floated yolk sac uppermost just under the surface film, swimming down frequently, only to rise to the surface again when they ceased swimming.

These young larvae of July 3, averaged only 5.2 mm. in length, but possessed definitely developed pectoral and ventral fins. The former averaged 0.7 mm. in length, while the latter, as yet only a single long process, averaged 1.6 mm. in length. The rudimentary first dorsal ray mentioned previously now varied from 0.4 - 0.6 mm. in length. In the larger specimens, where this ray was about 0.5 - 0.6 mm. in length, a second dorsal ray immediately posterior to the other was visible as a tiny conical projection.

Such fin development, when the total length of the larvae was only about 5.2 mm., is greatly in advance of that shown by Lebour, 1925. This striking development, especially of the ventral fins, is in agreement however, with the other accounts of the development of the American form of *Lophius*, as contrasted with the European.

At this point the hatching jar overflowed and the remaining larvae were lost.

MAMMALS OF THE WANAPITEI PROVINCIAL FOREST, SUDBURY DISTRICT, ONTARIO

By D. A. MacLULICH, B.Sc.F.

DURING the period from May to September of 1929 the writer was employed by the Ontario Forestry Branch with a party in the Wanapitei Provincial Forest. The work, under the direction of J. A. Brodie, consisted of an intensive forest survey as a basis for future plans for management and research. Incident to this work casual records of mammals were made by the writer both from personal observation and from reliable reports. As might be expected, sufficient collecting of specimens to demonstrate the racial forms of the region was impossible and consequently specific identity is all that is attempted below. In fact several species of mice and shrews which would be expected in this region were not recorded. The few specimens collected are in the Royal Ontario Museum of Zoology. The three measurements, total length (T.L.), tail vertebrae (T.V.) and hind foot (H.F.) are given in millimeters. The area comprises the townships of Norman, Parkin, Aylmer and that part of Rathbun which borders the north shore of Lake Wanapitei, in the district of Sudbury.

Work in adjacent regions may be mentioned for convenient reference. J. Dewey Soper (1920, 1921) wrote on the mammals of Ridout in the District of Sudbury but that place is some 120 miles northwestward of this locality. Soper (1923) published "a biological reconnaisance of portions of Nipissing and Temiskaming districts, Northern Ontario". Professor A. F. Coventry (1931, 1932) has reported on the occurrence, and changes in abundance, of mammals in the region around Lake Timagami which is only about thirty miles to the east and a few miles northward. The only species found in the Wanapitei area but not yet reported from Timagami are the Brewer's mole and the raccoon.

Parascalops breweri, BREWER'S OR HAIRY-TAILED MOLE. Mr. Casselman, a local resident, has seen this species and described the animal in detail. He knew it was not a star-nosed mole or short-tailed shrew, with both of which he was familiar. This record is used because it has been substantiated by specimens from parts of the province both east and west of this region.

Condylura cristata, STAR-NOSED MOLE. A decayed specimen was found in an open jack pine forest in Parkin Township near Mountain Creek.

Sorex cinereus, CINEREOUS SHREW. Quite common; one was taken in a freshly dug pit in poplar bush.

♀, T.L.94, T.V.45, H.F.12, Aug. 3.

♀, T.L.97, T.V.44, H.F.11.5, Sept. 1.

Microsorex hoyi, PYGMY SHREW. One was collected in the pit mentioned above in poplar bush with much *Aster macrophyllus* on the ground, in Aylmer Township.

♀, T.L.91, T.V.34, H.F.10, July 25.

Blarina brevicauda, SHORT-TAILED SHREW. One was seen in Parkin Township but none collected and the species must have been scarce that year.

Myotis sp., LITTLE BROWN BAT. Rather frequently seen.

Ursus americanus, BLACK BEAR. Very common, especially in burned areas in the northeast part of Aylmer Township. Pairs of cubs with their mothers were seen several times. A bear

killed a large pig at a lumber camp on the Wanapitei River and carried it a quarter of a mile away.

Procyon lotor, RACCOON. One individual was observed on the shore of a lake-like part of Mountain Creek near Bear Lake. The nearby bush was mixed poplar and white pine. The raccoon appeared to wash something in the water. This was in bright sunlight in the afternoon.

Martes pennanti, FISHER. Mr. Alcock, a local resident, reported "a few about".

Mustela cicognanii, BONAPARTE WEASEL. Active about camps, catching mice. Mr. Casselman's cat killed one which was preserved.

♂, T.L.281, T.V.78, H.F.35, Aug. 18.

Mustela vison, MINK. Several seen, but not very common

Mephitis mephitis, SKUNK. A few around.

Vulpes fulva, FOX. None observed or heard but said to be common.

Canis sp., WOLF. We heard them howling twice and their tracks were on an old road that was frequented by deer and moose.

Lynx canadensis, CANADA LYNX. According to Mr. Alcock lynx are not scarce.

Marmota monax, GROUNDHOG. Common in Norman Township in the brulés on gravel and sand plains and on scrubby hillsides, but few in the more forested Parkin Township or the more barren Aylmer Township.

Eutamias minimus, WESTERN CHIPMUNK. Uncommon, about one-fifth as abundant as the other chipmunk (*Tamias*).

Tamias striatus, EASTERN CHIPMUNK. Common.

♀, T.L.228, T.V.92, H.F.34, July 28.

♀, T.L.215, T.V.85, H.F.35, July 23.

Sciurus hudsonicus, RED SQUIRREL. Fairly common and found in both brulé and timber. On July 14 a red squirrel was seen to carry up a tree a neat sheaf, 1½ inches long, of green grass, holding it firmly in its mouth by the centre. This might have been for nesting purposes.

Glaucomys sabrinus, NORTHERN FLYING SQUIRREL. Mr. Alcock said they were fairly numerous, often being caught by his cat and in traps in winter.

Castor canadensis, BEAVER. There are a few in rather inaccessible places, especially in Parkin Township. Evidences of their presence, such as one or more of the following: fresh cuttings, repaired dams, occupied houses, used trails or canals, were found in at least seven different places.

Peromyscus maniculatus, WHITE-FOOTED MOUSE. Very abundant in most habitats this year.

♂, T.L.169, T.V.84, H.F.21. July 28.

♂, T.L.167, T.V.86, H.F.21, July 28.

♂, T.L.173, T.V.86, H.F.20, July 14.

Clethrionomys gapperi, RED-BACKED MOUSE. One was seen in a cabin in white pine woods in Norman Township.

Microtus pennsylvanicus, MEADOW MOUSE. Fairly common, chiefly in damp, grassy situations.

♂, T.L.130, T.V.36, H.F.20, July 29.

Ondatra zibethica, MUSKRAT. Several observed; said to be common.

Zapus hudsonius, MEADOW JUMPING MOUSE. Observed at a number of scattered places; very abundant around the camp at the head of West Bay of Lake Wanapitei in grassy white birch second growth.

♀, T.L.199, T.V.126, H.F.31, Aug. 26.

Napaeozapus insignis, WOODLAND JUMPING MOUSE. One collected in young white birch woods.

♀, T.L.229, T.V.144, H.F.31, Sept. 8.

Erethizon dorsatum, PORCUPINE. Only five observed.

Lepus americanus, VARYING HARE or SNOWSHOE RABBIT. Five seen; the hare is quite rare in the region this year. J. Dewey Soper (1921, p. 104) said that 1916 was a rabbit year about Sudbury.

Odocoileus virginianus, WHITE-TAILED DEER. Tracks were common and several were seen, so it was moderately common. The noise made by a survey party frightens deer away from before them. Fawns were observed twice.

Alces americana, MOOSE.. One, a cow, was seen but tracks were fairly numerous. Moose and other game appear to be unusually wary in this district. This is probably due to frequent hunting as the city of Sudbury is only twenty miles distant.

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LAND AND FRESHWATER MOLLUSKS COLLECTED ON A TRIP TO JAMES BAY

By HORACE G. RICHARDS

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IN AUGUST, 1933, the writer took a trip through northern Ontario and Quebec to James Bay. The main purpose of the trip was to collect marine mollusks (Recent and Pleistocene) from James Bay; a report on these is published elsewhere. (1)

Moosonee is on the west bank of the Moose River about five miles from Moose Factory Island, upon which is located the well known trading post of the Hudson's Bay Company, and about nine miles from James Bay. Since various lists had been published of the mollusks of Moose Factory, more of our time was spent collecting from the various other islands in the region. The water at Moose Factory was fresh during the time of our visit, although after heavy winds from the north, salt water from James Bay is said to be carried down as far as Moose Factory.

A canoe trip was taken down the Moose River to Shipsands Island at the mouth of the river. Even here the water was fresh, although the presence of unworn shells of *Macoma balthica* (Linn.), *Mytilus edulis* Linn. and *Paludestrina minuta* (Totten) suggested that the water was at times somewhat brackish. Land and freshwater shells were abundant in the beach drift.

Along the banks of the Moose River near Moose Factory there is a deposit of fossil-bearing clay. The fauna is marine and is thought to be of post-Glacial age (Pleistocene), deposited at a time when the land was lower. On top of this clay there is frequently a layer of silt containing freshwater or land shells. All this material is much younger than the marine deposits and much of it may be very recent. For convenience they are termed "sub fossils". The following species were noted: *Discus cronkhitei anthonyi* (Pilsbry), *Zonitoides arboreus* (Say), *Z. nitidus* (Müller), *Retinella hammonis* (Ström), *Cochlicopa lubrica* (Müller), *Succinea ovalis* Say, *S. retusa* Lea, *S. avara* Say, *Lymnaea artica* Lea, *Valvata tricarinata* (Say), *Sphaerium solidulum distortum* (Prime), *Musculium transversum* (Say).

After several days in the vicinity of Moose Factory I was fortunate in being able to visit Charlton and Cary Islands in James Bay, about eighty-five miles north of Moose Factory. Two lakes were visited on Charlton Island; in one, known as Freshwater Lake, in the interior of the island, about four miles from the sea, the water was very acid, and consequently the shells (*Physa heterostropha* (Say), *Lymnaea stagnalis jugularis* Say) were very fragile. The other lake, "Saltwater Lake" is really an arm of the bay. At the time of my visit the water was fresh and supported a freshwater fauna (*Gyraulus arcticus* (Beck), *Physa gyrina* (Say), *Lymnaea* cf. *catascopium* Say, *L. palustris* cf. var. *elodes* (Say) and *Pisidium mainense* Sterki). Unworn shells of *Paludestrina minuta* (Totten), *Macoma balthica* (Linn.) and *Littorina rudis* (Maton) give evidence that a change in the direction of the wind might cause the waters of "Saltwater Lake" to become brackish.

L. palustris ungava Baker, was abundant in the brackish pools above the tidal zone on Cary Island.

ACKNOWLEDGEMENTS

In addition to material collected on the above trip, there are listed a few mollusks collected on visits to Rivière du Loup, Quebec, in October, 1933, and to Algonquin Park, Ontario, in August, 1934. I was also fortunate in receiving material collected by various friends in this region. William Ransohoff sent an interesting collection from St. Joseph's Island, Ontario; Ludger Cataford supplied me with a number of mollusks from the vicinity of North Bay; Reginald and Maude

1 *American Midland Naturalist*. 17: 528-545 (1936)

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