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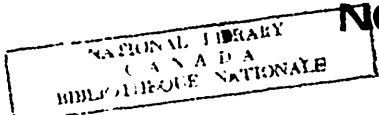
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THE OTTAWA NATURALIST.

VOL. XIII.

OTTAWA, NOVEMBER, 1899.

No. 8.

NOTES ON A GEOLOGICAL TRIP OVER A PORTION OF THE CANADIAN NORTHWEST TERRITORIES.

BY T. C. WESTON, F.G.S.A.*

It was my privilege while a member of the Geological Survey of Canada to be assigned, in 1889, the task of exploring and collecting objects in natural history and archæology from the banks of those portions of the Red Deer and South Saskatchewan rivers lying between the fifth principal meridian and the South Saskatchewan landing, a distance of about four hundred miles; but taking in the hundreds of small turns in those rivers, probably double that distance. Taking the Canadian Pacific train from Ottawa to Winnipeg—that wonderful city which has sprung up within the last few years—we continued by the same line to Calgary, which is close to the beautiful Bow River, 2,142 miles from the capital of the Dominion of Canada, in sight of the Rocky Mountains, and 3,413 feet above the ocean. The city of Calgary stands on a beautiful plateau which only a few years ago was the favorite camping ground of those war-making Blackfoot Indians, a portion of which tribe occupies a reservation a short distance from Calgary, while others of the same tribe camp on the outside of town, preferring to pick up a precarious living rather than be confined in the reservation provided for them by the Canadian Government.

Here I find my half-breed Indian, Mackenzie, with wagon and horses. He has come from his home on the banks of the Red Deer, a hundred miles from this, to meet and accompany me

* Portions of this paper have been published in another form in Mr. Weston's "Reminiscences Among the Rocks."

on a long journey across the plains and down a river where very few white men have been; and which with regard to its fossil fauna and flora, is scarcely known. While waiting for a portion of our camp equipment, Mackenzie and I spent a day or so in examining the rocks about a mile from the C. P. R. depot and within a few feet of the Elbow River. This is our first exposure of the Laramie formation, a division of the great geological column which forms the upper part of the Cretaceous and the lower part of the Tertiary. The Laramie rocks we were about to examine are composed of fine and coarse sandstones, conglomerates, sands, silts, clays and lignite coals, detailed descriptions of which may be found in the reports of the Geological Survey of Canada. We find here, as I have said, our first exposure of the Laramie rocks, an escarpment called the "Hog's Back." It is a cliff of about 100 feet in height; the upper part is a coarse gravel and the lower portion a fine grained yellowish sandstone, which has been used in the construction of buildings. It is in this sandstone we find our first fossils, remarkably well preserved plants, characteristic forms of the Upper Laramie formation. The rocks here have acted beautifully as a botanical press, for some of the leaves are as perfect as when they fell from the trees untold ages ago. Sir J. W. Dawson says (Trans. Royal Soc. Can., Sec IV., 1889): "They belong to two species, *Populus Richardsonii*, and *Quercus platuma*." The latter species is represented by leaves of great size, one of which is twelve inches in length without the petiole. These leaves are not unlike the leaves of our largest species of poplar, and it is supposed that the climate at the time when they grew was similar to that of the present day. These rare examples of the fossil flora of our Laramie rocks may be seen in the cases of the Geological Museum, Ottawa. But we must leave Calgary with all its interesting associations of Indian and prairie life and start on our journey. We have 100 miles to make before reaching Mackenzie's farm on the banks of the Red Deer River, about eight miles below the Edmonton and Calgary crossing.

With a good stout wagon, two horses, provisions for two months, ammunition, guns and camp equipment, we leave Calgary at 2 p.m., June 10th, take the Edmonton trail and at 8 p.m. arrive at our first stopping place—McPherson's, which is situated

in a verdant valley through which Nose Creek runs. It is twenty-two miles from Calgary, 193 miles from Edmonton and over 3,400 feet above the sea. This is a ranch farm and we receive, as every traveller does, a hearty welcome from the ranchmen (women there are none), and after supper roll ourselves in our blankets, tumble down on the floor and soon sleep soundly till the blowing of a horn calls us to breakfast. At daylight Mac finds that his horses, which were picketed in a green spot of prairie grass near the farm have drawn their pickets and left. After a ride of several miles Mac finds them quietly making their way homeward. At 10 a.m. we leave this rough but hospitable prairie farm and are again on our journey. Our nights till we reach Mackenzie's farm are spent under canvas. Space will not allow of a detailed description of the many interesting incidents which occur in a journey across the Northwest plains. On the third morning we leave the Edmonton trail, or main road, strike across the country and at sun-set arrive at the Red Deer River, which in places is a rapid and turbid stream rising and falling suddenly according to the melting of the snow in the mountains. Mac's practised eye sees at a glance that the water has risen two feet since he left home, and that we cannot cross here with our outfit. Mac is a man of few words, and says, "Keep a tight hold on the horses till I return." Tired after the day's journey, the rushing of the water, barking of several prairie wolves in the distance, together with the anxiety of the horses to get to their stable opposite, makes me a little nervous; but in a short time Mackenzie returns and says, "We can cross lower down," and soon our horses plunge into the stream; the water covers the floor of the waggon, but in a few moments we are safely over, and in a short time at the door of Mackenzie's house, where we receive a warm greeting from Mrs. Mac and her numerous family who are all typical specimens of the half-breeds of this locality. At the time of my visit, with the exception of the Rev. Leo Gaetz's farm—a little higher up the river—this is the best farm to be found for many miles; wheat, oats, in fact any farm produce can be raised here with little tilling of the land. It is the last farm on the banks of the Red Deer we shall see for probably a month.

The source of the Red Deer River is in one of the ranges of the Rocky Mountains in lat. $51^{\circ} 30'$, long. $116^{\circ} W.$, and flowing eastward joins the South Saskatchewan near the fourth principal meridian. The following morning after reaching the Mackenzie farm I find it will be two or three days before we can start down the river, so embrace the opportunity offered to visit the village, eight miles up stream, which place we reach by crossing the river on horseback and proceeding along its east bank. Here at the Calgary-Edmonton crossing the stream is rapid and over 470 feet wide. On the east side is situated Red Deer Village, which at that time (1889) consisted of two general stores, one log cabin boarding house and a few other buildings. The principal trade done by the stores is with the half-breed freighters who are constantly passing to and fro between Calgary and Edmonton, a distance of about 170 miles. The country here is beautiful, consisting of rich dark loamy prairie lands broken by clusters of spruce, poplar and other trees. The variety and beauty of the wild flowers are remarkable and makes one loath to leave so charming a spot. But we must return to the Mackenzie farm where Mac and another half-breed are busy calking and pitching the two boats which are to carry us hundreds of miles down part of two remarkable streams. Our boats have been made by half-breed Indians during the spring; they are made of half and one inch planks sawn from trees which grow on the banks of the river in this vicinity. They are rough flat-bottomed boats constructed specially for the journey we are to make.

From the Red Deer Village crossing, eight miles up stream, the river is very crooked with, in places, "cut banks" of alluvial deposits, clays, gravels, and laminated beds in which we found pieces of wood, leaves, and fragments of bone; one seemed to be part of the succrum of a buffalo; it was found with some flint chip-pings five feet below the surface. A few miles below the Red Deer Village crossing the Blind Man River enters the Red Deer between high "cut banks" and sloping wooded land. This is an interesting locality, as here we find in the calcareous clay slates beautifully preserved leaves of exogenous plants, some of which are closely allied to certain species of plants of the present day. With these are associated several species of delicate ferns and grasses belong-

ing to the endogenous family. They have been carefully pressed in nature's story-book, and are as perfect as when they fell in those bygone ages, before the probably 20,000 feet of rock, which has been formed since, covered them; in those ages when the gigantic saurians roamed these plains. But we leave this interesting spot where we have obtained some good photographs and bagged many fine specimens of the fossil flora of these rocks, and hasten back to the Mackenzie farm where soon all our traps are on board. We have divided our camp equipment in case of accidents, which may happen at any time while navigating this rapid stream. Reid—a sturdy half-breed who has had much rough experience on some of our Ontario lakes and rivers—is to take the lightest of our two boats and during the journey to take the lead, while Mackenzie and I are to follow. It is 2 p.m. on a lovely June afternoon when we step aboard our rudely made craft and loosen them from their moorings. The current here is very swift, and the moment our boats are loose they glide swiftly down the stream and in a few minutes we are in one of the most dangerous bits of navigation we shall probably encounter. It is what is locally known as the canon. High and in places scarped banks come close to the margin of the river forming a deep gorge through which a large body of water rushes over and between quartzite and other boulders. It is a dangerous spot, and I hold my breath as a large wave dashes our boat against a projecting rock, but fortunately little injury is done, and our boat shoots stern first through the remainder of these turbulent waters, and soon we are out of the canon and gliding over a series of light rapids.

Below this the valley is open and patches of large spruce occupy the sides of the stream, while in other spots poplar, grey willow and other trees form dense shelters for the many wild animals which still inhabit this section of the Northwest. Open patches and wooded lands continue till we reach Tail Creek, township 37, range 24, west of the fourth initial meridian, District of Alberta. We have now reached a most important economic locality, for here are high banks of Lignite coal. The top beds are partly obscured by drift deposits or land slides. Taking the various seams—the thickest of which is about eighty feet.—there is a depth of forty-five to fifty feet seen above the level of the

river, and below the level of the water these beds may extend for a hundred feet. At this time (1889) no attempt had been made to work these valuable coal fields. In many of the coal banks of this locality through combustion or from fires started by Indians, an enormous amount of coal has been burned, leaving the hard shaly beds which intercept the seams, various shades of color from a bright red to a dark yellow. The stratification is so marked and the colors so brilliant that we called one spot Vermilion Point. Opposite the largest of these coal deposits is a fine alluvial flat of several hundred acres—a splendid town site, waiting the time when the “iron horse” and busy hands will utilize this nature’s gift to man. For miles lower down the river we pass extensive coal banks, all showing more or less the marks of fire. The river is smooth with numerous shoal rapids and free from boulders.

GOLD.

Gold can be washed out from many of the alluvial deposits of this river and most of the sand-bars of the Red Deer will yield gold in small quantities. A sand-bar near our starting point on this river yielded to an expert at panning from one to two dollars a day. It is supposed that the gold in the Red Deer and other rivers of the Northwest has been washed from the soft rocks which formed the banks of these rivers, having in the first place been derived from the quartzite and other rocks of the Rocky Mountains.

IRON.

Clay ironstone is met with in thin beds and as nodules which contain a percentage of metallic iron. Both shells and plants are found in this ironstone; one nodule we found contained a curious member of the lobster family. We have now reached “Tail Creek” a stream of about twenty feet wide, the outlet of Buffalo Lake, to which a small band of Cree Indians we have just met are bound. They have heard that two buffaloes have been seen in that vicinity and are making their way to the big lake to try and capture them. These Indians are very poor. Two stura, members of the band stripped and swam the river to our camp with the hope of getting a little food. Here, alluvial banks of from one to two hundred feet high occupy the north side of the river, while on the south

side fine flats for agricultural purposes are seen. All these flats are well timbered with black poplar, cotton-wood, birch and spruce. We have made about thirty miles to-day. During most of the time a flock of wild geese has kept ahead of our boats. Two of their number lie on the bottom of my boat, but the sound of our gun and the loss of their comrades does not give them sense enough to take to the woods. These geese feed on a short mossy grass which grows on the muddy shore of the river. During the last two or three days I have been charmed by the singing of many small birds, and for the last two days we have constantly heard the cooing of the mourning-dove. Several bald eagles have been seen, two species of owls, and a numerous variety of small birds. During our night camps we have frequently heard the barking of the coyotes or prairie wolves; one passed us on the shore of the river this morning. He was evidently looking for a breakfast of goose. On the shores of this stream we have seen the tracks of a grizzly bear, many tracks of deer and small rodents. Several beaver dams have been passed during the day, and one fine fellow slid into the water as we approached his dam. The river afforded us a good supply of white-fish, "gold eyes," the only species we have caught so far. Some evenings the river appears to be crowded with them; twenty fine specimens were caught by one man in an hour. Although we have expected to meet with rattle snakes—as I have in similar lands of the Northwest—we have fortunately escaped so far. The geological formation we have been passing over for a few days is known as the Edmonton sub-division of the Laramie, but we are now in another division of the Cretaceous formation, and are fairly in the "Bad Lands."

We have passed through, in many respects, a charming country. High cut and scarped banks of yellowish weathering sandstones and other deposits which have yielded many interesting fossils and other objects in natural history. We have passed through valleys from six to eight hundred feet deep which in places slope gradually down from the prairie land to fine alluvial flats where a few years ago great herds of buffalo rested after their journey across the plains. Many of the buffalo tracks seen on the sloping sides of the banks and down the sides of the great coulées

are as distinct as if only made a few months ago. All the buffalo trails crossing the plains lead to water, and are narrow, showing that when they travelled they always went in single file or as it is called, in Indian file. Occasionally when the river widens out considerably the water is very shallow, passing over beds of quicksand and ooze, in which our boats frequently stuck, causing trouble to get them out before the drifting sand accumulated around and imbedded them. An incident which occurred to the writer a little later in our journey, may be mentioned here. In one of the great coulées of these Bad Lands I found it necessary to cross the bed of a small brook which leads from the table-land but which, like most small creeks at this season of the year, was dry, with a bottom apparently of hard sandy clay, on which I stepped, reaching about the middle of the brook, when to my surprise my leg sank up to my knee; placing my other foot down that also sank, and before I could throw myself forward I had sunk up to the bottom of my waistcoat. Fortunately, however, I managed to grab a sage-bush on the margin of the brook and with difficulty pull myself out of the cold slimy sandy ooze. One of my men after sounding the depth with a ten-foot pole remarked: "If you had not grabbed that bush only your hat would have been left, but we should have known where you had gone."

ISLANDS.

We passed many small islands, all more or less wooded and covered with rich verdure of grasses and shrubs. Towards sunset as our boats glide past some of these green spots, often surrounded by clear rippling water, we hear the cooing of the dove and the songs of numerous small birds, and forget the troubles and anxieties we have had in bringing our boats through the shallow waters and quicksands.

"BAD LANDS."

For the past two or three days we have been passing through the "Bad Lands" of this locality. The river averages about 900 feet wide with valleys 500 to 700 feet deep. On both sides are high buttes and long stretches of steep banks composed of sands, clays and sandstones. Wild sage, cactus and a few grasses appear to be all the vegetation these lands will support. These desert

lands, however, are precious to the geologist and osteologist, for here was the home of the great dinosaurian, a huge kangaroo-like reptile, probably from forty to sixty feet long and which as one writer says "rivalled in bulk the yet future mammoth and mastodon."

To-day we have collected from these sands and sandstones many important remains of this great reptile. Here on this slab of sandstone is the right and left lower jaw, each about eight inches long. One ramus partly covers the other, hiding the teeth, but in the upper jaw the teeth are almost perfectly preserved, and show that this creature, which existed—well, say 2,000,000 years before man trod this earth—was a carnivorous animal, for the teeth are flattened, serrated, and taper to a sharp point, showing that they were formed for cutting and tearing flesh; the enamel is as perfect as when used. With these jaws—which lie on the roof of the cranium—were found several claws—powerful talons; dangerous weapons they must have been; these, with the teeth, make one think of Tennyson's lines:

" Monsters of the prime,
Who tear each other in their slime."

Here is a femur or thigh-bone we have dug out of the hard sand. It is almost five feet long and too heavy for me to lift, but when lifted by two men crumbled into a thousand fragments. I had risked much to obtain this bone, and to see it crumble to fragments was very annoying. But we have portions of similar bones which are perfectly silicified and retain all the bony structure—Haversian canals, &c., as in recent bone; a thin slice of our fossil makes an interesting microscopic object. Other bones of the fore limbs show that they were small like those of the kangaroo, almost useless for walking. This creature must have squatted on its hind legs and supported itself partly on its heavy tail. Numerous vertebra bones were found on these sandy buttes and plains. Some dorsal and lumbar bones are three times larger than the largest vertebra of the buffalo. Other cordal looking vertebra which probably belong to the same beast taper in size to an inch in diameter. Overlying the sandstone which contained the lower jaws, cranium and other bones just spoken of, was a thin bed of hard sandstone holding on one side leaves of an exogenous tree,

and on the other side were ripple marks showing that the wind blew over the waters and the leaves fell in those untold ages ago. I should like to linger many more days among these relics of creatures never seen by the eyes of man, but my men are getting uneasy and wish to get back to civilization, so we must leave the graves of these great saurians and hasten toward the more fertile banks of the South Saskatchewan.

Continuing our journey we glide quickly, and as my man remarks, gracefully down stream. It is a lovely morning, and but for the twittering of birds and rippling of water is as "quiet as a grave." But turning a sharp angle of the river we come suddenly on a large flock of wild geese which are feeding on the short mossy grass of the shore. I am not a sportsman and hate to kill anything, but Mac says we are getting short of grub, and hands me the gun. I fire and four fall. The skeleton of one is in the Dominion Museum, Ottawa. A little further on we pass three hungry looking coyotes making their way along the shore. We pass several small islands all well covered with rich vegetation. Suddenly the river widens out and becomes so shallow and full of sand-bars that we only make two miles in six hours, then we glide into a rapid stream and make ten miles in the afternoon.

Geologically this is not an interesting locality. Clay and sand banks occupy both sides of the river. It is evidently a good home for the beaver, for we have seen three and several beaver dams. We still hear the twittering of many small birds and the cooing of the dove, a large bald-headed eagle wings its flight over our heads, and in the twilight of the evening we hear the croaky cry of the big grey owl.

Sunday, July 14th, we reach the confluence of the Red Deer and South Saskatchewan rivers, and on the 19th we pitch our tents on the shore near the Battleford and Swift Current crossing. Here there is a mounted police "shack," and we greet the first white man we have seen since we left our starting point nearly two months ago, and here we store our boxes of precious fossils. At day-break next morning we are in our boats again and in an hour or so pitch our last camp opposite the mouth of Swift Current. To the palæontologist this is an exceedingly interesting spot. High buttes of dark-colored shales, clays and sands—rocks

belonging to the Pierre shales, a subdivision of the Cretaceous and part of the Laramie formation, but lower in the horizon than the Laramie and Belly River formation from which our dinosaurian remains come from, are rich in fossils. Here in a bed of dark-colored sandstone is a bivalve shell. It belongs to the genus *Inoceromus*, measures thirteen inches from apex to base and fourteen inches across the widest part. The mollusk these shells contained must have weighed four or five pounds and no doubt would have been good eating had there been any one to eat them. Here is a large convoluted shell, an Ammonite. It belongs to the Nautilidæ family, is sixteen inches in diameter and the test or shell still retains all the beautiful opalescent colors, blended together like the colors of the rainbow; and here is a little bivalve called *Lipistha undulata* that will almost lie in one of the furrows of our *Inoceromus*. But I cannot mention here the names of the numerous fossils these rocks contain, and must ask the reader of these notes, should he have an opportunity to visit the Geological Survey Museum, Ottawa, not to miss seeing some of the specimens taken from these, at first sight, barren rocks.

Our work here is now finished and we pull our boats well up on shore hoping they may be of use to some other geological investigators, and return to the crossing by freighter's cart, sent for us by the mounted police, who kindly stored our other fossils. It would take pages to describe the beauty of the rivers we have been drifting down for more than a month. The turbid state of these streams after heavy rains, and the difficulty of navigating the shallow places are of course a drawback, but with these exceptions I know of no more delightful spots in this section of our Northwest Territories. To the geologist, palæontologist and botanist the banks of these rivers offer abundant food for the mind; to the artist and sportsman rich fields for pencil and gun. Our journey from the Battleford and Edmonton crossing to the C. P. R. was made in freighters' carts.

MY FEATHERED JESTER.

BY A. C. TYNDALL.

If anyone who has recognised the leading characteristics of that problem of humanity known in the abstract as the Boy—whose manners and habits suggest not more an absorbing interest in life and all that belongs thereto, than an emulative admiration for the ways and works, in his lighter moods, of the great enemy of mankind—if such a one I say can imagine a like joyous spirit embodied in a feathered person some eighteen inches from beak to tip of tail, he or she will have a fair idea of the individual whose manners and habits have impressed the writer as entitling him to more than a passing notice.

The subject of this biography is, to all appearances, one of those rarely met with and most enviable of mortals who find their lot in life entirely to their liking. He displays an amount of energy and an enthusiasm in his daily doings, whether his occupation be seeking a suitable place of burial for a toad he has slain or that of arranging his toilet in an elm top, which I feel sure entitle him to a high place in the esteem of that gifted bard who sings untiringly the praise of "things as they are." This is not because he views life with the eyes of the unsophisticated denizen of the wilds. His earliest recollections of life on this planet being associated with his surroundings as a privileged member of the family circle, it may be regarded as a pardonable mistake on the part of this, in some respects, amiable bird, to suppose, as he evidently does, that it is the ties of blood which unite him to the friends of his youth of a widely different description zoologically. Nothing at all cares he for the opinion of his black-coated brothers, though they jeer and scoff at him for a corvine molly-coddle, since he prefers civilization and its luxuries to the joys of the life Bohemian and the companionship of the birds of ill omen.

It is, I believe, not often that anyone meeting a member of the crow family daily fails to be impressed by the force of character and amount of will power—not infrequently wrongly exercised—common to the crow kind, independently of difference in species or sub-species. And although my feathered friend is responsible

for many acts which to say the least are inadvisable, as when, for instance, his taunting yells and peals of loud laughter on the occasion of a passing funeral cortege, bring upon his friends and benefactors the opprobrium of ill-timed mirth, since it is only by the very few that the voice can be recognised as belonging to "that crow," it must be said that none of the misdoings which bring him into disfavor with those around him suggest the weak character unfitted to resist temptation, but rather the strong, though erring spirit, governed by the conviction that whatever presents itself as being the most desirable, is the one thing possible to do.

He has lately fallen into the prevailing error of the age, and is apparently firmly persuaded that he, the individual, has a mission in life, and is called upon to institute reform in such habits among his fellow-creatures as his judgment pronounces as productive of no beneficial results.

The form this idea takes at present is seen in his determined efforts to fix in every one who comes within the sphere of his influence the habit of early rising. This self-imposed task is a heavy one as he is well aware, but he does not shrink from it, and his earnest entreaties, made at an hour when the air is as dark as night can make it, meeting with no response, in growing indignation, with the appearance of the sun his tones change to those of stern command, and these alike failing to produce the desired results, he, as a last resource, seeks an open window to try upon the sluggard the effects of a strong, sharp beak.

However, the errors which call forth the most severe censure from those responsible in some degree for his actions belong to his pastimes. He has a most reprehensible habit of concealing himself in a tree by the roadside, and from there greeting the passer-by with fearful yells and such exclamations as "Ow wow, ow wow"—sounds suggestive of nothing so much as the interesting sufferer in the dentist's chair; while the peals of loud laughter, seemingly having for their cause the personal appearance of the objects of his attention—not seldom both alarms and offends. His persistent indulgence in these objectionable forms of amusement frequently results in a coolness between himself and his chosen friends, although it is only fair to say that in these leisure moments he devotes to experimenting on the variety of sounds his

vocal chords are capable of producing, he can be highly entertaining, especially—but in justice be it said that he is not often guilty of such weakness—when his mood leads him to believe he is endowed with the gift of song.

It would be superfluous to offer anyone, be his or her knowledge of avian talents and attainments ever so slight, the information that the crow does not rank with the song birds. It may not be so well known, however, that this fact is not always recognised by this otherwise up-to-date bird himself; but the range of tones presented in the guttural chucklings, the tuneless liltings in a falsetto voice—suggestive though they always are, of a mind free from care—besides the yells already described, and other sounds indescribable, which go to make up the recitals of my would-be songster—have at least the merit of being something out of the beaten path of bird minstrelsy. The public is cordially invited to be present at these performances, which generally take place in the midst of a group of stout evergreens in the garden, the principal performer not being, to all appearances, troubled by any doubts of his popularity as an entertainer. It disturbs his equanimity not the slightest to know that his methods are regarded with the strongest disapproval by the regularly qualified songsters around him, who, he cannot but be aware, never fail to take themselves out of hearing when he starts his overture—usually a series of terrific yells. He continues with unruffled serenity, until suddenly losing interest in this means of passing the time pleasantly, he drops from his tree and appears before the presiding genius of the kitchen with a demand for refreshments.

Such are some of the distinguishing characteristics and daily occupations of my feathered jester, Jim Crow.

The Soirée Committee met last week and prepared a tentative programme which will be completed this week. It was decided to hold the first soirée on Nov. 28th. A feature of this season's programme will be the unusually large number of illustrated lectures.

NOTES ON SOME BOTANIC GARDENS.

BY W. T. MACOUN.

A few weeks ago the writer visited several of the Botanic Gardens in the United States, also the Arnold Arboretum at Boston, Mass., in the hope of learning something which could be put into practice in our own Arboretum and Botanic Garden at Ottawa. A few facts regarding these places may not be without interest to readers of THE OTTAWA NATURALIST.

NEW YORK BOTANIC GARDEN.

The New York Botanical Garden is of very recent origin. It was in 1895, only, that the \$250,000 subscriptions were guaranteed which were necessary before the 250 acres of land in the northern part of Bronx Park could be handed over by the City of New York. After that the plans for the development of the garden had to be made which included the construction of large buildings to be used for museum purposes and plant houses. These buildings, which are now in course of erection, will be among the finest of their kind. Bronx Park is naturally well wooded. A picturesque stream runs through part of it and adds much to the beauty of the landscape. A fine collection of herbaceous plants has already been brought together. They have been neatly labelled and arranged in botanical order in beds. The planting of trees has not yet been very extensive, but doubtless will be before long. In the fruticetum the shrubs have been arranged in beds as on the herbaceous grounds, but as yet only a limited number have been planted. A large force of men is at present engaged in making roadways, levelling, filling in, etc., and it is evident from the scope of the work that it is the intention to make this one of the finest botanic gardens in the world.

ARNOLD ARBORETUM.

The Arnold Arboretum at Jamaica Plain, Boston, Mass., occupies more than 200 acres of land. It is southwest of the city of Boston proper, and is in the course of the great parkway system of that city. Work was begun in this arboretum more than twenty years ago, so that some of the trees planted there have

reached a considerable size. The arboretum is naturally well wooded, the land is very rolling, and magnificent views may be obtained from some of the commanding points of observation. In many places one would not suspect that any artificial planting had been done, as by the system adopted the natural is preserved as much as possible, and it is quite a common thing to see a tree apparently surrounded with a dense undergrowth which on closer inspection will be found to be kept far enough away from the tree to prevent its branches from being injured by too much shade. The thorough manner in which the soil is prepared before the trees are planted in their permanent positions ensures a healthy, vigorous growth. The fruticetum, where the shrubs are arranged in beds of convenient size, is kept in excellent condition, and as this very large collection only occupies a comparatively small area, any shrub is easy of access. In connection with this arboretum there is a fine herbarium which appears to be in good order.

HARVARD BOTANIC GARDEN.

Though only occupying about seven acres of land the Harvard Botanic Garden at Cambridge, Mass., is a credit to the institution to which it belongs. The collection of herbaceous plants there is very complete and is arranged in such a manner that the different species and varieties may be studied with ease. The plants are grouped in botanical order in narrow beds. The labels give the common and scientific names by which the plant is known, also the country of which it is a native. There are a few glass houses in connection with the garden but these are not of great magnitude.

SMITH COLLEGE BOTANIC GARDEN.

A few years ago a botanic garden was laid out in connection with Smith College, Northampton, Mass. The work done so far has been mostly with herbaceous plants, and a good collection has already been formed. Some trees and shrubs have been planted, but as the limited area of the campus will not admit of very extensive planting it is probable that the collection will not be large. There are some fine glass houses here which are kept in good order, as is also the whole botanic garden.

CHRYSOPA LARVA IN A NEW ROLE.

Recently I received from my friend the Rev. Father Burke, of Alberton, Prince Edward Island, one of the curious cocoons of the Lace-winged Fly (*Chrysopa* sp.) with the statement that the larva had bitten a friend of his three times. I was somewhat surprised at this and wrote for further particulars, when, at Father Burke's request, the following interesting letter was written by Mr. John T. Weeks, of Alberton, P.E.I. :

"In reference to the insect forwarded to you by Rev. A. E. Burke, I may say that a few nights before enclosing the insect, my little girl was rehearsing her lesson to me when I felt something bite me on the back of my neck. I put up my hand but could not feel anything. Shortly afterwards I felt another bite, and still could not catch anything. It bit again, and I pulled off my coat and vest and asked my little girl to look if there was anything on the back of my neck. She found the insect in question, and I put my magnifying glass on it, and as it was different from any insect I had ever seen, I brought it to my office to show it to Father Burke, when he suggested that we enclose it to you. It agrees exactly with your drawing in your letter to Father Burke."

The Lace-winged flies are extremely interesting not only for their predaceous habits which make them rank amongst the most beneficial insects, but from their remarkable transformations. The eggs are beautifully natted and are borne erect on slender hair-like pedicels. The larvæ are active elongated creatures tapering to each end and furnished with long scissor-like hollow mandibles by means of which they seize their prey. This consists, ordinarily, of other insects, chiefly plant lice, of which they destroy enormous numbers. The jaws are hollow, and through them they suck up their liquid food. When full grown these larvæ spin small round pearl-like cocoons, which are remarkable for their exceeding smallness, as compared with the size of the larva which packs itself away inside them, and the large size of the gauzy-winged, golden-eyed, but terribly malodorous fly which emerges from them.

J. FLETCHER.

PRELIMINARY LIST OF THE BATRACHIA OF THE GASPÉ
PENINSULA AND THE MARITIME PROVINCES.

BY PHILLIP COX.

RANA SEPTENTRIONALIS, Baird. Mink Frog.

Common on Gaspé Peninsula. Fairly common in New Brunswick. Does not occur on Prince Edward Island.

RANA FONTINALIS, Le Conte. Spring Frog.

Rather uncommon. Its place taken by *R. septentrionalis* in Gaspé, New Brunswick and Prince Edward Island.

RANA SYLVATICA, Le Conte. Wood Frog.

Rather rare in Gaspé and the Maritime Provinces.

RANA VIRESCENS, Kalm. Green Frog.

Our present knowledge shows this species to be rare in Gaspé and the Maritime Provinces.

RANA PALUSTRIS, Le Conte. Marsh Frog.

Somewhat rare at Grand Pabos. Generally distributed in New Brunswick and Prince Edward Island.

BUFO LENTIGINOSUS AMERICANUS, Le Conte. Toad.

Not very common in Gaspé Peninsula. Found throughout the Maritime Provinces.

DIENYCTYLUS VIRIDENS, Raf. Spotted Triton, Newt.

In small ponds in the valley of the Pabos and in lakes draining into the Dartmouth River, Gaspé. Not rare in New Brunswick and Prince Edward Island. The largest specimen seen was taken at Afton Lake, P. E. I.

DESMOGNATHUS FUSCA, (Raf.) Baird.

Larvæ seen in a pond at New Carlisle were, I think, of this species.

PLETHODON ERYTHRONOTUS, (Green.) Baird. Red-backed Salamander.

Not uncommon in the Gaspé Peninsula, New Brunswick and Nova Scotia.

AMBLYSTOMA JEFFERSONIANUM, (Green.) Baird.

Seems to be very rare, for although searched for was only found at Grand River. Common in New Brunswick but the pre-

vailing form is the variety *laterale* to which the Gaspé salamander is an approximate.

AMBLYSTOMA PUNCTATUM, (Linn.) Baird. Great Spotted Salamander.

Though no specimens were collected in Gaspé, the species described to me by some of the natives must be this one. It seems to be very rare.

NOTE.—The Green Snake and more than one variety of the Garter Snake are found in the region traversed but specimens were not collected. The notes of the Tree Toad were also heard, and judging from reports given me by local observers it must be quite common.

ORNITHOLOGICAL NOTES.

EDITED BY W. T. MACOUN.

Birds are getting scarce once more, now that the winter is approaching, and it will not be long before none but our permanent residents are left. An occasional robin and prairie horned lark may still be seen, however, which, with the juncos twittering in the hedgerows are among the few birds one observes at the Experimental Farm.

Few observers seem to take the field in autumn, a season of the year when there is much to interest a lover of birds. How, when and where the different species assemble prior to their departure; where they roost, what they feed upon, and finally when they depart are among the many interesting facts that could be learned by one who was really desirous of doing so.

CORRECTION.—Miss Harmer desires to make a correction. Later observations convinced her that the bird, which was recorded last spring by her as the White Rumped Shrike was really the Great Northern Shrike.

The following notes have been kindly furnished by Mr. L. Osborne Scott, Winnipeg, Man., and should prove interesting to readers of THE NATURALIST :

“On July 6th, 1899, I was out in the country about twenty-six miles north of Winnipeg, and being out for a walk about 5.30

o'clock in the morning I noticed a bird with an enormous tail (about twelve inches long) sitting on a bare limb of a poplar tree about 100 yards from me. On closer inspection I found it to be opening and closing its tail, and thinking at once of the Scissor-tailed Fly-catcher that I had read about, I took down notes of its plumage (it was quite tame) and looked it up, and am certain it was a Scissor-tailed Fly-catcher. There was a report that it had been seen about eighteen miles west of the same place two years before, but that may be a mistake.

“ The Whip-poor-Will left us about the 6th of September.

“ There are a lot of Red-breasted Nuthatches in the fir trees in front of the college just now. They are rather rare.

“ On the 18th of June I saw four nests of the Evening Grosbeak about one mile north of Winnipeg, near the Red River, in fact right on its bank. The nests were about twelve or fifteen feet from the ground in some grey willows ; they were rather flat and slight, made of sticks and roots and lined with smaller roots. There were only two eggs in two nests and one each in the other two. The eggs are more blotched than those of the Red-breasted and not so spotted, and I fancy they are a little smaller. Unfortunately some rascally boys got at them and left only the trees standing.

“ I have seen the Evening Grosbeak in flocks of ten to eighty on the Peace River. The Indians say they always build in Saskatoon willows (*Amelanchier*), though I think there are exceptions.”

Ottawa, Oct. 23rd, 1899.

BOTANICAL NOTES.

The herbarium of the Geological Survey has recently been enriched by several very interesting collections of plants from remote or little known regions. Chief among these is Prof. Macoun's very complete series of the plants of Sable Island. These number 190 species of flowering plants and about 50 species of cryptogams. Considering the number of shipwrecks in the vicinity of the island it is surprising that the number of introduced plants growing on Sable Island should be so very small. The few

detected grew in the vicinity of houses and had evidently been introduced in seed.

During the past ten years Mr. A. P. Low has brought from the Labrador Peninsula and the coasts and islands of Hudson Bay many hundred species of flowering plants, and each year's collections have filled some gaps in the National Herbarium, besides extending the range of scores of species. In 1898-99, Mr. Low made a survey of the whole northern part of the Labrador coast, much of which had not before been visited by a naturalist. During both seasons large collections of plants were made which will do much to enlarge our knowledge of the flora of that region.

From the vicinity of Dawson, in the Yukon District, Mr. J. B. Tyrrell has just brought in 120 species of flowering plants, the most complete collection which has been received from there. They indicate a warmer climate than is generally supposed to characterize that region, and with the plants collected by Dr. G. M. Dawson, Mr. Wm. Ogilvie and others on the Yukon, they form a very complete series of the flowering plants of the gold fields.

Mr. N. B. Sanson, the energetic caretaker of the Banff Museum, has made this year a large collection of the plants in the vicinity of that place for the Geological Survey. They will be added to from year to year until a complete series has been collected.

J. M. M.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

The thirty-sixth annual meeting of the Entomological Society of Ontario was held in the society's rooms, London, Ont., on the 11th and 12th October. Among the active members present were noticed the following: H. H. Lyman, M.A., president, Montreal; Rev. Dr. Bethune, London; Dr. James Fletcher, Dominion Entomologist, Ottawa; Prof. F. M. Webster, Wooster, Ohio, State Entomologist; Rev. Dr. Fyles, Quebec; Arthur Gibson, Ottawa; Prof. C. C. James, Toronto, Deputy Minister of Agriculture for Ontario; Geo. E. Fisher, San José Scale Inspector, Freeman; Prof. Dearness, London; Prof. Lochhead, Guelph; W. E. Saunders (secretary), J. A. Balkwill (treasurer), J. A. Moffatt (curator),

Hy. Saunders, Dr. Law, Prof. Bowman, R. W. Rennie, London.

The whole of the afternoon of the opening session was devoted to a discussion of the San José scale, Prof. Dearness introducing the subject with a paper in which he traced the introduction of the San José scale into California, and stating that it probably made its first appearance in Ontario about the year 1887. He also gave an interesting account of the trip taken by the San José Scale Commission in visiting the infested districts, and thought that by a judicious application of whale-oil soap the scale might be controlled in Ontario if not altogether eradicated.

Prof. Webster gave the result of his experience in fighting this pest in Ohio, and said that it was of the utmost importance that the work of spraying the infested trees should be controlled by some one man, this man to be responsible for the proper carrying out of this work. The fruit growers not knowing the nature of this scale could not be relied upon, he said, to use the proper solution at the proper time.

Prof. Lochhead gave an account of certain infested orchards in Ontario and was of opinion that the scale would not develop as rapidly in this cold climate as it does in the south. He thought it would be a capital idea if Public School inspectors in the province were supplied with samples of the scale, in order that they might show the same to the school children, pointing out the pernicious character of this insect, and in this manner the public would be informed generally.

Mr. Fisher mentioned that there are only three points in Ontario at which the infestation has extended to any great proportions, and spoke of the great rapidity with which the scale increases. He also spoke of interesting observations which he had made in connection with his endeavors to control this insect.

Dr. Fletcher also referred to the scale as the most dangerous pest fruit growers have to contend against, but stated it could be successfully treated if specialists who understood their work could be secured and fruit growers taught that they and the whole country were concerned. He complimented the Ontario Minister of Agriculture upon the steps taken to stamp out the scale.

Prof. James, representing the Hon. Minister of Agriculture, spoke of the magnitude of the task confronting the Department,

and said that the question was resting like a nightmare upon the heads of the Department at Toronto. Twenty-five thousand dollars would be spent this year in the endeavor to wipe out this pest.

At the close of this session the society passed a unanimous resolution approving of the measures adopted by the Ontario Department of Agriculture, and of the wise and judicious methods the Hon. Minister had adopted for the suppression of the San José scale.

The evening meeting was held in the Y. M. C. A. hall. President Lyman delivered his annual address, Prof. Webster read a paper entitled "One Hundred Years of Entomology in America," Dr. Fletcher gave an illustrated lantern lecture on "Some Familiar Insects," and Prof. Lochhead delivered a short address, also illustrated with lantern pictures, on "Insect Pests of the Garden, Orchard and Farm." Other short addresses were given by Rev. Dr. Fyles and Rev. Dr. Bethune.

During the second day valuable papers were read by Profs. Lochhead, Webster, Fletcher, and Messrs. Fyles, Bethune, Gibson and others, which were much appreciated. Reports of the Montreal, Toronto and Quebec branches were presented, as also those of the different sections of the society, all showing the useful work done by each during the year.

The election of officers for the ensuing year resulted as follows: "President, Rev. Dr. Fyles, Quebec; Vice-President, Prof. Wm. Lochhead, Guelph; Secretary, W. E. Saunders, London; Treasurer, J. A. Balkwill, London; Librarian and Curator, J. A. Moffatt, London; District Directors, W. H. Harrington, Ottawa; J. D. Evans, Trenton; D. G. Cox, Toronto; James Johnston, Bartonville; and R. W. Rennie, London.

The reports of the officers were very gratifying, showing that the society has 552 members, who are scattered throughout the whole world, and that its influence is spreading and being felt in every direction. The following honorary members were elected: Dr. L. O. Howard, U. S. Entomologist, Washington; Prof. Webster, State Entomologist of Ohio; Dr. J. B. Smith, Rutgers College, New Jersey, and Prof. H. F. Wickham, Iowa City, Iowa.

ARTHUR GIBSON,
Central Experimental Farm.

BOOK REVIEW.

"CATALOGUE OF THE TREES AND SHRUBS IN THE ARBORETUM AND BOTANIC GARDEN AT THE CENTRAL EXPERIMENTAL FARM, OTTAWA, ONTARIO, CANADA." By Wm. Saunders, LL. D., F. R. S. C., F. L. S., Director of Experimental Farms, and W. T. Macoun, Horticulturist of Central Experimental Farm and Curator of Arboretum. Bulletin No. 2, second series, June, 1899."

In the preface to this catalogue the writers give a short account of the work done in the Arboretum and Botanic Garden of the Central Experimental Farm since its establishment in 1887. From it we learn that no trees or shrubs were planted until 1889 when 200 species were set out followed by additional species each year, until in 1894 the number had reached 600. During the past five years special attention has been given to this branch of the work done at the Central Farm, the total number of species and varieties catalogued amounting to 3,071. Of these, according to the foot-note on the last page of the catalogue, 1,434 have been found to be hardy; 361 half hardy; 232 tender; 307 winter killed and 737 have not been planted long enough to admit of an opinion being given as to their hardiness.

Under each species the date of planting is given as well as the degree of hardiness, and this with the alphabetical arrangement of species which has been adopted will enable anyone to learn at once whether a plant is hardy or not in this region. Apart entirely from its scientific value the catalogue will be of great service to all planters of trees and shrubs in the latitude of Ottawa. The nomenclature of the "Index Kewensis" and "Kew Guide" has been adopted, but care has been taken to include in the synonymy the names under which some of our North American species are more generally known.

The arrangement of the catalogue is excellent and in completeness and general usefulness it is by far the most valuable publication of its kind that has been issued in America.

J. HOPE & SONS,

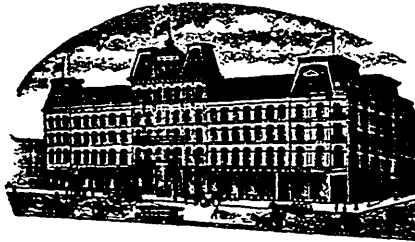
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