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JULY, 1896.
VOL. X, No. 4.

THE OTTAWA NATURALIST.

Published by the Ottawa Field-Naturalists' Club.

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48 RIDEAU STREET.

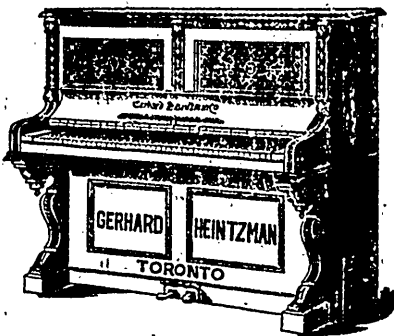
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THE OTTAWA NATURALIST.

VOL. X.

OTTAWA, JULY, 1896.

No. 4.

HOW WHALES BREATHE.

By PROFESSOR EDWARD E. PRINCE,

Dominion Commissioner of Fisheries, Ottawa.

No sight is more common, on a sea-voyage, than the spectacle of a whale "blowing." Many people imagine that the creature spouts forth a column of water, and most artists so depict it, forgetful of the fact that the blow-hole or spiracle, being really the nostril, is used for respiration, and that all cetaceans or whales are air-breathing creatures. It is true that fishes, which are cold-blooded, inhale water, for they breathe by means of gills; but whales have warm blood and have no gills, and indeed, are not fishes at all. Like ourselves they have a pair of lungs, and are compelled to rise to the surface of the water in order to breathe. If detained under water too long they are drowned like any other air-breathing animal. Some of the largest species remain submerged for thirty or forty minutes and on rising to the surface spout eight or nine times and then descend again. The sperm-whale spouts sixty or seventy times at brief intervals of three to ten seconds and then dives below. Whale hunters say that, when hunted, a whale will remain below for an hour. The white column thrown up at each "spout" of the whale, is really the hot damp breath mingled with a little mucus and water. In the cold atmospheric stratum just above the waves the breath is condensed and falls like a shower of fine

rain or spray, and the colder the weather the more marked and visible is this phenomenon. When a large whale raises its snout sufficiently far out of the water the column is thrown up precisely like a jet of steam forcibly escaping from a boiler. This jet may be ten or twelve feet high in the case of an Arctic whale or a huge Finner; but in the porpoise, one of the smallest of the whales, the jet is an insignificant puff only six or eight inches in height. Sometimes the creature breathes before the blow-hole is clear of the waves and a low fountain like a boiling jet is then formed, but if the blow-hole is level with the surface of the sea a small quantity of water is carried up with the rushing column of hot vapour. The cloud of ejected vapour, in very still weather, hangs for a considerable time and moves slowly over the water until it dissipates and fades away. Its appearance when seen from the level of the sea, as the late Professor H. N. Moseley recorded, "is very different from that which it has when seen from the deck of a ship; it appears so much higher and shoots up into the air like a fountain discharged from a very fine rose." Whereas the great Arctic whale (or Right whale) possesses two blow-holes side by side, and throws up two lofty jets of vapour, the Beluga or white porpoise, and the small porpoise or sea-pig, exhibits a single crescent-shaped aperture, and like the huge sperm-whale ejects a single puff or column; but in the last-named whale the spout curves over in front of the head, and forms an arch of white vapour. Two blow-holes occur in the Hump-backs, but in the Beaked Whales (*Hyperoodon*) which are allied to the toothed sperm-whale, there is a single cruciform aperture.

Great force being required to expand the spacious chest of these huge monsters, the muscles used in the breathing operation are very powerful and this is especially true of the muscular diaphragm. The elasticity of the lungs, due to the enormous development of "yellow fibres," and the pressure on

the surface of the body, by reason of the external water, renders the emptying of the lungs very easy, and the out-rush is not only swift and powerful enough to clear the complicated nasal passages, but to throw up the vapoury breath to a considerable height ; as we have seen.

I have on many occasions been privileged not only to examine the carcases of these gigantic creatures after capture, but to see them at close quarters when enjoying themselves in active life. On the Pacific coast, while cruising up the great inlets, and between the numerous islands, along the British Columbia sea-board, I frequently found myself in the midst of a school of whales, numbering in some cases at least twenty. The sea was as calm as a lake, and in the cool still atmosphere, the great clouds of vapour shot up at intervals all around, while the monsters glided with slow gracefulness after the shoals of minute animals on which they were feeding. At times one, in a fit of playfulness, would cause a great commotion, and with his flippers and tail throw up a storm of spray and foam ; but the school as a whole moved leisurely and noiselessly like dark shadows rising and sinking in the water. On certain occasions, when engaged in fishery investigations on the Scottish coast I found myself in close proximity to schools of gigantic Rorquals. They rose around our fishing yawl on all sides, and constantly threw up columns of white vapour accompanied by a deep bass snort or sigh like the gasp of the piston in a Cornish engine. When one of these mighty creatures, fifty or sixty feet in length, spouted within a few yards of us, the vibration made our vessel tremble, and one can understand the feelings of the novice on board ship who, in the long night watch, saw clouds of vapour and heard terrific sighs and snorts, and asked appealingly "How soon will I be off this perilous duty with those great guns afiring off so close to me?"

This process, by which whales breathe, may be likened to

sneezing, the ejection of the breath out of the nostrils being so powerful and spasmodic. It is easy to understand that in air-breathing creatures, which are born and live their whole life in the water, special provision was necessary to prevent the entrance of water into the windpipe and air passages, more especially as water must be taken in along with their food. Most of this water is thrown out again from the mouth, but the solid particles of food are retained and swallowed.

If we examine the breathing apparatus say in a small porpoise, we find that the trachea or windpipe is very short, and of wide calibre. At the top; the epiglottis projects like a conical funnel, and can be raised until it is pushed into the opening of the nasal chamber in the roof of the mouth. But a whole series of complex structures intervenes between the outer valved blow-hole, on the summit of the head, and the epiglottis or top of the windpipe. Five of these structures may be noticed in the porpoise, viz.: first; the valve of the crescentiform spiracle; second, the spiracular tube; third, a double enlarged chamber, really the two smelling sacs, but not used for purposes of smell; fourth, the sub-spiracular passage; fifth, the final opening into the mouth which is provided with a strong circular band of muscle. The purpose of the tubes, chambers, and valves is to afford passage to the air, entering, and driven out of the trachea and lungs, while at the same time preventing the entrance of water. Were water to gain access to the windpipe it might choke and kill the whale. We adopt in our churches in Canada an analogous arrangement in order to allow of the admission and exit of the congregation, while, as far as possible, preventing the entrance of cold air. Thus the storm-porch with its tight-fitting doors leads into a vestibule, which in some churches, leads into one or two curtained recesses, these finally opening, by baize-covered doors, into the body of the church.

The sense of smell, like that of hearing, is in the whales

either very defective or practically absent. The olfactory nerves, in fact, degenerate in all Cetaceans except the great baleen whales, the nasal chambers and passages being modified, as we have seen, for the peculiar respiration characteristic of these aquatic mammals.

Pennant in his "British Zoology" remarks that whales "like land animals, breathe by means of lungs, being destitute of gills. This obliges them to rise frequently to the surface of the water to respire, to sleep on the surface, as well as to perform several other functions." In the eyes of the law whales are still regarded as fish, and along with the sturgeon are, in Britain, named "Royal fish," and belong to the sovereign, in accordance with an old Act of Edward the Second, which runs "Item habet varectum maris per totum regnum Ballenas et Sturgiones captos etc.," so that when accidentally stranded or captured on British shores, "the king and queen divided the spoil," as Pennant quaintly adds: "the king asserting his right to the head, her majesty to the tail." Nor was the Queen's share to be altogether despised if Frederick Marten's opinion is to be trusted. "The flesh of the whale is coarse and leathery" he wrote, about three hundred years ago, "but somewhat resembles that of the ox the flesh of the tail is softer." It is not the object of these notes, however, to determine the culinary excellencies of the whale, but to refer simply to certain striking features in the respiration of these gigantic creatures.

SURVEY OF TIDES AND CURRENTS IN CANADIAN
WATERS.

By WM. P. ANDERSON, ESQ., C. E., Chief Engineer,

Department of Marine and Fisheries.

Good progress has been made by the technical branch of the Department of Marine and Fisheries in the survey of the tides and currents of the Gulf of St. Lawrence and Atlantic coasts of the Dominion.

Self registering tide gauges, giving continuous records day and night throughout the year, are now in operation at Quebec, Father Point, Anticosti, the Strait of Belle Isle, St. Paul Island, Halifax, and St. John, N. B.

Tide tables for Halifax and Quebec, based for the first time upon direct observations of the tides, have been published this year, which are infinitely more accurate than anything heretofore available. These tables have been inserted in the leading Canadian and nautical almanacs, and are thus far more widely circulated than they could be through any official medium.

The currents in the Strait of Belle Isle, off the Gaspé coast and in Cabot Strait, at the entrance to the Gulf of St. Lawrence have, during the past two seasons, been examined by Mr. W. Bell Dawson, Engineer in charge of the survey.

It is found that the current in the Strait of Belle Isle is not a constant inward current, as has been frequently claimed, but is fundamentally tidal in its nature. Off the Gaspé coast and in Cabot Strait there is a permanently outward set which, however, nowhere extends below forty fathoms in depth. An interesting development of the investigation of this current is the relation between the density of the water and the track of the current. It is found, as might reasonably be expected from the volume of discharge of the St. Lawrence, that the water off the Gaspé

coast is perceptibly less salty than in other parts of the gulf, and it is expected that the track of this freshened water will bear an intimate relation to that of the outward current.

Water of less density than the normal density of ordinary sea water, or in other words, containing less salt, is also found in Cabot Strait, but the connection with that off the Gaspe coast has yet to be definitely determined.

During the present season Mr. Dawson, on the Dominion steamer Lansdowne, will continue his examination of the currents, taking up first that part of the Gulf between the east end of Anticosti and the Newfoundland and Labrador shores.

Mr. Mackay, Mr. Dawson's principal assistant, will spend the summer on the west coast of the gulf, taking tidal observations with temporary gauges at several different points, for the purpose of establishing tidal differences, which can be referred to the main registering stations. The relations of the tide between different points in the gulf are not yet well defined, while the differences in the river St. Lawrence are remarkably regular, as has been established by comparison of the records of the gauges at Anticosti, Father Point, and Quebec.

Reports of progress have been published in pamphlet form by the Department of Marine and Fisheries, detailing the results obtained by Mr. Dawson up to this season.

THE NATIONAL MUSEUM.

The Museum on Sussex Street is fast becoming much too small for the purpose for which it was originally intended, on its being established in Ottawa. No one who visits that institution to-day will say that it is not overcrowded. The fact is that only a fraction of the resources of our Great Dominion are exhibited at present. Our legislators, who, during the session of Parliament, visit the Museum for the sake of obtaining exact and useful information on the natural resources of any special district, are deprived of the advantage of having the specimens they require to see, exhibited in their proper place in the Museum. The general public also apply for information on all kinds of topics and the fact that the Museum does not show all the specimens available for exhibition is a decided drawback.

Nor can we insist too much upon the fact that the Museum is a fire-trap. To think that the building as it stands to-day from cellar to attic contains the result of fifty-three years of work on the part of a well organised Geological staff, in all parts of Canada. Only two weeks ago a fire broke out in the immediate vicinity of the Museum and burned up a portion of the boundary between two lots adjoining the lot on which the Museum itself is built. We sincerely hope that the Government will see its way clear to build such a Museum as will be a credit to the memory of the first director of the Survey—Sir William Logan.

The Museum, we must not forget, is a unique one. It contains the type specimens described by men of science and these are unreplaceable in case of accident by fire or otherwise. The constant reference which scientific men of Europe and America make to specimens in the case of the Museum on Sussex Street is in itself an index of the value which outsiders place upon them.

And still the question comes—"how long will these valuable specimens be housed in a building quite inadequate to hold or receive the specimens ready to be exhibited therein?" We are

glad to see that the Roy. Soc. of Canada has passed a resolution in this respect at its last session. It is a step in the right direction. Not until the Scientific societies of Canada combine their forces and urge the Government to erect such a National Museum building as will be suitable for the purpose for which it was established, not till then will there be a movement in that direction.

H. M. A.

“ SOME COLONIAL MUSEUMS.”

By H. H. M. AMI.

An instructive comparative study of nine different Museums visited by Prof. Bather in South Africa, Tasmania, Australia and New Zealand, is given by Prof. Bather, of the British Museum, under the above title. From a cursory examination of the contents of the pamphlet, there are several points of unusual interest to Canadians. The value of Museums to a community depends largely upon the material which is exhibited and also upon the manner in which this material is displayed. The educative value of Museums make them a necessity now-a-days and from the excellence of a Museum, can be obtained a good general idea of the degree of progress and advancement which a community has made in the various branches of thought and research. My purpose here is to give a mere abstract of the pamphlet in question so as to enable the Canadian authorities to gain acquaintance with the advance made by other portions of the British Empire in this direction. The following are the different Museums and the brief abstracts made from the writings of Prof. Bather :—

The South African Museum.—This is situated in Cape Town ; now a-building and to cost £20,000. Workshops and

spirit rooms to be apart from the main building. The Museum will include :—

- (a) Carvings, bronze and iron weapons, implements etc. the property of the Royal South African Company.
- (b) Fossils, minerals, shells, corals, larger vertebrates.
- (c) Birds, fishes, reptiles, insects, marine invertebrates.
- (d) Ethnological specimens.

Hobart Museum, Tasmania.—This museum is very neat and effective. It included an Art Gallery, an aquarium, where native fish may be studied and examined critically, also an ethnological collection besides four main divisions of Zoology, Botany, Geology and Mineralogy. Tasmania University and the Royal Society of Tasmania are both connected with this Museum. University Extension lectures are given every year in one of the Halls of the Museum.

Otago Museum, Dunedin, New Zealand.—The chief feature of the museum is its zoological collection. Whales, Birds (*Noctornis Mantelli*) Copepods and Dinornis are also prominently represented. To the museum there is an annex for an Ethnological collection.

Christ Church Museum New Zealand.—In connection with Canterbury College. The largest museum in New Zealand. Very good general collection in Zoology. Extinct birds form a conspicuous feature of the exhibits. The Ethnological collections contain Alaskan, Indian, and Japanese costumes. Twelve fine skeletons of Mea birds one of which measures 10 ft. 7 inches in a resting position, besides four species of Apteryx are also present. Fossils, rocks, and minerals from the district are also exhibited, besides an excellent Botanical collection or Herbarium accompanied by a series of flower-paintings. Very fine Cetacea and Sirenia, also skulls of Maoris.

Colonial Museum, Wellington, New Zealand.—This is essentially a government Museum. It is the head quarters of the Geological Survey of New Zealand and the collec-

tions are therefore mostly geological. There is practically no arrangement in the Museum as everything is crowded, notwithstanding the great work done by such men as Sir James Hector and Alex. McKay there is insufficiency not only in men, but in means and time.

Auckland Museum, New Zealand.—Size, 100 ft x 50 ft, cost £10,074. A most complete collection of specimens illustrating the life-history of the Maoris. Fine collection of well-stuffed monkeys, in which may be seen that of an orang-outang with callosities, also *Semnopithecus nasalis*. New Zealand rocks and minerals also form part of the collections. The arrangements are excellent. T. F. Cheeseman, F. L. S., etc. in charge.

Australian Museum Sydney.—This is a government museum. Prof. Bather says:—"This is perhaps the largest and most important museum in all our colonies." The old building was altered in 1891. The Ethnological collection is the finest part of the collection. Original collections were burnt in 1882. Some rare birds and a few type specimens. Dr. Ramsay is curator. The various departments comprise, Osteology, Mammalia, Birds, Reptiles, Fishes, Fossils, and Minerals.

Mining and Geological Museum, Sydney.—Fire proof building for the Museum and offices. Geological branch and Dept. of Mines are here located. Fine collection of the minerals of New South Wales. Dr. Etheridge's type specimens of Permo-Carboniferous fossils are preserved here, and also A. Smith Woodward's types of fossil fishes.

Macleay Museum, Sydney.—Prof. Bather remarks that this museum is not necessary in Sydney. It is in connection with the University of Sydney. Contains the collections of W. S. Macleay.

Technological Museum, Sydney.—Cost \$20,000, contains 35,000 specimens, all collections made since 1882. Workshops, laboratories and offices just completed. Besides the above three museums in Sydney there is the "University of Sydney Museum."

GENERAL EXCURSION NO. 2. ROCKLAND AND
THE QUARRIES VISITED.

Another fortunate choice of date and place was made when the council decided to hold the second general excursion of the club to Rockland on Saturday, June 20th.

A party of about 80, composed of members and their friends boarded the *Empress* at the somewhat early hour of 7.30 o'clock, and thoroughly enjoyed the sail down the Ottawa, despite the fact that the mercury made a well marked ascent as the morning advanced.

Rockland was reached shortly after ten o'clock, and the party, at the kind invitation of W. C. Edwards, M. P., went for a trip among the islands with which the river abounds for some miles above the village. In this pleasant way more than two hours were spent, affording many delightful glimpses that the amateur photographers of the company took pains to obtain impressions of in remembrance of the day. During this voyage of discovery and enchantment one incident occurred that should be recorded. The obliging Captain in the endeavour to find a passage between two islands ran the boat aground. After the engine had been proven powerless to get her afloat, all the able-bodied men on board were enlisted and the volunteer crew worked at the ropes until success crowned their efforts and the "*Aid*" was once more able to pursue the even tenor of her way.

A landing was made about 1 p.m., and partly on foot and partly in vehicles the excursionists started for the rendezvous, the quarries of Mr. Archie Stewart. Here lunch was partaken of, the lunch basket of the company being supplemented by cooling drinks and grateful fruits through the generosity of Mr. Stewart. This is the second time that this gentleman has entertained the Club, and we wish in this way to publicly acknowledge our appreciation of his kindness and to tender our thanks to him for his hospitality.

The sight of this immense quarry in full work was indeed a surprise to many of us. Tracks and trucks, hammers and

horses all busily employed, and men everywhere ; a cut into the side of the hill considerably over 100 feet in height and some hundreds of yards in length, and from which a very large amount of stone has already been taken out ; walks and track roads everywhere lined along their narrow way with towering walls of huge blocks of stone ready cut and trimmed for use—these are the sights that meet the eye of the visitor and reward him for the hot, dusty walk from the river.

The quarry is of the lower beds of the Trenton limestone, and the stone appears to be eminently suited for building purposes, being close grained and free from flaws.

During the afternoon a visit was paid by many of the party to the noted farm and out buildings of Mr. W. C. Edwards. Those interested in agriculture inspected the admirable arrangements here in force for carrying on stock feeding on a large scale.

On returning to the wharf it was found that the "Empress" was one and a half hours late, so another delightful sail was taken on Mr. Edwards' tug. For contributing so much towards the real enjoyment of the excursion Mr. Edwards is entitled to the thanks of our members ; and we shall not soon forget his kindness. Ottawa was reached in the cool of the evening and another pleasant field-day brought to a close. Circumstances conspired against a large attendance of the Council, but among those who took a prominent part in the management of affairs may be mentioned Mr. Frank T. Shutt, President ; Mr. D. B. Dowling, Treasurer ; Mr. John Craig, leader in botany ; Mr. H. B. Small, leader in zoology ; and Mr. Wilson who shared with Mr. Dowling the honour of furnishing information regarding the geology of the district visited.

F. T. S.

NOTES, REVIEWS AND COMMENTS.

BOTANICAL NOTES.

Sisymbrium Alliaria.—Among some plants sent by Miss Alice Bowen from the vicinity of the Comin Swamp, Quebec, was a specimen of this European weed. Some years ago a large patch of this plant was observed in the grounds of the Hon. G. W. Allan, at Moss Park, Toronto. It is not a very valuable acquisition to our Flora. The white flowers are small, and the whole plant has a rather disagreeable alliaceous odour, from which it takes its English name, Garlic White Cress.

Cypripedium aristinum.—A splendid clump of this rare Lady's slipper has been presented to the Botanic Garden of the Central Experimental Farm by Mr. R. J. Drummond, of Perth. This beautiful little Orchid is very rare. It has been found in this vicinity in Dow's Swamp, at Alymer and at Buckingham.

Arethusa bulbosa.—A few specimens of this lovely Orchid were found in full flower in the Mer Bleue by Mr. W. T. Macoun on May the 28th. This is rather earlier than usual for the flowers to be found.

Listera australis.—The bed of this rare but not very showy Orchid was visited on the above named date, and about a dozen specimens were observed in full flower. This locality is the only one so far discovered for *L. australis* in Canada. There is no doubt it is a very rare plant but it is probable that, on account of its dull purplish brown colour, it has been overlooked by collectors.

Habenaria fimbriata, the Large Fringed Orchis.—From time to time specimens of a Fringed Orchis are sent in for confirmation named as above, but in almost all instances the specimens prove to be *H. psycodes*. If full data are kept there is no difficulty in distinguishing between these two species. *H. fimbriata* is not only a larger and handsomer plant in all its

parts, but flowers two or three weeks earlier, the buds are rounder, the spike less crowded and the separate flowers are much larger, deeper in colour, and each one has a rather conspicuous white eye. It has occurred in the vicinity of Ottawa at Eastman's, Buckingham and King's Mere, but is very rare. Mr. J. B. Goode, of Montreal, a well-known and successful collector of our native Orchis, who made an excursion to the Mere Bleue with some members of the Botanical Section, on May 28th found two or three fine plants, although at that time the spike of flowers was only just appearing. The flowers do not expand until the end of June.

Trillium Grandiflorum.—We give herewith a figure of a very beautiful *Trillium* which was received from our esteemed member Mrs. Chamberlin, now of Lakefield, Ont. The specimen was found on May the 1st, under a hawthorn tree in leaf mould with another young specimen. The

parcel also contained a specimen of undoubted *Trillium grandiflorum*, of which the inner lobes of the perianth ("petals") were beautifully striped with green. I am inclined to think that the present specimen is a variation of *Trillium erythrocarpum*, the Painted *Trillium*, although there are some characters which tend to make this doubtful. *Trillium erythrocarpum* with both whorls of the perianth green are found from time to time in different parts of Canada and are quite abundant in some localities, particu-



larly along the shore of Lake Erie. I have never felt quite

satisfied, however, that the specimens are correctly identified as *T. erythrocarpum*, and any one who finds this form might compare it with *T. nivale*. To show the remarkable *monstrosity* of the beautiful specimen figured, I give herewith the measurements: Height of plant from ground, 9 inches; stem up to base of leaves, 4 inches; peduncle, $3\frac{1}{2}$ inches; petioles, $2\frac{3}{4}$ inches; blade of leaf, $2\frac{1}{2}$ inches long by 3 in width; "sepals," $2\frac{1}{4}$ by $1\frac{1}{8}$ inches, leaf like; "petals," $1\frac{1}{8}$ by $1\frac{1}{4}$ inches wide, green and leaf-like, each borne on a petiole half an inch long. When young this inner whorl of the perianth had a white margin on each petal from $\frac{1}{8}$ to $\frac{1}{4}$ inch wide. As the flower grew older this white part turned magenta as in *T. grandiflorum* and ultimately faded whilst the green parts expanded and grew larger and assumed a purplish tinge similar to that of the stem. Pistil with three long slender beaks $\frac{3}{4}$ inch long; capsule $\frac{3}{8}$ by $\frac{1}{8}$ inch, spindle-shaped rounded, with the angles flattened slightly towards the apex. I fear that the fruit will not bear seed although it is perfectly green and healthy looking.

The photograph from which the figure is made was kindly taken by our President, Mr. F. T. Shutt, on May the 5th. The above given measurements were made on June the 5th.

Camelina sativa, False flax.—Among European weeds which have been introduced into Canada and which are gradually becoming more conspicuous and aggressive, mention may be made of this plant. As a rule, it is an annual, springing up in the summer particularly in the fields of flax with the seeds of which it is frequently imported, and ripening its seeds the same season. Specimens, however, have lately been received which were found by Dr. F. Johnson, near Delaware, Ont. which had made part of their growth last autumn and were flowering early this spring. This has not been previously observed with regard to this species; but is not at all an unusual habit among several other annual crucifers. It may be seen every year with *Capsella bursa pastoris* and in this district with

the newly introduced and pernicious weeds of the prairie province, Ball Mustard, *Neslia paniculata* and Tumble Mustard, *Tisymbrium altissimum*, L. (= *S. Sinapiotrum*, Crantz). In the west owing to the severity of the winter both of these plants are true annuals the seeds germinating in spring and ripening their seeds the same season.

Mr. W. T. Macoun, who is in charge of the work being carried on at the Experimental Farm with introduced ornamental shrubs and trees, reports that, notwithstanding the past unfavorable winter at Ottawa, which began with a long period of very cold weather without any snow on the ground until January 20th and which on the whole has been more disastrous than for some years there was not, however, as great a loss among the trees and shrubs in the Arboretum, Botanic Garden and ornamental grounds at the Experimental Farm, as was at first supposed, many varieties having recovered to a large extent; and at the present date, June 9th, most are looking well. The show of bloom on most of the shrubs has been better so far than it was last year. In the early part of May the trees and shrubs were about a week earlier in blooming than last year, and vegetation is now from two to four days earlier.

J. F.

REVIEWS OF RECENT GEOLOGICAL AND PHYSICAL WORKS.

MCGILL, ANTHONY, B.A., B. SC.,—“*Viscosity in Liquids and instruments for its measurement. Trans. Roy. Soc. of Canada, (new series), Vol. I :ect. III 1895-1896, pp. 97-103, Montreal, 1895.*”

Separates of this paper were distributed by the author in advance of the volume just issued, June, 1896. The paper is illustrated with diagrams and figures.

H. M. A.

CLARK, W. B. (PROF.) "*The Potomac River section of the Middle Atlantic Coast Eocene*" *American Jour. Sc. and Arts*, Vol. I, May, 1896.

In this article the author concludes—(1) "That the Eocene deposits of the Middle Atlantic slope constitute a single geological unit already described under the name of the Pamunky formation. (2) "The deposits are remarkably homogeneous: consisting typically of glauconitic sands and clay which reach a thickness of nearly 300 feet. (3) Two clearly defined faunal zones are found, viz :—the Aquia Creek stage and the Woodstock stage."

"Both the geological and palaeontological criteria are wholly inadequate for establishing the great number of local subdivisions recognised in the Gulf Area, and indeed the sequence of forms indicates that no such differentiation of the fauna took place "

H. M. A.

WOODWARD, HENRY, F. R. S., F. G. S.—"*On some Podophthalmous Crustacea from the Cretaceous formation of Vancouver and Queen Charlotte Islands*," *Quart. Jour. Geol. Soc. of London*, Vol- 52, pp. 221-228, London, 1896.

Among his many accomplishments, the keeper of the British Museum (Natural History Division), is an eminent authority on Crustacea. Notwithstanding his arduous labours in connection with the Cromwell Road Museum, Dr. Woodward has found time to describe several new forms of fossil animals amongst which we note four Canadian podophthalmous crustaceans. The following are the four species just recently described by Dr. Woodward :—

1. *Callianassa Whiteavesii*.
2. *Homolopsis Richardsons*.

3. *Palaeocorystes Harveyi*.
4. *Plagiolophus Vancouverensis*.

Callianassa Whiteavesii, Woodward, is described as one of the "small burrowing crustaceans, found at the present day." It is compared with two European species:—*C. neocomiensis* and *C. isochela* both described by Dr. Woodward himself. The Canadian form is smaller than its European congeners. As the name implies, this species is so called in honour of Mr. J. F. Whiteaves, one of the members of our Club.

Homolopsis Richardsoni, Woodward, is compared by Dr. Woodward with the European form *H. Edwardsi*, Bell, from the Gault formation of Folkstone, England.

Palaeocorystes Harveyi, Woodward, was described from two specimens sent to Dr. Woodward by Mr. Whiteaves who had obtained the same from Mr. Harvey in 1892 and from Dr. C. F. Newcombe. The species is named after Mr. Harvey of Comox who is doing a great deal towards elucidating the Natural History and geology of his district.

Plagiolophus Vancouverensis, Woodward, is based upon four specimens in the hands of Dr. Woodward; two from Hornby Island, one from Comox and a fourth from the Museum of the Geol. Soc. of London, Eng. locality and collector not being given.

Regarding other Crustacea from the Cretaceous of Canada Dr. Woodward refers to an *Hoploparia* or *Podocrates* recorded from the Niobrara-Benton of Manitoba, and a long-tailed decapod from the Pierre of the West. The descriptions are accompanied by excellent figures of the types in question.

H. M. A.

CLUB NEWS.

Two of our members, Messrs. J. M. Macoun and Andrew Halkett, have been appointed naturalists on the Behring Seal Commission to enquire further into the life history of the seal and also to observe the methods used in their capture. Mr. Macoun with the British naturalist goes to the Pribyloff Islands. Mr. Halkett will accompany the schooners engaged in pelagic sealing.

During the absence of our genial secretary, Miss Marion Whyte has been kind enough to offer to attend to the duties of the office

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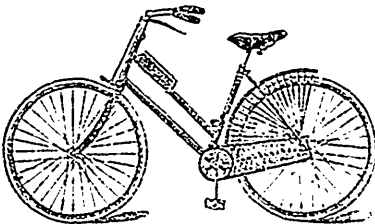
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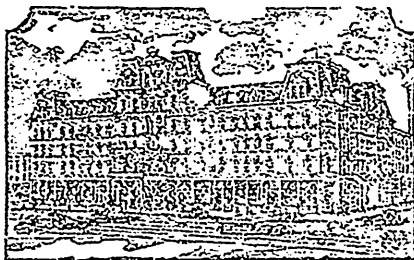
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