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COLOURLESS BLOOD IN ANIMALS.

By PROF. E. E. PRINCE, B.A., F.L.S., &c, Dominion Commissioner of Fisheries, Ottawa.

We are so accustomed to think of that wonderful fluid, which circulates through the blood-vessels of animals, as essentially a red fluid, that it may be a matter of surprise to many that red blood is in reality very exceptional in the animal kingdom. In all the various classes of animals, from the lowest to the highest, we recognize the remarkable fact that colourless blood is most general. In the highest forms there are corpuscles, coloured by that oxygen-loving substance, red hæmoglobin; but the presence of this coloured matter is so uncommon in the blood of the lower types, that examples of it are of extreme physiological interest. Thus, the earthworm and the leech have red blood; but the presence of the red colour is not in the corpuscles, it is due to hæmoglobin in the serum or fluid. The fluid is red, but the corpuscles themselves, are colourless. Other worms (marine annelids) have emerald green blood, others yellow: but in most the fluid is destitute of colour. It is the same amongst insects, and arthropods generally. The heart, which passes down the back in these creatures, drives a clear corpusculated fluid over the body. Remarkable exceptions amongst these may be noted, however. Thus, a small Dipteran fly, *Chironomus*, in its aquatic larval condition, is of a brilliant vermilion hue, due to the red blood visible through the transparent walls of the worm-like body. Such exceptions only emphasize the fact more strongly that colourless blood prevails. Anyone who has studied the anatomy of a starfish, has noticed below the intricate water-vascular system, a central ring or blood vessel encircling the mouth. This blood-ring is clear and transparent; and sends off a translucent radial blood vessel to each arm. The fluid

inside these tubes is colourless, slightly opalescent, and contains the characteristic corpuscles or floating cells present in all blood. This description of the nutrient fluid applies not to Echinoderms only, it is true, also, of mollusks, though there are some familiar exceptions. Certain cuttlefishes have green or even violet blood, while in the familiar *Planorbis* the blood is red. If from the simple dilated heart-tube of a shell-fish, say *Unio*, or of a beetle or lobster, we take a little of the watery blood, we may see, in the oxidised fluid, a faint blue tinge visible, due to haemocyanin, which tinge disappears under deoxidation. When we come to the vertebrates, the highest forms of animal life, we find in the simplest and most primitive of them, the worm-like lancelet (*Amphioxus*), colourless blood. Nay, in the early larval stages of other vertebrates, such as fishes, the blood is at first colourless, and the corpuscles exhibit no tint. Now it is well known that fishes, amphibians, reptiles, and higher animals, possess a circulation, called the lymphatic system, in which a clear corpusculated fluid flows. This lymphatic system is sufficiently distinct from the arteries and veins to be regarded as separate; but its real importance has not been generally recognised. It is usually regarded as a supplementary and subordinate system. In view of the foregoing facts it would seem in reality that the lymphatic system represents the primary blood-circulation. Physiologists have long been puzzled in interpreting the real nature of the red blood in man. The red-corpuscles are certainly not true cells, as Dr. Minot has shown, and they are not nucleated. The serum of red blood is almost identical with the lymph, and the white corpuscles are believed to be neither more nor less than lymph corpuscles or leucocytes originating in the lymphatic glands. The red-blood system has thus overshadowed the colourless blood, or lymphatic system, in man and the highest vertebrates, and the latter system has been, to some extent, turned to other purposes; the lymphatics of the digestive canal being now lacteals for conveying chyle into the red-blood system.

In the lower vertebrates the lymphatics still play an important part, and retain much of their primitive character. In fishes, well-marked pulsating chambers or lymph hearts, connected with an elaborate system of capillaries and larger vessels, convey clear lymph fluid and floating

corpuscles. The lymph hearts occur in the tail region and are much more than mere ill-defined spaces in the tissues. They are distinct chambers with special walls, in which striated muscle fibres may be made out. A long lymphatic vessel passes midway along the lateral muscle masses receiving successive side branches, while two trunks run alongside the lateral nerves, one on each side, and two pass along inside the spinal canal. Perhaps the amphibians, frogs especially, have this colourless blood-circulation best developed. Two definite lymph hearts occur, in the frog, between the short rib-like transverse processes of the 3rd and 4th vertebræ, and a second pair behind the hip-joint, on each side of the urostyle. These pulsating organs show striped muscle fibres. Other large lymph spaces, which do not however pulsate, occur on each side of the head, and a chain of irregular spaces, filled with fluid, run down each side of the back, with corresponding ventral vessels, and ramifications along the limbs. Lymph spaces and vessels have not been noticed so prominently in reptiles, except in tortoises and crocodiles. In the latter there are large abdominal spaces, and smaller chambers near the root of the tail. In the tail region in birds, during the early stages especially, there exist well marked lymph spaces. The existence of a lymph or colourless blood circulation in so many groups of animals, including the highest vertebrates, must have some weighty significance. Its primitive character is demonstrated by the fact that the suspended corpuscles are nucleated cells, and quite unlike the red corpuscles of warm-blooded mammals. When we thus find in the lowest vertebrate (*Amphioxus*) and in the early stages of higher forms, such as larval fishes, that the red blood circulation is absent there is every evidence that a colourless blood system is the original system, and that red-blood is a modified and secondary arrangement.

The blood circulation in the invertebrates is then a primitive system, which persists in *Amphioxus* as the only system; while in fishes and the lower vertebrates it maintains an importance almost equal to that of the red-blood circulation, but in the higher vertebrates, although it still supplies colourless corpuscles and serum to the red blood, the latter circulation has largely supplanted it and deprived it of its original importance.

THE RENSSELAER GRIT PLATEAU.

By R. W. ELLS, LL.D., F.R.S.C., F.G.S.A.

A very interesting report has recently been published by Mr. T. Nelson Dale, of the U.S. Geological Survey, styled "The Rensselaer Grit Plateau in New York." His paper is of interest to Canadian geologists since the rocks there discussed form part of the series so carefully studied in the earlier years of the Canadian Survey by Sir William Logan and his assistants in the province of Quebec, and the adjoining states to the south and described by him under the heading of "The Quebec Group." The area reported on by Mr. Dale was also examined very thoroughly by Sir William Logan, some thirty years ago, and his note books shew many careful measurements and sections of the rock there found which are evidently the extension southward down the valley of the Hudson, of the great series in Quebec which extends continuously from the extremity of the Gaspé Peninsula to the Vermont boundary. The arrangement and description of the strata as given by Mr. Dale, show that the same features are there found as in Quebec; and that the strata are practically the same in character.

These rocks in Canada consist of green, gray, black and red or purple slates, with heavy beds of gritty sandstones which occasionally pass into fine conglomerates. In the description of the grit and associated slates stated by Mr. Dale on p. 306 of his report, they are said to consist of a dark green exceedingly tough, in some places calcareous, generally thick bedded granular rock in which the quartz grains are apparent and upon closer inspection the feldspar grains also." "This rock is interbedded with strata of purplish or greenish slate (*phyllite*), varying in thickness from a few inches to perhaps a hundred feet . . . . the thin purple phyllite layers along the west edge of the plateau, contain minute branching annelid trails or fucoidal impressions." The conglomerate portion of the grits is thus described: "the pebbles of irregular outline measure from two-tenths to eight-tenths inch in diameter and consist of white, pinkish or blueish quartz, reddish felspar, gneiss, slate and red quartzite and as to relative abundance,

occurs in the order named."* These grits and conglomerates are now regarded by Mr. Dale as the equivalents of the Oneida conglomerates of Upper Silurian age.

The descriptions just quoted correspond so closely with those given by Sir Wm. Logan for the sandstone and slates of the Sillery formation as developed in Quebec and on the north-west coast of Newfoundland, that but little doubt can exist as to their being portions of the same geological series. The arrangement of strata at Rensselaer is evidently complicated by faults, folds and overturns as in Quebec which have been so extensive as in places to bring horizons, otherwise widely separated, contiguous to each other and in some cases even to have placed the newer formation beneath the older. Thus at Orleans Island, below Quebec, the strata which hold the Black-River-Trenton fauna, are now beneath those holding the Sillery-Lévis fauna, the whole series being apparently conformable. So also at several places along the coast below Métis the Trenton beds are enfolded and appear to constitute an integral part of the Sillery red and green slates. From the description of the rocks of the Rensselaer area a precisely similar arrangement would appear to exist and the Sillery red and green slates, grits and fine conglomerates appear to form a higher portion of the series above the "Hudson River" or Trenton formation. The relations of the several series in the two districts of Quebec and New York appear to be very similar.

It is therefore natural to suppose that the view taken by Sir Wm. Logan, after a careful study of the strata in both countries, that these represent portions of the same great series, is a correct one; and so strongly was he impressed with this fact that in the great geological map of Canada and the northern United States, (1866,) he so mapped them as portions of the Sillery and Lévis formations. It is interesting to note here also that in Quebec the conclusions first reached as to the stratigraphical sequence of this series coincided almost exactly with those put forth by Mr. Dale in his recent report, in which the Sillery and Lévis rocks were regarded as stratigraphically newer than the Hudson River

*The Rensselaer Grit Plateau in New York, by T. Nelson Dale, 13th Ann. Rep. U.S. Geol. Survey, pp. 306, 307.

division. Thus in a small volume called "Esquisse Géologique du Canada," published in connection with the Paris Exhibition, 1855, in the chapter relating to the rocks afterwards known as the "Quebec Group," after describing the Hudson River division near Quebec city and the overlying slates and conglomerates of Lévis, it is stated that "this formation at Quebec is succeeded by red and green slates with thin bands of calcareous matter, and intercalated towards the summit with great masses of quartzose sandstone, often calcareous, and coloured by a mixture of argillaceous matter which is greenish or reddish. This series of sandstones and slates which has a total thickness of 1000 metres has been named by Logan the Sillery group, and appears to be the equivalent of that which has been named by the New York geologists the Shawangunk or Oneida conglomerate, which in central New York lies between the Richelieu slates and the Medina sandstone."

Subsequently however the finding of Calciferous and Chazy fossils in the beds overlying the Hudson River portion led to a change of view as to the age of the Sillery and Lévis rocks, and to their being placed in a much lower position in the geological scale. The subsequent detailed work on these rocks shewed that the Sillery grits and slates were of the horizon of the Potsdam sandstone, while the Lévis limestones and slates associated, were Calciferous. As for the so-called Hudson River division, then supposed to be the lowest beds of the series, the work of Lapworth and Ami has shewn these to be presumably about the horizon of the Black River and Trenton.

It would thus appear that in connection with the Rensselaer beds the order as proposed by Mr. Dale, may be subject to criticism; more particularly when we consider the work done by Sir Wm. Logan in this area, and the resemblance, in every particular, to the beds which we call the Sillery and Lévis in Canada, and which the work of recent years has placed on a satisfactory basis. And it is interesting to note how the views of structure concerning the northern extension of these beds in Canada, abandoned forty years ago by Logan and his associates, have so lately been put forward by our fellow geologists south of the line. This may readily be regarded as a clear case of history repeating itself.

THE RELATION OF THE ATMOSPHERE TO AGRICULTURE.*

By FRANK T. SHUTT, M.A., F.I.C., Chief Chemist, Dominion Experimental Farm

The fundamental principle to realize in the consideration of this question is that plants are living organisms, and as such, in order to develop and multiply, require food. Their requirements may be ascertained by several methods, chief among which is chemical analysis, by which also we arrive at the proximate and ultimate composition of plant constituents.

A preliminary analysis of a plant, as for example the Indian Corn, enables us to arrange its constituents under one or another of the following classes:

WATER,
ORGANIC MATTER,
MINERAL MATTER or ASH.

Taking as an illustration the Indian Corn plant, when approaching maturity, we find that it is made up of,

WATER	72.0	lbs.
ORGANIC MATTER	26.6	"
MINERAL MATTER or ASH	1.4	"
	100 0	"

These materials have been derived and assimilated by the plant from two sources, the atmosphere and the soil.

With respect to the water contained in a plant, it is only necessary to point out that its source is soil-moisture, derived by the deposition of atmospheric aqueous vapour (chiefly rain), and that it has been taken up by the plant roots.

The mineral constituents are also soil-derived. To be assimilated they must be in solution, and to this end atmospheric agencies and small quantities of acid exuded by the plant rootlets, assist.

The organic matter of plants is composed of varying quantities of

*NOTE.—This is a condensed report of an address delivered before the Central Experimental Farm Club, March 27th, 1895.

the familiar substances, sugar, starch, fibre and a class of nitrogen-containing bodies known as albuminoids or proteids. Of these the gluten of wheat and other grains, forms a well known example.

The sugar, starch, fibre and other non-nitrogenous organic constituents are built up by the physiological functions of the plant from the carbonic acid, which exists to the extent of .4 volumes in 10,000 volumes of the atmosphere. This absorption and assimilation takes place by means of the plant's chorophyll (or green colouring matter) in the presence of sunlight, oxygen by the same process being evolved. The carbon (the fundamental element in organic bodies) of the albuminoids is also derived from the same source. It will thus be seen that by far the greater part of the dry matter of all plants is derived directly from the atmosphere. It may be pointed out in passing that in this way the carbonic acid exhaled by animals is utilized, and thus the approximate constancy in the proportions of the atmospheric elements, maintained. The production and consumption of carbonic acid and oxygen thus effected, provides for the welfare of both plants and animals.

PLANT CONSTITUENTS.

The Organic elements	Carbon, Oxygen, Hydrogen, Nitrogen	Carbonic Acid, Water	Starch, Sugar, Fibre, Oil	Albuminoids	Air derived elements
The Inorganic elements	Calcium, Magnesium, Potassium, Sodium, Iron, Manganese	Phosphorus, Silicon, Sulphur			Soil derived elements.

Until recent years, it was believed that all plants absorbed their nitrogen from nitrogen-containing bodies (chiefly humus) in the soil, and from this source only. It has now, however, been definitely ascertained, as the result of many carefully conducted experiments in Germany and England, that certain plants have the power of utilizing the free nitrogen of the air, building it up within their tissues into complex organic substances, as the albuminoids. These plants are known as the Legumes, comprising the well known plants, pea, bean

clover, vetches, etc. The names of some of the principal scientists who have solved this problem are: Sir. J. H. Gilbert, who for more than half a century has been associated with Sir John B. Lawes in agricultural research, Wagner, Hellriegel, Willfarth, Frank and Warrington. Their successful work in determining beyond all doubt that the legumes have this power, marks the most important and valuable discovery in agricultural science of the present day. It means practically that the soil-nitrogen, exhausted by the growth of cereals and other farm crops, can be readily and cheaply restored by "green manuring" with one or other of the legumes—their nitrogen for the most part having been appropriated from the atmosphere.

The exact way in which these plants are able to appropriate free nitrogen is not known, but the fact has been ascertained that the assimilation is directly connected with the presence and development of certain tubercles or nodules on the roots. These tubercles contain micro-organisms, whose apparent function it is to absorb the atmospheric nitrogen, present in the interstices of the soil, and convert it into compounds of its host. We have here an excellent example of symbiosis, and one which must in the future prove of immense value to agriculturists and indirectly to the community in general.

THE ROYAL SOCIETY OF CANADA.

The fourteenth meeting of the Royal Society of Canada will be held in Ottawa on the 15th, 16th and 17th of May, 1895.

In a circular letter received from Dr. J. G. Bourinot, C.M.G., Hon. Secretary of the Royal Society, the members of the Ottawa Field Naturalists' Club are invited to contribute papers or articles for the approaching meeting of that Society.

Our President, Mr. F. T. Shutt, has been chosen by Council to represent us on that occasion. Any member of the Club desirous of submitting papers should communicate with him at as early a date as possible, so that the necessary arrangements may be made for their presentation before the proper section.

SIXTEENTH ANNUAL REPORT OF COUNCIL, 1894-95.

To the Members of the Ottawa Field Naturalists' Club :—

The Council elected by you on the 20th of March, 1894, has pleasure in reporting that the past year, on the whole, has been a successful and prosperous one.

Perhaps in no single year of the history of the club has the attendance at both the excursions or field days, in summer, and the evening soirées during the winter season, been so satisfactory.

The membership list keeps up a high level, there being no less than 233 at present on the roll. Seven new members were added during the year. Three members were removed by death, viz :—Mr. Scott Barlow, Chief Draughtsman and Cartographer to the Geological Survey of Canada, Mr. P. H. Le Rossignol, B.A.Sc., Assistant Chemist, Central Experimental Farm, and Mr. H. R. Moore, B.A. Seventeen members, many of whom are non-resident members, have sent in their resignations. Your Council has held ten meetings during the year to carry on the routine work of the club, which includes the 'striking' and arrangement of committees, the appointments of leaders in the various branches of the Club's work, and the nomination of the Editor of THE OTTAWA NATURALIST and his staff.

Early in the year, an effort was made by your Council to obtain a grant from the Ontario Legislature, but this proved unsuccessful. We are indebted to the Hon. E. H. Bronson for the manner in which he presented our claims before his colleagues in the Council.

The Royal Society of Canada's invitation to send a delegate to its meeting in Ottawa last May was received and Mr. F. T. Shutt, who has acted in that capacity for some years past was again chosen to represent us. At the meeting, he presented the customary annual account of the work of the club, which is incorporated in the Transactions of the Royal Society of Canada.

The Council finds it necessary to draw the particular attention of the members of the club to the necessity of paying the annual club dues promptly. There are now 114 members in arrears. The amount of the subscription is small and when not handed in spontaneously—the time and labour involved in collecting the dues is very great.

Three successful excursions were held in 1894, under the auspices of the club.

1. *Chelsea.*—The first of these was to Chelsea, on the Gatineau Valley R.R., in May, when a number of Fellows of the Royal Society joined us as guests of the Club; 218 persons were present at this excursion which proved both enjoyable and profitable.

2. *Wakefield.*—This excursion was also largely attended. Some interesting work was done and valuable information obtained by members of the club.

3. *Gaietta.*—The third excursion took place at this very interesting new locality for the club. The opening of the Ottawa, Amprior & Parry Sound Railway has afforded special facilities to examine the region west of Ottawa and south of the Canadian Pacific Railway track.

Besides the large and general excursions of the club held at more or less lengthy intervals during the summer, a number of members have availed themselves of the sub-excursion scheme, which has always proved so important to the welfare of the club in this district. As a rule much better and closer work can be accomplished when a few members meet together and visit a certain definite locality with a special object in view. The Council recommends these sub-excursions to all the members of the club.

THE OTTAWA NATURALIST has been published by the Editor, Mr. W. H. Harrington. We regret, however, to add, that the January number was not issued, but if the increased interest taken during the past year in recording facts and observations in this district and elsewhere be an earnest of what the members of the club propose to do, then the success of the official organ of our club is assured for the future, and the NATURALIST will be filled with the records of observers in all parts of Canada since our membership counts most of the leading men interested in the scientific growth and development of our country. THE OTTAWA NATURALIST is not a purely local publication. A perusal of the volume of 162 pages, just published, amply shows the wide scope of its articles.

Our exchange list is an important one and the Library which the

Club possess is indicative of the high appreciation of the work done. From many quarters we hear of congratulatory remarks on our work and especially on our simple but practical methods of organizing for work.

Seven soirées were held during the past winter, which as you are all aware have been remarkably well attended and proved highly interesting.

The following is the programme as carried out by the Club during the past season, 1894-95.

PROGRAMME OF SOIRÉES.

Dec. 6th, 1894. MICROSCOPICAL SOIREE.

Inaugural Remarks, Dr. G. M. Dawson, F.R.S.; A Grain of Wheat, Prof. W. Saunders; Microscopic structures in young fishes, etc., Prof. E. E. Prince, B.A., F.L.S. Microscopes and slides were kindly furnished by Messrs. J. F. Whiteaves, Wm. Scott, G. M. Dawson, W. S. Odell, F. T. Shutt, A. Halkett, T. C. Weston, D. B. Dowling, W. Saunders, E. E. Prince, W. F. Ferrier, R. W. Ells and H. M. Ami.

Dec. 20th, 1894. GEOLOGY.

1. How Rocks are Formed, Dr. R. W. Ells, F.R.S.C. 2. Crystals. (Illustrated by Models), W. F. Ferrier, B.A.Sc. 3. Report of the Geological Branch, H. M. Ami. 4. On the Shumardia limestones of Levis, Que, T. C. Weston, F.G.S.A. 5. Description of a new Caddis-fly (*Phryganea ejecta*) from the Pleistocene clays of Green's Creek, Prof. S. H. Scudder.

Jan. 17th, 1895. BOTANY.

1. Flowering of Plants, Mr. R. B. Whyte. 2. The Growth and Development of Fruit, Mr. J. Craig.

Jan. 31st, 1895. CONCHOLOGY.

1. The present condition of Canadian Conchology, Rev. G. W. Taylor, F.R.S.C. 2. How Shells grow, F. R. Latchford, B.A. 3. How to collect Shells, Prof. J. Macoun, F.L.S. 4. Report of the Conchological Section, Mr. Fletcher.

Feb. 14th, 1895. ENTOMOLOGY

1. How Insects grow, Mr. James Fletcher, F.L.S. 2. Some

Insect Works, Mr. W. H. Harrington, F.R.S.C. 3. Report of the Entomological Branch, Mr. J. Fletcher. 4. Notice of a Monograph on Canadian Spiders by Emerton, H. M. Ami.

Feb. 28th, 1895. ZOOLOGY.

"On some protective peculiarities in young animals," Prof. E. E. Prince, B.A., F.L.S. Illustrated lecture.

March 14th, 1895. ORNITHOLOGY.

1. "Town Birds," Mr. W. A. D. Lees. 2. How to Study Bird-life, Prof. Macoun, M.A. 3. "Feathers," Mr. A. G. Kingston.

All these lectures were illustrated with microscopic sections or specimens and interesting discussions followed their delivery. Through the kindness of Dr. McCabe, Principal of the Normal School, Ottawa, the club has held its soirées in the lecture rooms of that institution. The thanks of the Council and Club are unanimously due to Dr. McCabe for his kindness and courtesy.

The Council in resigning its trust for the year, leaves the consideration of the future character of the work again in the hands of the members generally. It is possible that recommendations and suggestions may have occurred to many of the members, the adoption of which would add to the usefulness and still further popularize the work of the club. This meeting is the occasion upon which the future policy of the club should be fully considered.

All of which is respectfully submitted on behalf of the Council.

G. M. DAWSON, *President.*

HENRY M. AMI, *Secretary.*

Ottawa, 19th March, 1895.

OTTAWA FIELD-NATURALISTS' CLUB.

TREASURER'S STATEMENT, CLUB YEAR ENDING 19TH MARCH, 1895

RECEIPTS.

Balance on hand from 1893-94		$ 25 92	
Subscription fees received—			
Arrears of previous years	$ 48 00		
For current year	118 00		
For 1895-96, paid in advance	8 00		
		174 00	
Received for advertisements in "Naturalist"		37 00	
" "Naturalists" sold		2 20	
" "Authors' Extras" including arrears		17 25	
Net proceeds of excursions		7 10	
			$263 47

EXPENDITURE.

Printing "Ottawa Naturalist," Vol. VIII	$192 28	
Postage on same	15 93	
Printing "Authors' Extras"	11 30	
" *Flora Ottawaënsis*, balance to date	1 20	
General Printing and Stationery	13 92	
" Postage	4 66	
Expenses of Soirées	10 30	
	$249 59	
Balance on hand	13 88	
		$263 47

A. G. KINGSTON,
Treasurer.

Audited and found correct.
Ottawa East, 4th April, 1895.

WM. A. D. LEES,
J. BALLANTYNE, } *Auditors.*

NOTES, REVIEWS, AND COMMENTS.

Geology.—ELLS, R. W., L.L.D., F.R.S.C.—"*The Potsdam and Calciferous formations of Quebec and Eastern Ontario.*" Advance copy and Ex. Trans. Roy. Soc. Canada, Vol. XI., Section IV., pp. 21-30, 1895—(distributed, 12th February 1895.)

In this paper, the geographical distribution, local characters, palæontological as well as stratigraphical relations of the Potsdam and Calciferous formations as they are found in Eastern Canada in particular and in Eastern America in general are discussed. Dr. Ells points out also the relations of these two formations to the Levis and Upper Sillery. He correlates the Calciferous with the Levis of the vicinity of Quebec and the Potsdam with the Upper Sillery of the same region. He places all these in the Ordovician system—but refers the Lower Sillery to the Cambrian epoch.

Dr. Ells concludes by stating: "It would appear, therefore, from all the evidence at our disposal, that the real line of division between the Cambrian and the Cambro-Silurian system should be placed at the close of the Georgia slate and Red Sandrock divisions, and that the series from the base of the typical Potsdam to the summit of the Utica and Hudson River formations should constitute the system known as Cambro-Silurian or Ordovician.

AMI, H. M.—"*Notes on Canadian Fossil Bryozoa.*" Ex. Can. Rec. Science, Vol. VI., No. 4, pp. 222-229, Montreal, January, 1895.

This paper is practically a résumé of Prof. Ulrich's work on the Bryozoa of the Lower Silurian in Minnesota,* in which attention is called to thirty-three species from Canada comprising twenty-one genera. Six additional species of Bryozoa referable to as many genera are added to the above, but these were described by Prof. Ulrich's in Part II. of the Palæontology of Illinois, Section VI. The localities in Canada from which the species recorded were obtained, the horizon, references and other points of interest regarding these are given in them notes.

*Vol. III of Final Rep. Geol. and Nat. Hist. Survey of Minnesota, Minneapolis, 1894.

AMI, H. M.—"*Notes on a Collection of Silurian Fossils from Cape George, Antigonish Co., Nova Scotia, with descriptions of four new species,*" Ex. Proc. and Trans. Nova Scotian Inst. Science, Halifax, 2nd Ser. Vol. I., pt. 4, pp. 411-415, October, 1894.

Contains descriptions and notes on a collection of fossils made in Nova Scotia, by Messrs. Hugh Fletcher, and J. McDonald in 1886.

JONES, PROF. T. RUPERT F.R.S., F.G.S.—"*On some fossil Ostracoda from Canada.*"—Ex. Geol. Mag. Dec. IV. Vol. II, No. 367, pp. 20-28, Pt. II., January, 1895.

In this paper are described *six* new species of **Ostracoda** from collections made in the North West Territory of Canada and Manitoba. Three of these collections were made by Dr. G. M. Dawson, from the St. Mary River beds in 1874 and 1881:—Another collection was made by Mr. J. B. Tyrrell of the Geol. Surv. Dept. from the friable marl beds of the Rolling River district of Manitoba. The descriptions of the species by Prof. Jones comprise:

I. PLEISTOCENE of Rolling River, Manitoba.
   1. Candona candida, Müller.
   2. ? Ilyobates reptans, Baird.
   3. Cytheridea Tyrrellii, n. sp.

II. ST. MARY-RIVER-SERIES. Milk R., N.W. T. (Loose.)
   4. Pontocypris pyriformis, n. sp.
   5. Cypris Dawsoni, n. sp.
   6. Ilyocypris oblonga, n. sp.

III. ST. MARY-RIVER-SERIES. Milk River, N.W.T.
   7. Cythere, sp. indet.
   8. Candona ? Sanctæ-Mariae, n. sp.
   9. Cytherella crucifera, n. sp.

IV. ST. MARY-RIVER-SERIES. Old Man R., N.W.T.
   10. Candona ?, sp. undet.

Nine of these species are figured on Pl. II. accompanying the text Prof. Jones adds a note stating that the hingement being very rarely indicated, the generic relationships of the foregoing species are for the most part uncertain. This interesting contribution to our knowledge

of the more recent fossil Ostracoda of Canada, from the pen of Prof. T. Rupert Jones serves to increase our indebtedness to him for his zeal, patience and assiduity in working out the material which has been sent to him from Canada during the past thirty-six years.

Conchology.—RECENT MOLLUSCA FROM THE HEADWATERS OF THE OTTAWA. The following recent shells were collected by Mr. A. E. Barlow, of the Geological Survey Department. These have been kindly determined by Mr. Whiteaves of the same department, as follows:—

A.—FOOT OF LAKE TEMISCAMING.

Fresh Water Mollusca.

PELECYPODA.

1. Sphærium secure, Prime.
2. " striatinum, Lamarck.
3. " sulcatum, Lamarck.
4. Pisidium abditum, Haldeman.
5. Anodonta, sp.

GASTEROPODA.

6. Valvata sincera, Say.
7. " tricarinata, Say,
8. Amnicola porata, Say.
9. Physa heterostropha, Say.
10. Planorbis bicarinatus, Say.
11. " deflectus, Say.
12. " trivolvis, Say.
13. " " var. macrostomus, Whiteaves.
14. Limnæa desidiosa, Say.
15. " humilis, Say.

Land Mollusca.

16. Patula alternata, Say, sp.

B.—EMERALD LAKE.

From Emerald Lake at the head of the South Branch of the Opemican Creek, district of Nipissing, the following fresh-water shells were also obtained by Mr. Barlow, in a thick deposit of shell-marl:—

1. Sphærium sulcatum, Lamarck.
2. Planorbis trivolvis, Say, var. macrostomus, Whiteaves.

Ornithology.—*Winter Birds.*—BOHEMIAN WAXWING (AMPELIS GARRULUS.) A flock of 20 or 30 of these rare cold weather visitors has been spending the winter with us. They first appeared on the 8th of January and since then have frequently been seen

in different parts of the city, feeding on the berries of the rowan-trees (*Pyrus Americana*). Their note is much like that of their summer cousins the cherry-birds, but louder and more incessant. Even during the worst days of the "cold wave," at the opening of February, their merry voices told how well earned was their old name of Bohemian Chatterer. The epithet *Bohemian* is probably applied with the meaning of *gipsy* in reference to their erratic migrations, for they have no special connection with Southern Germany. In winter they may appear at uncertain times in almost any country of the north temperate zone; and their summer home is in the extreme north, being bounded only by the last stretches of timber country. The few records of nests are from Lapland and Alaska.

NORTHERN SHRIKE (LANIUS BOREALIS). This bird, always a sparse winter resident in the open country, has been growing noticeably commoner in Ottawa of late years. On a sunshiny winter morning his song from the top of poplar or maple is really pleasing, as well as a surprise from a bird of such hawklike build and habits. Perhaps he sings the praises of the introducer of the European sparrow, for, in the flocks of these birds, he seems to find a never-failing source of food.

A. G KINGSTON.

GEOLOGICAL SOCIETY OF AMERICA.

The winter meeting of the Geological Society of America was held at Baltimore, Md., Dec. 27th, 28th and 29th, and was largely attended by the Fellows. There were forty-eight papers on the list and most of these were read by the authors themselves. Prof. T. C. Chamberlin, of the University of Chicago presided. Dr. Adams, of McGill, and Dr. Ami, of the Geological Survey, were the only two Canadians present.

At the opening meeting, Prof. W. B. Clark, of Johns Hopkins University, read a biographical notice of the late Dr. G. H. Williams, of whose life and work a brief sketch has already appeared in THE NATURALIST.* Dr. Ami read an appropriate memorial of the late Amos Bowman, F.G.S.A. at one time a member of this club. Among the papers read at this meeting the following were prepared by

* OTTAWA NATURALIST, vol. VIII. No. 7, p. 113, 1894.

Canadians:—1. A further contribution to our knowledge of the Laurentian, Dr. F. D. ADAMS. 2. On the honeycombed limestones in the bottom of Lake Huron, DR. ROBERT BELL. 3. On some dykes containing "Huronite," ALFRED E. BARLOW. These three papers were read *in extenso* and were well received.

For a complete list of the papers read at the meeting the reader is referred to No. 1, Vol III, p. 99. of the "Journal of Geology," Chicago, Jan.-Feb., 1895.

EDITORIAL.

THE OTTAWA NATURALIST is entering upon the **ninth year** of its existence and as in the past, will be the official organ of the Ottawa Field Naturalists' Club.

The Council of the Club has appointed four of its number a Publishing Committee, and selected seven members of the club who are **leaders** in the various branches of the Club's work as ASSOCIATE EDITORS.

After careful consideration and discussion, the Publishing Committee of Council has decided to change somewhat the dress and general appearance of THE NATURALIST. The present number has been unavoidably delayed. It is the purpose of the new committee and editorial staff to issue THE NATURALIST promptly on time.

A number of **advertisements** have been secured from business firms and houses in the city. The attention of our members and **others,** in whose hands THE NATURALIST may fall is called to them.

Members and contributors will confer a favour on the Committee if they will send their **articles** on Geology, Botany, Entomology etc., at as early a date as possible. Records of observations, notes and papers on the Geology, Botany, Entomology, Zoology, Conchology and Ornithology of this district or of any part of the Dominion are earnestly solicited.

The intention of the Publishing Committee and of the editorial staff is to increase the sphere of usefulness of THE OTTAWA NATURALIST. Not less than 16 pp. will be published every month, and our purpose is to increase the amount of reading matter in proportion to the amount of MS. and funds at our disposal. With an increased revenue from an increasing membership, and from a larger number of paying advertisements, we hope to accomplish that purpose. We want new **subscribers** to our magazine and a much larger membership list to the club. The **fee** is very small, being only **one dollar.** Blank forms of application may be obtained from the secretary of the club from any member of Council, or from

THE EDITOR.

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