

Tradition tells us that in times long past, the fields with their crops now on the verge of the precipice, were once nearly a mile from the sea; but every year, nay every day, is preparing for them a "watery grave;" and where the husbandman now guides his plough along the furrowed earth, the fisherman will some day (perhaps not far distant) be seen steering his little craft through the foaming waves.

N. B.—Reference is made in several parts of the foregoing paper to "Figures" illustrating various deposits; but it is hardly necessary to reproduce them.

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ART. VI. ON THE MAMMALIA OF NOVA SCOTIA. BY J. BERNARD GILPIN, A. B., M. D., M. R. C. S.

(Read February 13, 1871.)

*Lepus, Americanus*, (Erxleben, Shaw, Richardson, Dekay, Audubon, Baird.)

*Lepus, Hudsonius*, (Pallas, Bodaert.)

*Lepus, nanus*, (Schreiber.)

*Lepus, Virginianus*, (Harlam.)

*American Hare*, (Penant, Foster.)

THE AMERICAN HARE.

From measuring many specimens before me, the following are the least and the greatest measurement I have made:—

Length of body.....	17 inches.
Length to outstretched hind leg.....	24 "
Length of body.....	20 <sup>7</sup> / <sub>10</sub> "
Length to outstretched hind leg.....	28 <sup>5</sup> / <sub>12</sub> "
Length of hind leg.....	5 <sup>2</sup> / <sub>10</sub> "
Height of ear.....	3 <sup>5</sup> / <sub>10</sub> "
Length of head.....	3 <sup>5</sup> / <sub>10</sub> "

Their bodies seeming to vary more than their extremities. The smaller were doubtless the young of the year. In form they shew the usual leporine characteristics of arched forehead, high back and great length of hind leg, a crouching attitude when in repose with feet

concealed ; in swift motion a rapid galop of immense leaps, with hind legs thrown far behind ; and in slow motion, the hind legs with the whole foot to the heel resting upon the ground. The colour of one before me snared 1st November, 1870, is, head, neck, back, and upper parts, sepia brown, with a yellow wash. At base these hairs are lead colour and covered by lead coloured fur. Belly white inside of fore legs, and fronts of thighs and legs to hind toes mixed white and brown. Inside hind legs white. Tail white, with mixed sooty hoary on the top, throat and fronts of forelegs yellowish brown, underneath the throat or chin greyish white. A dusky line leads from the tip of chin, emarginates the nose and runs up to the forehead ; there is also inside of this a white margin to the nose. Whiskers black, about four inches long. Ears outside fold or front brownish, the backs hoary, a narrow black edging on two thirds of the ears terminated in the broad black tip, the inside of the ear was furred about an inch downwards, giving a small white lining to the black border, the rest naked. The feet, both fore and hind, covered by thick, yellowish rusty fur. There were many coarse darkish hairs all over the back, and the base of all the hair either brown or white was lead colour. The eye was large and yellow, the nostrils frontal oblique, concealed by nose. Upper lip deeply divided to above insertion of frontal tooth with a naked membrane extending into nostril. The fore feet had four toes with a rudimentary thumb, the hind feet four. The toes both hind and fore are connected by a membrane to first joint and are densely furred. This, snared in November may be taken as a specimen of summer pelage, before the winter change. I notice that Baird describing the same hare from more southern specimens speaks of brilliant reddish or cinnamon tints. Ours exhibit none of those tints. Should I colour a drawing of one I should use sepia and cover with a yellowish wash. During the month of November, they change the brown tints for a soiled and rusty white. The following description from one before me, taken the middle of January, will serve as a description of the ordinary winter pelage.

Colour of all the upper parts, white soiled by rusty ; the lower parts and hind parts, hair white as regards the belly, and soiled white behind. The hair or fur is much longer and coarser on these parts. All the fur both upper and lower is lead colour at base, that on the back is rust in middle and white at the tips. The nose and chin are always rusty ; a rusty circlet usually surrounds the eyes, and the front folds of the ear is of the same colour. There is a streak of rusty down the front of fore legs, and sometimes on the front of hind legs. All four pads and feet are yellowish rusty. The tail is concealed by white longish hairs and the sooty spot on its extremity nearly concealed by them. The backs of the ears are nearly white, a black rim bordered by white and a black tip remains as in summer.

Thus in studying the changes, we find the white belly, the rusty pads and feet, and the borders and tips of the ears, remaining unchanged ; all other parts turning more or less soiled white and

the sepia brown changing into rusty. The variations in the intensity of this colour in different individuals, are only numbered by the individuals themselves. Some even in mid-winter remain unchanged, and again I have noticed two or three nearly white and stained by the sulphur wash so common in the winter weasel. But generalising, pure white below, rusty white above, and pads, nose, chin, circlets around the eyes, fronts of fore legs, and of ears, rusty, may be called the winter pelage.

On the first of November you scarcely see any change upon them except a little grizly on the forehead, or the fronts of thighs getting white. By December the change is complete. The change back again as the animal is not so directly under our notice is not so well known. However in mid-May, I have seen the forest filled by brown hares. Their gambols and attitudes reminding me of the maxim "as mad as a March hare." This, no doubt is their sexual season, and analogy would make us suppose they had completed their summer coating. As regards the nature of this change my observation leads me to suppose it is caused by casting the old hair and having it renewed by a new coat. The spring change undoubtedly is thus caused, and nature never employs two different causes. Those who maintain that it is caused by a sudden change of colour, must explain how the end of each hair is only changed, the base and middle remaining unchanged. In confinement it is said they never change. I have no experience in this but it is probably true, as I have seen, as before stated, individuals, unchanged in mid-winter. This hare is very numerous in our Province. Half-way in size to the Polar Hare, (*L. glacialis*.) which changes into pure white and which inhabits Newfoundland and Labrador to the Arctic circle, he is one half larger than the wood hare, which inhabits Southern N. England (*L. sylvaticus*.) and which never varies. Though our hare strays into N. England and is found near the Arctic circle, neither of these species are known with us. His habits are solitary and so vigilant or shy that you scarce put him up in the forest, yet the thousands that are snared for the Halifax market, or the new fallen snow, covered and crossed and recrossed by his tracks, attest his numbers. The hemlock swamps are his favorite places, in the bunches of the long

tussock grass there abounding, he makes his simple form—his food the various grasses, and when he can obtain it, the tender twigs and bark of the white birch. It is a common practice to fell a white birch in the forest to attract them. The next morning the numerous tracks in the snow and the many victims, each snared in his treacherous noose, attest their numbers about, though you may have searched the forest around the day before, and unseen, solitary, vigilant, each hidden in his shallow form, not one would have met your view. The tender buds of the black poplar and the leaves of the pyrola are both said to afford them food. The female brings forth her young in May or early in June, from four to six at a litter. She is said to have two litters in the year in southern N England; but here, judging from the size of the young, I do not think she produces more than one, though of this I am uncertain. Entirely defenceless, depending upon her extreme watchfulness for her safety, she seems an easy banquet spread for our carnivora. The crafty fox and sly lynx prey upon her. The great tree weazels, the fisher and the martin, hunt her down. The weazel winds on her doubles, and men and idle boys cross her path with snares, and yet nevertheless such is her fecundity and vigilance that she in her generations will see them all out. The number of sixty thousand skins collected by one man at Halifax, during one season, attest her present number in the Province.

Such is our varying hare; our forests abound with them, yet only twice, except at the April meeting, have I ever met them. Once a half-breed dog put one up, and I had the opportunity of seeing two or three nice doubles, before she came into the open. Here the stupid hound ran headlong over her scent, and she escaped. Once again I saw one, near an old saw mill, sitting on her haunches, her long ears pushed forward, and fore leg hanging loose. In the April before spoken of, I stood upon a tussock of winter killed grass and counted seven that I could have tapped with my trout rod, and the forest all around seemed alive with their moving forms. Nothing but sexual instinct could have produced such a gathering. Usually she sits in her form in summer, brown as the dead grass and old hairs forming it, in winter white as the snow drift in which her tawny paws have scratched a hollow bed,

in either place all but invisible, with her ever vigilant eye watching every object, her great pendulous ears thrown toward every vibration, and her soft feet ready for a swift and noiseless retreat. No wonder she escapes our observation, or that in the stillness of the northern forest we marvel where the hordes are, that last night left their thousand footprints on that feathery rime that covers the hard crusted snow, on each day's night of those brilliant sunny March days of our tardy Spring.

This ends our list of Rodentia, yet one introduced species must be added to it. The domestic rabbit (*Le cunicularius*), which introduced about seventy years ago on Sable Island, suffered to become wild, and never recrossed by new individuals, has entered its feral state. They have grown larger in size and have almost entirely assumed a common livery of silver gray with white collar. They burrow in the sands of the Island, feed upon its rich grasses, and wild pea vines, and apparently live without water, as colonies of them live at least five miles from any fresh pond.

We come next to the Ruminantia, passing over the orders of Edentata, Solidungula and Pachydermata, of whom we have no representative in the Province except of the Solidungula, in the horse introduced into Sable Island some hundred years ago, and suffered to assume the feral state, and on which a paper has already been read before the Institute. Our ruminantia include only two individuals, but they make up for their fewness by their beauty, and the majesty of their antlered proportions—the Cariboo and the Moose deer. We cannot refrain from some few generalisations arrived at in the study of a boreal fauna. We find animals of the most opposite construction, braving a northern winter. It is not as if there were animals fitted for the pole, and others fitted for the equator, but as if both kinds were mixed together and tropical forms live beside the arctic. Thus we have the marmot, a true boreal form protected from the cold by hybernation; and the mouse a cosmopolite but with the thin coat and naked leg also protected by hybernation. We might say this is his natural protection, unable to endure the cold he sleeps through it; but we are met by the fact of the shrews with still finer coats, and limbs so fragile that they seem needles, bearing the lowest temperature, active and

nimble, beneath a thermometer of  $-15$  degrees. The beautiful red squirrel sports with his naked palms on snow, standing at the same low level, whilst the ground squirrel is fast asleep in his well lined burrow. We are apt to say of the ermine and sable that their thick lustrous fur, well covered pads and ears, and strong carnivorous diet enables them to endure the low temperature in which they delight, yet we have side by side with them our spare vegetable cater, the hare with its long naked pendulous ears, (apparently the very subjects for frost bite) sitting in its snowy form, whilst they have sought their burrows. Thus, though it is very true the furry foot of the great day owl and winter falcon, of the northern lynx, and the isatis, of the ermine weasel, ptarmigan, northern grouse, and polar hare, are the true livery of the north, yet we find animals equally bearing it with naked limbs and thin coats. It seems that something akin to what geologists say has taken place in the physical world, has also influenced the animal one. As the gorgeous tropical flora of the carboniferous period, attest to the sunny days once ruling at the arctic circle, so too may the fauna have been equally disturbed, and have left the remnants of their races behind them in times far subsequent to those stony records.

No true boreal forms exist at the equator, and these remnants of equatorial life, if they be such remnants, seem endowed like man to retain life in every degree of cold or heat.

Since the above paper was read Mr. Welch, the asst. surgeon, 22nd Regt. has sent the Institute a paper read before the Zoological Society, London, April 8th, 1869, entitled "Observations on *L. Americanus*, especially with reference to the change of colour, &c." In this very able paper the writer concludes that the change of colour is gradual, taking about seven weeks, and is caused by a new growth of white hair, and also by the summer coating becoming white on its tips as well as thickening as regards each hair, the cause being the suspension of the secretion of the *Pigmentum nigrum*, and that there is no shedding process going on. I have thought it best not to alter any remarks I have made, but to make further observations, no doubt caused by reading Mr. Welch's paper. He has studied a much more boreal animal than ours. His changes take place in October, ours in November. He

speaks of a pure white with leaden base, our animal never reaches this; a rusty white in mid-winter is all ours attains to. Our nearness to the ocean causes our climate to approximate to southern New England, where the hares become in winter only hoary. Mr. Welch has the credit of publishing the first original, exact, and exhaustive articles on change of colour caused by climactral influences, ever given to the public. My observations were made from the Halifax markets, which are abundantly supplied with hares. Beginning the 18th October, I found one with two white whiskers. On the 30th I found one with a whisker half white and half black, but in no other respects changed. On the 9th and 10th November, I examined many more, one had hair in front of thighs getting long and white, several more had the same appearance on fronts of thighs, but in addition, the rump and tail becoming covered with long and white hairs, a white patch each side of the nose, a patch upon the forehead and backs of ears becoming hoary. One had a patch of white running up the side of the belly, in front of thigh. The whiskers were generally white. November 18th a very large buck hare, had forehead to the eyes white, spot middle of forehead and back of eyes white, backs of both ears and stripe running down nape of neck, white. Some white and long hairs in front of fore legs, (which are also becoming rusty) and shoulders with long white hairs, the hind legs, with exception of toes and pads are soiled white, this soiled white has invaded the whole rump tail and is creeping over the hind flanks and down the back to about two inches. Under a strong glass, this soiled look is caused by long black hairs scattered about. The brown fur still remaining is short and lustreless, still having many black hairs through it, and the edges ill defined where it borders upon the white. The toes both before and hind are light rusty, and all the pads, rusty white, and much thickened in patches; on opening the fur on the brown parts and examining it with a strong glass, the basal fur is seen, and through it a short crop of white hairs, sticking up and crossing each other in all directions is seen. In the pure white of the belly and where the change has taken place, this crop is not seen. Every where the long white hair is thicker than the old brown hair which comes out on pulling, about as easily as the new.

In this specimen, is a short crop of white hair, new long white ones, and many long black ones, both in the changed and unchanged parts. The light rusty streak on the fore arm, fore and hind toes, is not I fancy a new colour gained, but caused by the absence of the numerous small black hairs which in summer sprinkled upon these parts give a sepia brown to them, but being absent a light rusty colour pervades them.

*27th November.*—In this specimen the long winter coat had pervaded the whole animal: pure white below, soiled or rusty white above, especially upon the dorsal ridge. The nose and about the eyes rusty; the ears hoary rust; the front folds deeper rust. The tip of the hairs white, the middle rusty, the base plumbeous. The back had still a soiled black look, which under a strong glass, was caused by numerous black hairs about two inches long and black to the roots. The whiskers are some black, others black at root, and white at tip, others all white. The pads hind and fore are of a deeper rust, and longer and thicker; the toes both hind and fore, light rust. Under the glass the short black hairs which in the summer specimens are numerous in these parts and causing the brown sepia tints, are very few. The same cause is making the fronts of the ear rusty. Though this specimen which was a large buck had so nearly completed his winter change, yet I had to search some fifty specimens, all in the earliest state of change, before I could obtain it—the mildness to this date, of the winter, causing them to change slowly. In a specimen taken about 21st January, that is mid-winter, there was a little rusty colour on the nose, about the eyes, on the front folds of the ears, nape, chin, fronts of legs and toes both hind and fore, and heels, the rest more or less, white; the belly, fronts of thighs, and rump, had long loose hairs, plumbeous at base, white at tip; the dorsal parts had shorter hair, plumbeous at base, rusty in middle and white at tip; this middle rusty, continually showing through the white tips gave the animal a soiled rusty white appearance. All the long black hairs of summer have disappeared; the bright rust of the legs, far brighter than any summer tints, is produced by the absence of the short black hairs, which in summer toned these parts down to a sepia brown; the whiskers are black. I think the change in this



may be considered complete except the whiskers. I have noticed other specimens where the sides and dorsal regions were mottled white and brown on the whole surface instead of changing in patches.

From these observations, we gather that the first appearance of winter change occurs in front of thighs, and rump, that almost immediately the backs of the ears become hoary, and white patches appear on the sides of nose, cheeks and forehead, and that whilst the white of the rump is stealing over the tail and up the back, the white of the belly is rising to meet it, and the patches of white are stealing over the face, the nape and fore shoulders; that in some comparatively rare instances a general mottling of white and brown takes place, instead of these regular approaches. The hare in his full winter coat in Nova Scotia is pure white beneath and on thighs and rump; rusty white on dorsal regions; nose, around the eyes, front folds of ears, fronts of fore legs and hind legs, light rust. The pads and the narrow black edge and tip of ear remains unchanged, the pads being soiled white or light yellow. On the dorsal regions the hair is plumbeous at base, rusty in middle and white at tip; beneath thighs and rump, longer and plumbeous at base with white extremities. With regard to the secondary cause of these changes but little can be found in systematic writers. Mr. Welch attributes, in his able paper before mentioned, to first a new growth of long and thicker white hair which as it were out-colours the brown, and to a change of colour in the remaining brown to a pure white with plumbeous base, and that no shedding takes place. From his description he has studied more boreal specimens than ours, since he calls the animal pure white. Whilst he has the analogy of the whiskers, which we know do not shed, and which we study from time to time, now all black, now the tip white, now all white, and whilst there comes to us a certain conviction we are studying the same individual hairs, yet in other animals which we have watched more closely there is an autumnal change. Our horses as everyone knows, who rides them or inspects the stables, have a large autumnal shed, a strawberry roan especially an old one, will have broad patches of hoary on his rump in mid-winter. The cariboo sheds by handfulls in November, as also

does the Virginia deer. The very bright rust on the fore legs, caused under a strong glass by the absence of minute black hairs, existing in the summer coat, can only be accounted for by shedding. In the few polar hares I have studied, from Labrador and Newfoundland, the entire animal is pure white except edge and tip of ear black; a very faint rust on the fore arm just points to a semblance with ours. The summer pelage is a beautiful pencilled French grey, with the entire ear of a velvet black, at least that was the colour of a skin from Labrador.

### THE CARIBOO.

- Cervus tarandus, cariboo*, (Linn., 1792.)  
*Rangifer, cariboo*, (Aud., Bachman, Baird.)  
*Cervus, tarandus*, (Godman, Harlam.)  
*Rangifer, tarandus*, (DeKay.)  
*Cervus tarandus, Sylvestris*, (Richardson.)  
*Tarandus, rangifer*, (J. B. Gray.)  
*Cervus, hastalis*, (Agassiz.)

From these synonyms we learn that the doubt still unsettled, whether our Cariboo and the Lapland Reindeer are identical, commenced with the great father of the science, Linnæus. That there should be seven or eight synonyms since his day, and that such men as DeKay should call him *Rangifer tarandus*, and J. B. Grey of the British Museum, *Tarandus rangifer*, and neither accept Linnæus' specific "Cariboo," argues little for that simplicity of nomenclature now so greatly needed. It would go a great way to solve the doubt, if a thorough and scientific description of our cariboo could be made and recorded; but for this at present I have no materials, and so seldom now have we the unbroken deer brought to town, I fear years might elapse. The following description from my recollections taken from one live one, and the carcasses of many dead ones must suffice:—

A full grown cariboo stands about three or four feet at the withers, the doe something less; the head is large and narrow, the forehead having no dish in it, but straight, the lower line also straight; the muzzle entirely hairy. We miss the wide swelling forehead, the elegant curve

and pointed muzzle of the more southern deer; the neck is short and carried low with the hair long and flowing on its lower surface, the back rather straight, powerful loins and haunches, body heavy and supported by stout and thick legs, and large wide spreading hoofs of the blackest dyed horn.

The animal stands with its weight resting upon the dew-claw, or back hoof. Thus we see an arctic type; strong, low, broad, fitted for fatigue, living in low, ever-green woods and swampy barrens in summer, in winter running freely over the snow. Both sexes have horns, the doe comparatively small; with great irregularity of form, those horns are all regular in two or three typical marks. They have almost always one brow antler, broad and palmated over the eye, the other corresponding antler round. A second brow antler fronting forward, a few inches above this; and the main shaft of the horn turned forward, more or less palmated, and with more or less tines, all coming from the back or convex surface of the horn. I possess a pair of horns, in which the two brow antlers are symmetrical, resembling clasped hands over the forehead. I possess another pair of very small horns, with one simple brow antler, and but one tine from a scarcely palmated horn. This last came from Labrador, and I think is a doe's. The other may be either a Nova Scotian or Newfoundlander.

Between those two, which may be considered the ultra extremes, the variety is endless. The bucks cast their horns in January and February, the does retain them a month or so longer. The colour varies in summer and winter; the winter coat, that which I am most familiar with, is thick and long, of one prevailing soiled yellowish white. The hair on the neck, breast and belly, rather whiter than on the back, and the rump and tail white. The legs on the outside are brownish, and have a fringe of white hair over the instep, and extending to the back hoofs. In summer, towards July, this thick soiled white coat is removed, and in its place a fine clove brown, sometimes bright yellow brown (according to Captain Hardy) on every part, save the neck and shoulders, rump, tail and belly, with inside of the legs which are white; the ears brown and forehead white. Mr. Eagan informs me that in a September skin he saw, the line between the white and the brown was well defined;

those I saw myself I took no notes of. In Captain Hardy's (an accurate observer) sketch, the whole neck is represented white and long haired, but not reaching behind the shoulders; whilst in Sir Wm. Jardine's coloured drawing of the Reindeer, the white extends far backward to the quarters. Audubon also mentions a faint white streak behind the shoulder. The legs of a doe killed in September were beautiful mouse colour, with a wash of dun. James Luxy, (Alexis,) an Indian hunter, says that when the does have fawns, that is July or June, they have a black ring about their eyes, (Hardy's black patch on the cheek,) and also the white of the neck extends farther upon the side. (Sir Wm. Jardine's coloured sketch of Reindeers shows this.) Of two legs with hoofs before me, killed winter 1871, the colour is deep brown, I should use sepia in drawing it, with a white fringe around the coronet, running back to beyond the dew claw. Thus in summing colour up: In winter, soiled yellowish white; neck, rump, tail and under parts, pure white; legs white inside, outside brown, with white fringes. In summer, neck extending into fore-shoulder, rump and tail, under parts and inside of legs pure white, all other parts clove brown; sometimes reddish and yellowish, with black patch on cheek and eye, and white fringe on hoofs. In colour then our own Cariboo assimilate closely to the Lapland Reindeer.

In studying the hoof before me, nothing can exceed its beauty of finish. The inside a perfect cavity, the frog all absorbed or dried away, the outside rim with a beautiful cutting edge. The animal must stand almost like a woman upon pattens, on four rings, upon any hard surface, in descending slopes, the dew-claw behind would bear slightly on the surface. The whole too is enveloped in a beautiful fringe of coarse hair, curling down over the black hoof till it nearly covers it, and passing between the toes to form a thick mop of coarse hair, wrapping the sole and dew-claws in a warm cushion. On glittering ice or slippery slopes how secure this ice foot, with its keen circular cutting edge; in soft snows, spreading the toes it forms a broad cushion to hold up the deer upon its treacherous surface, as well as to shield it from the cold. We are immediately struck with an analogy most unexpected between the hairy foot of the deer and the feathered leg and claw of the winter

falcon, and great northern owl; and we are apt to speculate how the deer, passing north, has had his limbs thus clothed in hair, and has departed from the typical slender, satin-skinned foot of his race. Yet geological facts deny the assumption; they teach us that once there was a world that produced nothing but bitter lichens and sour mosses, scantily growing beneath winter suns, and upon glaciated wastes, and that there came a thick-legged robust deer to browse upon these mosses, with his thick coat and hairy hoofs, the first type of deer the world ever saw, the companion of the U. speleus, the cave bear, the extinct hyena, the rhinoceros, terchoorinus, and the primordial elephants, all extinct but himself; so runs the record of the geologist, carried out in his stone-flora, and by the bones found in the upper tertiaries. How far the earth's surface was thus covered is conjecture, perhaps near to the equator. As genial suns under a better climate produced more exuberant crops, this arctic species gradually retreated from the pole. In Europe, he has retreated to Lapland; in Asia, to the shores of the Arctic ocean, where herds are kept by the Tungeses; in America, a few are left in Nova Scotia; more in Newfoundland; and the rest are all driven back toward the polar circle.

Nova Scotia, with its latitude between 43 and 44 north, is their lowest southern habitat now existing, and consequently the most interesting place to study them in. The following are the dimensions of a buck killed this winter, in Digby county, by my son; they were taken upon the spot, thirty miles from the sea, marked upon his waist-belt, and carefully taken off on returning home.

Length from tip of nose to tail,.....	7 ft.
Height at foreshoulder,.....	4 ft. 10 in.
Girth at foreshoulder,.....	6 ft. 4 in.
Girth, thickest part of neck,.....	3 ft. 7 in.
Length of hind leg, from hip, ..	5 ft. 5 in.
Length of fore leg, ..	2 ft. 6 in.
Girth of hind leg, largest part, .....	1 ft. 2 in.
do do smallest part,.....	7 in.
Girth of fore leg, largest part, .....	1 ft 1 in.
do do smallest part, ..	6 in.
Tip of nose to ear, .....	1 ft 8½ in.
He had no horns.	

These dimensions are enormous, but are fully carried out by Captain Hardy and other authors, though doubted by Sir John Richardson, who, accustomed to the Arctic variety, weighing when dressed sixty pounds, and which the hunter tossed over his shoulder, thought a cariboo weighing four hundred pounds must be a mistake for another species of deer. I have now given his appearance, colour winter and summer, structure of hoof, his weight and dimensions, and in this have rather shunned authors, but taken my own and the observations of eye witnesses. The only one I have seen living was a young doe without horns; she was of the soiled white or winter colour, and resembled Bewick's wood cut of the Lapland reindeer, and also Landseer's exquisite etching of a cariboo's head, after Captain Back, (*Fauna Borealis*.) The plates from "Mammals of Zoological Gardens," and of Sir Wm. Jardine, copied by all writers, though no doubt good representatives of reindeer, were less like her.

It now remains to give a sketch of his habits in our own Province. Formerly very abundant, and in our own time plenty, as the skins brought to market some fifty years ago showed; but few skins and scarcely a carcase of meat in one or two years finds its way now to town. Therefore if they are becoming extinct, it is not by the hand of man. When I lived in the western counties, a year or two would elapse before one was killed; we have no wild animals which destroy them; wolves, happily extinct, are the only ones to be dreaded. If then they are becoming extinct, it must be by that noiseless way that wild animals fade out of sight, as their feeding grounds become encroached upon; they lose their reproductiveness, the doe has fewer fawns, the buck becomes early barren, the devoted race dies out. Now, the food of this ancient deer exists as it did in Pleistocene times, perhaps on the very spot, but in less abundance. Forests have sprung up, and grasses have given verdant carpets to a warmer soil; the lichens and mosses his food, (*Cladonia rangiferina*) (*Stictia pulmonaria*) (*Usnea*) are now found in isolated barrens, or cariboo bogs as they are termed, and they are every year encroached upon. The great cariboo bog at Aylesford, the water shed of the Province, has a rail road running for five miles on its surface. The table land of the north

mountain, from Blomidon to Brier Island, once a favorite resort, is now become strange to them; a part linger about the Cumberland hills, the lake basin of the Shubenacadie, the St. Mary and the Tangier hold a few more; Margaret's Bay and the basin of the Avon might shelter a few, and finally the great western lake basin, and barrens from whence flow the Annapolis, the Sissiboo and the Bear into the Bay of Fundy, and the Liverpool, Shelburne, Clyde and Yarmouth, into the Atlantic, is their last hold. Accustomed in ancient days to roam the Province, this restless, wandering creature, is confined to those isolated spots, where he scents the tainted gale of man, or hears his axe on the down wind, and with a snort seeks a deeper solitude, if haply one may be found; this must go far towards his extinction. Thus our cariboo may be said to range in those different lake basins, in herds of from two or three to seven or eight; the does to produce their young in June; and the rutting season to be in September. It is rarely that they are killed in summer or fall, unless accidentally seen on the barren and stalked. It is impossible to track them in summer woods; on the winter snow he leaves a wide track, and though from his fleetness in running over the snow, on which his broad foot holds him up, it is impossible to chase him with snow-shoe and dog, yet he may be stalked silently, and come upon within a hundred yards to windward, whilst pounding the snow with his fore foot from above the lichens. The following is a brief hunter's diary, sent me fresh from the spot:—"We struck the tracks on a barren; they were a day old; followed them about two hours; then came upon them on a barren, digging the snow with their feet, to get at the mosses they feed upon; they were in plain sight for five hundred yards either way; crept up to within one hundred yards, and missed them; they ran right towards me; killed one at forty yards; as they ran by me killed another at one hundred yards; still running killed a third at two hundred and fifty yards; at four hundred yards fired and missed; still again at five hundred yards fired and missed." Thus here were six shots, and five loadings, from a single barreled breech loader, whilst the deer were going five hundred yards. The last two shots, fired from a single Enfield breechloading rifle, may be considered forlorn hopes, sacrificed to the love of sport, as few

marksmen are good for running shots, at four and five hundred yards; yet considering the cold, and the position covered by snow, the firing was rapid.

As the question now stands, Nova Scotia has a deer identical with that of Newfoundland, Labrador, and what may be called the southern limits of the polar circle, but larger than all. Lapland and the north of Asia also possess a deer, supposed, but not identified, as the same species, both smaller than ours. Reindeer, cariboo, and woodland cariboo, are their local names. In addition to this, the extreme north possesses a deer smaller than any of those, with much larger horns, and with no gall bladder, otherwise the same. Sir John Richardson calls them a permanent variety, naming them Barren Ground cariboo. The absence of the gall bladder seems a very great divergence; yet can any one tell me has our own cariboo one? The horse we know has none. Finally, bones found on the upper tertiary of this ancient deer, and also in ages long subsequent, in the kitchen middens of the pre-historic man of the old world, as well as in our own of more modern date, undoubtedly prove him to have lived side by side with forms that have forever perished; again to have been the food of man of the stone age, who crushed his bones and tore his bloody flesh with their rude axes, where now their polished descendants carve in silver and steel, and which pushed backwards to the snows and lichens of the Poles, affords still the same rude banquet to the man of stone of the nineteenth century. Most enduring form, most ancient type of all deer extant, this broad-spreading, hair-cushioned foot, with its cutting edge, how many forms has it survived, how many new forms born of itself; of satin-skinned deer, with pointed toe; or African sun-dried deer, with hoof a nut-shell—has it seen.