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CONTENTS.

	PAGE
1. Dr. Nansen's Scientific Results, by Professor Edward E. Prince	137
2. Winter Lectures	145
3. Gannets and Cormorants, with Special Reference to Canadian Forms, by Arthur Halkett	146
4. <i>Hemphillia Glandulosa</i> , by Geo. W. Taylor	150
5. A National Museum	151
6. To Our Members	152

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THE OTTAWA NATURALIST.

VOL. XIV.

OTTAWA, NOVEMBER, 1900.

No. 8.

DR. NANSEN'S SCIENTIFIC RESULTS.

By PROFESSOR EDWARD E. PRINCE, Dominion Commissioner of Fisheries,
Ottawa.

On Dr. Nansen's return from his perilous Arctic expedition, doubt was expressed in many quarters as to the utility and value, scientific or otherwise, of any results which he might give to the world. Even in scientific circles, the risks and hardships involved were regarded by some as greatly overbalancing probably meagre additions to our knowledge, and the question "Cui bono?" was not infrequently urged. Many critics, indeed, did not hesitate to pronounce the North Pole expedition to be a somewhat foolhardy enterprise. Nothing could be further from the truth, as those felt who knew Nansen as a scientific worker, and especially those who knew him personally as a friend.

It cannot, of course, be denied that the chief aim of some Arctic discoverers, so-called, has been self-glorification. Their object was achieved when the columns of the newspapers were filled with accounts of their elaborate preparations, or their theatrical embarkations. Even an explorer like Peary, of the United States Navy, declared to the American Geographical Society (in Chickering Hall, 1897), that "his aim had always been to push the Stars and Stripes to the very apex of the globe!"

Wholly different were Dr. Nansen's aims. His methods were entirely the reverse of that. His object above all was to add to the world's knowledge, and Lord Lister succinctly expressed the truth upon this matter when he said, addressing the

Royal Geographical Society in London (on Feb. 5th, 1897), that "nothing is more remarkable than the scientific element in Nansen's expedition."

How far Dr. Nansen succeeded we have now some means of judging in the handsome volume of scientific memoirs, published in London a few months ago.

When Dr. Nansen was in Ottawa, three years ago, I ventured to ask him what his results were likely to be, and when the scientific world might expect their publication. He said that he had accumulated in his trip such a mass of observations, physical, meteorological, geological, as well as biological, that some years would of necessity elapse before they could be fully worked up into treatises. "The specimens of Crustacea alone," he informed me, knowing my special interest in zoology, "will take my brother-in-law, Dr. Sars, about three years to completely study." That was in 1897, and like so many of Dr. Nansen's anticipations, it has been literally fulfilled, for of the five splendid scientific memoirs contained in the quarto volume just issued by Nansen, the longest, and in some respects most striking, is that upon the Crustacea by Professor G. O. Sars, the brilliant Norse zoologist. It contains some very unexpected information. Thus we learn that floating surface animals of minute size, are abundant even in the most northerly polar waters, though almost perpetually covered by a layer of ice. Mr. Tyrrell has told us that there are lakes in the northern barren grounds sheeted over with thick ice at midsummer, yet abounding in whitefish; but the plenitude of minute crustaceans in the icy surface waters of the Arctic is even more surprising. Most of them are Copepods, an order of almost microscopic crustaceans, of which the common freshwater mite, *Cyclops*, is a familiar example. Most of the sub-class *Entomostraca*, to which the Copepods belong, are small crustaceans with a thin firm cuticle, never a thick shell like the lobster or crayfish, a simple organization, and a variable number of segments or body rings, and jointed legs. Like *Cyclops* they have usually a single median eye at the front of the head. Copepods are frequently colourless and translucent, though they may be orange red, and one species which I observed off the west coast of Ireland, was appropriately enough of a brilliant green colour. They form the

staple food of young fishes in the sea, where they are very widespread in the surface waters. In the cold seas of the north the number of species is extraordinary, and they often discolour the sea's surface by reason of their multitude. Dr. Sars tells us that, oddly enough, the largest catches in Polar waters were made not at the surface, but at a depth of 250 or 300 yards (200 to 300 metres); indicating that the presence of ice makes the uppermost strata too frigid for even these hardy members of the crab and shrimp class. It is no doubt paradoxical to speak of the open sea in reference to the Polar basin, which, for so large a part of the year, is frozen over to a great thickness; but Dr. Nansen's tow-netting in the long lanes of water, which opened between the long ridges of hummock ice, revealed a rich pelagic life at apparently all seasons. British, German, Norse, and American investigators have found that typical surface animals constantly descend, and many species appear to frequent the basal waters 20 to 50 fathoms deep; but the mid-water zone of life described by Dr. Sars, at 200 to 300 metres depth, is a new fact of interest. Naturalists anticipated that there might be a rich fauna on the floor of the Arctic seas. The reverse appears to be the case. Indeed the paucity of animal life there is most striking. As Dr. Nansen held the view that the polar waters were probably shallow, the good ship "Fram" was not well provided with deep-sea gear: but Professor Sars reports that in the deep sea soundings which were made every indication appeared of a scanty abyssmal fauna. Only one bottle in Dr. Nansen's extensive collection contained true bottom-living animals. The more considerable depths, 1600 to 1900 fathoms, occurred northward of 79 deg. N. latitude. Near the Siberian coast, and up to 79 deg. N. latitude, the water rarely exceeds 90 fathoms: but a little south of the latitude named, the shallows began to disappear, deeper soundings were recorded, and the depth increased with amazing suddenness, thus overthrowing altogether the preconceived conception of a North Polar sea. Indeed the great depth discovered appears to be a continuation of that North Atlantic channel which extends between Spitzbergen and Greenland. One peculiar shrimp-like creature, an Amphipod called *Cyclocaris guillelmi*, was found clinging to the sounding line, when hauled up from depths of 1100 to

2000 fathoms. Its eyes were very rudimentary—indeed it was almost blind—and it afforded every evidence that in its abyssmal habitat no light strayed down from the surface waters. The deep sea fauna may however be more varied than Nansen's fragmentary investigation appears to indicate. Perhaps the most remarkable facts to the minds of naturalists have been the discovery in polar waters of Copepods which are identical with, or closely allied to, species hitherto found in tropical waters and in some cases not nearer than twelve thousand miles. What can be the meaning of this strange occurrence of the same or similar animals in localities so far asunder? It is less surprising to find that some Calanoids, small crustaceans rarely larger than a grain of sand, were recognised at once by Sars as species he had got in deep fjords off the west and south shores of Norway, at depths never less than 100 fathoms. The conditions at that depth in the fjords are evidently the same as those characterizing the more superficial Arctic strata. A similar fact has long been known to naturalists in regard to the higher Amphipodan type, Norwegian and Swedish naturalists having described many species of Amphipods which were known to be Arctic also. Species of *Calanus* are widespread, and along the whole route of the "Fram" specimens were secured in almost every haul. Dr. Sars imagines that these minute crustacean worms have, for the most part, been carried north and east by a warmer Atlantic current flowing from the west beneath the cold Siberian current moving from the east, just as a cold northern current flows southward along the coast of Nova Scotia on the top of the deeper and warmer water of the Gulf Stream. Contrary to all previous hydrographical experience in the extreme north, the temperature was found by Nansen to rise as the thermometer descends in the water to greater depths, thus showing that the warmer currents referred to permeate and influence the conditions which prevail in the very heart of the ice world. Dr. W. B. Carpenter long advocated an hypothesis that a warm current "interdigitated" with an Arctic stream flowing south, but it had remained for Dr. Nansen to confirm it with some modifications. Nansen explains this deeper warmer current as the last remnants of the Gulf Stream spending itself in these frigid zones, a much more questionable theory than

Carpenter's equatorial current. Thus an abundant floating fauna has been introduced, as Nansen argues, from the west, while the food supplies to support this vast marine population come from the east. "I think that the Siberian current is of great importance," says Dr. Sars, "in conveying a constant supply of nourishment to the pelagic animals of the north polar basin. This nourishment consists of microscopic algæ, chiefly Diatoms, which are found to abound in the superficial polar water of the Siberian Sea, though gradually diminishing in quantity westwards, apparently owing to their being largely fed upon by the various pelagic animals. Indeed, without such a constant conveyance of nourishing matter, there could be no such rich animal life in the polar sea." The dark bands and discolorations exhibited by ice in northern waters are mainly due to these lowly plants (diatoms), though mingled at times with mineral dust, probably volcanic. The ochre, brownish red, or dull green tints seen on the sides and margins of large bergs, floes, and even pans, are found to be due to these vegetable organisms.* Dr. Wakeham, when in Hudson Straits with the "Diana" in 1897 reports, July 14th, "A great deal of the ice we have seen to-day is discolored and soiled; in some of it we noticed sand and gravel; the most of it, however, is covered with an alga, similar to that we have seen on the ice through the strait." (Hudson Bay Exped. 1897, Report Marine and Fisheries, 1898, p. 17.) Mr. Andrew Halkett, in the report mentioned, figures these plant forms, of which there appear to have occurred more than a dozen species. Professor Cleve, on his first examination of Dr. Nansen's material, distinguished sixteen species, all of which were identical with Kellwan's specimens from Behring Strait, and twelve are unknown elsewhere. Cleve was struck by the fact that two areas so far removed should be the habitat of the same organisms, utterly unlike others from other localities.

Still more remarkable facts are, however, detailed in this report. A minute crustacean, unique in its external characters, a species of *Hemicalanus* was obtained in the very centre of the "polar basin." All previous records of this genus are either in

* Dr. Robt. Brown "On the Discoloration of the Arctic Seas." Quart. Journ. Mic. Sci., 1865.

the distant waters of the Mediterranean Sea or in the tropical zones of the Atlantic and Pacific. None are recorded in British or Norse seas, or in the Atlantic waters of Europe. A precisely similar find was that of two species of *Oncaea*, which Dr. Sars to his uncontrollable astonishment found to be identical with species quite recently captured by Dr. Giesbrecht in the Bay of Naples, and described in one of his last papers. A beautiful Copepod so perfectly colourless and translucent as to be almost invisible when swimming in the water, Dr. Sars recognized as a *Mormonilla*—a highly remarkable genus established by Dr. Giesbrecht, and of which only two species are known. Both species, strange to say, are strictly confined to tropical Pacific waters, south indeed of the equator. Yet here we find in the remote polar seas, over twelve thousand miles away, Arctic specimens which can hardly be distinguished from the Tropical species. Dr. Sars would have conferred upon the Arctic form the name bestowed by Dr. Giesbrecht on the tropical form, "were it not" he says "that the great distance between the occurrences seems to forbid such an identification." Hardly less remarkable and of extreme interest not to zoologists alone, but to geologists and physiographers, is the fact that two polar species of Amphipods * (*Pseudalibrotus*) brought back by Nansen are closely allied to forms peculiar to the Caspian Sea. It is hardly possible to conceive of a more erratic occurrence of creatures practically identical, and the most reasonable explanation is that already provided by the geologists' supposition, usually accepted, viz: the former continuity of the Caspian and the Polar seas.

Many interesting lines of thought are suggested by these remarkable results of Dr. Nansen's expedition. Either the species, practically identical, have originated independently in widely separated localities, or they have been carried from one centre to remote and isolated areas, and have left us representatives in the intervening waters. In the case of the Copepoda there is this profoundly significant point to be noticed that zoologists are agreed upon their primitive and unspecialised character. The Copepoda are regarded as generalised, indeed the whole sub-class Entomostraca is looked upon as resembling the ancestors of the modern

* The common fresh-water shrimp (*Gammarus*) is a typical Amphipod.

specialised Crustacea. Professor F. M. Balfour says (Comp. Embryol, Vol. I., p. 487): "The free Copepoda are undoubtedly amongst the lowest forms of those Crustacea which are free or do not lead a parasitic existence. Although some features of their anatomy, such for instance as the frequent absence of a heart, may be put down to retrogressive development, yet from their retention of the median frontal eye, . . . their simple biramous swimming legs, and other characters, they may claim to be very primitive forms, which have diverged to no great extent from the main line of Crustacean development."

In a brief notice of the Paddle-nosed Sturgeon in Ontario (*Ottawa Naturalist*, October, 1899, Vol. xiii) I indicated what meaning the naturalist feels bound to attach to the local occurrence, in areas remote from one another, of any primitive or generalised type of animal. The same deep significance attaches to the Copepods and Amphipods referred to above.

Of the birds observed during the expedition Dr. Nansen himself writes conjointly with Dr. Collett, and the account is full of interest. Between 81 deg. and 83 deg. N. latitude there is an abundance of bird life. Oddly enough, young birds seem to prevail in these inhospitable regions. Vast numbers of certain species were noticed including the Little Auk (*Mergulus* or *Alle alle*, Linn.) and the Ringed Plover (*Ægialitis hiaticula*, Linn.). *Cephus mandtii*, *Crymophilus fulicarius*, and *Pagophila eburnea*, the Ivory Gull, were also obtained, and one specimen of Sabine's Gull (*Xema sabinii*, Sabine). During the spring of 1894, it was on May 13th, when the "Fram" was moving towards the most northerly point in her drift through the ice, a gull was noticed, apparently *Pagophila eburnea*, and others were seen occasionally until Aug. 23rd, but after the lanes between the hummocks and the channels around the ship began to freeze, about the end of August, no more birds were seen for over eight months. Indeed, the first to appear the next year was noticed on May 14th. Readers of "Farthest North" will remember Nansen's references to the beautiful and rare Ross's Gull or the Roseate Gull (*Rhodotethia rosea*, Macgill), and for the first time a fully detailed description of the species is now published with exquisitely tinted illustrative plates. In the waters around Hirtenland, the four

glacier-capped islands in 81 deg. 38 min. N. lat. and 63 deg. E. long., numbers of that scarce and weird bird appeared. Its beautiful rose-coloured breast, wedge shaped tail, and airy flight, make it, as Nansen tells us, "the most beautiful of all the animal forms of the frozen regions." Though too late to find its nest or eggs there appeared no doubt that its breeding grounds were in that area.

Lastly, some results are published of great value in a geological and palæontological sense. The second and third papers in the volume are by Dr. Pompeckj, Professor Nathorst and Dr. Nansen; they deal with the stratigraphy and fossils of Cape Flora and the adjacent territory, and of Franz Josef Land. Dr. Nansen treats of the geological structure of Cape Flora, while the fossils obtained there in the Jurassic sedimentary rocks are described by Dr. Pompeckj, who determined twenty-six species of animal forms in the collection—a less extensive list than that made by the Jackson-Harmsworth expedition. Both collections go to establish close affinity with the Jurassic of Central Europe, and invalidate Neumayer's scheme of climatic zones in the Jurassic period. Dr. Nathorst's report on the palæophytology of Cape Flora is valuable, as the fossil plants he describes from Cape Flora are relegated to the Upper Jurassic, and to an earlier horizon than the Wealden, which in his view is not Cretaceous but Jurassic. Fine plates accompany these papers.

Most readers of Nansen's simple but thrilling story "Farthest North," had their attention rivetted upon the mammals, few in species, which make their home in these fields of eternal ice. Foxes were found by Nansen and Johansen further north than any other air-breathing animals. It was in 86 deg. N. latitude on April 25th 1895, very little south of their most northerly point (which was 86 deg. 14 min. N. and about 95 deg. E. longitude); and their astonishment may be imagined when they observed the foot-prints of two foxes in these remote Arctic snows apparently untrodden by any other living thing. These foxes probably subsist on small crustacea, which they must dip out of the shallow watery lanes between the rugged ice-ridges. They shot a large bearded seal in 82 deg. N. latitude, and a little further south killed three polar bears. It appears as though animal life (so far as

quadrupeds and birds are concerned) wholly ceases in the extreme north, and over the vast ice fields no moving thing is visible. Of the polar waters, on the other hand, it may be affirmed that they everywhere abound in minute examples of animal organisms, some of which have been hitherto pronounced by naturalists to be Mediterranean or even equatorial species.

It is apparent that warm and cold currents so affect and modify submarine life as to complicate very much the problems with which the palæontologist deals. As the late Dr. Carpenter long ago pointed out, Arctic shells have been found as far south as Gibraltar, a clear proof that the glacial temperature exists there beneath the waves without making any difference in the terrestrial climate. *Vice versa* we find Tropical species in Arctic waters. The late Sir William Dawson once wrote to Dr. Carpenter that the latter's accounts of the temperature of the deep-sea and its effect upon animal life while they tended to modify geological theory, explained facts otherwise difficult to interpret, especially the evidences of glacial conditions in periods when such conditions were not regarded as existing. "I am quite prepared," wrote Sir William, "to accept the conclusion that glacial beds may have been formed in any latitude and at any geological period."

WINTER LECTURES.

The Soirée Committee are now preparing the programme for the series of winter lectures, and will be obliged if any members who wish to read papers, or who have short notes of interest to communicate at any of the meetings, will at once send in their titles, and at the same time state at what date they would wish to present their papers. This information may be sent to Dr. R. Bell, F.R.S., the chairman of the Soirée Committee, Dr. H. M. Ami, F.R.S.C., or any member of the Council. It is probable that there will be a *Conversazione* or two, and six or seven Lecture nights. From the papers which have been already promised, the coming season promises to be one of exceptional interest. It is hoped that the first meeting will be held early in December. All titles of papers must therefore be in the hands of the Committee at the latest by the 15th November.

GANNETS AND CORMORANTS, WITH SPECIAL REFERENCE TO CANADIAN FORMS.

By ANDREW HALKETT, Ottawa.

The following notes are mostly about the Solan-goose or Common Gannet (*Sula bassana*, L.) and several species of Cormorants (*Phalacrocorax*), with brief references to allied species.

The Toti-palmate order of birds, which embraces the Pelicans (*Pelecanus*), the Darters (*Plofus*), the Frigates (*Tachypetes*), the Tropic Birds (*Phaëthon*), the Cormorants (*Phalacrocorax*), and the Gannets (*Sula*), are distinguished from all other birds, by having, as the name implies, the feet completely webbed. Ducks, gulls and murres have only two webs to each foot; the toti-palmates have three. This is occasioned by the hallux, or hind toe, being located semi-laterally, which admits of three webs to each foot. Another distinguishing character is the possession of a gular-pouch which in the Pelicans and Frigates is enormously expanded; is rudimentary and unfeathered in the Gannets, Cormorants and Darters; and rudimentary and feathered in the Tropic Birds.

The Pelicans (*Pelecanus*) like the Cormorants and Gannets are gregarious, resembling in their habits the former in being both marine and inland birds, while the latter are solely marine.

There are two North American species: the White Pelican (*P. erythrorhynchus*) and the Brown Pelican (*P. fuscus*), and some consider that there is a third, the California Brown Pelican (*P. californicus*). I remember seeing a fine White Pelican in captivity, whilst passing through the prairies. A nicely mounted specimen of the Brown Pelican, an adult male, is to be seen in the museum of the Geological and Natural History Survey, Ottawa, which was shot on the eastern end of Pictou Island, Nova Scotia, by Mr. J. W. Hogg, on 15th May, 1892.

An examination of a specimen of this species to which I had access, showed in brief as follows: The plumage variegated and dark, a whitish spotted band from the top of the head down each side of the neck, the bill very large and long in proportion to the head, and terminating in a hook, the gular-pouch of enormous size.

The Darters (*Plotus*) unlike all other genera of the order are not maritime in their habits. If we are to see them in their native haunts they must be followed to almost impenetrable swamps in the tropics. These birds have long slender necks, with numerous cervical vertebræ, so that they sometimes receive the name of Snake-birds. There are only a few species of Darters, one of which *Plotus anhinga* belongs to North America,

The Frigates (*Tachypetes*) like the Pelicans have the gular-pouch of great size. There is one well defined species *Tachypetes aquilus*. This bird has the feet very small, and the wings of great size and strength, so that it is not only marine in its habits, but pelagic. It is a poor swimmer, can hardly walk, and cannot dive at all, but its power of flight is astonishing.

Of Tropic birds (*Phaëthon*) there are three known species: *P. flavirostris*, *P. æthereus*, and *P. rubricauda*, the two first mentioned of which are North American. The following is an examination of a specimen of the Yellow-billed Tropic Bird (*P. flavirostris*). It had a yellow bill and black toes: the bill being very like that of a tern and was not hooked. The rudimentary gular-pouch was covered with feathers, instead of being naked as is generally the case with toti-palmate birds, and the nostrils were open, which is an uncommon feature in other birds of the order. The middle feathers of the tails were of great length. The general colour of the plumage was white, nicely contrasted with black.

Of Gannets there are now recognised six distinct species indigenous to North America. These are the White Gannet or Solan-goose (*Sula bassana*), the Brown Gannet or Booby (*S. leucogastra* or *S. sula*), the Blue-faced Booby (*S. cyanops*), the Red-footed Booby (*S. piscator*), the Blue-footed Booby (*S. gossi*), and Brewster's Booby (*S. brewsteri*).

The first time I ever saw a Gannet was when a boy at a small inland town about eight miles from the sea, on the east side of Scotland. Some fifty miles from this town at the Bass Rock, in the Frith of Forth, the White Gannets congregate in prodigious numbers: indeed this species which is otherwise called the Solan goose, receives its specific name *bassana* from the Bass Rock. The bird I saw was in the hands of a fish-monger, or cadger as that functionary is designated in some parts of Scotland, and it

had doubtless strayed from the Bass Rock or from the coast of Fife. The Solan-geese is not considered edible, yet forsooth the Scotch are sometimes charged with eating them. Still the cadger sought not to dispose of his gannet as he did of his turbot and skate, and one of the things yet vivid in my memory is that bird sitting at the end of the cart greedily gulping down a fish every time its owner offered one, whilst the patient horse drew the load of fish up the steep High street.

Last August and September (1899) I had a rare opportunity of seeing the white gannets at their native haunts at the Bird Rocks and at Bonaventure Island, in the Gulf of St. Lawrence. The nesting season was then of course over, and some of the birds had seemingly migrated south, yet this was one of the finest sights I have witnessed in my natural history studies. On certain dull evenings in summer the chimney-swifts congregate around the Parliament buildings in immense numbers, and if those who are familiar with the spectacle presented by an assemblage of some thousands of these birds, can in imagination magnify them in size to that of a goose, and bring them comparatively low down so that the effect of size is not lost, some idea may be formed of what I saw. At Bonaventure Island the Gannets readily associate with the murrens and gulls, but never with their allies, the cormorants, and *vice versa* with the cormorants at Percy Rock adjacent, and it is a funny sight to see the rocks of the one place white with gannets, and the rocks of the other black with cormorants, both species being in full view at the same time. It is like the old story repeated about the Jews who had no dealings with the Samaritans.

In examining the bodies of four specimens of gannets I was surprised to find the entire absence of fat, just where one would have expected to find it—in a water bird. Instead there was a wonderful provision of nature. The skin hung loosely, as it were away from the body, being connected to it by membranous tissue forming a wonderful receptacle for air: thus giving to the bird great buoyancy.

Nothing could well be imagined more beautiful than the iris of the white gannet. The books describe it as white, but it is difficult to give it any true description, and must be seen in order

to appreciate its beauty. It is silvery or ice-like in colour, and certainly is as beautiful a bird's eye as I have yet seen.

The following outline of some of the external characters of the white gannet was made from a few skins. The bill is longer than the head, and cleft beyond the eyes. It tapers towards the tip, and is not hooked, as it is in the case of the cormorants. The mandibles have keen cutting edges, as I experienced, for one bird almost bit the top of my thumb off. There is a nasal groove, but the nostrils are abortive. The gular-sac is rudimentary but unfeathered. The wings are of great expanse—one I measured was fully six feet from tip to tip. The tail is wedge-shaped and the shape and position of the feet give an equi-balance to this species which is lacking in the other birds of the order.

The eggs of Gannets are encrusted in a calcareous deposit. When that is removed they are of a pale bluish-white colour. The specimens I have examined were all denuded of the rough outer coating. Gannets are said to lay only one egg at a hatching.

An interesting fact, in connection with Gannets, was brought to light in the year 1888, in the discovery in the Gulf of California, by Col. Goss, of two new species, one of which has been ascribed to him as *Sula gossi*, its vernacular name being the Blue-footed Booby; whilst the other is called *Sula brewsteri*, the vernacular name of this species being Brewster's Booby.

In the possession of Prof. Cope are fossil remains of a Gannet (*Sula loxostyla*) from the Miocene of North Carolina.

After what has been pointed out relative to our Gannet, I need hardly enter into the structural peculiarities of Anserine birds, in order to convince the incredulous that the Solan-goose is no goose.

About half the species of Toti-palmate birds are Cormorants, and they are almost cosmopolitan in their distribution. It is well known that the Chinese employ them in fishing. I have been fortunate enough to observe them in the Atlantic and Pacific oceans, and in one instance in the Behring Sea. Never can I forget the quaint appearance of a craggy rock or islet in Barclay Sound, Ucluelet, at the west side of Vancouver Island, with three Shags or Cormorants sitting bolt upright upon it. The cormorant I saw in the Behring Sea was a stray individual, as these birds do

not wander far out to sea. I saw it alight among some other marine fowls which do go a great distance from land, and at the place there was no land for several hundreds of miles from either the American or Asiatic sides.

The Double crested Cormorant (*P. dilophus*) is the only Canadian inland species. The young birds lack the side plumes which belong to the adults. The iris is green, a very common colour with Cormorants, but most uncommon among birds in general.

Fossil remains of a Cormorant (*P. macropus*) are in the possession of Prof. Cope from the Pliocene of Oregon; and fossil remains of another (*P. idahensis*), from the Pliocene of Idaho, are in the Yale museum at New Haven, Conn., but when I visited that institution some years ago¹ I was not specially interested in Totipalmate Birds, so the pleasure of seeing the specimen is in reserve.

HEMPHILLIA GLANDULOSA.

A SLUG NEW TO THE CANADIAN LIST.

By GEO. W. TAYLOR, Nanaimo, B.C.

A couple of days ago one of my boys brought in a specimen of *H. glandulosa*, which he had found near the banks of the Nanaimo river, about three miles from its mouth. As the species was new to British Columbia and to Canada, I devoted an hour or two this morning to an examination of the spot where the slug had been found, and was rewarded by the capture of eleven other specimens. They were all taken under the dead fronds of ferns (*Aspidium murinum*) growing in a rather open spot on the banks of the river.

H. glandulosa was discovered nearly thirty years ago at Astoria, Oregon, by the indefatigable Henry Hemphill, and was described as the type of a new genus by Bland & Binney in the Annals of the Lyceum of Natural History of New York for 1872. It has since been found at other points in Oregon, and at Chehalis, Olympia and Tacoma, in Washington, but has not been recorded, I think, from any locality outside these two States. A second species of the genus (*H. camelus*) has however been described

recently from Idaho, by Messrs. Pilsbry & Vanatta. [See "Nautilus," Vol. XI, p. 44.] A full account of the genus, with figures and anatomical details of both species, has been published by the last-named authors in the Proceedings of the Academy of Natural Sciences of Philadelphia for 1898. The paper, with which I suppose most Canadian conchologists are familiar, is entitled, "Revision of the North American Slugs: *Binneya*, *Hemphillia*, *Hesperarion*, *Prophysaon* and *Anadenulus*." For the benefit of those who have not paid much attention to slugs, I may say that the genus *Hemphillia* differs from all other genera represented in our fauna in that the mantle has a large opening above (about 5 x 3 mm. in extent) exposing to view nearly the whole of the internal shell.

Figure No. 75 in Binney's Manual is an accurate representation of our slug as contracted in alcohol, but figure 78 in the same work bears small resemblance to it either alive or dead.

Nanaimo, B.C., Oct. 15, 1900.

A NATIONAL MUSEUM.

The recently issued report of the United States National Museum drawn up by the Acting Assistant Secretary, C. D. Walcott, and containing 246 pages, shows the progress made during the last year. Part I discusses the condition and progress of the Museum itself, whereas Part II treats of the papers describing and illustrating the collections of the National Museum.

Part I is of special interest and gives an idea of the equipment of the Museum and staff. The Department of Anthropology alone has seventeen curators and assistants. The Division of Animal Biology has twenty-seven curators and assistants besides three honorary associates. The Division of Plants counts eight curators and assistants, whilst the Division of Geology and Mineralogy numbers eighteen curators and assistants. The Museum authorities consist of a Secretary and Keeper, the Hon. S. P. Langley; an Assistant Secretary, the Hon. C. D. Walcott, and an Executive Curator, Mr. F. W. True; besides two

Librarians, one Editor, one Chief of Correspondence and Documents, and one Chief of Buildings.

The main purposes of the National Museum are these :
 1. Exhibition of Collections. 2. Access to reserve collections for specialists. 3. Identification of specimens. 4. Library. 5. Donation of specimens to educational institutions. 6. Donation of publications. 7. Lecture Course during the year. 8. Correspondence and Information.

In looking over these figures and reports it appears to indicate clearly the line in which it is confidently expected that at no distant date our politicians will see to it that a National Museum will be established at Ottawa and properly maintained. It is an urgent necessity that a Central Bureau exist, where not only information on all kinds of subjects can be obtained from specialists, but a record may be kept of the information gathered from the result of studies made in connection with the resources of our great Dominion, sent from all directions. The incalculable value to the United States of the National Museum has been recognized by Congress, and it is hoped that our Canadian statesmen will see that before long a suitable building shall be erected and a thoroughly equipped staff established, so that we can take our place and properly exhibit and illustrate those wonderful natural resources which we possess in our own country, Canada.

H. M. A.

TO OUR READERS.

Although there is actually no time of the year when *nothing* can be seen or collected by the naturalist, the collecting season in most branches of natural history study is now practically over ; there is, however, much good work for our members yet to do. All collections should be put in order for exhibition and notes revised for presentation at the winter soirees. All should realise that what has interested or seemed new and strange to them in their out-door observations will also be of interest to many others. Short, concise notes, with specimens if possible, are what we particularly want at our evening meetings. These will give a live character to the meetings and make the Club more and more useful and attractive.—J. F., Act'g Editor.

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