

## THE PLIGHT OF THE BARREN-GROUND CARIBOU

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The caribou is a typical Arctic animal, like a reindeer but with longer legs. In late autumn both animals appear very sturdy because of lengthening hair and accumulating fat. The caribou is specially adapted to its environment in many ways; its large broad hoofs support its weight on crusted snow and the concavity of the sole of the hoof makes it sure-footed on ice.

The ears, tail and muzzle are short and well furred and thus well protected against frost-bite. The pelage is long, dense and light. Moulting takes place in July. The new hairs continue to grow in length and thickness during autumn and early winter; so that whereas in late summer they lie parallel to the hide, by winter they stand erect and form a thick, long coat. Dorsally and on the flanks the colour is at first clove brown, but by late winter has worn to a greyish-white. The belly and rump are white.

The caribou bull carries an impressive set of antlers; cows have much smaller, simpler ones and a few cows have none at all. Early in November, after the rut, the adult bulls start to shed their antlers, the cows doing so in April or May.

*Food.*—The food of the caribou in summer includes cotton-grass, dwarf birch and horsetails, besides many species of willows, grasses and sedges. In winter lichens are eaten and dried grasses and twigs of willows and aspen browsed; discarded antlers are avidly chewed.

*Behaviour.*—The caribou seems to be a restless animal by nature. While slowly feeding along a ridge it may suddenly break into a trot, only to walk again after a few paces. When alarmed or aroused by curiosity, it trots with a loose gait; but this can be changed into a long spring-like stride with stiff legs. Thus it can cover great distances with seemingly little effort. When hard pressed the caribou breaks into a laboured, rolling gallop, but cannot maintain this for long. On a frozen lake one must drive at 45 or 50 miles an hour to overtake caribou. During migration their rate of travel may be exceedingly slow, but an average of 19 miles per day has been observed over a period.

Caribou readily take to water for they are probably the most amphibious of deer. A herd has been observed to swim 1,000

yards in  $8\frac{1}{2}$  minutes without special exertion—a speed of 4 miles per hour. Even in a light canoe, with two strong paddlers, it is difficult to overtake caribou.

*Voice.*—Alone, caribou are usually silent though when surprised or annoyed they may give a loud snort. But when in large groups they grunt like swine and the calves bawl frequently during the first few months of their lives. In fact, what with the bawling of calves and the low, short, belching grunts of adults, there is a great deal of noise associated with a large herd.

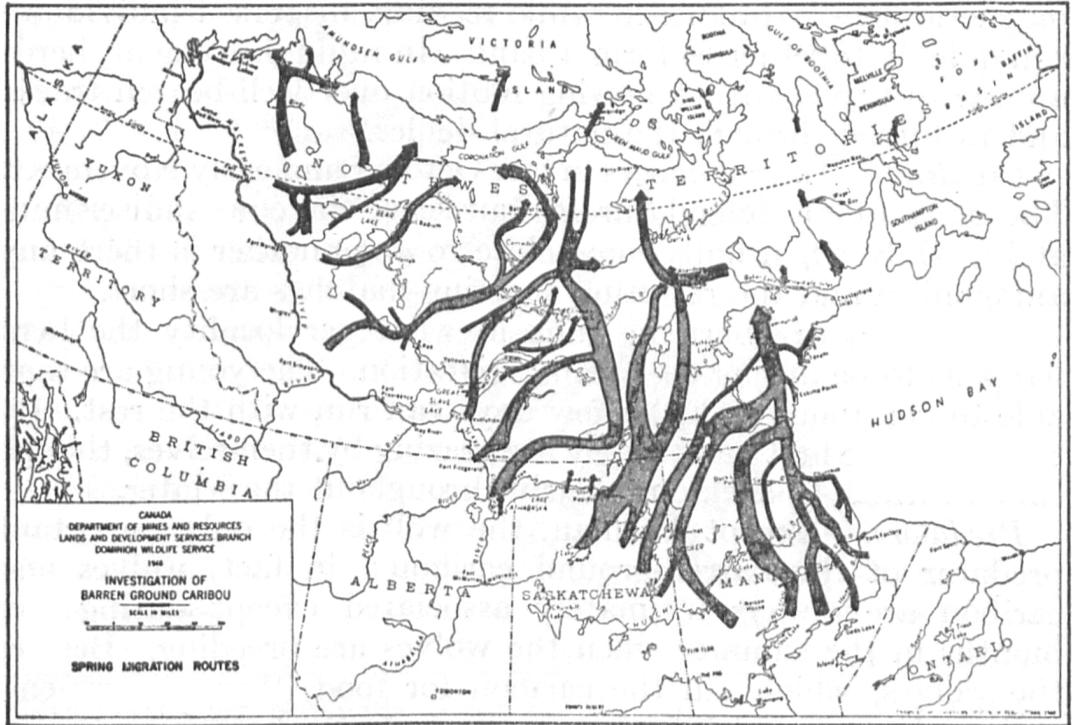
*Senses.*—Caribou have a keen sense of smell and react quickly and violently to human scent. But it is difficult to tell the distance human scent carries. The author was once lying among some boulders watching a herd of several thousand caribou advancing across the wind carrying his scent. He was soon surrounded except for a corridor directly downwind, which was clear of caribou, and which was about one mile in length and subtended an angle of about 15 degrees from his position. Any bands attempting to cross this segment were immediately repelled by the human scent and made their way around it by travelling upwind. These bands often passed within 20 yards to windward of the observer's position.

The caribou's sense of hearing is moderately good. It is thought that they take warning from the cries of the scavenging ravens and herring gulls, which often follow hunting wolves or men. They do not seem yet to associate a rifle shot with danger, but peer towards its sound and circle to get the scent of the hunter, thus making themselves particularly vulnerable to the modern rifle.

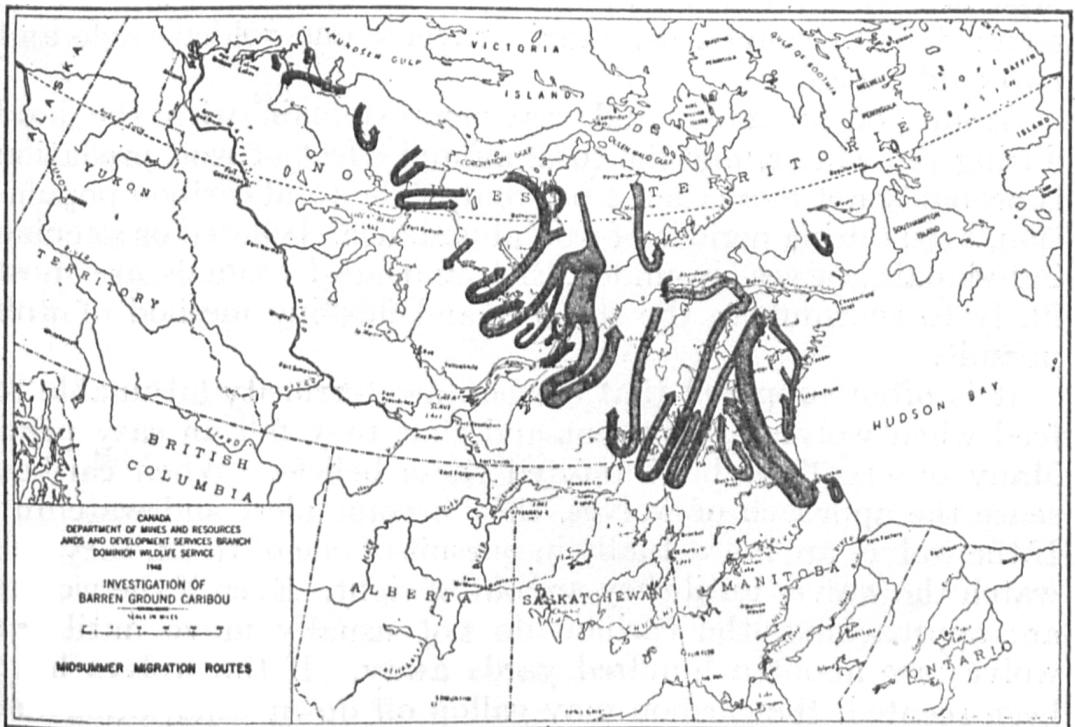
Eyesight is comparatively poor. It is possible to crawl within 15 yards of a resting caribou by "freezing" when the animal is looking towards one; and one can walk unobserved to within 150 yards of a herd on the open tundra.

Caribou are well known for their "curiosity" and can be attracted by unusual behaviour. They are generally docile, though occasionally during the rutting season a wounded or cornered bull will defend himself.

*Habits.*—The barren-ground caribou is usually met with in small bands or loose herds. Bands consist of about five to 100 individuals. Except for the association of cows with their calves, there seems no fixed organization or established leader. A herd is composed of from 100 to 2,000 or 3,000 animals, made up of loosely associated bands. Individual animals in a herd seem to be governed by a force resembling magnetic attraction. From the air, individuals in a large herd of moving caribou are



Map 1.—April, May, June. Caribou herds move to the tundra.



Map 2.—Late July, August, September. The herds return to the forest belt but go back to the tundra for the rut.

seen to be arranged in parallel strings like iron filings in a magnetic field. If alarmed while feeding, dispersed individuals run quickly together to form a band. In rapid movement, herds appear to travel with a flowing motion over well-beaten tracks and to funnel through the natural defiles.

*Breeding.*—The rut occurs in late October and early November. The bulls do not defend harems but serve the cows indiscriminately. Only when bulls come close to one another is there any antagonism and the resulting sparring matches are short.

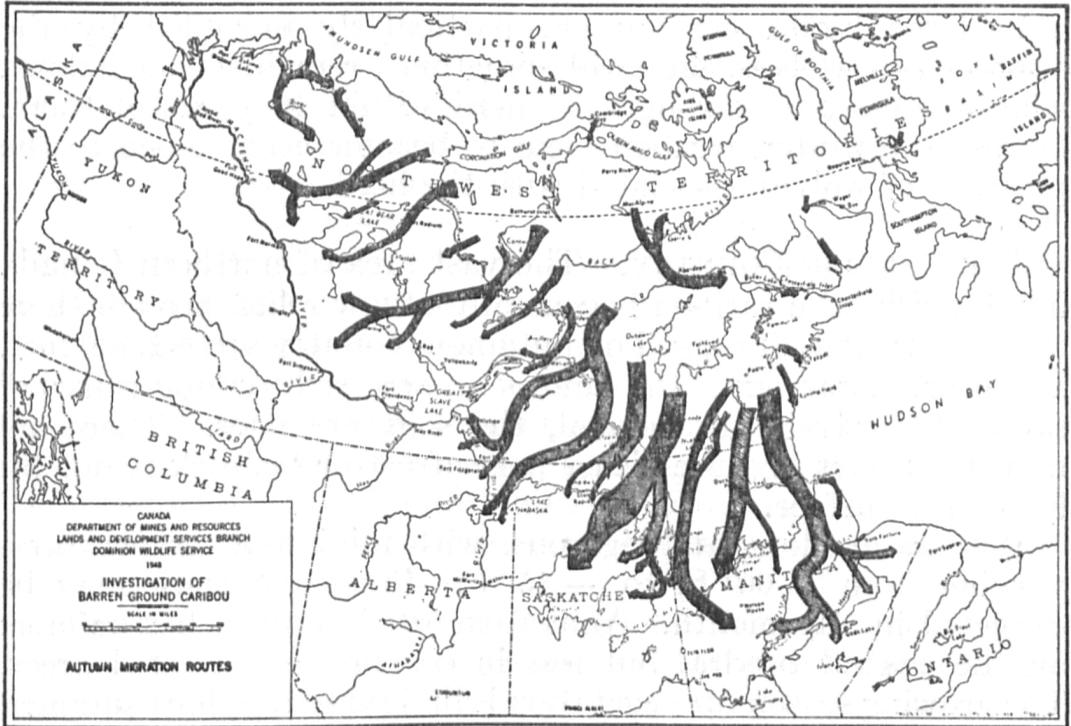
The calves are born in June in whatever locality the herd happens to be during the spring migration. The young are soon able to get about and in a few days can run with the rest. By the end of the first month they are grazing by themselves, though they continue to suckle regularly throughout the winter.

*Predators.*—Except for man, the wolf is the only important predator of the barren-ground caribou; in fact, wolves and caribou are always intimately associated except during two months in the summer when the wolves are breeding. Besides the wolves, which kill the caribou for food, there are ravens, gulls and eagles which feed on carrion. As the herd migrates the group forms a mobile community; in fact, the tundra in summer appears particularly empty if the caribou are absent. With a herd of about 100,000 caribou on Ghost Lake \* in April were seen: twenty wolves, a hundred ravens, one golden eagle and two bald eagles.

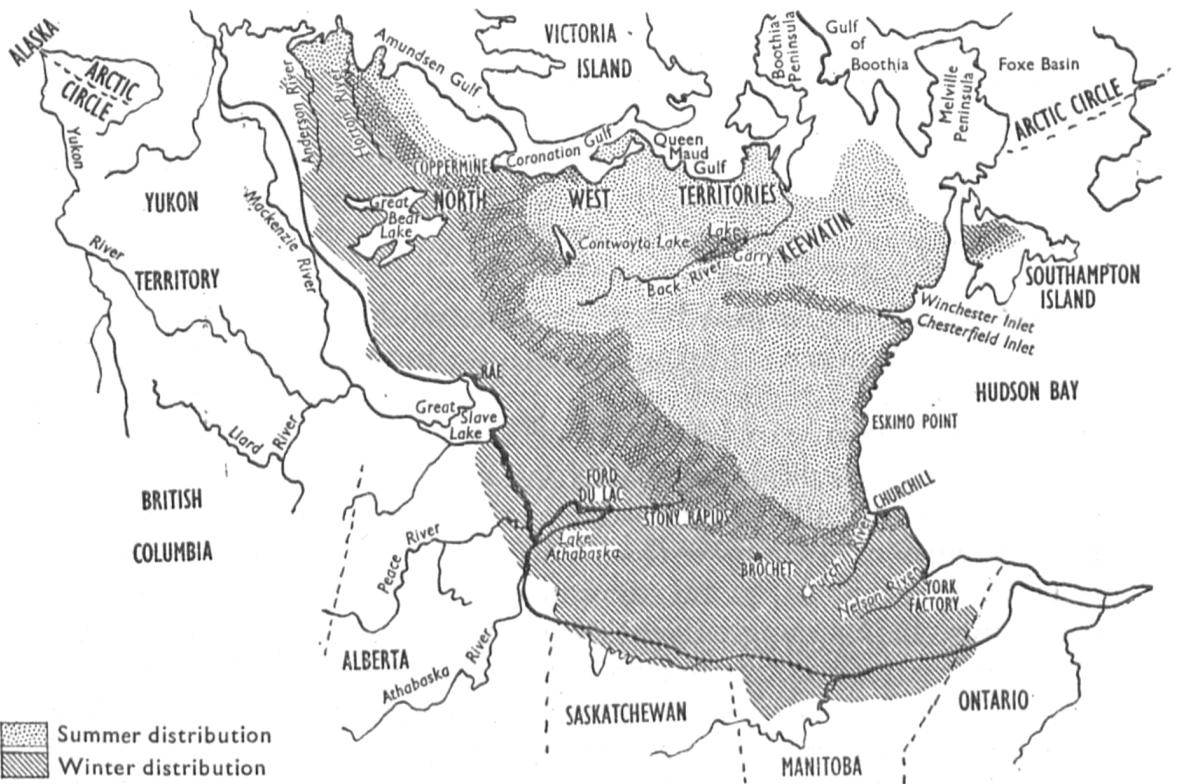
Groups of predators and scavengers remain with the herd during the winter, but the total annual effect of wolf predation is probably not more than 5 per cent of the total caribou population, even during periods of wolf abundance. Isolated or sleeping individuals, calves, wounded, sick and aged animals are most likely to succumb to the stalking and flushing method of wolf pursuit.

It is often supposed that caribou are terrified and unable to feed when wolves are present and that they fall an easy prey. Many observations have refuted these beliefs. When caribou sense the approach of wolves, they become alert and watchful. If the wolves are not actually in pursuit of one of them, they will watch the wolves until they are out of sight. Even if the wolves are approaching, the caribou do not usually move until the wolves are about a hundred yards away. If the wolves have been scented, the caribou may gallop off down wind, otherwise they will circle to get wind of the wolves.

\* Ghost Lake is 100 miles north-east of Lac la Martre.



Map 3.—October, November, December. Final return to winter territories.



Former distribution covered all land to N. & N.E. of heavy black line, including the southern half of Victoria Island and the whole of Southampton Island.

Map 4.—Past and present ranges.

In large herds, caribou are particularly unruffled by the approach of wolves, and will sometimes remain bedded down while wolves pass through the herd within 50 yards of them. During the winter, caribou seem to become accustomed to the presence of wolves associated with the herd.

**THE CARIBOU COUNTRY.**—The vast area of northern Canada inhabited by the caribou is generally of low relief, though there are some regions of rugged mountainous country up to 2,500 feet. Lakes are numerous. The land is crisscrossed by long ridges of sand and gravel. In general, the soils are poor. There are numerous bogs because either permafrost or bedrock is not far below the surface.

Winters are long and rigorous, with minimum temperatures varying from  $-60^{\circ}$  F. to  $-45^{\circ}$  F. Frost and snow may be expected in any month. Annual snowfall is 60 inches or more on the central tundra, but less in coastal and forested areas. The growing season for vegetation is limited to the short summer, which is moderately warm and dry with 5 inches of rainfall, or less.

**MIGRATION.**—See maps 1, 2, 3. The caribou is a nomadic animal, moving between the forest belt in winter and the tundra in summer; but small herds and scattered bands remain on the tundra all winter. Herds usually return for several seasons to the same general winter locality and then abandon it and spend several winters in a distant one. Failure of the food supply may be the reason.

In April and May, with lengthening daylight and fine weather, the caribou move towards the tundra which they inhabit from June to September. Throughout these months the herds are in movement. In June and early July the movement is away from the wooded area. In late July or early August this is reversed and by 1st September most caribou are near the tree line again, some even within it. The herds are then complete with cows and bulls together. In September, with the approach of the rutting season, there is a second movement to the tundra, the herds retracing their spring migration routes. But this movement to the tundra does not reach so far as the spring one; when it is finished there are caribou dispersed widely from the northern fringes of the forest to the Arctic ocean.

During late autumn, after the rut, the final movement to the wooded winter area begins. Starting in late October, in November or even in December, the herds travel over distinct routes,

marked by parallel trails which cross tundra and forested country. The trails are generally 6–12 inches wide, 1–3 feet apart, clear of vegetation and sometimes worn 4 inches deep by constant use during many years. As many as twelve parallel trails have been counted on one route.

During spring migrations the routes lie along waterways, the herds travelling upon the frozen lakes and rivers. During summer and autumn migrations the animals tend to follow the heights and to cross waterways.

The human residents of the caribou range have become familiar with the routes generally used by caribou, and hunters congregate at well-known lake crossings or defiles. They are unable to forecast with certainty the appearance of the herds, and if these fail to use the favourite migration route, the hunters may suffer dire consequences.

The normal winter range of caribou is about 295,000 square miles and the summer range about 300,000 square miles, but they are not evenly distributed over these enormous areas. The majority occur in large herds, from several hundred to a thousand individuals or more. These herds have general areas in which they carry out annual movements. Between these great herds are scattered bands which indeed occupy the greater part of the caribou range.

**PAST AND PRESENT RANGES.**—The great reduction in the territory of the caribou between 1900 and 1950 can be seen on Map 4. The large herds reported from the Mackenzie delta by Franklin and Simpson have been absent for many years. From there to Coppermine there has been a heavy reduction. Past conditions seem little changed from Coppermine to Kent Peninsula, but there are far fewer animals now in the Queen Maud Gulf area. The great herds once to be seen in summer from Sherman to Boothia Peninsula and on King William Island are almost gone. Along the gulf of Boothia and on Melville Peninsula caribou once occurred in large bands which left the peninsula in winter. They now occur only in small bands on the peninsula coasts. Only small scattered groups remain of the many herds encountered by Schwatka inland from Winchester inlet. From Chesterfield Inlet to York Factory numbers are comparable with those described by the early explorers.

The area along the arctic coast, where the caribou were so greatly reduced, is known to parallel very closely the range of baleen whales in western arctic waters, where there was a whaling concentration at the end of the last century and the

beginning of this one. Many ships spent the winter at arctic ports and their crews depended upon the caribou. Natives were given firearms and paid in trade goods for meat. The slaughter of caribou was tremendous and is considered to be a primary factor in the reduction of the herds on this coast.

The shrinkage of the caribou herds from Adelaide to Melville peninsulas cannot be attributed to whalers. It was due to a change in the economy of the Eskimos and Indians. They were given firearms and persuaded to journey inland seeking not only furs, but caribou meat for the trading posts. Their dog teams were also increased in size and fed on caribou meat.

Upon the central tundra there seems to have been less change and the observations of massed caribou on the Coppermine, Kazan, Back, Thelon and Dubawnt rivers and at Contwoyto Lake can be repeated to-day.

The great autumn migration of caribou across upper Horton River, described by Stefansson, has no counterpart now, nor have the herds which ascended Anderson River. The caribou have largely forsaken the crossing point at Fort Rae described by Russell. At Fond-du-lac and Stoney Rapids, Saskatchewan, the migrations are reported to be much smaller of late. Father Eganoff, who has been stationed at Lac du Brochet, Manitoba, for 40 years, reported that he had noted a steady decline in the number of migrating caribou. Caribou still cross the Churchill and Nelson rivers as described by Hearne and others, but the present numbers are said by old-time trappers to be fewer.

The areas now occupied as winter range are generally the same as those mentioned in records of exploration.

**THE CARIBOU AND MAN.**—Since the earliest times the caribou has been a vital factor in man's survival in northern Canada : in fact, the animal was once the cornerstone in the economy of two great peoples, the Athabaskan Indians and the Eskimos. The culture of the most important Athabaskan tribe, the Chipewans, who lived on the northern edge of the taiga\* from Churchill to Great Bear Lake, was so entirely based on the caribou that they were called "Caribou-eaters". Eskimos had mainly a marine economy, but they made hunting excursions inland for caribou hides in summer. Inland groups of Eskimos were more dependent on the caribou.

Though in modern times civilization has replaced many of the

\* Tundra is the zone beyond the timber line, the "Barren-grounds" between Hudson Bay and Mackenzie River. Taiga is the coniferous belt south of the tundra.



*Photo: Geological Survey of Canada, G. M. Wright*

**CARIBOU HERD CROSSING A LAKE ON AUTUMN MIGRATION.**



*Photo: "The Beaver"*

**A SCENE OF CARNAGE WHERE SWIMMING CARIBOU HAVE BEEN SPEARED FROM CANOES.  
EACH YEAR THOUSANDS OF CARCASSES ARE THUS ABANDONED.**

products of the caribou, in emergencies they are used as in primitive times ; small groups of Eskimos and Indians are even yet almost completely dependent on them.

The primary human use of caribou is for meat. White trappers choose the hind quarters, Eskimos prefer the head and rib-basket. All agree that the tongue is the greatest delicacy, being only slightly superior to the liver. The back fat is an important part of pemmican. Rendered fat is used as fuel oil in the small stone lamps of the Eskimos. Other useful parts are the tips of the antlers in velvet, stomach contents and blood which is allowed to jell in bags made of intestine lining. Leg bones are heated over hot stones and are split open to extract the marrow, a great delicacy.

Eskimos and Indians use caribou meat as dog food throughout the winter, and where it is available make little effort to obtain a winter fish supply. A team of ten to fourteen dogs can easily eat a caribou every day.

Caribou hide provides the Eskimo's winter outfit, though woollen underwear is now replacing it for inner garments. A complete Eskimo winter caribou hide outfit consists of an outer and an inner suit. The outer suit comprises " parka ", trousers, high boots and mitts. Under these are worn a parka-like garment, inner trousers and stockings. A complete outfit might take twelve caribou hides.

Leather from the bull's forehead makes the best soles for boots. Calf skins are used for stockings and the inner parka. Hide from the legs is used for leggings and quivers. Probably twenty-five hides annually would clothe a family of two adults and two children.

Four or six hides may be sewn together to make a sleeping robe. Hides are also used for beds, for igloo doors and roofs, for covers of caches, to line carioles and to throw over sleigh loads. In remote areas a few caribou-hide tepees are still used, though canvas tents have almost everywhere superseded them. Inland Eskimos, lacking seals, used de-haired caribou hides to cover their kyaks—as many as twelve to each.

Caribou antlers still provide useful tools and handles for tools. The beams are used as dog and tent stakes and occasionally to make chairs and to support ridge poles. In Keewatin the beams and tines are fastened to sleighs as brakes ; when a foot is pushed upon the inverted beam, the tines dig into the snow.

All in all, the caribou is still a vital factor in the economy of more than 25,000 people between Yukon and Labrador.

**CARIBOU NUMBERS.**—As the caribou is so necessary to the inhabitants of northern Canada, its status is clearly important and since early times many estimates of caribou numbers have been made. These have even been as high as 100 million, but most writers grossly over-estimated the herds of caribou observed during mass migrations, and more often assumed an equally dense concentration beyond their view. A better figure can be reached by considering the distribution of caribou and the carrying capacity of its environment. The former winter range of the barren-ground caribou (*vide* Map 4) covered about 350,000 square miles. In 1944 L. J. Palmer estimated a population of five to ten caribou per square mile of environment, basing this upon range and feeding studies in Alaska. Considering that the capacity of the winter range probably limited total numbers and that no allowance for water or otherwise uninhabitable areas has been made in the total area given above, five caribou per square mile seems a fair estimate. This gives 1,750,000 as the approximate number of barren-ground caribou in 1900.

Legend has it that the caribou population is inexhaustible. On the contrary, the investigations which are now being undertaken show that it can easily be depleted.

**THE PRESENT INVESTIGATION.**—In 1947 the Eleventh Conference of Provincial and Dominion Wildlife Officials considered reports of the decrease both in numbers and range of the barren-ground caribou and recommended that a thorough investigation should be made. The Canadian Wildlife Service accepted this task and put the author in charge of the field investigation. This started in 1948. It was to include: status, distribution and movements of caribou; the population trend and its causes; life history and ecological relations; human utilization and a programme for future management.

There has been previous investigation into caribou populations but they had been limited to the time-honoured means of northern travel—canoe in summer, dog-team in winter. In the present investigations aircraft were extensively used.

Most of the counts were made by aerial transects; that is by flights across the herds at definite intervals, the observers counting the caribou up to a certain distance on each side of the line of flight. The information obtained from the transects was plotted on large-scale maps. The boundaries of migration corridors were drawn and the positions of the front and rear of each moving herd fixed. An estimate of the total population was then made using the transect density figures.

With large herds a photograph was taken to check the transect results. Ground stations were also used throughout the caribou range to supplement aerial observations and to study the other aspects of the investigation.

As a result of this first inquiry, which finished in 1950, nineteen caribou herds were named and recorded, together with their winter and summer ranges and their populations. The total number of barren-ground caribou arrived at was about 670,000. If, as is mentioned earlier, the caribou population in 1900 was 1,750,000, there was a fall of 62 per cent in fifty years.

The caribou population can remain constant only if annual losses of all ages do not exceed the annual increment of calves. In 1949 the annual kill of caribou was estimated as follows: by Indians, 50,000; by Eskimos, 30,000; by other hunters, 20,000; by wolves, 34,000 (maximum); by disease, accident and weather, 34,000. These losses total 168,000 animals. The number of calves born yearly was estimated at 145,000, so there seemed to be an annual deficit of 23,000 caribou.

From 1950 onwards caribou investigations continued. Mr. J. P. Kelsall was stationed at Yellowknife to study particularly fawning habits and food requirements. In 1953 a survey of the Yukon herd was undertaken in co-operation with the United States Fish and Wildlife Service. In 1954 aerial surveys showed a Baffin Island population of 5,000 and another 5,000 in the Ungava peninsula, Quebec.

*1955 Spring Survey.*—During the spring of 1955 a complete aerial re-survey of the central area was undertaken. The results are alarming, for they indicate that the present barren-ground population is about 277,000 animals—a decline of 393,000, or 60 per cent, during the last six years. For example, the herds north of the Great Bear Lake have dropped from 35,000 to 5,000, between Great Bear and Great Slave lakes from 220,000 to 59,000. Only in Keewatin district did the caribou population seem to be holding its own.

*1955-56 Winter Survey.*—During the winter of 1955-56 a caribou air survey was again carried out, except in Manitoba and Keewatin.

The caribou were found to be much more widely scattered than they usually are in winter and were using some areas formerly considered summer range. The exceedingly light snow conditions may have partly accounted for this.

This latest survey, compared with that in the spring of 1955, shows a reduction from 59,000 to 33,100 animals in the herds between Great Bear and Great Slave lakes, and a reduction from

32,400 to 23,000 animals between Great Slave Lake and Lake Athabasca.

There also seemed to have been an exceedingly low calf crop.

Although no air surveys were carried out in Manitoba or Keewatin, reports from the Manitoba Game Branch, the Royal Canadian Mounted Police and the Arctic Division were analysed and the total Manitoba population estimated at 25,000. The 1955 survey figures are not comparable, but winter caribou populations in Manitoba have been as high as 90,000. Information from the Game Branch indicated human utilization at about 35 per cent per annum.

In Keewatin, 5,000 caribou were reported to have wintered along the Hudson Bay coast from Eskimo Point to Wilson River. The Northern Affairs spring inspection tour reported caribou as rare and decreasing in all areas visited in Keewatin District.

At least one of the reasons behind the rapid drop in caribou numbers was demonstrated during the past winter by the Snowdrift Indians. Caribou in the Snowdrift area moved to their winter range in November. Throughout the winter they were subject to continuous daily hunting pressure by about forty hunters of the Snowdrift community. By early January at least 1,000 animals had been taken, and hunting continued until May. Men, women, children and dogs were fed almost exclusively on caribou for five months, although Snowdrift is one of the good fishing sites in Great Slave Lake. The census flights in April showed only 2,300 remaining from a herd which had likely numbered more than 5,000.

All the evidence in 1955-56 indicated a continued decline in caribou numbers. Man's use alone accounting for an annual decrease of 30 per cent.

*Man's Methods.*—The early explorers remarked upon the ingenious methods employed by natives to kill caribou and gave colourful accounts of them. Hearne (1795) described pounds made by Chipewyans to capture bands of caribou. They were built of bushy trees with a gate placed upon a well-worn caribou trail. Inside were hedges arranged in a maze, at intervals were snares tied to growing spruce poles. Drift fences extended to a lake shore or along a valley border. An Indian family or two would pitch their tents nearby and maintain such a pound throughout the winter.

The Eskimos employed the same methods to drive caribou, but with materials at hand on the tundra. Long drift fences were made of pillars of stones or sods placed upon upturned columnar stones, usually leading to defiles or lake crossings.

Several families of Eskimos would use one of these fences during a caribou migration. The women, children and aged would hide behind the stone columns, the hunters taking up positions at the apex of the fence or, if it led to a lake, in kayaks at the water's edge. When a herd reached the fence the hidden people arose, shouted and waved their arms. The frightened caribou would race along the fence to the defile or lake shore, where the hunters slaughtered them with bow, spear and knife.

Natives of northern Canada still use the primitive method of securing caribou by spearing them from canoes and kayaks. Lawrie described such a hunt. The hunter's canoe was in readiness on the south shore of the bay where the caribou had a half-mile swim. As the animals neared the shore, the canoe was urged towards them and they were faced with a long swim back to escape. Initially more than a match for four paddles, they were overtaken in mid-bay and the spearing began with the canoe driven right among the panic-stricken animals, often with the prow riding upon one.

The spear is held very close to the butt and jabbed single-handedly into the small of the caribou's back. The stroke, properly delivered, severs the dorsal aorta, penetrates the spleen, or opens the chest cavity. Death is rapid, and efficiently-speared animals do not reach shore. However, the Eskimos became wildly excited and the spearman laid about him at any animal within reach with the inevitable result that many animals were more or less severely wounded. Many of these lived to reach shore and those which had merely been slashed over the rump went free while the badly wounded either died on the beach or escaped to die in the hills. Twenty caribou were secured in this way, including two animals which were tracked down and shot by Lawrie. There is no doubt that at least as many more were wounded, some probably fatally.

The Eskimos made no attempt to pursue the wounded but contented themselves with skinning those which had reached the shore (Lawrie had insisted that they speared only animals which were prime) and ensuring that those in the water would float, to drift ashore later. To the credit of the Eskimos it must be said that all of these animals were recovered the following day but the fate of the meat and the hides is an excellent illustration of the Eskimos' failings—perhaps, too, of their difficulties. Tongues and marrow bones were taken for immediate use, the rest piled in a heap on the beach. The suggestion that some of this meat should be dried was met with the assurance that it would serve as dog food in the winter. In deference to Lawrie's plea that it be

properly cached, a few dead willows were flung over the pile. In the fall the water rose and the whole, long-since putrid, was frozen in. The hides were dutifully staked out to dry and totally ruined by a subsequent five-day rain which brought no action from the Eskimos. Quite probably they had never seriously intended to use them.

*Firearms.*—Almost every native hunter owns one or two rifles. The 30·30 carbine is well adapted to hunting caribou, but a great deal of caribou shooting is done with the ·22 rifle. Some men use it and almost all caribou hunting by women and children is done with it. At times children fire into caribou herds in sport; without any intention of utilization.

Generally, neither Eskimos nor Indians make any effort to conserve caribou when hunting; as many caribou as possible are killed from each band. Little or no attempt is made, when killing adult animals, to select suitable animals for hides or for meat; but large numbers of calves and yearlings are selectively killed because their hides are preferred for clothing. As long as other animals are available, attempts are rarely made to kill wounded animals which escape, or to find wounded animals which may have died at a distance.

Intensive survey of the locations of regular hunts in both the taiga and tundra always resulted in discovery of the remains of numerous caribou, whose intact condition, hide punctures or broken bones indicated that they were unutilized animals killed by gunfire.

A typical example of such hunting wastage was observed on 16th August, 1949, at Contwoyto Lake. A herd of about 125 caribou were observed to swim a narrow part of the lake and reach a long peninsula on which four Eskimo hunters had taken up positions about 25 yards apart. On the report of the first rifle, the leading animals turned and the band hesitated. They then ran the gauntlet past the hunters, who blazed away at a range of about 20 yards, knocking many caribou down. The band continued down the point past the Eskimo tents and dog lines. It was a spirited scene, with the dogs howling and jumping on their chains and the women rushing out of the tents searching for rifles.

Two days later the camp was visited and more than seventy-five carcasses lying on the peninsula were counted—the results of several hunts such as the one described. Most of the carcasses were within 150 yards of the tents and some of these had been skinned and eviscerated. About ten unutilized carcasses were observed. Four bloated carcasses were lying in shallow water

and no attempt to utilize these animals had been made. Other wounded animals had dropped too far from the hunting scene to be easily located by the Eskimos. Two wounded cows hobbling about the scene were ignored by the natives.

Such wastage has been reported by many writers during the last century and the early part of the present century. It is regrettable that these conditions still exist. From interviews with wardens, traders, missionaries and trappers in the northern parts of the provinces and the Northwest Territories it is known that excessive wastage is widespread throughout the whole range of the caribou and is indulged in by Indians, Eskimos and some European trappers.

*Man's Influence on Habitat.*—Not only does man wastefully destroy the caribou itself but he causes forest fires which ravage its habitat. Lichens, the caribou's chief winter food, are exceedingly slow-growing plants. A burnt over lichen area may take twenty-five years to regenerate. If the humus is destroyed the loss is for all practical purposes permanent.

The tundra and the northern fringe of the taiga are largely unaffected by fires, but there have been large destructive fires in the heart of the taiga winter caribou range. It is difficult to assess the full effect of recent burns upon the population of the species. Hitherto it has meant a shift of the herds to other areas. It is probable that, were the larger part of the winter range destroyed by fire, the caribou population would be reduced by starvation.

**THE FUTURE.**—All the evidence from 1948 to 1956 has shown a continuous decline in caribou numbers. The present population of caribou is large enough to supply all the basic needs of the dependent human population on a continuing basis, if only really needed caribou are killed and if there is no wastage.

It is this wastage which northern people must take the lead in curbing. Government legislation cannot effectively prevent wastage in the remote areas of northern Canada. Restoration of the caribou can only be accomplished through an enlightened and aggressive programme of conservation education, which will bring home to each hunter his own responsibility. Such a programme should emphasize long-term conservation and it must reach not only the children but the present-day hunters or we may have few caribou for the children to hunt.

Government policy has already set aside the caribou for the benefit of northerners by the prohibition of non-resident sport hunting in the caribou range. If the resource is to be maintained,

the number taken by northerners should now be restricted to the actual need.

There are some who say that the caribou is doomed in any case in the course of northern development, and that we should not concern ourselves with its fate. But this need not happen, for in Alaska caribou are increasing under proper management. Large areas of tundra and stunted spruce forest can best be used in raising these animals which are adapted to living on arctic and sub-arctic vegetation.

Caribou husbandry is not tedious work. Given adequate protection and herd management the migratory caribou can supply annually approximately three million pounds of good meat delivered free in many areas of northern Canada. In addition, possibly 25,000 hides could be utilized for clothing and sleeping robes. All this bounty would be produced without the work of feeding, herding, corralling or sheltering the stock. Considering the cost of domestic meat and winter clothing in northern Canada, one can appreciate the value of this natural resource. That is why the people of the north should be vitally concerned over the caribou crisis.

#### ACKNOWLEDGMENTS

Department of Northern Affairs and National Resources, Canada, National Parks Branch, Canadian Wildlife Service :—

The Barren Ground Caribou, 1951.

Preliminary Investigation of the Barren Ground Caribou, 1954.

Barren Ground Caribou Populations and Utilization, Winter, 1955-56.

*The Beaver*, spring, 1956 :—

The Caribou Crisis.

#### AUTHOR'S NOTE

*Species of Caribou.*—The caribou inhabiting the continental barren grounds west of Hudson Bay were first described by Sir John Richardson in 1829. They are recognized as the barren-ground caribou *Rangifer arcticus arcticus* and are still the most numerous of the North American caribou herds. Other populations of the *arcticus* group occur in Alaska, the Arctic Archipelago, the Ungava Peninsula and the northern Rocky Mountains. The larger woodland caribou, *Rangifer caribou*, is found in scattered groups in the Boreal forest to the south, from the Mackenzie River valley east to southern Labrador. An allied race occurs on Newfoundland. Introduced Asiatic reindeer are confined to the Reindeer Preserve at the mouth of the Mackenzie River, in Canada. They may be generally recognized by their stockier form and shorter legs in comparison with native caribou. The occurrence of white and spotted reindeer is also helpful in identifying a group. At present there is little chance of mixing reindeer and caribou because caribou are rare in the vicinity of the Reindeer Preserve.