

SEPTEMBER, 1905.

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# THE OTTAWA NATURALIST.

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# THE OTTAWA NATURALIST.

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VOL. XIX. OTTAWA, SEPTEMBER, 1905.

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No. 6

## A NATURALIST IN THE FROZEN NORTH.

By ANDREW HALKETT.

(Continued from page 109.)

Of Gastropods may be mentioned Periwinkles (*Littorina palliata*), Whelks (*Buccinum*), and the egg-capsules of Whelks, Limpets (*Acmaea testudinalis*) found in the gizzards of Eiders and, at the shore at low-tide, valves of Chitons (*Tonicella marmorea*), also found in the gizzards of Eiders, and certain Nudi-branches.

Of bivalve mollusks, Cockles (*Cardium islandicum*), and specimens of various species which bear no English names, were dredged, and dried valves of Mussels (*Mytilus edulis*) were found lying on the ground at Wakeham Bay.

Fragments of a few species of Polyzoans were dredged.

Of Annelids, certain specimens were collected in muck at Fullerton. The tubes of those worms and the worms themselves are beautiful objects of exquisite pattern. The tubes are shaped like the shell of *Dentalium*, and are composed of very fine grains of quartz or other substances of an archaic nature, which the annelids skilfully cement together. Specimens of *Spirorbis* were found on sea-weed, shells, etc., and numerous annelids were dredged. Mention may also be made of fresh-water annelids, including a very small kind of leech, collected at Fullerton.

Of Echinoderms, Sea Urchins (*Strongylocentrotus drobachiensis*), a few Star-fishes of the genera *Solaster* and *Crossaster*, and Sea Cucumbers (*Pentacta*) were found among sea-weed at the beach at Port Leopold, North Summerset. A few tiny specimens of typical Star-fishes (*Asterias*), specimens of Brittle- or Serpent-

stars (*Ophioglypa*), and numerous specimens of Sea Cucumbers (*Psolus phantopus*) were dredged at Port Burwell.

The Cœlenterates seen and examined embraced Hydrozoans, Anemones and Ctenophores. The Hydrozoans and Ctenophores (which on this occasion may be considered together) of the northern seas are of exquisite shape and colouring. They are extremely delicate organisms, yet so constructed as to live and thrive in the sea. Once removed from that element, however, their fragility defies any way of well preserving them as specimens. Some were of mushroom or umbrella shape; others like bells, and were of the most beautiful blues and pinks, or of opaline or soft yellowish colour. Others again were transparent and colourless, and appeared like water bubbles.

In size the Medusoid kinds range from over a foot across the disc to that of less than a small thimble, and I had frequent occasion to examine the smaller ones close at hand, by scooping them up with a small net and placing them alive in a glass vessel containing sea-water.

Medusoids were observed at Black Tickle, Labrador; at Port Burwell, Ungava; at Cumberland Sound, Baffin Land; at Fullerton, Keewatin; and at Chesterfield Inlet. I saw some large ones at Port Burwell, one of which was more than a foot across the disc. In colour those were magenta with transparent borders.

The phosphorescence of the sea in the Hudson Bay is not such an imposing spectacle as I have seen that phenomenon in the Behring Sea; nevertheless, where the Cœlenterates were numerous, on dark nights, the sea appeared at places near by as if beset with twinkling stars. Doubtless, small crustaceans, notably amphipods, also contributed to this phenomenon. I experimented with some of the ctenophore cœlenterates, by placing them in glass vessels containing salt water, in the dark in my cabin, and discovered the luminosity to proceed from the vibratile cilia which are located, in eight rows, at regular intervals adown the sides.

The Ctenophores were particularly fragile, so that it was impossible indefinitely to preserve any specimens. This very fragility, however, led to observations which may prove to be of some consequence. On removing them from the scoop-net and



placing them in a vessel containing sea-water they would usually break up into fragments, some of which would afterwards form themselves into revolving little wheels with cilia, which gave me the impression that the particles were starting on a new round of existence as separate individual organisms; and were there facilities at some subsequent time for observing their strange evolutions, I am of the opinion that light might be thrown on modes of reproduction concerning this and perhaps of other allied groups of the Cœlenterates. But this fact itself, so far as observed, requires to be mentioned with caution, unless it be a matter which has already, unknown to me, engaged the attention of biologists.

Ornithologists who would like to know more about birds of the Frozen North region visited by Mr. Halkett, are referred to a special article on the subject by the Rev. C. W. G. Eifrig, in *The Auk*, for July last, pp. 233-241, entitled: "Ornithological Results of the Canadian 'Neptune' Expedition to Hudson Bay and Northward, 1903-1904."

*STHENOPIS (HEPIALUS) THULE*, STRECKER, AT  
OTTAWA.

By ARTHUR GIBSON, Central Experimental Farm, Ottawa.

The discovery of this rare and extremely local moth at Ottawa during the past season is very remarkable. The only known definite locality of this insect, as far as we know, is Montreal, Canada, where the moths in some years are taken not uncommonly. The presence, therefore, of the species at Ottawa is most interesting and worthy of special notice.

On the 6th July, 1905, Dr. Fletcher, Mr. J. W. Baldwin and the writer spent the evening collecting moths around the electric lights close to the entrance to the Experimental Farm. The night was a rather good one for the purpose, and it was a little late when Mr. Baldwin and I started in to the city, for our respective homes. At the southern end of LeBreton Street, where there is an electric light, we stopped for a moment, and, just as we did so, I noticed a large moth fly quickly past and settle on the road a short distance away. A few seconds later it was safe

within my cyanide bottle, and naturally I was rather excited when I saw that it was *Sthenopsis thule*, the first specimen which had ever been taken in the Ottawa district.

The specimen, a female, was in perfect condition, and had evidently only emerged from the pupa a short time previously. In colour it was a beautiful primrose yellow, the reddish brown along the costa and the spots of the same colour on the primaries, being well defined. With the wings expanded it measures  $3\frac{1}{8}$  inches. The time of capture, viz., 11.35 p.m., seems rather unusual. In an article on the occurrence of the species at Montreal,\* Mr. H. H. Lyman says :

“The species seems to fly only for about fifteen to twenty minutes in the twilight, as I have never taken it before ten minutes past eight, nor ever after half past eight.”

Since capture, the wings of the above mentioned specimen have lost some of the bright yellow colour ; but this, Mr. Lyman tells us, is peculiar to the species, as, in the cabinet, specimens soon fade and lose their original yellow colour.

The following evening, the 7th July, I again had the good fortune to observe the species. At this time it was along the road at the northern end of Dow's Lake, but a short distance from where the first specimen was seen. About 8.30 p.m. I was walking along this road to the Farm to meet Dr. Fletcher, when I saw a male specimen of *thule* flying rapidly up and down, near a tall cedar tree, in the peculiar oscillating manner of the species. I watched it flying thus for several minutes, when suddenly a female flew along and settled near the end of a twig of the same tree. The male immediately flew around her, and in a very short time copulation took place. I observed them further for some little time, and thought by giving the tree a sudden jar that they would fall and I could capture them. The jarring, of course, disturbed them; but, as it was getting dark, I failed to see whether they fell to the ground or flew away.

Search was made for further specimens on following evenings, by both Dr. Fletcher and the writer, but without results.

---

\*Canadian Entomologist, vol. xxv, Dec. 1893.

## BIRD MIGRATION, 1904.

## OBSERVATIONS MADE AT SABLE ISLAND, NOVA SCOTIA.

By JAMES BOUTELLER, Sable Island.

Name of Species.	When First Seen.	Number Seen.
Shore Lark.....	January 21 .....	In numbers.
Redpoll . . . . .	February 7 ... ..	In a flock.
Sanderling . . . . .	March 4 .....	A flock.
American Robin . . . . .	„ 20 .....	Two.
Slate-coloured Junco.....	„ 20 .....	One.
Fox Sparrow . . . . .	„ 20 .....	Two.
Song Sparrow ... ..	„ 20 .....	In numbers.
American Crow ... ..	„ 20 .....	Several.
Blackbird . . . . .	„ 25 .....	One.
Gannet* . . . . .	April 5 .....	In numbers.
American Robin.....	„ 12 .....	In numbers.
Yellow-crowned N. Heron ..	„ 13 .....	One.
Slate-coloured Junco.....	„ 17 .....	In numbers.
Fox Sparrow . . . . .	„ 17 .....	In numbers.
Red-winged Blackbird . . . . .	„ 20 .....	One.
House Sparrow . . . . .	„ 22 .....	One.
Terns, Common and Arctic..	„ 26 .....	A few.
Semi-palmated R. Plover....	„ 26 .....	Several.
Yellow-legs . . . . .	May 5 .....	One.
Crow . . . . .	„ 7 .....	One.
Least Sandpiper . . . . .	„ 8 .....	In numbers.
White-throated Sparrow ....	„ 13 .....	Several.
Black-bellied Plover . . . . .	„ 13 .....	One.
Roseate Tern . . . . .	„ 15 .....	In numbers.
Nuthatch . . . . .	„ 16 .....	One.
Spotted Sandpiper.....	„ 21 .....	One.
Black-bellied Plover . . . . .	„ 22 .....	Three.
Yellow-legs .. . . .	„ 22 .....	Four or five.
Swallows . . . . .	„ 22 .....	Four.
Semi-palmated Sandpiper ...	„ 23 .....	One.

\* On north side of the island.

Two House Sparrows, here since autumn, left about April 1st.

Name of Species.	When First Seen.	Number Seen.
Ovenbird.....	May 25 .....	One.
American Crow .....	„ 25 .....	Two.
Red Phalarope .....	„ 25 .....	In a flock.
Black-bellied Plover .....	„ 25 .....	Six.
Spotted Sandpiper.....	„ 25 .....	In numbers.
Magnolia Warbler.....	„ 25 .....	One.
Belted Kingfisher .....	„ 25 .....	One.
Hermit Thrush .....	„ 25 .....	In numbers.
Turnstone Plover .....	„ 25 .....	One.
Black-bellied Warbler .....	„ 26 .....	One.
Piping Plover.....	„ 29 .....	In numbers.
Yellow Warbler.....	June 4 .....	One.
Pine Siskin.....	„ 7 .....	One.
Pine Warbler.....	„ 8 .....	One.
Yellow-legs .....	„ 8 .....	Two.
Yellow-bellied Flycatcher .....	„ 8 .....	Several.
Barn Swallow .....	„ 8 .....	Several.
American Crossbill .....	„ 20 .....	One.
Wilson's Snipe .....	July 10 .....	Nine.
Yellow-legs .....	„ 10 .....	One.
Turnstone Plover .....	August 3.....	In numbers.
Greater Yellow-legs .....	„ 3.....	In numbers.
Semi-palmated Sandpiper .....	„ 3.....	In numbers.
White-rumped Sandpiper.....	„ 3.....	In numbers.
Black-bellied Plover .....	„ 3.....	In numbers.
Yellow Warbler.....	„ 3.....	One.
Kittiwake .....	„ 3.....	One.
Black-bellied Cuckoo .....	„ 5.....	One.
Lesser Yellow-legs .....	„ 5.....	In numbers.
Solitary Sandpiper .....	„ 5.....	In numbers.
Great Blue Heron .....	„ 5.....	One.
Black and White Warbler .....	„ 20.....	One.
Purple Martin .....	„ 20.....	In numbers.
Various kinds of Swallows .....	„ 20.....	In numbers.

ONTARIO ORNITHOLOGICAL NOTES : WINTER 1904-05.

By A. B. KLUGH, Sec'y Wellington F.-Nat. Club, Guelph, Ont.

Ornithologically considered, the past winter has not been without its interesting episodes.

On December 30, during a snowstorm, a Horned Grebe lit in a snowdrift in Guelph. One foot appeared to have been frozen, but the bird seemed otherwise all right. It was placed in a large case with a pan of water and fed on fish, which it consumed readily; but it died the next day.

Great Black-backed Gulls have been seen throughout the winter at Toronto by Mr. S. Hunter.

Herring Gulls, though seen on the Great Lakes, have not wandered inland as much as usual.

American Mergansers wintered in some numbers on the Thames at London and a few on the Speed at Guelph.

A Mallard was taken at Wingham on February 12, and two Black Ducks were seen at the mouth of a small creek near Penetanguishene by Mr. A. F. Young on February 8.

A Scaup Duck was taken at Penetanguishene on December 5.

Old-squaw Ducks wintered at Toronto, and American Golden-eyes at Toronto and London.

An adult female Black-crowned Night Heron was shot in an orchard near Woodstock on December 24, and was given to Mr. W. D. Hobson of that city.

A Cooper's Hawk was seen by Mr. S. Beattie at Guelph on January 20, and by others on January 28 and February 7.

A Bald Eagle was seen by Mr. W. E. Saunders at London on February 4, and one was shot near Woodstock on March 11 and examined by Mr. W. D. Hobson.

An American Sparrow Hawk was seen at Guelph in February by Mr. A. A. Davidson.

Three Snowy Owls were shot in Frontenac and Leeds counties and sent to the taxidermist in Kingston, one was taken at Brampton in December, and one at Guelph on February 26.

An Arctic Three-toed Woodpecker was seen at Penetan-



guishene on December 3, and another on February 17 by Mr. A. F. Young; two were seen at Millbrook on December 31 by Mr. S. Hunter, and one taken on February 21 at Alma by Mr. E. Gale.

A Red-headed Woodpecker was seen at Toronto on February 23 by Mr. S. Hunter.

Canada Jays were seen between October 7 and December 31 at the following places: Madoc, Penetanguishene, Napanee, Acton, Toronto, Hillsburg, Rockwood, Guelph, Killean, Galt, Kingston and Millbrook.

A Bronze Grackle was noted as wintering at Kingston by Dr. C. K. Clarke, and a Meadowlark at Guelph by Mr. E. J. Colgate.

Purple Finches wintered in large numbers at Guelph, and were also seen throughout the winter at Alma by Mr. J. Allan, Jr., at Toronto on February 13, 16, 20 and 28 by Mr. S. Hunter, at Penetanguishene on February 17 by Mr. A. F. Young, and at London on February 27 by the writer.

A flock of White-winged Crossbills was seen at Guelph on January 2 by Mr. L. Beattie.

American Crossbills were seen at Woodstock, by Mr. W. D. Hobson, and at Guelph by Mr. F. N. Beattie.

Redpolls appear to have been common only at Penetanguishene; they have been seen also at Madoc by Mr. C. J. Young, and at Guelph, but at the latter place not since October.

The American Goldfinch has wintered in rather larger numbers than usual at Guelph, and has also wintered at Alma, where specimens were noted by Mr. J. Allan, Jr., and at Madoc, where others were seen by Mr. C. J. Young.

Pine Siskins have been noted at Penetanguishene, Alma and Woodstock, and have been very abundant at Guelph.

Snowflakes arrived early and have been seen throughout the winter at various points.

Tree Sparrows have been scarce; they have been noted at London, Alma and Guelph, but only in small numbers.

Cedar Wax-wings were noted by Mr. S. Hunter at Toronto on January 5, 6 and 24; two were seen at Guelph on February 1 by Mr. W. Holliday; 36 at London on February 26 by Mr. W. E. Saunders, and 16 at Galt by Mr. W. Herriot on February 5.

A Northern Shrike was seen at Guelph on November 3, and several were seen throughout the winter at Woodstock by Mr. W. D. Hobson and at Alma by Mr. J. Allan, Jr.

Brown Creepers were very common at Guelph during the early part of the winter, and Golden-crowned Kinglets have been fairly common throughout the winter.

An American Robin wintered at Mount Forest, where it was seen by Mr. Howard Skales, one at Port Albert, one at Kingston, where it was noted by Dr. C. K. Clarke, and three at Guelph, where they were seen by Mr. E. J. Colgate.

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#### A FEW NOTES ON THE FAUNA AND CLIMATE OF THE LIÈVRE RIVER.

By E. E. LEMIEUX.

The following notes are an extract from my report for 1904 as secretary-treasurer to the Matabi Fish & Game Club, respecting a few observations made on the preserves of that Club during the last two weeks of November, 1904. These preserves are situated some 90 miles up the Lièvre River (P. Q.), or 10 miles farther north than Notre Dame du Laus, and 7 miles on the east of the river.

**BIRD LIFE.**—The birds noticed around the club house during the last two weeks of November were: Chickadees, ravens, owls, blue jays, magpies, sparrows (near the last farmer's house), cherry-birds, and for the first time at such a late season quite a number of wild canaries near the club house.

**BEASTS OF PREY.**—Wolves are reported quite plentiful around Whitefish Lake, but not on the club's preserves. I have seen no indications of them during 1903 and 1904, although I travelled the bush to a great extent during the last two weeks of November, when snow was on the ground. Bear tracks, however, were quite plentiful. Two were killed in October, 1904.

**METEOROLOGY.**—Temperature: maximum,  $41^{\circ}$  for two days; lowest,  $6^{\circ}$  above zero; mean temperature,  $27^{\circ}$  to  $28^{\circ}$ . At same period, in 1903, the mean temperature was  $5^{\circ}$  to  $6^{\circ}$  degrees lower; the lowest point reached was  $3^{\circ}$  below zero.

**ICE ON THE LAKES.**—These lakes (which contain speckled trout

only) are to a great extent fed by natural springs from the mountains around and from the bottom of the lakes themselves; consequently, when the ice forms, it is of very uneven thickness, and is therefore dangerous to travel on. I have noticed that the ice formed at certain parts of the Pembina Lake would all melt away within 48 hours, although the weather kept much below freezing point.

The ice forms on Pembina Lake, usually, between the 15th and 20th November. It is a very few days earlier in small surrounding lakes. I have no personal accurate data as to when the ice breaks up in the spring. These lakes being land-locked and surrounded by high mountains, the ice becomes gradually honey-combed by the sun, and I have been told that even in the first days of May the waters are not entirely clear of ice.

April, 1905.

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#### WHY OUR FIELD AND ROADSIDE WEEDS ARE INTRODUCED SPECIES.

---

W. T. MACOUN.

A few years ago an Englishman was visiting Canada and, being observant, though not a botanist, was struck, when going about the cities and towns and along the country roads, by the similarity between the wild flowers he saw in Canada and those in the Old Country.\* "How is it," he said to a well known Canadian botanist, "that, separated as we are by nearly 3,000 miles of water, Canadian flowers are just the same as those at home?" "You do not see Canadian flowers," said the botanist; "you see your own species which have been introduced into this country and become weeds, as many of them are with you.

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\* For instance, the following twenty-four well known common weeds are all introduced species:—Buttercup, Charlock, Shepherd's-purse, Penny-cress, St. John's-wort, Cockle, Chickweed, Purslane, Mallow, Purple-tufted Vetch, Mayweed, Yarrow, Ox-eye Daisy, Groundsel, Canada Thistle (which in spite of its name is a European plant), Chicory, Dandelion, Sow-thistle, Viper's-bugloss, Bindweed, Mullein, Toad-flax, Heal-all and Plantain.

If you wish to see Canadian wild flowers, you must go to our woods or along our streams, where you will find many beautiful species quite unknown to you."

The fact that practically all the weeds seen growing in vacant lots, along roadsides, in cultivated and uncultivated fields in Ontario and some of the other provinces, are introduced species, is known to botanists; but the reason why these introduced plants should become weeds and our own should not, is not, we think, so generally known or thought of.

At a meeting of the Botanical Branch of the Ottawa Field-Naturalists' Club held last winter, Prof. John Macoun explained the matter to everyone's satisfaction. Ontario and other parts of Canada were heavily wooded before the settler came and the native plants grew in the woods, along the rivers' banks or in the marshes. When the woods were cleared away, the conditions were not favorable to the woodland species and they disappeared; but in their stead are found the weeds introduced from Great Britain and Europe, where for centuries they have been growing in field, in hedgerow, and along the roadside. These, finding suitable conditions, have multiplied with great rapidity in Canada.

It would be an interesting study for the botanists of the Ottawa Field-Naturalists' Club to determine how many, and which, of the bad weeds of Canada are native. The list would, we know, be found very small.

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#### BOTANICAL BRANCH.

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A regular meeting of the Botanical Club was held at Mr. R. B. Whyte's, on March 10th. Mr. Whyte gave a brief account of a recent visit to the New York Botanical Garden at Bronx Park, New York. He was much impressed by the extent of the collection of plants, and the great size and luxuriant growth of the palms, most of which were grown in large boxes, about five feet square. As an instance, he mentioned a Banana in fruit twenty-two months old, that was twenty-two feet high, with leaves fourteen feet long. A very large collection of Cacti was also referred to, and the information obtained from the horticulturist, that

most growers erred in keeping their Cacti too dry. While these plants require but little moisture in the dormant season, it is still quite possible to keep them too dry.

The Bronx Park Orchid house was also referred to, and the names given of a few kinds that were easily grown in any amateur greenhouse, such as *Cælogyne cristata*, *Cypripedium insigne*, *Bletia hyacinthina*, *Phaius grandiflorus*, etc. In the forcing house was a large collection of seedlings in pots of *Enothera biennis* grown to illustrate Dr. Hugo de Vries's theory of mutations, which had been discussed by the Club at the previous meeting. Nothing was observed or learnt by Mr. Whyte about them to change the opinion he had held, in the first place, that there was nothing in these mutations to justify the prominence that had been given to them, and, secondly, that the variations were varietal and not specific.

As a subject for discussion, Mr. Whyte introduced the question of the relative value of artificial cross-fertilization versus natural cross-fertilization. He maintained that, while there was a great future for artificial fertilization and much had already been attained by it, still we should not lose sight of the fact that more than nine-tenths of our apples, peaches, pears, plums, grapes, currants and gooseberries were the product of natural crossing. Though accidental seedlings, when valuable, had been selected and propagated by the skill of the horticulturist, he held that natural crosses would continue to be the principal source of improvement, on account of the great number of these crosses compared with the very small number of successful artificial crosses; also that it was only by slow advances that permanent improvement could be expected when the cross is violent, as from different species, as in Roger's grapes the progeny are apt to be deficient in vigor. Mr. Whyte illustrated his remarks with his own experiences in raising new varieties of raspberries, gladiolus and poppies.

R. B. W.

ANNOUNCEMENT.—Mrs. Agnes Chamberlin, Lakefield, Ont., is now receiving subscriptions (\$1.50) for copies of the new valuable book by the well known author of several delightful volumes on nature, Mrs. C. P. Traill: "Studies of Plant Life in Canada"—like the former works beautifully illustrated by Mrs. Chamberlin. To be out this autumn.



## NATURE STUDY—No. XXVII.

OTTAWA SUMMER SCHOOL FOR TEACHERS.

J. H. PUTMAN.

The first Summer School held in Ottawa closed on July 31st after a most successful three weeks' course. The work of organization was entrusted by the Department of Education to Dr. J. F. White, Principal of the Normal School. Early in May Dr. White sent circulars to the teachers and inspectors of Eastern Ontario, giving an outline of the work and specifying four courses, viz:—Nature Study, Art, Manual Training and Domestic Science.

About 160 students were enrolled; and, while the larger number came from Eastern Ontario, other parts were represented, several coming from Peterboro', London, Stratford, Brantford, and other western points.

A most interesting feature of the attendance was that some ninety of the students were teaching sisters from the various convents of Eastern Ontario. If the enthusiasm shown by these ladies at the Summer School is a fair criterion by which to judge their work, then it may safely be said that the Separate Schools of Ontario have many earnest and capable teachers. Their attendance also showed that they are only too ready to make sacrifices in order to keep fully abreast with the requirements of the most advanced curriculum.

Inspector Cowley was present at the opening and gave many valuable suggestions on the aims of Nature Study. Mr. Cowley's well-known interest in Nature Study and his success in introducing such work into the schools under his charge, made his hearers feel that he spoke as one sure of the facts.

As the OTTAWA NATURALIST is most closely in touch with the Nature Study work, this article will deal especially with that phase of the Summer School.

Principal White gave six lectures on Physical Geography. The aim of these was to present in a simple manner how the Earth has been changed from pre-historic times down to the present, to call attention to changes that are now going on, and by induction to infer the changes that will come in the future. Special emphasis was laid upon the agency of rivers and streams in depositing soil

and giving the Earth its present diversified form of rounded hills, precipitous gorges, low lying valleys and rich alluvial flood plains. The evolution of lakes, springs, deltas, coal-beds, oil-fields and gas reservoirs was treated in simple, yet comprehensive, manner. Soils, their formation, composition and possibilities was another special feature. These lectures, coupled with the practical field work given the class by Dr. White, cannot fail to make Physical Geography a more interesting department of Nature Study to those students who followed the course.

Dr. James Fletcher, of Ottawa, gave two lectures on Canadian birds, and two on insects. Not always is a great naturalist a good teacher, but it was the unanimous voice of the Summer School that Dr. Fletcher is both. His unbounded enthusiasm carried him over every difficulty. His homely apt illustrations made scientific facts as simple as the multiplication table. His natural methods of classification and his skill in using common terms instead of technical ones, show him to have the essentials of the "Kindergarten" method. Dr. Fletcher laid especial emphasis upon the economic side of bird and insect study. A loving sympathy with nature is the key-note of Dr. Fletcher's philosophy.

Principal Attwood, of the Waller Street School, gave two interesting and practical lectures on minerals. He led his class to form for themselves a very concise working definition of what is meant by a mineral. He suggested several natural methods of classifying minerals and added very much to the clearness of his explanations by concrete illustrations. Perhaps one of the most striking features of his lectures was his practical illustration of how each mineral may be identified by its stain, when powdered and smeared over paper. The two lectures on minerals convinced the students that mineralogy offers an inviting field for Nature Study, which may be used with advantage to broaden the minds of pupils in our elementary schools.

To the writer was assigned the work in Botany and Nature Study Aims and Methods with children. Whether rightly or wrongly, the Botany purposely got the lion's share of attention. A method is a part of each individual teacher: it is his ideal way of doing a thing; it is part and parcel of himself. Let him know a thing thoroughly, let him have a reverent love for its spiritual significance, let him know something of the child to whom the truth is to be imparted, and the method will take care of itself. With this as a pedagogical creed, it was felt that the most important work was to foster a love for plant life by giving the maximum of instruction about plants.

All educators recognize that, in order to do any work well, the teacher must be inspired; but so often we forget that true and

permanent inspiration can come only through knowledge. It would be pessimistic and uncharitable to hold that no good work in Nature Study can be done by teachers who are not scientists; it would be insanely optimistic to hold that we can ever do the best work in Nature Study until we have a corps of teachers who have done enough work in science to catch the scientific spirit. Nature Study for elementary schools and natural science may be very different things--indeed they are different--but their difference is a difference in method, in spirit, in point of approach, in quantum, in continuity, in intensity, in purpose, rather than a difference in knowledge demanded of the teacher.

Only those who have tried to map out a course in Botany that will have some organic significance and yet be comprised in a dozen lessons, know the difficulties that meet a teacher in planning a course for a Summer School. The course followed at the Ottawa school comprised Germination, Roots, Stems and Buds, Leaves the Plants' Stomach, Plants and Insects, Plant Societies, Plants and their Environment, Monocotyledons and Dicotyledons, Plant Structure, Seed Dispersal and A Flower Garden. These subjects served as centres round which it was possible to group the most elementary and essential facts about the way plants live and the work they do.

It had constantly to be kept in mind that a summer class is made up of students having widely varying information of plant life. Some have a fair knowledge of elementary botany, others know almost nothing of the subject. Under such circumstances only one line of action was possible—to begin at the bottom. The growth of a plant, like the life of a human being, is in its way an epic. This epic may, like the story of the Prodigal Son, be told in a hundred ways, and yet every one of the hundred may embody all that is essential.

Germination was illustrated by a series of experiments. Three weeks previous to the lesson, germinating cases were prepared. Each of these consisted of two pieces of glass 16 in. x 5 in. with a layer of moistened cotton wool between. Just under the upper glass a layer of black cloth was stretched over the cotton. Then each day a single seed was inserted between the glass and the dark cloth. The moistened cotton behind the seed supplied the water. As the germinating seed was between the glass and the black cloth, the whole process was plainly visible. At the end of fifteen days the story of the germination of every seed under observation was told in fifteen chapters of twenty-four hours each. Experiments of this kind were made with peas, beans, scarlet runners, barley, Indian corn, flax, vetch, white lupin, radish and Boston Ivy. This selection gave an opportunity to observe seeds of slow germination and seeds of rapid germination, seeds with one

cotyledon and seeds with two, seeds whose cotyledons were raised above the soil and seeds whose cotyledons remained below the soil, seeds sending out tap roots and seeds with fibrous rootlets.

Small sheets of glass and seeds were supplied the students in order that each might make some experiments at home. One result of these home experiments was reported, that has a peculiar interest and that illustrates the inherent possibilities of Nature Study. A middle-aged business man who saw a student's experiments, became so fascinated that he began work for himself and was still carrying on his studies with seeds when the Summer School closed.

Every lesson in Botany was illustrated as far as possible with lantern slides. The students were unanimous in their opinion that these were of great service in making clear the lectures. Sometimes not more than three or four slides were used during a lesson. The educational value of lantern slides with either children or adults is often inversely proportional to the number used.

An interesting lecture was given by Dr. H. M. Ami on ferns. The lesson was introduced by a reference to the classification of ferns illustrated by beautiful specimens. Dr. Ami then gave the students an opportunity to examine the reproductive organs of ferns under a high-power microscope.

An inspiring address was given by Prof. Robertson on the Manual Training and Nature Study Schools organized under the Macdonald Fund. Several students determined to take a thorough course in Nature Study when the College at Ste. Anne de Bellevue shall be ready to give them a welcome.

A very profitable lecture was given by Prof. Prince, of the Fisheries Department, on Fish Life. It was superbly illustrated and delivered in a most pleasing manner by a man who has given the greater part of his life to this one subject, and whose opportunities for studying fish habits have been unrivalled.

On the whole, although a course of three weeks has many limitations, it has some possibilities. The chief of these is the giving of an intelligent and rational inspiration.

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The great success of the Ottawa Summer School this year was undoubtedly due to the great care with which all arrangements were made by Dr. White and Mr. Putman, not only for the instruction of the visitors but for their comfort in every way. All in attendance felt that. The constant patience and courtesy of these gentlemen and of Mr. Attwood, as well as the vast amount of useful and helpful knowledge imparted, made what was undoubtedly a period of hard work also a pleasant holiday.—NATURE STUDY EDITOR.



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