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# THE OTTAWA NATURALIST

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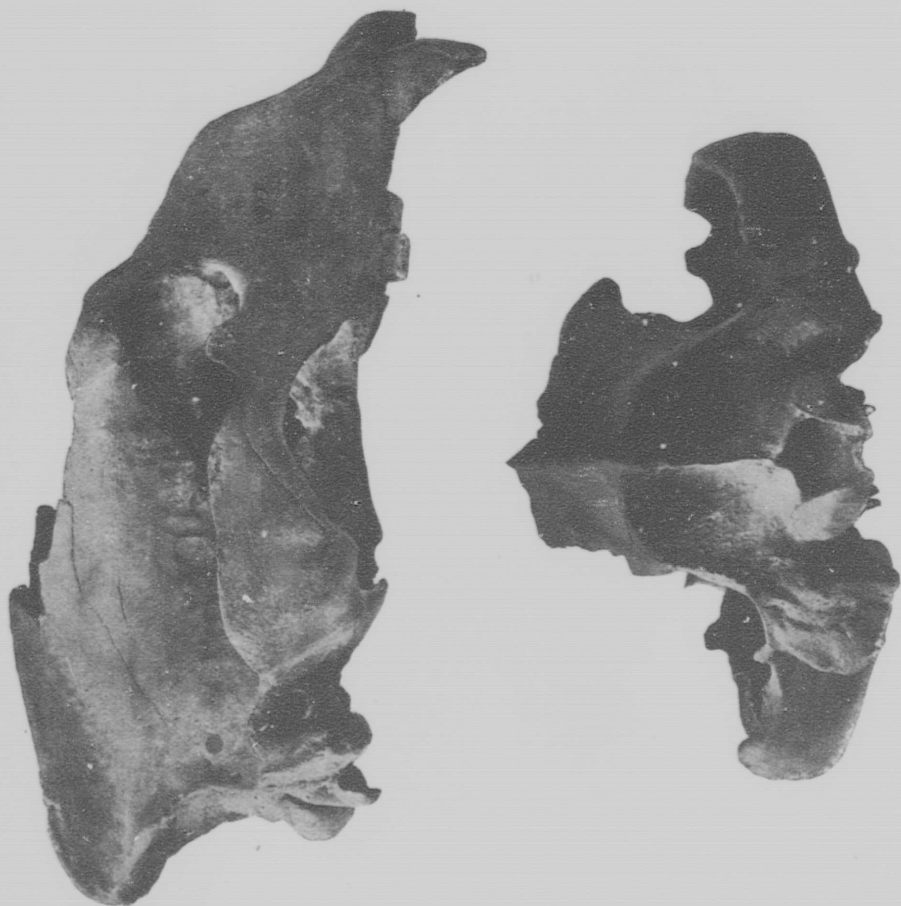
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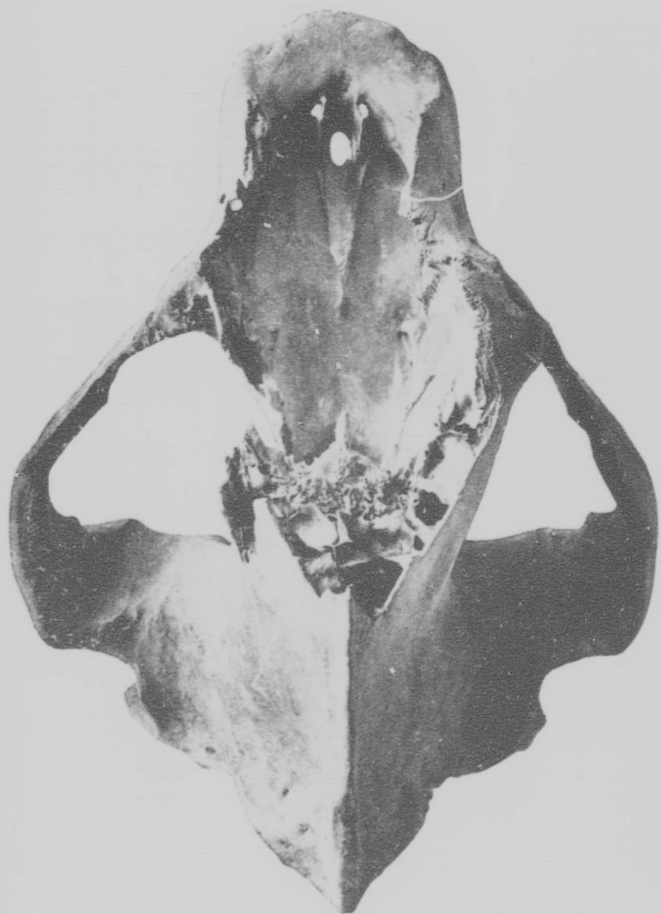
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ARCTOTHERIUM YUKONENSE.



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# THE OTTAWA NATURALIST

VOL. XXV.

OTTAWA, MAY, 1911

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## ON ARCTOTHERIUM FROM THE PLEISTOCENE OF YUKON.\*

BY LAWRENCE M. LAMBE, F.G.S., F.R.S.C.,  
VERTÉBRATE PALÆONTOLOGIST, GEOLOGICAL SURVEY, OTTAWA.

A well preserved skull of the giant bear *Arctotherium* has lately been acquired by the Geological Survey and is of interest in many particulars. The specimen consists of the skull without the lower jaw and was discovered at Gold-run Creek, Yukon, in frozen Pleistocene deposits at a depth of forty feet beneath the surface of the ground.

This widely distributed but imperfectly known genus is distinctive of the Pleistocene of the American continents. In North America three species have been described, viz.: *A. pristinum* (Leidy), from South Carolina; *A. simum*, Cope, from California, and *A. haplodon*, Cope, from Pennsylvania. The South American species, *A. bonariense* (P. Gervais) is from the River Plata, Buenos Ayres.

The discovery of the skull at Gold-run creek extends the known range of the genus very much northward, as this is the first record of the occurrence of *Arctotherium* in the northern half of this continent.

As indicated principally by the teeth, *Arctotherium* is intermediate between the old-world *Hyænarctos* and the genus *Ursus*, and is notable for its great size which equalled, if it did not exceed, the largest species of both these genera.

The Yukon skull is remarkably broad in proportion to its length and represents an individual of great physical power and bulk.

It is in a good state of preservation, but has suffered injury in the upper anterior portion, the nasals being absent with the greater part of the forehead broken away. On the left side the second incisor and the premolars in advance of the fourth have fallen out and been lost, as have also the three incisors, the premolars in front of the fourth, and the second molar, of the right side. Otherwise the specimen is perfect.

\*Communicated by permission of the Director of the Geological Survey.

The skull derives its great breadth principally from the outward spread of the zygomatic arches, a measurement across them nearly equalling three-fourths the length of the skull. In advance of the orbits it is short and broad. The forehead is high, moderately broad, and descends convexly downward in front. The breadth across the postorbital processes of the frontals is contained about two and a half times in the skull's length. Viewing the skull from above there is a rapid narrowing behind the postorbital process which is accentuated by the general and marked depression of the surface between the upper portion of the base of the zygomatic arch and the sagittal crest, a very slight swelling in the middle of this surface alone saving it from being concave throughout. Between the inner limits of the temporal fossæ the breadth of the brain case is slightly less than one-third the maximum breadth of the skull. The sagittal crest is high and strongly developed. In outline, as seen from above, the cranium is pointed behind, the lambdoidal ridges, marking the upper limit of the occipital bone, meeting at an angle of 90°. The inion overhangs the posterior curve of the occipital condyles to the extent of about 43 mm. The surface of the occipital is strongly concave from the condyles up and is rather flat in a transverse direction. A high, thin occipital crest is continuous between the external occipital protuberance (inion) and the upper margin of the foramen magnum, and, as already mentioned, there is a considerable overhang to the upper portion of the occiput.

The palate is broad and, for the most part, slightly concave, both longitudinally and transversely, but in advance of the anterior palatine foramina its surface curves rapidly downward. From the second molars it narrows evenly and rapidly backward to the posterior nares, which are set rather far back. In line with the posterior nares a horizontal measurement taken across the vertical plates of the palatines is only 70 mm. The posterior narial emargination is rather narrowly rounded anteriorly. The distance from the posterior nares to the occipital condyles is short compared with the length of the hard palate. The zygomatic fossæ are triangular and as wide as long, their greatest width being but slightly in advance of the glenoid cavity. The anterior basal margin of the occipital condyles, viewing these surfaces from beneath, form an even transverse curve arching but slightly forward, the flatness of the curve being conspicuous.

Between the canine and the fourth premolar are three alveoli, which are interpreted as being those for the first premolar and for a double-rooted third premolar. The anterior one of these three alveoli is close to the canine. Those for the supposed

double-rooted third premolar are self-contained in distinct, clean-cut peripheral margins without any elevation of the bone externally or internally between them, and are separated only by a sharp-edged septum of bone which is at the same level as, and contributes equally to, the margins of both alveoli. Between the alveolus for the first premolar and the anterior one of the third is a space measuring 6 mm.

Diameter of alveolus of first premolar:	Mm.
Antero-posterior.....	13
Transverse.....	8
Diameter of anterior alveolus of third premolar:	
Antero-posterior.....	7.5
Transverse.....	6
Diameter of posterior alveolus of third premolar:	
Antero-posterior.....	10.5
Transverse.....	7

Of the incisors the third is much the largest, and the second is slightly smaller than the first. The fourth premolar has a well-developed inner cusp in line with the mid-length of the tooth, adding to its breadth and causing the cross section of the crown to be subtriangular in outline, the exterior surface of the crown exceeding in length the two inner and equal sides. The first molar is subquadrangular in outline, its breadth nearly equalling its maximum antero-posterior diameter which is at the outer side of the crown. The second molar is broadest in front, and narrows rapidly backward; its maximum breadth is equal to two-thirds of its length. All the teeth are much worn.

Diameter of first incisor:	Mm.
Antero-posterior.....	12.5
Transverse.....	8
Diameter of alveolus of second incisor:	
Antero-posterior.....	13
Transverse.....	7
Diameter of third incisor:	
Antero-posterior.....	17
Transverse.....	18
Diameter of fourth premolar:	
Antero-posterior.....	22.5
Transverse.....	17
Diameter of first molar:	
Antero-posterior.....	27
Transverse.....	25
Diameter of second molar:	
Antero-posterior.....	37.5
Transverse.....	25



	Mm.
Space occupied by molars and fourth premolar...	84
Space occupied by molars and premolars.....	123
Space occupied by the six incisors.....	74
Length of canine (worn at tip) protruding beyond inner edge of alveolus.....	60
Transverse diameter of canine at edge of alveolus	26
Antero-posterior diameter of canine at edge of alveolus .....	42

A large median foramen (length 19 mm., width 11 mm.) occurs behind the anterior palatine foramina, its centre being in line with the posterior edge of the alveolus of the first premolar. The posterior palatine foramina are placed rather far back in line with the hinder half of the second molars. There are two external infraorbital foramina, one above the other, and distant about 17 mm. apart, in line with the anterior portion of the first molar.

	Mm.
Length of skull frominion to anterior end of pre- maxillary (20½ inches).....	521
Length of skull along base from vertically below apex of inion to anterior end of premaxillary (19⅝ in.).....	506
Length of skull from posterior edge of occipital condyle to anterior end of premaxillary.....	463
Distance from anterior end of premaxillary to posterior nares.....	260
Elevation of forehead vertically above posterior extremity of posterior molar (estimated).....	200
Width between inner border of posterior molars...	93
Width between inner edges of alveoli of canines...	74
Extension backward of sagittal crest beyond oc- cipital condyle.....	43
Extreme breadth across zygomatic arches.....	364
Breadth across postorbital processes of frontals...	205
Height of sagittal crest vertically above postglenoid process.....	215
Breadth across mastoid processes of periotics.....	240
Combined breadth of occipital condyles.....	89
Diameter of foramen magnum:	
Vertical.....	39
Transverse.....	40

The Gold-run creek skull is considered to represent a species of *Arctotherium*, hitherto undescribed, for which the name *yukonense* is proposed, with the skull as the type (Cat. No. 7438).

It approaches closest to *A. simum*, Cope\*, from which, however, it differs in general proportions as well as in a number of particulars.

In general shape it is broader throughout, except axially, behind the hard palate and including the brain case and forehead, where it is narrower; its height in its posterior half is less.

Comparing the Yukon skull further with the Californian one the following differences are apparent: (1) The breadth across the maxillæ, over the swelling for the root of the canine and in line with the median foramen in the palate, is greater. (2) The breadth across the postorbital processes is less. (3) The brain case is smaller, causing a more rapid contraction of the upper portion of the skull backward from the postorbital processes; the narrowness is here accentuated by the greater height and farther backward extension of the sagittal crest. (4) The molar-premolar series occupy a shorter space. The molars and fourth premolar are smaller, and the premolars in advance of the fourth are less crowded. (5) The median anterior foramen, as also the posterior palatine foramina occupy more posterior positions relative to the teeth. (6) The posterior nares is farther back from the second molar, although the hard palate apparently has the same proportionate length. The posterior narial opening is narrower and more pointed in front. (7) The breadth across the palatines at the posterior nares is much less. (8) The breadth across the mastoid processes of the periotics is much greater. (9) The occipital condyles are narrower and, as seen from below, their anterior margins are almost at right angles to the longitudinal axis of the skull, and are not directed obliquely backward as in *A. simum*.

The following measurements of the Californian skull, as given by Cope, are:—

	Mm.
Length along base from below apex ofinion to premaxillary.....	387
The same in <i>A. yukonense</i> .....	506
Elevation of forehead vertically above the posterior extremity of the last molar.....	141
The same in <i>A. yukonense</i> (estimated) .....	200
Width between inner border of posterior molars...	76
The same in <i>A. yukonense</i> .....	93

*A. yukonense* exceeded in size the largest of the living bears, viz.: the Kadiak or Alaska Peninsula bear (*Ursus middendorffi*) described by Merriam in his Preliminary Synopsis of the American

\*The American Naturalist, 1879, vol. XIII, p. 791 and 800; 1891, vol. XXV, p. 997, pl. XXI, figs. 1, 2 and 3.

Bears, Proceedings of the Biological Society of Washington, Vol. ix, pp. 65-82, pls. 4-6, April, 1896. In this paper, Dr. Merriam gives 440 mm. ( $17\frac{3}{8}$  inches) as the greatest length (front of premaxillary to end of occipital crest), and 277 mm. as the zygomatic breadth of the largest skull (type of the species) seen by him. Corresponding measurements in *A. yukonense* are 521 mm. ( $20\frac{1}{2}$  inches) and 364 mm., the breadth being proportionally greater in the Yukon skull.

In general shape the skull of *Ursus middendorffi* shews much resemblance to that of *A. yukonense*. The writer has not had the opportunity of studying the dentition of the former species, but if the teeth depart in any particular from the usual *Ursus* type it would be interesting to note if any approach toward the dentition of *Arctotherium* is indicated. In *U. middendorffi* we may have the descendant of *A. yukonense*, the giant form of the Pleistocene of the extreme north-west.

The great Cave Bear (*Ursus spelæus*) was apparently of about the same height and length as the western North American *Arctotherium*, although the latter animal was probably of heavier build, and its broad, high head with a decidedly short face and nose would give the living animal an appearance quite different from that of the long-nosed *U. spelæus*.

The skull of *U. spelæus* from Gailenreuth, near Muggendorf, Bavaria, figured by Owen in his History of British Fossil Mammals and Birds, 1846, has a length (inion to premaxillary) exceeding that of the Gold-run skull by half an inch. In the same publication is a figure of a canine (fig. 29) referred to *U. spelæus*, from Kent's Hole, Torquay, which is almost as large as the canines of the skull from Gold-run creek.

Another skull of *U. spelæus*, from Banwell, England, is, using a corresponding measurement, only one quarter of an inch shorter than the Gold-run skull (Palæontographical Society, 1906, a Monograph of the British Pleistocene Mammalia, Vol. ii., pt. ii., The Bears, by S. H. Reymolds, pl. 1, fig. 1).

#### EXPLANATION OF PLATES.

- Plate I.—Right lateral aspect of the skull (type) of *Arctotherium yukonense* (upper figure). Occipital aspect of the same (lower figure).  
 Plate II.—Palatal view of the same skull.  
 Plate III.—View of the same from above.  
 Figures one-fourth natural size, linear.

## THE SPRING MIGRATION OF BIRDS AT FISHERMANS ISLAND, TORONTO, 1910.

BY J. A. MUNRO.

The eastern portion of the sandbar to the south of Toronto, enclosing Ashbridges Bay, with its wide expanse of marsh and weedy lagoons and called collectively Fishermans Island, has been known for many years by the local ornithologists as one of the best vantage points in the province from which to study the ever interesting bird migration. The vast area of marsh now rapidly being reclaimed for commercial purposes, the once clear lagoons, poisoned by sewage, and the rows of cottages on the former feeding ground of Godwit and Curlew, are indications that the old order of things is fast giving way to a less beautiful if more utilitarian industrial era, with its attendant ills of reeking chimneys and crowded docks. As the locality is changing so rapidly, a short topographical description will be necessary.

There is a more or less authenticated tradition to the effect that many years ago a ridge of pine and hardwood extended from where the eastern channel is now cut through for several miles eastward. Black squirrels, mink, foxes and hares were plentiful. No trace of this ridge, said to have been twenty or thirty feet high, now remains.

The present beach, for the most part perfectly flat, has in several places an elevation of about two feet above the surface of the lake, and is sparsely covered with seedling poplars and willows. Between the Eastern Gap on the west and Coatsworths Cut on the east, the beach extends for about three miles, and is about four hundred yards wide at the widest part. At both the eastern and western ends of the beach many summer cottages have been built. Between the two settlements there is a park reservation about one mile long. This is the only portion of the sandbar that retains its natural features.

In the lake, in front of the cottages at the west end of the beach and about fifty yards south of the beach proper, a long narrow sandbar has recently been piled up by natural causes, forming a wide pond, where several species of marsh weeds have taken root. Many records were made beside this "Beach Pond", and it was on the narrow sandbar that the Herring Gulls, of which a record follows, congregated all summer.

Near the western end of the sandbar there is a wooden breakwater and a roadway running north and joining the island to the city. The breakwater also serves to separate Ashbridges Bay and Toronto Bay. Along the southern portion of the roadway there is a considerable growth of willows and balm of gilead.

These, the only large trees on the island, prove a great attraction to warblers, sparrows and other small migrants.

Along the north shore of the sandbar, fringed by rushes and *Phragmites* for the greater part of its length, many varieties of plants find conditions suitable to their development. Several species of *Solidago*, *Lobeliaceæ*, *Gerardia purpurea*, Turtlehead and many beautiful Gramineæ. During May and June the sand is yellow with the blossoms of *Potentilla anserina*.

The wide stretch of bog in the south-west corner of Ashbridges Bay is cut up by a chain of shallow weedy lagoons, known by the local sportsmen as "Knockem Pond", "The Deep Hole" and "The Lilyweed Pond." The waste oil deposited in the bay by the gas works has killed off a number of the less hardy water plants, but such species as Pickerel weed, Arrow-head and three varieties of *Nymphaea* are still abundant. Florida Gallinules, American and Least Bitterns, Sora and Virginia Rails, Long-b. Marsh Wrens, Red-winged Blackbirds, Swamp Sparrows, and occasionally Coots, Red-billed Grebe and Blue-winged Teal breed in the bog. The Gallinules, Rails and the more wary species choose the less accessible places where the vegetation is too dense to allow the passage of a canoe and the bottom too treacherous to admit of wading.

The following records were made between January 1st and July 10th, 1910:—

**HOLBOELL'S GREBE.**—One seen on April 2nd, feeding in "Knockem Pond." It allowed a canoe to approach within sixty yards before taking flight. May 2nd, one seen in the "Beach Pond". May 3rd, two seen in Toronto Bay, feeding along the island shore.

**HORNED GREBE.**—March 5th, three seen in the lake swimming close to the ice banks on the shore. No more were seen until April 16th. From that date until April 23rd they were fairly plentiful in "Knockem Pond" and "The Deep Hole." On April 17th three were seen asleep with their heads on their backs.

**RED-BILLED GREBE.**—One seen in "Knockem Pond" on March 31st. Two on April 2nd. On April 9th and 10th they were quite numerous. None were seen after April 10th. In former years several pairs always nested in the marsh.

**LOON.**—May 13th, seven were seen swimming up the lake not far from the shore. Until the end of May two or more were seen daily. The last spring record was made on June 12th, when a single bird flew over the beach.

**GLAUCOUS GULL.**—May 30th, one seen on the sandbar among a flock of Herring Gulls.

**HERRING GULL.**—During January and February single birds

and flocks of six and seven were seen. In the first week of March they began to congregate on the ice on "Knockem Pond" and Ashbridges Bay. Sometimes the flock numbered five or six hundred. They always left the ice at dusk and flew far out in the lake. Evidently they spent little time in feeding as they remained almost motionless on the ice for hours at a time. On March 24th, the ice was broken up and the flock was disbanded until March 28th, when they gathered again on the sandbar in the lake. Until July 7th, when the last record was made, there was a daily concourse on the bar, their numbers sometimes augmented by flocks of Ring-bills, Bonapartes and Caspian Terns. The number of birds in the flock varied from fifty to three hundred. During the latter part of June and the first week in July young birds predominated. The hard sand was white with their droppings and feathers. Several castings of fish bones were found.

**RING-BILLED GULL.**—May 19th, twelve seen on the sandbar in company with the Herring Gulls. Small flocks arrived daily until May 26th, when 165 were counted. The greater part of the flock had left by June 1st, but a few were seen daily until July 7th. As a rule they mixed indiscriminately with the Herring Gulls, but on several occasions they were seen in separate flocks ten or fifteen yards from the larger gulls.

**BONAPARTE'S GULL.**—May 6th, six seen with the Herring Gulls. On May 21st eight were seen, and by May 31st there were twenty in the flock. On July 1st adults and young began to return in daily increasing numbers. On July 7th three hundred were counted.

**CASPIAN TERN.**—May 1st, four on the sandbar with the Herring Gulls; May 3rd, forty-five on the sandbar. They were very noisy, their voices harsh and rasping. They had been watched by many admiring eyes for some twenty minutes, when suddenly they rose from the sand, and as they circled over the water the sunlight glittered on their snowy plumage, throwing into relief their black caps and scarlet bills. In a few minutes they formed into a long straggling flock and flew in a northerly direction about forty yards above the beach. Three or four were seen daily until June 8th.

**COMMON TERN.**—From May 13th until June 7th they were quite numerous, flying over the beach in flocks of seven to twenty.

**BLACK TERN.**—May 15th, a flock of six seen flying over "The Deep Hole." On June 26th a pair were seen circling over the bog.

**AMERICAN MERGANSER.**—March 29th, two in the lake.

April 3rd, four seen flying over the beach. Between April 10th and April 23rd they were fairly numerous.

RED-BREASTED MERGANSER.—Numerous from March 31st until May 14th. A few single birds and small flocks were seen until May 28th.

HOODED MERGANSER.—May 4th, a flock of nine in the "Beach Pond."

BLACK DUCK.—Flocks of three to eight seen between March 6th and April 21st. May 24th, four seen flying over the bog.

AMERICAN WIDGEON.—March 4th, a pointer flushed four, from the long grass at the edge of the bog. On April 17th four were seen in "Knockem Pond."

GREEN-WINGED TEAL.—A flock of eight seen in "Knockem Pond."

BLUE-WINGED TEAL.—April 25th, early in the morning, a pair flew over the beach. April 30th, one seen swimming along the shore of "Knockem Pond." June 12th, flushed a pair from a shallow pool near the edge of the bog.

SHOVELLER.—March 30th, one seen flying over "Knockem Pond." April 2nd, one seen flying over the marsh.

PINTAIL.—A flock of eighteen seen flying over the marsh.

WOOD DUCK.—March 30th, two seen in "Knockem Pond." April 2nd, a pair seen flying over the beach. May 17th, one drake seen. May 24th, two seen flying across "The Deep Hole."

REDHEAD.—February 14th, a flock of seventy-five feeding in a piece of open water, Toronto Bay. March 6th, two, in company with a large flock of Scaup Ducks in Toronto Bay near the Eastern Gap. April 10th, several small flocks seen flying up the lake.

SCAUP DUCK.—March 6th, a flock of 125 in Toronto Bay near the Eastern Gap, and a flock of 250 near the island shore. They were quite plentiful until May 24th. On June 19th a single male was seen swimming along the edge of the marsh in Ashbridges Bay.

LESSER SCAUP DUCK.—April 22nd, a flock of 600 in the lake about one hundred yards from the island shore. A number of small flocks were seen flying up the lake. April 23rd, a flock of fifty seen. May 8th, a flock of thirty in Ashbridges Bay.

AMERICAN GOLDEN-EYE.—January 15th, one seen flying up the lake. January 29th, one seen in the lake near Coatsworths Cut. March 6th, a flock of forty in Toronto Bay near the Eastern Gap. They remained in the vicinity for a week. April 10th, three in the lake close to shore.

BUFFLE-HEAD.—April 10th, a single female visited "Knock-

em Pond" and remained there a week. April 17th, a flock of six in Toronto Bay.

LONG-TAILED DUCK.—During the spring and fall migration the "Coween" is the common duck in Toronto Bay. Flocks of eight and nine hundred have frequently been seen. In the spring of 1910 very few were seen at Fishermans Island, but they were probably numerous in Toronto Bay. March 5th, a flock of four flew down the lake close to shore. March 6th, six mated birds flew across the beach at the Eastern Gap.

WHITE-WINGED SCOTER.—From April 13th until May 19th immense flocks flew over the island, flying up the lake half a mile from shore and crossing the island at a considerable elevation. None were observed alighting in the lake or the bay. June 19th, two seen flying up the lake.

CANADA GOOSE.—March 11th, a flock of twenty flying south over the island. March 19th, a flock of sixteen crossed the sandbar, flying in a northerly direction.

AMERICAN BITTERN.—A summer resident, the first record made on April 22nd.

LEAST BITTERN.—The first record made on May 12th. They were plentiful a few days later. One nest containing three eggs found on June 19th.

GREAT BLUE HERON.—One bird seen on April 15th and 22nd, and on May 10th. They are numerous in the late summer and remain all day in the marsh feeding in the lagoons.

VIRGINIA RAIL.—April 14th, five heard in the bog. From that date they were seen frequently all summer.

SORA RAIL.—April 10th, a single bird seen. They were numerous by April 14th. On June 12th a nest containing seven eggs was found concealed in a clump of coarse grass in a dry meadow at the edge of the bog.

FLORIDA GALLINULE.—May 7th, several heard. July 7th, a female with four young seen in "Knockem Pond."

AMERICAN COOT.—From April 1st to April 28th, four or five were seen daily in the lagoons, or flushed from the rushes at the water's edge. A single bird remained in "Knockem Pond" until June 1st.

KNOT.—June 5th, a flock of seven and three single birds seen on the lake shore.

LEAST SANDPIPER.—May 12th, a flock of seven seen. May 13th, one seen in company with a Piping Plover. May 19th, a flock of seven on the beach. A few were seen until May 26th but were never numerous.

(To be continued.)



## MEETINGS OF THE BOTANICAL BRANCH.

February 25th, 1911, at the home of Mr. J. J. Carter. Meeting addressed by Dr. M. O. Malte, members present, besides the host and the speaker, Prof. John Macoun, Messrs. Whyte, G. H. Clark, W. T. Macoun, Attwood, Eastham, Newman, Sirett, Eddy and Groh.

Dr. Malte gave a short report of some of the results obtained when studying the grasses of the Geological Survey Herbarium. These results must be regarded as only preliminary, as a decisive knowledge of the Canadian grasses can only be obtained by studies in nature.

When beginning the study of the grasses, Dr. Malte realized the necessity of paying the most careful attention especially to the construction of the flowers and spikelets, these parts of the grass-plant being less variable than the vegetative characters and forming a safer basis for the exact judgment of the systematic value and relationship of the different forms. Especially when trying to make a natural system out of a polymorphous genus, the main groups, each of which contain a number of different species, will be found very easy and with more accuracy, if based upon essential flower characters. This was demonstrated in the genus *Panicum*.

In grouping the Canadian species of *Panicum*, about thirty in number, according to the construction of their spikelets, four main groups will be obtained. When comparing the different species of each of these groups, they all show the most striking correlation between flower-construction and general appearance. One type of spikelet is thus combined with a certain type of panicle and a special general character of the leaves; another type of spikelet corresponds to another type of panicle and another shape of the leaves, etc. The closer studying of the flowers has also been of important value for the distinct limiting of polymorphous species. In fact, the microscopical examination of the spikelets of different specimens of a polymorphous species has often shown, that what has been regarded as one species, in reality is a mixture of two or more species. The difficulty of recognizing these systematically independent species has often been due to the fact, that the descriptions, given by some grass-monographers, do not at all agree with the original descriptions of the species in question, and even are based upon more than one type, some characters having been picked up from one type, other characters from another. Such confusion of species will for instance, be found within the genus *Calamagrostis*.

The Greenlandian *C. hyperborea* Lge. is thus supposed to be widely spread all over Canada. In fact, no one of the Canadian

specimens, labelled *C. hyperborea* Lge. of the Geological Survey herbarium agrees with the Greenlandian plant. Most probably they belong to quite different species, no one of them being identical with *C. hyperborea* Lge. Similar things have been found regarding other *Calamagrostis* species.

The method followed when clearing out a species-skein was demonstrated in *Deschampsia cæspitosa* (L.) Beauv. This species is distributed all over Canada, presenting peculiar varieties especially in the Arctic region, and on the west coast. By a comparative examination of the flowers of the continental *D. cæspitosa* specimens and those of Vancouver Island, the interesting observation was clearly made, that the latter ones differed in many essential points. There will be no doubt, that the Vancouver form will turn out to be a very good and distinct species. This new species, however, seemed at first to be very variable, showing varieties, which to a certain extent seemed to pass over to *D. elongata* Munro. These varieties have been called *D. cæspitosa* var. *longiflora*. The examination of the pollen of these doubtful specimens settled the whole matter. Their pollen is typical hybrid-pollen, that is, the pollen-grains are of very varying size and empty, no one of them being capable of fertilization. The comparative study of the hybrid and those *Deschampsia* species, occurring in Vancouver Island, has shown that the specimens in question are hybrids between *D. elongata* Munro and the above mentioned new species. The west-coast form of so-called *Deschampsia cæspitosa* consequently consists of one new species and the hybrid between this species and *D. elongata*.

Some specimens of *Alopecurus* were also demonstrated, and it was suggested that the native western species, which are called *A. geniculatus* and *A. aristulatus*, very likely may represent new species, quite different from the European species of the same name.

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March 11th, 1911, at the home of Prof. John Macoun. Mr. L. H. Newman, who recently returned from Europe after nearly a year's absence, dealt with the subject, "The Composition of an old race of cereals and its variability", basing his remarks largely upon the present attitude of the experts of the famous plant breeding Institution at Svalöf, Sweden, where he had been studying.

In his opening remarks reference was made to the composite character of many old races. Many different forms were to be found within these races which by some were regarded as accidental mixtures, while others regarded them as the results of

variation. "Within recent years", continued the speaker, "a new light has been thrown on this question by the appearance of the theories of Mendel, DeVries and Johannsen. The basic principle of these theories is that an individual plant or animal is composed of distinct units which correspond in a sense to atoms in chemistry. By crossing two individuals a combination of units takes place which finds expression in a new form combining the characters of the two.

If the above theory of "Unit characters" is correct hereditary variation must take place in either of two ways, viz.—

(a) Through new combinations of characters by crossing, or

(b) By the sudden alteration in the unit constitution of the individual itself, a phenomenon to which the name "Mutation" has been applied.

This idea is clearly inimical to the old Darwinian belief in the omnipresence of hereditary variation at least in so far as it concerns those plants which naturally self-fertilize.

If we accept the idea that the various forms within an old race arise either as the result of natural crossing or by mutation, our next problem is to determine, if possible, how often these combinations and mutations take place, and which is of the more frequent occurrence.

DeVries, the real founder of the mutation theory, has classified mutations under two categories, viz., *Retrogressive Mutation* and *Progressive Mutation*. The first owes its existence to the dropping out of a unit while the latter has arisen, according to DeVries, through the acquisition of a new unit. Despite all that has been said and written about the mutations theory and its great practical importance, the speaker had not found it very seriously considered in Europe. While there were evidences to show that so-called retrogressive mutations probably occur occasionally, yet he had not been able to find an unquestionable example of a progressive mutation. On the other hand the whole manner of thinking in the most progressive centres, such as Cambridge, England, (Bateson, Punnet, Wood, etc.), Copenhagen (Johannsen, Ravn, etc.), Berlin (Bauer), Austria (Tschermak), Sweden (Ehle and Tedin), and many other places was after the combinations idea. This idea has developed enormously during the past ten years following the extensive work which has been done in artificial cross fertilization, a work which provides a means of studying the unit constitution of the individual plant or animal and thus of throwing new light upon the great problems of heredity.

It has long been held by certain authorities that natural cross-fertilization among such supposedly self-fertilizing plants as wheat, oats, barley and peas was practically impossible. Re-

cent observations and conclusions of recognized authorities show, however, that this process takes place more often than is commonly supposed, although it is by no means frequent.

When one remembers Mendel's own annunciation, however, that it is only necessary to cross two individuals which differ in ten different characters in order to produce over 1,000 distinctly different hereditary forms, it will readily be seen how great may be the confusion (variation) which must follow within a population through the natural segregation of the heterogenous progeny in successive generations. This dividing up of the progeny of a crossing is now generally regarded as the variation which Darwin described but was unable to explain.

The speaker showed a large number of samples of oats from *Pure Lines* taken out of the old Probestier variety, the common white oats grown in the Baltic region. These samples were arranged to show the gradations in characters from one extreme to the other. Thus there was shown a gradation in *awniness* from an absolutely awnless sort to one which was heavily awned, the gradation between the two conditions being a very gradual one. Other lines out of the same variety were arranged to show the same gradations in size, shape and color of kernel.

A very large number of these pure lines from this variety have been worked with in Sweden and Denmark, the best sorts now in use in these countries having originated in this way. So great had been the multiplicity of distinct hereditary forms in this old variety that the experts in charge of the breeding operations found it difficult to obtain identical progeny from any two individuals. These different forms were *not regarded as mutations* but as the product of natural crossing. The experience in artificial crossing work had led Ehle, of Sweden, to state his conviction that a single crossing between two sorts possessing certain characters was quite sufficient to account for practically all the different forms now found in the above old variety.

STRANGE FORMS.—While the above forms can, without any stretch of the imagination, be regarded as being traceable to a common origin, other forms, more foreign in appearance, occur from time to time which seem more difficult to account for. Thus there may arise bearded heads of wheat in a bald sort, white kernelled individuals may appear in a black oat sort and vice versa, or they may appear in a red kernelled sort; side oats may appear in varieties which have branching panicles, etc.

The above aberrant forms have been called atavists by some, being regarded as the sudden reappearance of the character of an ancestor; others have applied the name mutation. Experience has shown, however, that the majority of these forms which appear in nature without any apparent preparation may

be produced artificially by crossing and may be accounted for not as mutations or atavists but as a natural consequence, following a combination of the units. Thus has this conception of unit characters revolutionized the whole manner of thinking and since it is happily capable of experimental proof it has served to place the great problem of the amelioration of races in an entirely new light.

March 25th, 1911, at the home of Mr. R. B. Whyte, members present sixteen. Mr. Whyte was the speaker, and gave an interesting account of a recent visit to Florida and Georgia, and the impressions gathered during two weeks observations. His observations were not confined to the botanical features of the country, but whether applying to the botany, the horticulture, the country itself, or its people, the impression which they almost uniformly gave was one of poverty. The soil, except in a few instances, which were referred to, supported very sparse crops or natural vegetation, being in places almost pure silica, and generally short of soil moisture. Among the few herbaceous plants growing wild were lupines and what was taken to be a magnolia, and the principal trees were cypress, magnolia, live oak and Georgia pine. Close grass turf such as we know is never seen, as the Bermuda grass which takes the place of our grasses there, grows always in tufts.

Of particular interest to a northern botanist were the cypress "knees" which are produced where these trees grow in water. Also the "black moss" or *Tillandsia* which festoons the branches of trees everywhere, and gives them a funereal aspect, which becomes very depressing. With regard to the Georgia or "long-leaf" pine, it was observed that its seedlings, unlike those of our white pine, were able to start freely without any protection or shading whatever.

Notwithstanding the poverty-stricken appearance of its agriculture, this part of the South is enjoying somewhat of a land boom. Large plantations of pecan nuts, and of oranges and grape fruits are being set out. Within recent years many superior varieties of pecans have been obtained, and their propagation promises to become an important source of revenue for the South.

Specimens of various varieties of pecan nuts were shown, as were also the *Tillandsia*, a seedling Georgia pine, and a sample of the sponges obtained in a large commercial way in the Gulf fisheries.

H.G.

## BOOK NOTICE.

"PHYTOPATHOLOGY": Official Organ of the American Phytopathological Society. Volume I, No. 1, February, 1911. Published bi-monthly for the Society by Andrus & Church, Printers, Ithaca, N.Y.

Phytopathology, the pathology or study of diseases of plants, occupies a prominent position in the many Agricultural Experiment Stations in the United States. The Bureau of Plant Industry of the United States Department of Agriculture, at Washington, D.C., employs a large and efficient staff of specialists, devoting the whole of their time to the study of minute plant organisms causing disease in vegetation of all kinds, and also to the solution of the perplexing problems connected with the protection of plant life. Dr. Erwin F. Smith, who ranks among the most prominent members of the staff, is in charge of the Laboratory of Plant Pathology. His laboratory, which I have had the pleasure of visiting occasionally, is and deserves to be, because of its magnificent equipment, the basis of all plant pathological work of the Bureau of Plant Industry. It receives an appropriation of from \$19,000 to \$22,500 per annum of which nearly \$15,000 is paid in salaries. Under his direction there are, besides the central laboratory, other laboratories devoted to the investigation of diseases of forest trees, grain, fodder, vegetable and other crops, each with separate endowments.

Nearly every State possesses its own Experiment Station; on the staff of which there are one or more plant pathologists of great activity. This activity manifests itself every year by the large amount of publications, in form of Bulletins and Annual Reports, of more or less important nature, distributed gratuitously throughout the different States. The Americans take far more interest in the progress of this comparatively new science, than may be boasted of elsewhere, probably with the exception of Germany—the home and birthplace of this discipline. The extent of their experiments in field and laboratory are truly American. One may say that to each experimental plant in Europe, there are a hundred, or more, in the United States.

In view of these facts it is only surprising that, with so large a body of trained men interested in the study of diseases, the birth of a society devoted to phytopathological interests, has not taken place sooner. It was my privilege to be present at the inaugural meeting of the new Phytopathological Society, held at Boston at the time of the meeting of the American Asso-

ciation, and to get an idea of the enthusiastic spirit of its many members distributed all over the United States. One may well realize the advantages of such an organization in a vast country like the United States, and the future prospects of this Society are very safe.

Hitherto, any matter concerning the study of plant diseases was brought before the Section of Botany at the Association's meetings, or was published in various periodicals, and remained duly undiscovered. Hence the Society is to be congratulated upon the publication of a journal, devoted entirely to Phytopathology, of which the first number made its appearance recently. Though primarily devoted to the dissemination of matter brought before the Society by its own members, the editorial board, very happily chosen, assisted by a number of Associate Editors from various parts of the States and including a representative from Canada, however, will aim to make the Journal more broadly representative, and there is no reason why this Journal should not succeed and be of great value not only as a national organ, but as a publication of much interest to investigators the world over, who will welcome a good resumé of the work done by our American friends.

It is proposed, for the present, to issue the Journal bi-monthly. It has long been my hope to see a publication of this kind appear in the English language, equal to Sorauer's famous *Zeitschrift* in Germany.

Dr. Erwin Smith, besides his many attainments and a historian of no mean order, ushers the new Journal into the world by paying homage, in an opening biographical sketch, to Anton de Bary.

Anton de Bary "none more productive of important results" as the author states; "may this," he continues, "be indicative not only of the breadth and inclusiveness of the new Journal, but also of its standard of excellence." Truly a noble greeting! May this new born babe realize all anticipations!

The same author contributes another article with some excellent photographs on the results of his study of Crown Gall of plants. I intend to express my views on this interesting problem in another place and hence refer to the paper only by title.

Johnson, of the United States Department of Agriculture, deals with the important question of floret sterility in wheats. The author's observations deserve careful study. The conclusion reached may be summarized that the most important agents causing floret sterility (at San Antonio, Texas, at least) are rusts. As the rust spores, however, are frequently carried by small insects known as Thrips which were found in 1908 in at

least two-thirds of all sterile flowers examined, the prevention of this trouble is in my opinion primarily an entomological problem.

The present number contains seven contributions in all, besides a good review of Stephen & Hall's new book on "Diseases of Economic Plants," which, good as it is, is so peculiarly different from all other text-books by the unfortunate tendency of its authors to form the common names for nearly all described diseases from their generic names, by terminating them in "ose," "rose," or "nose:" (Vermiculariose! Cercosporose! Pseudomonose!)

H. T. G.

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#### PORTRAIT OF THE LATE DR. JAMES FLETCHER.

The Fletcher Memorial Committee announce that the portrait of the late Dr. James Fletcher, which has been painted by Mr. Franklin Brownell, R.C.A., is now on exhibition, to members of the Ottawa Field-Naturalists' Club and their friends, at Wilson's Studio (upstairs), on Sparks Street. The likeness is a particularly good one, and will undoubtedly please all those who knew Dr. Fletcher. The Committee after paying all expenses in connection with the Memorial Fountain, had on hand a balance sufficient to allow of the above portrait being made. It will be hung in one of our public buildings where it will serve to remind us of one who did so much for the Club.

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#### NESTING OF THE MOURNING WARBLER, LAVAL COUNTY, QUE.

My experience of the breeding habits of the Mourning Warbler is limited to three nests. On June 20th, 1908, while going through some woods of cedar and spruce, I observed a slight movement in a clump of ferns in a glade and immediately surmised it was a White-throated Sparrow leaving her nest. On following the bird up, however, I got a glimpse of a Mourning Warbler slipping through the underbrush. The bird, eventually, disappeared entirely and I never saw it again, although I remained in the locality for about half an hour. Upon returning to the spot where the bird was first disturbed, I found the nest nicely hidden five inches up in the centre of the bunch of ferns referred to and slightly resting on a mound covered with moss. It contained three fresh eggs about the size of those of the Yellow-throat, two which were marked at the larger end



with light reddish dots, the third egg having undershell scrawls and streaks. The nest, which is before me, is built externally with dead ferns, vegetable and vine stalks, skeleton leaves, and lined with black rootlets, a little moss, and horse hair. The same locality was visited on June 23rd, 1909, and I apparently ran across the same pair of birds again. After searching amongst the undergrowth for fifteen or twenty minutes the nest was located, about one foot up, in a raspberry bush and just over the tips of some ferns and other plants. The nest was constructed upon the same lines as the preceding one and the four fresh eggs were similarly marked. On July 17th, 1909, in some deep mixed woods, another nest of this species, containing three newly hatched young and one addled egg, was found. This warbler, unlike the others, had chosen a very open wet spot, wherein grew rank grass and water-cress, and built her home about three inches up from the ground in the centre of a skunk cabbage. The remarks on the composition of the other two nests would apply to this one also, but it was quite a frail affair, the bird evidently depending upon the thickness of the leaves of the plant as a backing and as a possible protection from storms. It is hard to say why this bit of swampy ground was selected as a site for the nest, as there were many other more suitable places in the immediate vicinity.

W. J. BROWN, WESTMOUNT, QUE.

#### OBITUARY.

On Sunday morning, April 9th, the death occurred at Hamilton, Ont., of Miss Ruby B. McQuesten, after a long and trying illness, which she bore with great patience and cheerfulness. For many years during her residence in Ottawa, Miss McQuesten was a valued member of the Council of the Ottawa Field Naturalists' Club. She was a regular attendant at our lectures and field excursions and did much to interest the young ladies, under her charge, at the Ottawa Ladies' College, in the work of the Club. Her gentle, kindly disposition endeared her to all with whom she was associated. At a recent meeting of the Council of the Club, a special committee was appointed to extend to Mrs. McQuesten and her family, in their sad bereavement, the sincere sympathy of the members of the Council, and also that of all the Field-Naturalists who had the pleasure of her acquaintance.

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