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The MAMMALS OF
PRINCE ALBERT NATIONAL PARK,
SASKATCHEWAN, CANADA.

by
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Wildlife Management Bulletins are produced to make available to wildlife administrators the information contained in reports which are submitted by officers of the Canadian Wildlife Service.

The reports do not, in most cases, cover extensive studies and are not written primarily for publication. Recommendations arising from the studies are not included.

Introduction

Prince Albert National Park lies almost in the geographical centre of Saskatchewan in a great wilderness region of rolling hills, lakes, and boreal forest. It was established comparatively recently, in 1927.

Among other purposes, it was primarily "dedicated to the people of Canada for their benefit, education, and enjoyment ... and to be made use of so as to leave it unimpaired for the enjoyment of future generations". It was intended to preserve intact the native fauna and its habitat, a virgin and uncommonly beautiful wilderness, a tranquil-seeming land with an atmosphere peculiar to the North.

This park is the third largest in Canada's National Parks System, being exceeded in size only by Jasper and Banff National Parks. Its area in 1940 was 1,869 square miles, since reduced to 1,496 square miles by removal of small areas in the extreme south and all the area east of the Third Meridian. The mean elevation above sea level is approximately 1,800 feet. The southeastern corner of the park is about 34 airline miles north of Prince Albert, 110 miles north of Saskatoon, and 316 miles north of the International Boundary. An all-weather highway from Prince Albert extends well into the park. The highway is one of the main travel routes into Canada's boreal region.

The knowledge of the biology of the park, up to a few years ago, had not advanced as rapidly as was desirable for proper administration. It was not, for example, as well understood as were the forests, geology, and physical geography. A good deal of data about big game and fur animals had accumulated, but comparatively little was known about the indigenous bird life and there was little

or no precise knowledge of the small mammals.

In 1939 the Department of Mines and Resources took action to improve this situation by initiating a faunal survey of the park. The writer was to be mainly responsible for investigating mammals and birds. This report gives the results obtained from the investigation of the mammals.

The investigations were carried on only as other duties permitted. They were commenced in midsummer, 1940. During that summer large areas of the park were examined. These included the southern prairies and the country west to Sturgeon River, east to Montreal Lake, and north to Waskesiu, Crean, Kingsmere, and Lavallee Lakes. In August, 1942, further observations were made from Halkett Lake west to Sugar and Rabbit Creeks. During June, 1943, research was conducted at Waskesiu, Hanging Heart, and Crean Lakes and in the country between Crean Lake and Tibiska Lake. During June, 1946, with the assistance of Austin W. Cameron, extensive investigations were made in the vicinities of Halkett, Namekus, Waskesiu, Hanging Heart, Crean, Kingsmere, Bagwa, and Amyot Lakes. Additional valuable ornithological information was gathered, especially in the southern part of the park from Halkett Lake to Amyot Lake and in or near the Sturgeon River Valley.

Except in a few cases, camps were set up to be used as headquarters. In three instances wardens' cabins were used -- at the south end of Crean Lake, on the north shore of Kingsmere Lake, and at West Boundary Cabin. The use of a motor car facilitated some of the work but most of the travelling was done by canoe or motorboat or on foot.

Usual field methods were employed. The big game animals were observed with the aid of x8 prism binoculars and a x32 nautical

telescope. Most of the data on small mammals were secured by trapping. Attention was directed to unit area research. In selective collection, specimens were taken with a .410 gauge shotgun. In most instances the diagnostic series preserved during the investigations represent the only material of the kind taken in the park either before or since its establishment.

Acknowledgments

It is a privilege to express gratitude to Herbert Knight, former Park Superintendent, for very helpful co-operation throughout the investigations and for subsequent aid by correspondence. He provided a great deal of valuable information and forwarded wardens' reports upon the abundance of big game and fur-bearing animals.

Wardens Harrison, Arnold, Jervis, Anderson, Genge, and Schermerhorn readily and cheerfully gave assistance in travelling about the park. Warden Harrison was particularly helpful during a strenuous packing trip from Kingsmere Cabin to Lavallee Lake and return.

Dr. R.M. Anderson, then Chief, Biological Division, National Museum of Canada, identified subspecifically all the mammal specimens taken in the park. It is a very pleasant duty to acknowledge this valuable technical assistance.

Physical Geography

Prince Albert National Park lies in the coniferous forest belt of central Saskatchewan a comparatively short distance north of the agricultural lands of the Great Plains. It is divided by the height of land between the North Saskatchewan and Churchill

River Basins. The Bluebell Divide, a short distance south of Waskesiu Lake, is part of this height of land. Most of the drainage, including that from all the larger lakes of the park, finds its way to the Churchill through Waskesiu and Montreal Rivers. The southern part of the park drains to the Saskatchewan through Sturgeon and Spruce Rivers.

The land is hilly on the whole, but localities only a short distance apart may vary widely in character. Hills and ridges in some places commonly rise from 50 to 100 feet. In many places, especially in the southern and southwestern parts of the park, local areas are gently rolling or nearly flat, as in places from Sugar Creek past Rabbit Creek to Amyot Lake. These nearly level tracts are largely open or semi-open, and expanses of genuine prairie occur (Figs. 1 and 2). Scattered, partly wooded farms adjoin the park along the south boundary and part of the west boundary.

Much the greater part of the park is wooded with poplar, spruce, birch, and Banksian pine (Figs. 3 to 8), but the forest is broken by hundreds of attractive glades and lush meadows. There are some fine stands of timber, especially in localities in the south. The forest tends to deteriorate in quality east of Waskesiu Lake and in the north, where there is an increased extent of muskeg, with its cover of slim black spruces, tamaracks, shrubs, and mosses (Fig. 4). The patches of good timber appear to extend farther north on the west side than on the east, owing largely to the type of topography found there. The localities that are low and boggy have a conspicuously poor and inadequate appearance.

The lake system of the park, which includes hundreds of bodies of water ranging in size from pools to fairly large lakes, is

a conspicuous feature of the topography. The largest and most important lakes are those found in the central part of the park at an average altitude of about 1,745 feet. These include Crean Lake, the largest body of water in the Park, and also Waskesiu and Kingsmere Lakes. These lakes are grouped close together and are easily reached from park headquarters on the east shore of Waskesiu Lake. The larger lakes are clear and deep (maximum depth, 165 feet) and have many excellent sandy beaches. Other interesting areas are Halkett, Namekus, Hanging Heart, and Lavallee Lakes. All but the last named are readily accessible by motor car. The presence of the lakes adds immeasurably to the attractiveness of the region as a resort.

Streams are also many, and range in size from tiny spring rivulets to fair-sized rivers. Waskesiu River, with a length of about 25 miles running from Waskesiu Lake to Montreal Lake and draining a large tract in the central part of the park, is the largest stream within the park. Crean Lake is drained by Crean River to Montreal Lake, about 13 miles distant. Sturgeon River, which forms a large part of the southwestern boundary of the Park is the longest river in the district. A locality particularly noted for its maze of creeks, potholes, and small lakes lies southwest of Waskesiu Lake at the headwaters of Spruce River and Bear-trap and Moose Creeks.

The waterways and lakes provide several excellent canoe routes, but some streams are too small for even the smallest canoes, and much of the wilderness can be penetrated only on foot.

Numerous bogs, potholes, lakes, sand and gravel ridges, and boulder clay deposits show that the region was once heavily glaciated. The character of the glacial deposits may be said to

determine the general character of the topography. Some localities, particularly in the south where fine stands of poplar occur, have a deep soil of black loam that is very fertile. In places, rich leaf humus covers the ground to some depth. Elsewhere the soil varies from clay loam to pure clay. Many rounded ridges are composed of sand or sand and gravel.

Surface boulder drift is not very common, though seen from time to time. The clay mantle, in some places, contains many stones that are most in evidence as an outwash product along the shores of lakes and streams. These consist of Precambrian and later sedimentary formations. The underlying bedrock is of Mesozoic age, referable, in approximately the southern half of the park, to the Foxhill and Pierre Formations, and in the northern half to the older Benton and Niobarra Formations. The southwestern edge of the Precambrian rock country of the Canadian Shield lies about 55 miles north of the north boundary of the park.

Climate

Owing to its location in mid-continent with a mean latitude of $53^{\circ} 56' N$, the park has a distinctly boreal climate with long cold winters and short warm summers. January, with a mean maximum temperature of 1° and a mean minimum of -20° , is the coldest month. February mean temperatures are only two or three degrees higher. December is the next coldest month with a mean maximum of 8° and minimum of -12° . The mean monthly temperatures of March and November are about 15° but March has a mean minimum about 10° degrees lower than November. Winter may be said to last five months - closer to five and a half months

in the northern, predominantly coniferous, part of the park. Snow fall is not excessive but a fairly large amount of snow usually accumulates in the bush by spring. The precipitation from October to March inclusive in inches of rainfall is about 5 inches out of a mean annual total of between 16 and 17 inches.

Spring normally commences about mid-April, but this may vary in different seasons by as much as 10 days or two weeks. April is usually thought of as the first month of spring and spring weather continues through May and the first half of June. Mean maximum and minimum temperatures for the spring months are as follows: April, 44° and 18°; May, 58° and 32°; June, 68° and 42°. The average precipitation for these months is approximately 4.8 inches.

Summer normally lasts from the middle of June to early September, less than three months. Some summers are shorter than others. Mean maximum and minimum temperatures for July and August are 74° and 46°, and 70° and 43°, respectively. The precipitation during these two months averages 4.2 inches. The total average rainfall from April to September inclusive is approximately 11 inches and the average length of the growing season, from average time of seeding to average time of first killing frost, is about 110 days.

Early autumn temperatures are ideal. Flies are absent at that time, and the blaze of autumn colour makes this season most agreeable. Mean maximum and minimum temperatures for September are about 60° and 35°, respectively, and for October 48° and 25°, respectively. October is very much like April in temperature but averages a little warmer.

Notes on the Flora

In most parts of the park that are forested, especially in the north, conifers predominate. White spruce (Picea glauca) is the most important conifer and reaches relatively large size - up to 2 feet in diameter and 100 feet in height in favourable localities. It occurs both in dense, pure stands and in association with poplar and birch. The best spruce grows near lakes and streams on well-drained ground. Another common conifer is the Banksian pine (Pinus Banksiana), found on dry sand plains and sand and gravel ridges (Fig. 8), **in tracks** not very extensive in relation to the whole area. The balsam fir (Abies balsamea) occurs throughout the region and is known to range sparingly as far north as Lake Athabasca but was nowhere commonly observed in the park.

The two poplars found in the park are the aspen poplar (Populus tremuloides) and the balsam poplar (P. balsamifera). The former is much the more abundant of the two and occurs in large areas both in pure stands and mixed with balsam poplar and white spruce. Balsam poplar is practically confined to somewhat moist valley land and is often found in distinct zonation along lakes and streams.

The white birch (Betula papyrifera) is widely distributed but is scarce or absent in rather large areas. Some fine stands of birch are seen in the valleys and on slopes with northern exposure.

Bogs and muskegs, ranging in size from a few square yards to thousands of acres, are a conspicuous feature of the country. They have a very characteristic flora. The most prominent species

is the black spruce (Picea mariana), which covers all of some muskeg areas and forms a belt of growth around most others. The tamarack (Larix laricina) is common in the muskegs but not always present. Other bog and muskeg species include Labrador tea (Ledum groenlandicum), various willows (Salix spp.), dwarf birch (Betula glandulosa), cloudberry (Rubus Chamaemorus), small cranberry (Vaccinium Oxycoccus), hummocky muskeg moss (Sphagnum capillaceum), cottongrass (Eriophorum sp.), and water sedge, (Carex aquatilis). Here and there on wet flats near lakes, ponds, and streams, large areas are almost exclusively occupied by willows, alders, grasses, and sedges.

Various species of shrubs abound in the better upland woods. The undergrowth is sometimes so dense as to be almost impenetrable, particularly on the borders of thick woods where the glaucous willow (Salix glauca) and the woodland alder (Alnus crispa) sometimes associate in thick belts. Other indigenous shrubs are wild rose (Rosa sp.), shrubby cinquefoil (Potentilla fruticosa), silverberry (Elaeagnus argentea), snowberry (Symphoricarpos albus), wolfberry (S. occidentalis), buffalo-berry (Shepherdia canadensis), red raspberry (Rubus sp.), goose-berry (Ribes sp.), red osier dogwood (Cornus sp.), highbush cranberry (Viburnum opulus), saskatoon (Amelanchier sp.), choke-cherry (Prunus virginiana), and pincherry (P. pensylvanica).

On dry hills and ridges and in pine woods the Canada blueberry (Vaccinium canadense) and the bearberry (Arctostaphylos Uva-ursi) are often locally common. In pine woods the woodland alder is sometimes the only shrub that does not form a trailing mat.

Various herbaceous and vascular flowering plants are

abundant in suitable localities and cause a succession of bloom and colour from early spring to late autumn.

There is comparatively little aquatic vegetation in the park. The larger lakes are generally unsuitable for such growth, being deep and cold and having beaches of sand and rubble. Many ponds and muskeg lakes are sterile for other reasons. Some bays have a good growth of subaquatic and emergent plants. The most common emergent plant is the round-stem bulrush, which is occasionally associated with cat-tail.

Faunal Life Zone

The park lies wholly within the zoogeographic division known as the Coniferous Forest Biome of the Canadian Life Zone. The aspen grove belt of the Transition Life Zone is 30 miles to the south, and the stunted woods of the Hudsonian Life Zone or sub-arctic forest 250 miles to the northeast. Being rather close to the Transition Life Zone, the park, as might be expected, contains some elements of that zone. Certain areas in the south part greatly resemble the aspen grove belt. This results in a good deal of overlapping of the ranges of animal species.

Species typical of the Canadian Life Zone are dominant throughout the district. In the northern three-quarters of the park, in the coniferous forest, the animal species belong almost exclusively to that zone. Among the mammals typical of the Canadian Life Zone that are found in the park are black bear, moose, lynx, Eastern Canada porcupine, northern interior chipmunk, water shrew, and Mackenzie white-footed mouse.

Where dilute Transition Life Zone conditions exist in

the southern part of the park and aspen poplar, prairie flowering plants, and campestral species of small shrubs such as the snowberry and silverberry are found, several small mammal species typical of the Transition Life Zone occur. These include Richardson's, northern thirteen-striped, and Franklin's ground squirrels; Richardson's pocket gopher; prairie jumping mouse; and possibly others.

Trapping Results

During the investigations an effort was made to identify as many as possible of the species of mammals that inhabit the park, and to secure an amply representative series of specimens of each of the smaller forms for subspecific determination. This was only partly accomplished, and it is not claimed or assumed that even a relatively complete knowledge of the park mammals has been obtained. The park is large and has a great variety of habitats, some of which could not be investigated. Seasonal changes and cyclic variations are many. There is an apparently erratic distribution of some forms in superficially similar environments. A very much longer time would be required to obtain complete solution of all the biological problems involved.

In comparing the status of small mammals, reliance, in many instances, was placed on the results obtained by trapping. These results were, however, regarded as being subject to error, because it was not always possible to run trap lines in habitats of comparable ecological character in succeeding seasons. It is well known, too, that relative abundance may vary greatly in similar habitats within a few miles of each other. On the whole,

however, the trapping method was regarded as the best method available for obtaining quantitative measurement data. Several apparent changes in abundance of small mammals in the different years were indicated; in some cases these increases or decreases were fairly large.

Trapping was carried on in the following years in the localities indicated:

1940-Spruce River, Lat. $53^{\circ} 45'$ N.

West Boundary, centering on Lat. $53^{\circ} 56'$ N.

1942-Sugar Creek and vicinity near the southern boundary

1943-On north and south shores and three islands of Crean Lake

1946-Namekus Lake

Moose Bay, Crean Lake

Northern Hanging Heart Lake

Bagwa and Amyot Lakes

The data obtained, in 1,975 trap nights during the four years of trapping, are presented in the following table. The data are restricted to smaller mammals normally taken with 'Museum Special' traps so that direct comparison of results may be made.

TABLE - TRAPPING DATA

Species	1940	1942	1943	1946	Total	Per cent of total catch
	540 trap- nights	300 trap- nights	350 trap- nights	785 trap- nights		
<i>Sorex c. cinereus</i>	1	3	1	8	13	4.82
<i>Sorex a. arcticus</i>				5	5	1.86
<i>Sorex obscurus soperi</i>	1				1	.37
<i>Sorex p. palustris</i>	1				1	.37
<i>Eutamias minimus borealis</i>	6	2	1	6	15	5.56
<i>Peromyscus maniculatus borealis</i>	10	55	37	19	121	44.79
<i>Synaptomys borealis smithii</i>	1				1	.37
<i>Phenacomys ungava soperi</i>		1			1	.37
<i>Clethrionomys gapperi loringi</i>	4	6	38	26	74	27.40
<i>Microtus pennsylvanicus drummondii</i>	11	2	5	7	25	9.27
<i>Zapus h. hudsonius</i>	5			7	12	4.45
<i>Zapus h. campestris</i>		1			1	.37
Total	40	70	82	78	270	100.00

Trapping on the three larger islands in the mid-section of southern Crean Lake in June, 1943, was carried on to ascertain the abundance of small mammal species on the islands as compared with the mainland. Only three species were secured on the islands. The results indicated that Peromyscus was 1,860 per cent more numerous on the island, Microtus 67 per cent more numerous, and Clethrionomys 62 per cent less numerous.

Annotated List of Mammals.

In sequence of species and nomenclature this list follows Dr. R.M. Anderson's "Catalogue of Recent Canadian Mammals, 1946". The trinomial system is used since the geographic forms of the larger mammals are well established and specimens of small mammals secured during the investigations were determined sub-specifically. The new material revealed the presence of geographical races not previously known or described. The number of forms named is 43.

1. Common Cinereus Shrew. Sorex cinereus cinereus Kerr.

This shrew was evidently rather rare in the park as only very indifferent results were obtained in trapping for it, although trapping was carried on in each year and in all likely biotic areas in various parts of the park. Indicating its apparent scarcity, only 13 were obtained in 1,975 trap-nights at Sugar Creek and Namekus, Crean, Hanging Heart, and Bagwa Lakes. Average measurements, with minima in parenthesis, of those preserved were: length (L.) 94.7 (92-98), tail (T.) 36.7 (33-39), hind foot (H.F.) 11.6 (11-12) mm.; weight (W.) 3.4 (3.3 - 3.6) grams. The habitat occupied varied from typical muskeg and stream border to moderately high, dry forest.

2. American Saddle-backed Shrew. Sorex arcticus arcticus Kerr.

Despite persistent collecting in characteristic haunts, not one of this species was trapped during the first three seasons spent in the park. In 1940 one was found badly mangled on the main highway near a swamp west of Trappers Lake. During June, 1946, five specimens were collected at Crean and Amyot Lakes - the only ones secured in a total of 1,975 trap-nights (785 trap-nights in 1946). The measurements of these were L. 118.4 (114-122); T. 40.2 (38-43), H.F. 14 (13.3-14.5) mm.; W. 9.1 (7.5-10.6) grams.

These shrews resort to ordinary marshy ground along the margins of lakes and streams that is grown to tangled grasses, spikerush and willows. They are also found occasionally in bulrush and cat-tail fringes along lake shores where the water has subsided; two were taken in this kind of habitat on an island in Amyot Lake. A number were found to inhabit mossy muskeg areas on the mainland in association with Sorex cinereus and Synaptomys borealis.

3. Prairie Dusky Shrew. Sorex obscurus soperi Anderson and Rand.

A single specimen of this shrew, a female measuring L. 108, T. 44, H.F. 12 mm., was taken on July 9, 1940, in moist willow-alder-poplar woods on the bank of Spruce River southwest of Trappers Lake. The collection of the species in that place was unexpected, as it was the first record for central Saskatchewan, including the park. Dr. R.M. Anderson, upon determining this specimen, remarked, in part, as follows: "Another find which surprised me, still more, was to recognize your specimen No. 4207 as the Dusky Shrew, Sorex obscurus Merriam. Hitherto, the most eastern record of this species in Canada

consists of a series collected by C.H. Young in Cypress Hills, and there are very few other records east of the Rocky Mountains Mountains" The rarity of this shrew in the park is shown by the fact that it was not again taken despite extensive trapping in 1942, 1943, and 1946.

4. American Water Shrew. Sorex palustris palustris Richardson.

The water shrew is obviously scarce in the park, since but one example has been taken there, a male measuring L. 151, T. 63, H.F. 19 mm. It was trapped on July 18, 1940, just within the western boundary, on the margin of a small, rapid brook that empties into Nesslin Lake. The apparent rarity of the animal in this region is surprising as an environment with so many streams and lakes would seem to be ideal for it.

5. Little Brown Bat. Myotis lucifugus lucifugus (LeConte).

Four specimens of this bat were secured from the attic of a government building at Waskesiu on July 14, 1951. All were females. The average measurements were L. 102.5, T. 41.0, H.F. 12.7, ear, 16.1, tragus, 8.9 mm. Others were noted in flight in the same locality during August, 1942, but the species was not seen in any other part of the park. No other species of bat was seen during the investigations, although the park comes within the probable or known geographical range of Eptesicus fuscus, Lasiurus borealis and Lasiurus cinereus.

6. American Black Bear. Euarctos americanus americanus Pallas.

This species was well distributed in the high, dry forest of the park, but, on the whole, appeared to shun the meadows. However, bears were seen occasionally in grassland-willow tracts in the vicinity of lakes and streams. It was found to be common in the northern Spruce River Valley, where several

bears and much sign were observed. A good many bear signs were noted in travelling from Waskesiu via Kingsmere and Sanctuary Lakes to Lavallee Lake, and a fair number were observed in the mixed woods along the western boundary of the park north to about latitude $53^{\circ} 56'$ N. Several bear signs and many fresh tracks were observed at Crean Lake. At Namekus, Bagwa, Lily, and Hanging Heart Lakes bear signs were infrequent. Nothing was seen of the species at Amyot Lake, but one pair was seen along the south park road near Rabbit Creek.

The species was said by the wardens to be fairly common in some northern localities, but apparently the population generally was not as large as in some more southern areas. From reports of the district wardens, it appeared that there might be more than 1,000 bears in the park. Average abundance appeared to vary from one per two square miles up to four or five times as much. Some areas were very attractive to the species, but other areas were very sparsely populated.

During the summer of 1939, park wardens captured more than 30 bears by means of live-traps within Waskesiu townsite and in that vicinity as the animals had become numerous enough to be a nuisance to tourists. The bears were taken in box-traps, loaded on a motor truck, transported to a distant part of the wilderness, and released. Many more were removed in the same manner during 1940 and succeeding seasons.

7. Northern Plains Red Fox. Vulpes fulva regalis Merriam.

At normal population levels this species is common and widely dispersed throughout the region. In 1940 foxes were definitely increasing in number. This was proved by the number

seen by park personnel or heard barking, and by the number of tracks noted on lake shores and dusty trails. By the winter of 1942-43, the population had greatly expanded; it would appear that the peak of the cycle was reached about this time. It was reported that in areas where varying hares had previously been plentiful the foxes had practically exterminated them.

Shortly afterward foxes began to decline in number and in the summer of 1946 there were few in the park. During that season none was seen and fox sign was much less frequent than in 1942 and 1943. On the basis of available data, it would appear that the species is more numerous in the south part of the park than in the north.

8. Northern Coyote. Canis latrans latrans Say.

The coyote, or "brush wolf", inhabited all districts in the park, but apparently was nowhere actually abundant. In favourable localities it was by no means uncommon and it may be regarded as one of the most characteristic species of the territory. On many occasions coyote **tracks** in dusty and sandy places were noted, and coyotes were heard howling in several localities both by day and by night. This happened in the Spruce River locality and the prairie-woodlands in the south part of the park oftener than elsewhere.

The warden service, in 1940, estimated about 300 coyotes in the park, or about one coyote to each six square miles. Investigations after that time showed that the number of coyotes had remained relatively static.

9. Saskatchewan Timber Wolf. Canis lupus knightii Anderson.

These animals range in considerable numbers over most of the park and the surrounding country, particularly northward. It

was well known that they favoured the northern forest part of the park much more than the mixed forest-prairie of the south.

In the boreal forest region of northern Saskatchewan, timber wolves began to increase in number perceptibly about 1925. A moderate but consistent upward trend in the population was evident until about 1948, or during 23 years. This increase was not apparent in the park until the late thirties and early forties. During those years the wardens consistently reported an increasing number. In several parts of the park timber wolves became common by 1941, particularly in the vicinity of Crean and Kingsmere Lakes and in some northern areas. Control measures were carried out in the winter of 1941-42 and during several succeeding winters. During this period the wolves in the park seemed to be materially reduced in number and brought into better balance with the resident game species. During the same period timber wolves continued to increase in the region as a whole.

10. Fisher. Martes pennanti columbiana Goldman.

This species was a regular inhabitant of the park many years ago but appeared to have been almost exterminated before the establishment of the park, which would have given it protection. For many years none of the wardens included the fisher in their game reports and it seemed fairly conclusive that it no longer occurred in the park. Finally a record was established, when Warden H. Harrison, during the winter of 1945-46, came upon a fisher trail at the second lake north of Crean Lake along the trail to Tibiska Lake. This was the only fisher sign observed in the park for a long period of time. The species is, therefore, represented only by casual wanderers and is undoubtedly very rare.

The form M.p. columbiana has been assigned to this region, and westward into the Rocky Mountains, but it comes within a zone of intergradation and is non-typical. Specimens examined from east of the Rocky Mountains apparently show a gradual approach to M.p. pennanti about as far east as eastern Saskatchewan, and western Manitoba.

11. Richardson's Weasel. Mustela erminea richardsoni Bonaparte.

This is the race of weasels that commonly ranges throughout this region. It varies periodically in numbers, being abundant or at least common at the peak of its cycle and much scarcer at the extreme low. The cycle appears to cover a period of about five years, and to coincide with the fluctuations of populations of mice and voles.

Apparently a peak in the cycle in this region was reached between 1938 and 1940. At that time the wardens reported large numbers of weasels and an uncommonly large number were seen in the park during the summer of 1940. None were seen during the investigations of 1942 and 1943. If the peak of the cycle was reached between 1938 and 1940 the next peak should have occurred between 1943 and 1945, during which period trap-line data suggested a relatively high population among the small mammals, particularly Clethrionomys and Peromyscus.

Several specimens were taken in the park for subspecific determination. Their measurements were: L. 317.5 (293-342), T. 96.0 (86-106), H.F. 40.7 (40-41.5) mm. These specimens were captured in or along the margins of black spruce muskegs. In this region and elsewhere in the Canadian Northwest it has often been noted that richardsoni shows a distinct preference for swampy environment, during the summer months at least.

12. Hudson Bay Mink. Mustela vison lacustris (Preble).

Mink are found in fair numbers in the park. Only a few were actually seen, but their tracks were often noted in the muddy margins of creeks and rivers and at Waskesiu, Hanging Heart, Crean, Kingsmere, Lily, and Bagwa Lakes. In the extreme southern part of the park they inhabited Sturgeon River and Sugar and Rabbit Creeks, but there were fewer than in the central and northern parts. In some districts in the north and centre, such as Crean Lake, the species was locally common to abundant. According to the wardens, even some of the islands of this lake are frequented by mink. Almost all the park, with its many lakes and streams, is as nearly ideal for mink as anywhere in Northwest Canada.

13. Mackenzie Otter. Lutra canadensis preblei Goldman.

No signs of otters were observed by the author and they would seem, from all accounts, to have been scarce everywhere in the park. No doubt the species was almost extirpated in this region before the park was established in 1927. Despite more than 20 years of protection, the species had not recovered very much. During the first 10 or 12 years of park administration only a few widely-scattered examples were noted. In the wardens' reports for 1939-40, five otters were recorded -- two each in the Crean and Kingsmere Lakes areas, and one in the district to the southwest containing Rabbit Creek, Sturgeon River and Amyot Lake. Subsequent observations seem to indicate that the species is holding its own or slightly increasing in numbers. In addition to these districts of known occupation, unmistakable signs of an otter were seen at Beartrap Lake, southwest of Waskesiu, in the early winter of 1942-43. From the

information available, it appeared that the entire park population did not exceed 10 or 12 pairs.

14. Northern Plains Skunk. Mephitis mephitis hudsonica
(Richardson).

The investigations and the wardens' reports both indicated that this species was common in the mixed forest and prairielands in the southern part of the park. In northern areas the species was conspicuously less numerous clearly because of the lack of open country, the relatively smaller amount of upland with semi-open forest, and the greater abundance of swamps and muskegs. Nevertheless, the species was widely distributed and might be said to be numerous in favourable areas. The exact type locality of this subspecies is not definitely known, but it is usually regarded as being near Carlton House, about 50 miles south of the park.

15. American Badger. Taxidea taxus taxus (Schreber).

All but the southern extremity of the park is beyond the badger's northward range in central Saskatchewan. Even there it is uncommon and was not seen by the author. The park records are founded upon the observations of Wardens Millard and Schermerhorn, both of whom had seen the animals in the broken prairie country between Sugar Creek and Amyot Lake. Until comparatively recent years it was not suspected that the species ranged so far north. Possibly it did not do so before the settlement and clearing of the land immediately south of the park, when it gradually moved northward.

16. Canada Lynx. Lynx canadensis canadensis Kerr.

Without question, this was one of the rarest mammals at the time of the first investigations in the park in 1940.

The only member of the park staff who had listed the species in the game reports of the preceding year was Warden Millard, who recorded a single individual. It was not clear whether the scarcity of the lynx was due to near extirpation before the establishment of the park or to a natural decline which was part of a periodic cycle of abundance.

In any event, the population did not recover to any great extent during the years succeeding establishment. Only a few widely-scattered signs of the species were noted during the thirties and early forties, and thereafter they apparently became even rarer. By the winter of 1945-46 the lynx was said to have become so scarce, perhaps as a result of an abrupt decline in the varying hare population, that lynx sign was very rare indeed. Warden Schermerhorn stated that during the winter of 1945-46 he saw but one lynx trail while patrolling in the Crean Lake district. Warden Harrison, of Kingsmere Lake, saw none. This indicates the scarcity of the species at that time -- a condition general in the whole region.

17. White-tailed Jack Rabbit. Lepus townsendii campanius
Hollister.

On August 24, 1942, an adult was flushed on the large isolated patch of prairie immediately east of the upper part of Sugar Creek. This was the first official record of the species within the park. Subsequently, Warden Millard stated that he had several times seen individuals on the scattered prairies between Sugar and Rabbit Creeks. This minor invasion of the park's southern extremity was clearly recent, and was doubtless induced by the clearing of agricultural lands just south of the park. The species was not recorded elsewhere in the park until

April, 1945, when Wardens Davis and Schermerhorn saw a large adult running on the ice of Waskesiu Lake. This may be regarded as most unusual in view of the heavily forested country lying between Waskesiu Lake and the nearest prairie, about 24 miles south-southwest.

18. American Varying Hare. Lepus americanus americanus
Erxleben.

In 1940, the varying hare, or snowshoe rabbit, as it is commonly called, inhabited the greater part of the park in fair abundance. Numerous adults were seen in the forest, and half-grown young were also noted frequently. Well-worn trails in muskegs and elsewhere were common almost everywhere, clearly indicating a large population. From available information, it appeared that the species had been steadily increasing in number since 1937 or 1938.

During investigations in the southern end of the park in August, 1942, the species was still common, even abundant in some places. It appeared that it had then reached maximum numbers in its periodic cycle of abundance, as detailed investigations in the Crean Lake district in the following summer showed conclusively that a crash decline had occurred during the preceding winter. Where formerly thousands were present, now many days were spent on active field work without seeing any.

The situation was similar in 1946. Throughout the whole month of June, spent in many widely-separated localities in the park, only one was observed. The species was now so phenomenally rare that it seemed impossible for it to become any scarcer without becoming extinct.

19. Canada Woodchuck. Marmota monax canadensis (Erxleben).

In mid-summer, 1940, the woodchuck was fairly common in several localities. The largest number was noted in the upper Spruce River Valley and adjacent country, along Cowan Creek, and north to Beartrap Lake. Numerous burrows and woodchucks were seen and one specimen was collected, on July 6, measuring L.530, T.118, H.F. 76 mm. This big animal had a thick layer of fat and weighed 6.25 pounds. The wardens reported the species to be tolerably common in many localities. It was stated that more had been seen during that season than ever before in this region, a condition evidently prevalent in all the country occupied by woodchucks from southeastern Manitoba to at least central Alberta.

In 1942 and 1943 the animals appeared to be as numerous as in 1940. Many were seen in the extreme south and near Namekus and Halkett Lakes. Burrows assumed to belong to this species were also noted between the south Gate House and Rabbit Creek, and, more frequently, in the valley of Sugar Creek, where open, grass-covered slopes are common. Wide-spread observations made it clear that woodchucks were more commonly distributed in the southern prairie-parklands country than in the heavily timbered northern districts.

In the course of the investigations during June, 1946, no woodchucks were actually seen near Crean, Kingsmere, Bagwa, or Lily Lakes, but the species is known to range at least sparingly in that country and farther north. It is said to be fairly plentiful in the vicinity of Waskesiu Lake. Again considerable numbers were noted in the south, in the Sugar and Rabbit Creeks area, and also in the neighbourhood of Fox Creek,

Sturgeon River and Amyot Lake.

20. Richardson's Ground Squirrel. Citellus richardsonii
richardsonii (Sabine)

The most northerly colony of these ground squirrels in this part of Saskatchewan that was known to the author before the investigations inhabited a little patch of prairie at the southeast end of Christopher Lake, 24 miles north of Prince Albert. It was soon learned that they existed much farther north when Warden Hubel stated that he had seen several at the Clare Creek bridge and one near Beartrap Cabin. None was noted by the author anywhere in the eastern part of the park. Later, they were commonly seen on the prairies east and west of Rabbit Creek, near the southern boundary. They were also locally plentiful on the grassland slopes of the Sturgeon River Valley in Townships 54 and 55, Range 5. Warden Jervis stated that the northernmost ground squirrels of this species along the western boundary that he knew of occupied a small prairie approximately in the northwest corner of Township 56, Range 5, northwest of Kiyam Lake.

In 1942 it was discovered that a particularly favourite environment was the grassy slopes of Sugar Creek. Scores were seen there and on the adjacent prairies on every fine day, and many were also seen on the isolated grassy upland northeast of Sugar Creek. In 1943, Warden Schermerhorn reported that, two summers before, he had seen one of these ground squirrels in his garden at the warden cabin at the southwestern extremity of Crean Lake. He had not previously seen one anywhere in the district, where he had served for many years. This record is extraordinary, as the nearest point where the species occurs in any numbers is

on the scattered prairie tracts in the southern part of the park, about 29 miles southward across forested country.

In June, 1946, additional data on the local distribution of richardsonii in the southern section of the park were secured. Small, scattered colonies were noted west of Fox Creek and many smaller groups and individuals were seen along the west side of Amyot Lake. There they inhabited grassy tracts and semi-open poplar-willow areas along the lake shore. It is very unusual to find this species in actual wooded country. Many others were seen in open grasslands west of the lake, northwest to Sturgeon River and along that stream. On Amyot Lake, one was overtaken swimming about 200 yards from shore. Judging by the direction it was taking, it intended to cross the lake near the north end. This was the first time the author had ever observed one of these ground squirrels voluntarily swimming in a lake or a stream. The type locality of richardsonii is Carlton House, 50 miles south of the park and 38 miles southwest of Prince Albert.

21. Northern Thirteen-Striped Ground Squirrel. Citellus tridecemlineatus hoodii (Sabine).

This is a new form for central Saskatchewan, or at least the revival of an old name from Sabine, 1822, which the research work of 1940 shows has application to material taken in Prince Albert National Park. After examining several specimens from Spruce River, Dr. R. M. Anderson referred them to hoodii with the comment, "Howell in his 1938 monograph put hoodii in synonymy, but I do not think that the specimens he listed are sufficient to prove that point, and I am satisfied that I have examined enough specimens to show that hoodii is a

recognizable form."

In the vicinity of the camp at Spruce River, $2\frac{1}{2}$ miles southwest of Trappers Lake, these ground squirrels were quite numerous in the grassy openings throughout the woods. They had overrun the clearing about the old buildings of an abandoned construction camp. They were also found in glades in the forest far from any other grasslands. Such groups, of course, were completely isolated. Subsequent investigations in 1942 and 1946 showed that hoodii occurred locally over most of the extreme southern part of the park from the Sturgeon River Valley east to Bell Lake and north along Spruce River to Waskesiu Lake and the south shore of Crean Lake. North of Beartrap Lake, however, the species was very uncommon.

In the southern prairie the animals were observed in several localities, but they were much scarcer than expected in view of the numbers previously found along the upper part of Spruce River. Discussions with several wardens showed that they inhabited other southern localities and that along the western boundary their northern limit of distribution was approximately latitude $53^{\circ} 56'$ N.

A series of four adult specimens was collected at Namekus Lake and along Spruce River southwest of Trappers Lake. Average measurements of these were: L.283.7 (270-292), T.100 (92-106), H.F. 38.7 (38.5-39) mm. Two immatures taken in early July averaged L. 211.5, T.73.5, H.F. 35.5 mm. An adult female collected at Namekus Lake on June 6, 1946, weighed 170 grams. Hoodii is noticeably richer and darker in colour than the type race, which inhabits the Prairie Provinces far to the south. The type locality of hoodii is the same as for richardsonii (No.20).

22. Franklin's Ground Squirrel. Citellus franklinii (Sabine).

This species occurs sparingly in the eastern part of the park as far north as Hanging Heart Lake and Waskesiu. One was seen eating lettuce in a garden at Waskesiu in the spring of 1940. At upper Spruce River the author saw only two, both, surprisingly enough, in a small area of black spruce muskeg. The first was seen there on July 9, when it was caught in a trap set for weasels. It measured L. 362, T. 131, H.F. 55 mm. One was seen crossing the trail near Beartrap Lake and one or two others were noted under similar circumstances between Trappers Lake and the southeast entrance to the park.

In 1942 the species was found in some localities in the southern part of the park and along the west boundary to about the latitude of Nesslin Lake. Its distribution was notably inconsistent, however, and in many favourable localities it appeared to be absent. Obviously it was thinly distributed even in the south and in places that seemed well suited to it.

On June 10, 1946, one of these ground squirrels was observed for several minutes along the west shore of Bagwa Lake. This was the northernmost record obtained within the park. During the investigations at Waskesiu, Hanging Heart, Crean, Kingsmere, and Lily Lakes, this was the only one found, indicating that the species was extremely rare that far north.

A considerable number were observed along Spruce River and several were seen and heard calling at Halkett Lake. They were found to be fairly numerous at Amyot Lake, particularly along the west-central shore. Others were observed in poplar woods near the several tracts of open grasslands in the vicinity. Scattered individuals were seen in the forest-prairie country between Amyot

Lake and the Gate House, south of Halkett Lake. The type locality of the species, as for several other Saskatchewan species of mammals, is Carlton House.

23. Northern Interior Chipmunk. Eutamias minimus borealis (Allen).

This attractive little mammal was moderately common in suitable areas throughout the park. Its favourite habitat is sunny aspen woodland or spruce-poplar forest on well drained ground. Many chipmunks were also found in poplar-pine woods. It was well dispersed in the park but its distribution in some districts was very irregular. It was found abundant in favourable situations from the southeastern entrance westward to Amyot Lake and dozens were seen around Sugar Creek and elsewhere in the south where the combination of prairie and poplar-spruce forest seemed to be especially attractive. It was also common locally northward to Namekus and Waskesiu Lakes.

On the other hand it was notably scarce in the Crean Lake district (except in the southern part) and at Lily, Bagwa, and Kingsmere Lakes. This was puzzling, because many parts of these localities differed little from other places in the park where the species was plentiful and uniformly distributed.

The average measurements of six specimens were as follows: L. 205.4 (187-218), T. 92.8 (86-102), H.F. 31.1 (30-32) mm.; W. 43.3 (36.5-50.1) grams.

24. Mackenzie Red Squirrel. Tamiasciurus hudsonicus preblei Howell.

This species is common and almost universally distributed throughout the park wherever the environment is suited to it, but its local abundance varies because of varying topography

and vegetation. It was found plentiful in many localities and was much more numerous in the park than outside of it. A few individuals were noticed in pure aspen poplar woods, but the centres of greatest abundance were invariably stands where white spruce predominated.

A series of specimens taken for determination of sub-specific identity conformed well to the type characteristics of the race, but approached intergradation with T.h. hudsonicus, whose known range lies in central and northern Manitoba and eastward. Intergrading may be expected in east-central and northeastern Saskatchewan. Average measurements of adult specimens taken in the park were: L. 320.5 (318-323), T.121.7 (118-125), H.F. 49.3 (48-50) mm.; W. 235.3 (220-260) grams.

25. Hudson Bay Flying Squirrel. Glaucomys sabrinus sabrinus (Shaw).

As usual, information about this species was difficult to secure. Flying squirrels are often captured by northern trappers in traps set for other fur-bearers and are regarded as worthless and thrown away, but they are not easily **taken in traps** by naturalists during summer. Months may be spent in country inhabited by many flying squirrels without seeing any. None was seen or taken during the investigations in the park although much trapping for it was done.

Nevertheless, the park is well within the known range of the species and the wardens infrequently report its occurrence there. Warden Millard informed me that in August, 1942, he saw one about 12 miles north of the Rabbit Creek cabin. Warden Schermerhorn stated that he had noted several in the Crean Lake district and he believed that the animals were not uncommon

in some parts of the park. During the summer of 1945 Warden Harrison captured one in a storehouse at Kingsmere Lake.

Because of its secretive and nocturnal habits, this species may seem to be extremely rare even when it is actually present in moderate abundance.

26. Richardson's Pocket Gopher. Thomomys talpoides talpoides (Richardson).

No sign of these animals was observed during the 1940 investigations. In 1942, 1943, and 1946, however, the species was found to be commonly distributed in detached prairie tracts and old beaver meadows from northwest of Palsen Lake west to Rabbit Creek. Some evidence indicated that they had spread into the park along the southern boundary and had become much more common during the previous few years. It is more than probable that opening up of farmlands just south of the park led to the extension of their range to the north. In parts of Sugar Creek Valley, and in a few small tracts elsewhere, the number of pocket gopher workings compared favourably with that in many well-populated areas in the true aspen poplar parklands.

Average measurements of adult specimens were: L. 218.8 (211-236), T. 63.6 (58-75), H.F. 28.8 (28-31) mm.; W. 118.8 (110.1-137.2) grams. An immature female accidentally captured in a "Museum Special" mouse trap at Sugar Creek on August 21, 1942, measured L. 176, T. 48, H.F. 25 mm.; W. 98 grams.

27. Canada Beaver. Castor canadensis canadensis Kuhl.

The beaver is one of the mammals most characteristic of the park. It was distributed more or less uniformly, although variation of environment naturally caused differences in its

numerical status from one locality to another. It had long been a common member of the park fauna and of late years it was said to have increased steadily in numbers in the more attractive situations. It can truly be said that in many areas the species had become very abundant.

Shore-trails, tree-cutting, lodges, and food piles were familiar sights and the beavers themselves were often seen. Beaver activities are not confined to hours of darkness in this wilderness and under suitable circumstances they were commonly seen during the day. There were excellent opportunities to observe them while canoeing in the evening in waters inhabited by them.

28. Mackenzie White-footed Mouse. Peromyscus maniculatus borealis (Mearns).

Night trapping results revealed that white-footed mice were very scarce in 1940. During 450 trap-nights in the central part of the park only 10 were taken. Ordinarily they are very numerous in nearly all types of habitat in the district, and 30 per cent to 40 per cent of the traps may have mice in them each morning.

In 1942 the results of trapping in the southern part of the park indicated a great increase in number during the intervening two years. The population was apparently eight times greater than in 1940, 55 being taken in 300 trap-nights. Most of the trapping was done in the neighborhood of Sugar Creek. Here the mice frequented every type of habitat available, individuals being taken in spruce-tamarack swamps, grass and willow lowlands, under shrubs and bunchgrass on isolated prairies, in heavy spruce-poplar woods along the creek, and in aspen woods on the uplands.

By June 1, 1943, a marked decrease in numbers had evidently occurred. On the mainland about Crean and Hanging Heart Lakes, only eight white-footed mice were secured in 295 trap-nights, the animals being notably scarcer about the north end of the lake than farther south. During the same period, however, an entirely different situation existed on the three islands in the southern part of Crean Lake where the animals were abundant and 28 were taken in 50 trap-nights. Apparently they were more than eight times as numerous on the islands as on the mainland.

In June, 1946, it was evident that a further marked decrease in numbers had taken place, for only 19 mice were captured in 785 trap-nights. At that time the numerical status seemed to be about the same as in 1940. The animals were so rare in some localities that not one was taken. Despite this the total results of the investigations revealed Peromyscus to be **by far** the most common small mammal in the park.

Average measurements of the 10 adult specimens preserved were as follows: L. 169.2 (158-190), T. 74.1 (68-89), H.F. 20.2 (19-21.5) mm.; W. 21.2 (18.5-25.7) grams.

29. Manitoba Lemming Mouse. Synaptomys borealis smithii
Anderson and Rand.

This mouse is evidently very scarce in the park. During the investigations from 1940 to 1946 numerous traps were set in many localities in bog habitat of the kind that it typically frequents, but only one of the species was caught -- in a black spruce-sphagnum swamp at the west boundary east of Nesslin Lake on July 16, 1940. In a few instances old runways apparently made by these mice and droppings, probably of the

previous winter, were noted, but the mice seemed to have disappeared. Considering the known geographical distribution of the species, it might be expected to occur throughout the park in the many bogs of favourable type. The control factor limiting the abundance of the species in the park is not known. It is possible that the species is subject to periodic cycles of abundance.

The single specimen taken was a male measuring L. 118, T. 23, H.F. 17 mm.

30. Prairie Phenacomys. Phenacomys ungava soperi Anderson.

An important event during the investigations at Sugar Creek in 1942 was the capture of a phenacomys -- the first record for Prince Albert National Park. This specimen was an immature female measuring L. 113, T. 26, H.F. 17 mm.; W. 14.4 grams. It was trapped on August 24 in poplar woods about 70 feet above the water level of Sugar Creek in which there was an abundance of underbrush, rotting logs, and other litter. The species is clearly very scarce in the park, as in 1,975 trap-nights only that one specimen was captured. The nearest previous record was established by A.W.F. Banfield, who in June, 1939, took five specimens at Emma Lake, a few miles east of the park, in about the same latitude as Sugar Creek. Dr. R.M. Anderson described this new subspecies in the Canadian Field-Naturalist, Vol. LVI, No. 4, April, 1942, pp. 58-59, basing it on the type specimen taken by the author on Riding Mountain on June 5, 1941.

31. Plains Red-backed Mouse. Clethrionomys gapperi loringsi (Bailey).

During July, 1940, only four specimens of this mouse were taken in 450 trap-nights. During the Sugar Creek operations

of 1942, six were captured in 300 trap-nights. This result may indicate a perceptible increase during the intervening two years, although the areas trapped were not identical.

In 1943 these mice were found relatively common at the north end of Crean Lake in spruce-poplar-pine woods on dry ground, as well as in black spruce-Labrador tea associations along the margins of higher and dryer forested areas. In this locality 30 were taken in 250 trap-nights, a rate of capture six times as great as in the Sugar Creek area in the previous year. This nearly coincided with the maximum abundance of white-footed mice, which, according to trapping results, was reached in 1942. The two species had about the same relative abundance in 1943 as in 1942.

Unlike Peromyscus, the red-backed mouse was found in 1943 to be much more numerous on the mainland than on islands in Crean Lake. On the three islands trapped, only two were taken in 50 trap-nights, whereas in 45 traps set between Crean and Hanging Heart Lakes, six were secured in a single night.

In 1946, as compared with 1943, the trapping results indicated a decrease of about 68 per cent in the population. Only 26 were captured in 785 trap-nights. Specimens were taken in all areas investigated but one, this being at the south end of Crean Lake. The trapping yield varied greatly from one part of the territory to another in similar environment. The total results indicated that the species was the second most abundant of the **small** mammals, being exceeded in **number** only by Peromyscus.

The **average** measurements of the large series of adult specimens taken were: L. 137.3 (135-141), T. 37.5 (34-39), H.F. 18.2 (17.5-19.5) mm.; W. 22.7 (19.9-27.6) grams. Two

immatures taken at Sugar Creek in late August, 1942, weighed 15.3 and 16.1 grams, respectively. On the whole, the colour characteristics of specimens taken in the park agreed well with those of typical specimens of the same species collected on the plains of southern Saskatchewan and Manitoba. A few specimens from Spruce River and Crean Lake, however, showed an unmistakable approach to the geographical race, C. g. athabascae Preble.

32. Drummond's Meadow Mouse. Microtus pennsylvanicus drummondii (Audubon and Bachman).

In 1940 this normally familiar and common mouse occurred in only moderate numbers, but it was apparently more numerous at that time than either Clethrionomys or Peromyscus. More often than not the opposite is the case. In 1942 the meadow mouse was exceedingly scarce, whereas Clethrionomys had somewhat passed it in abundance and Peromyscus had far outstripped it. Drummondii continued very scarce in 1943 and 1946, although some recovery was indicated in the latter year. In all the investigations only 25 were secured in a total of 1,975 trap-nights. Nevertheless, it apparently ranked as the third commonest small mammal.

As its name implies, this mouse chiefly inhabits lowland meadow tracts with lush cover of grass and sedge. This is particularly true in the northern coniferous forest. On a number of occasions, however, it was captured on upland areas grown to mixed forest, where its runways extended beside decaying logs and through moss, humus, stands of low herbaceous plants, and other matter common to northland woods. It was especially attracted to old beaver meadows, grassy terminals of old beaver dams, and the grass-sedge margins of marshy lakes. In the southern part of the park it inhabited some upland prairies similar to those occupied by it on

the treeless plains.

Data in connection with a rather extensive series of specimens, many of which were not preserved, was secured. Average measurements of adults and subadults were: L. 151.6 (136-160), T. 42.3 (37-45), H.F. 18.7 (18-20) mm.; W. 33.3 (31.7-41.1) grams. The heaviest specimen recorded was a female captured in late August, that weighed 41.1 grams and contained four embryos each 12 millimetres in length.

There is a marked variation in the colour pattern of the pelage as seen in a good series of this species. Most specimens conform to an average, or "typical", coloration, but a few diverge from it with very much more yellow on the sides of the nose and deeper buff on the underparts. It is perhaps not significant that a specimen taken on an island in Crean Lake was more strongly marked in this respect than any other collected in the park.

33. Hudson Bay Muskrat. Ondatra zibethica alba (Sabine).

The wardens' reports show that there are many thousands of muskrats in the park, that they are well dispersed, and that they are fairly abundant in waters with subaquatic and emergent vegetation in sufficient quantities. Although there is an abundance of streams and lakes, many of them lack suitable conditions and in such waters there are few or no muskrats.

This was confirmed by the investigations. Muskrats or their sign were noted in some parts of nearly all the localities investigated. The quality of the habitat was a decisive factor everywhere. Thus, muskrats existed in very fair numbers in areas with attractive marsh conditions, such as the northwestern part of Namekus Lake, Hanging Heart Lake, Moose Bay, Crean Lake, the

bulrush-waterlily narrows at Bagwa and Lily Lakes, and the chain of small waters north of Kingsmere Lake to Lavallee Lake, including parts of that lake.

Many were also found in sluggish streams throughout the area, including Sturgeon and Spruce Rivers, Rabbit, Sugar, Cowan, and Beartrap Creeks, and creeks emptying into Waskesiu and Crean Lakes. A male collected in Crean Lake on June 11, 1946, measured L. 555, T. 264, H.F. 70 mm.; and weighed 2.12 pounds. The type locality of O. z. alba is Cumberland House, approximately 130 miles east of the park.

34. House Rat. Rattus norvegicus (Erxleben).

During the summer of 1940, Superintendent H. Knight stated that the first record of this species in the park had been obtained three years before. At that time one was killed in a warehouse at Waskesiu. A rat taken in 1939 in the same locality was sent to Dr. R.M. Anderson of the National Museum, as the basis of another northwestern record of occurrence. It was suspected that the species originally reached the park in truck-loads of merchandise. As yet, it is not very common nor is it as widely distributed in Saskatchewan as it is in much of southern Manitoba, but inevitably its western trend will lead to greater abundance and more universal occurrence.

35. Hudson Bay Jumping Mouse. Zapus hudsonius hudsonius (Zimmermann).

The results of trapping indicated that these jumping mice were far from common in the park. They may be somewhat more numerous in places than appeared from the data, but it was evident that distribution was spotty and uneven. The trapping data also suggested that there were more of them in choice southern localities

than in the dense coniferous forest and muskeg areas in the north. During all operations, 12 were taken in 1,975 trap-nights. On this basis, the species was sixth in order of abundance among the small mammals of the park.

In 1940, five were captured along Spruce River, southwest of Trappers Lake. During the investigations of 1942 and 1943 not one was taken, a fact that indicates reduction in the population. In June, 1946, however, the trap-night catch was very nearly the same as in 1940, seven in all being taken at Moose Bay, Crean Lake, and at Amyot and Namekus Lakes, all but three in the latter locality. This was not far from where the largest number was taken in the summer of 1940.

Average measurements and weight of the park specimens were: L. 213 (205-224), T. 129 (119-133), H.F. 30.3 (29-31) mm.; W. 16.9 (14.7-19.3) grams. On the whole, external characters of specimens from the park clearly show them to be referable to Z.h. hudsonius as most of them are quite indistinguishable from specimens of that race taken in central and northern Alberta. They are somewhat duller in colour than specimens from the mixed forest of south-eastern Manitoba; the latter, nevertheless, are much nearer to typical hudsonius than to campestris.

36. Prairie Jumping Mouse. Zapus hudsonius campestris Preble.

While the author was making observations on foot in the southeast corner of the park on the afternoon of July 7, 1940, one of these mice was run down and caught by hand in semi-open, grassy country not far from the junction of Spruce River and Bell Creek. This capture came as a complete surprise, as it was not expected to find campestris so far north of the true prairie. As far as is known, this is the northern-most record of this normally campestral

mammal in central Saskatchewan. The specimen was a female measuring as follows: L. 224, T. 130, H.F. 30.5 mm.

Since this subspecies is now known to occur, however rarely, so far north, it may be expected to inhabit the southern park prairies to the west of the point where the capture was made. The specimen taken agrees in every respect with typical examples of campestris from southern Manitoba.

37. Eastern Canada Porcupine. Erethizon dorsatum dorsatum (Linnaeus).

While it is known from personal observation and from wardens' reports that porcupines may be found anywhere in the park, the species can scarcely be regarded as being very common there. Signs of porcupines were seen repeatedly in various localities throughout almost the entire park, but only two in 1940, three in 1942, none in 1943, and two in 1946, were actually seen. The localities represented were Sugar Creek Valley, Spruce River, Namekus, Kingsmere and Bagwa Lakes, and the west boundary of the park east of Nesslin Lake. The warden's estimates indicated a park aggregate of several hundred and an average density not greater than one to each five square miles.

Most porcupines examined at close range were notably dark and were characteristic of the type dorsatum, but a sub-adult observed at Bagwa Lake had many pale yellow guard hairs and some quill terminals similarly tinted. An adult was seen at Sugar Creek, the outer portions of whose guard hairs were conspicuously yellow to yellowish-white - much more so than any other porcupine seen in this region. In this case, however, the quills were more like those of the average dark dorsatum, being black with whitish tips. Probably these characters, on the whole, may best be

regarded as normal individual variation of E. d. dorsatum, rather than an approach to E. d. myops, whose range lies to the northwest.

38. Manitoba Wapiti, or Elk. Cervus canadensis manitobensis
Millais.

This species was well represented in the park and seemed to be the most abundant of the big game mammals. A few years ago the wardens estimated a total of between 3,000 and 4,000 and an average of about two to the square mile. The densest population occurs in the southwestern part of the park in the mixed woodlands and scattered prairies. Somewhat less densely occupied areas lie in the southeastern and central parts, and the smallest number are found in the extreme east-central and west-central sections and in the whole of the northern part beyond the latitude of Waskesiu Lake.

In 1943 a fine well-preserved set of wapiti antlers was observed along the north shore of Crean Lake, where they had evidently been dropped during the previous winter. This showed that at least an occasional animal ranged that far north. Warden Schermerhorn stated that of late years the animals had been spreading out somewhat more freely to the northward from south and south-central localities and that they now appeared more or less regularly in the country immediately north and east of Kingsmere Lake, where formerly they were rarely, if ever, seen. Despite this somewhat freer and more active dispersal (perhaps partly seasonal), in June, 1946, not one was observed anywhere in the country around Hanging Heart, Crean, Kingsmere, Bagwa, and Lily Lakes.

As in previous years, a number were seen in the eastern

part of the park, north to Waskesiu, and in the south between Halkett and Amyot Lakes and Sturgeon River. The vicinity of Namekus Lake also appeared to be a favourite area. In many localities, trunk and lateral trails were common. During the first days of June, in 1940 and in 1946, numerous cows with young of the year were observed in southeastern and southern parts of the park. At that time the calves were very small and spotted, and most of them appeared to be not more than a few days old.

39. Rocky Mountain Mule Deer. Odocoileus hemionus hemionus
(Rafinesque).

These deer appear to occur throughout the park, but they are definitely more numerous in southern parts than in northern. They were, however, fairly well represented even in the northern end of the park and in parts of the region much farther to the north and northwest. Many signs of their presence, and occasional mule deer, were seen north to Lavallee and Crean Lakes and in areas between the latter and Tibiska Lake.

The sum of observations made in all the seasons spent in the park indicated a more uniform and plentiful distribution throughout the extreme southern part of the area, particularly in the eastern section north to about the latitude of Waskesiu. However, the deer or their tracks were noted in every locality investigated. According to wardens' estimates the total population of the park was about 1,500, or an average of one to each 1.3 square miles. If these estimates were fairly accurate there were about 40 per cent as many mule deer as wapiti in the park.

40. Dakota White-tailed Deer. Odocoileus virginianus dacotensis
Goldman and Kellogg.

The white-tailed deer is a comparatively recent arrival in the park. Formerly, it was quite unknown in this latitude, the indigenous deer population being solely composed of Rocky Mountain mule deer. Within the last decade or two, the "white-tail" has gradually spread northward with settlement into central Saskatchewan and parts of southern Alberta.

As yet, the species is sparsely represented in the park. In 1940, wardens in the south estimated a total population of about 35 to 40. Evidently they were confined more or less to the southern fringe of the park between Halkett and Amyot Lakes. Since 1940 they were said to have become somewhat more numerous.

Limited evidence indicated that they were extending their range farther northward. In the spring of 1943 Warden Schermerhorn observed a solitary buck between Crean and Hanging Heart Lakes -- the first and only white-tailed deer seen in that district. Warden Harrison had not seen the species anywhere in the country to the west or north. During the investigations the species was seen nowhere in the central and northern parts of the park, and rarely even in the south.

41. Eastern Moose. Alces americana americana (Clinton).

Generally speaking, this large and conspicuous quadruped is a common resident of the coniferous forest of the entire park. Signs of moose were seen often and the moose themselves not infrequently (Fig.7). Naturally they preferred favourable areas, and were scarce or absent, except as transients, in unfavourable ones.

Moose or fresh moose sign were seen in every locality investigated except at Sugar Creek and Amyot Lake. Even there,

old droppings and signs of browsing such as broken boughs, chiefly of paper birch, showed that they had been present during the previous winter. Undoubtedly most of the moose that winter in the prairie-poplar woodlands of the south retreat to the northern part of the park in summer.

In particularly favourable areas the species reached abundance. Moose and their signs were very numerous at Namekus Lake, in some parts of the Spruce River basin, in various places about Crean Lake (notably the northern part of that district), at Bagwa and Lily Lakes, and along the route from Kingsmere via Lone Island and Sanctuary Lakes to Lavallee Lake. Undoubtedly many other places not examined were equally well inhabited.

The wardens estimated a total of nearly 1,900 moose, or an average of about one per square mile in 1939-40. The estimates for the various districts ran from about a dozen to several hundred, clearly showing the variable distribution. They showed clearly that the greatest abundance occurred in central and west-central districts and in the whole of the park lying immediately to the north. The moose is the second most abundant big game mammal in the park, ranking next in numerical status to the wapiti.

42. Western Woodland Caribou. Rangifer caribou sylvestris
(Richardson).

With a few minor exceptions, this species normally occurs in the park only during the winter months. The caribou migrate slowly south as winter advances and enter the northern extremity of the park during late November or early December. It is evident from the wardens' reports that the caribou usually

visit only the northern half of the park, the southern limit of occurrence being roughly latitude $53^{\circ} 50'$ N. In spring the small caribou herds move north again out of the park.

A census of the population, taken in the winter of 1939-40, indicated a total of between 600 and 700, most of which inhabited the country north of Kingsmere and Crean Lakes and between Crean and Montreal Lakes. A few stragglers were found around Waskesiu Lake and in a small area just southwest of that lake. These figures revealed a relatively sparse population averaging only about one to each three square miles of winter range.

The exceptional occurrences referred to in the first paragraph of this section were as follows:

On August 11, 1942, Warden Harrison discovered an adult bull caribou stuck in the mud and water of Pease Narrows, the channel between Kingsmere and Bagwa Lakes. It was rescued, fed and rested in a pen at the warden's cabin on the north shore of Kingsmere Lake and then released. A photograph of the animal is in the author's possession. Warden Harrison stated that it was most unusual for a caribou to be seen so far south in the park in the middle of the summer.

On June 7, 1943, a fairly fresh caribou trail was observed in sandy soil along the north shore of Crean Lake. In subsequent discussion Warden Schermerhorn stated that a few stragglers spent the summer north and northwest of Crean Lake and that a rare individual had been seen during that season north of Kingsmere Lake. Apparently a few caribou summer around Tibiska, Wassegam, Wabeno, and Lavallee Lakes.

In 1946, the northern wardens reported a recent very

definite decline in the numbers of caribou reaching the northern part of the park. They believed that the decline had been caused, to some extent at least, by forest fires in the northern part of the park that destroyed most of the reindeer moss and other kinds of the best forage plants. Other factors involved may well have been over-shooting of caribou in provincial territory to the north, and excessive predation by timber wolves that had steadily increased in numbers in recent years.

In time the predation may be reduced as some years ago the park authorities began wolf control practices and, moreover, wolves appear to be declining in number throughout the boreal regions. Barring more forest fires, forage plants will gradually recover, and the number of caribou occupying the park should again increase.

43. Plains Bison. Bison bison bison (Linnaeus).

Large numbers of this species are known to have inhabited the prairies and forest north of the North Saskatchewan River in former times. The northern perimeter of the range of the subspecies in this region is not accurately known, but it may well have been in the general vicinity of the prairies in the park between Sugar Creek and Sturgeon River. Perhaps even there some of the animals showed signs of intergradation with the wood bison, Bison bison athabascae. Bison recorded in the early days at Peter Pond Lake, Meythe Portage, and Clearwater River are assumed to have been referable to the latter race. The last of the plains bison were exterminated in central Saskatchewan apparently between 1875 and 1883. In the territory under review they are not given freedom of range as in Elk

Island National Park, Alberta, but a number are enclosed in a paddock at the southeastern corner of the park for tourists to see.

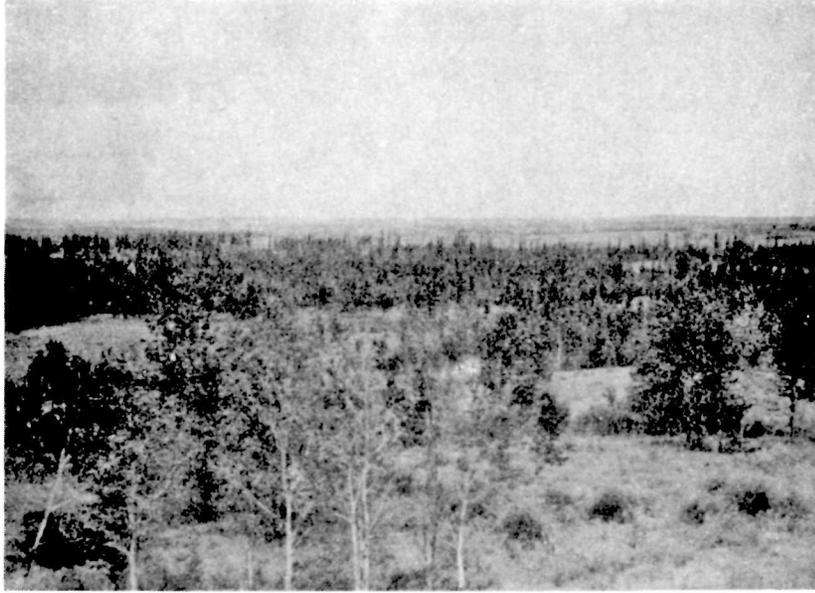


Fig. 1. Looking north over park from point near south boundary in vicinity of Sugar Creek.



Fig. 2. Open tract of prairie in southern part of park west of Rabbit Creek.



Fig. 3. Shoreline and adjacent Canadian Life Zone forest at south end of Namekus Lake.



Fig. 4. Meadow-muskeg area a short distance northeast of Nikik Lake.



Fig. 5. Near southern extremity of Crean Lake looking northwest toward Chipewyan Portage.



Fig. 6. Scene along north end of Crean Lake where coniferous forest species predominate.



Fig. 7. Cow moose feeding in marshy, shallow water along southeast shore of Bagwa Lake.



Fig. 8. Typical Banksian pine woods on low, sandy ridge between tracts of lowland mixedwood forest and muskegs.

