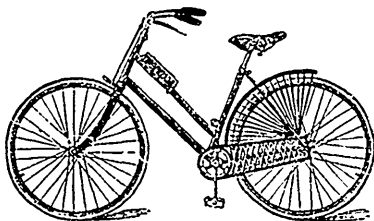


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