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SOME NEWFOUNDLAND BIRD NOTES—MAY, JUNE, JULY, 1911.

By W. J. Brown, Westmount, Que.

The Newfoundland summer is very brief. By June 3rd, in the northern portions of the country, vegetation was not up, and the shrubs and bushes were just breaking into bud. In the spruce woods, snowbanks were repeatedly met with. Further south, however, the season was much more advanced. These conditions did not affect many of the birds, as nesting was going merrily on at this time. The warblers, as a whole, were perhaps a little late in arriving and did not start building until about the middle of the month.

It is regrettable that the Newfoundland Government officials do not take active measures in the direction of protecting the water-fowl. The fisherman not only take the eggs of the gulls throughout the breeding season, but shoot the young as soon as they are able to fly. Certain islands were visited on the western coast where the gulls had nested by the hundreds a few years back, and to-day the cliffs are occupied by a solitary pair of Northern Ravens.

The Reid-Newfoundland Railway, which is a narrow gauge one, probably runs through the most picturesque territory. Roughly speaking, the physical features of the island are apparently of a rocky and mountainous nature, punctuated with vast stretches of spruce woods and bogs, and well watered by streams, lakes, or "ponds."

The following list is the result of careful study and work at only six points contiguous to the line of the Reid-Newfoundland Railway, and is not, therefore, complete.

1. Loon. One pair seen on a small "pond" on June 6th. At this date they had not started to nest.

2. Black Guillemot. Fairly abundant. Breeding on the "Banks" on June 10th.

3. Glaucous Gull. Common. Several pairs had their

nests built out on large boulders in the centre of "ponds," but as the water was very cold and over our heads in depth, we could not examine them.

4. GREAT BLACK-BACKED GULL. Generally distributed along the western coast, and breeding. A few pairs were found nesting on small islands in "ponds" adjacent to the Bay of Islands, on June 10th.

5. HERRING GULL. Common resident. Observed everywhere off the Banks of Newfoundland, but their numbers are being rapidly decimated by the fishermen.

6. COMMON TERN. We saw a small colony at Bay of Islands on June 7th. At this date they had not started to build.

7. LEACH PETREL. Several burrows of this species located on an island, June 10th, but as the holes invariably ran under a large rock, a pick axe was necessary to examine the contents.

8. AMERICAN MERGANSER. Nest found, containing 9 fresh eggs, May 19th, on the Banks of the Humber River.

9. AMERICAN GOLDEN-EYE. Nest containing 8 fresh eggs found in a dead tree near the Humber River, May 21st.

10. AMERICAN EIDER. Saw two birds of this species at St. George's Bay, June 9th.

11. CANADA GOOSE. Common breeder. At the time of our visit the young were already hatched out and when they were approached the anxious parents were heard "honking" in the vicinity.

12. AMERICAN BITTERN. One individual heard "pumping" on June 1st; was undoubtedly breeding.

13. WILSON'S SNIPE. A very abundant species and noted wherever there was bog. One bird was heard overhead continuously from 9.30 p.m. to 4.30 a.m., June 9th. A nest containing 3 fresh eggs was found on a mound in a spruce bog, June 8th. On June 12th, another was located where the young had just left, as evidenced by the egg shells lying about.

14. LEAST SANDPIPER. Common. Several nests examined between June 3rd and 12th; one had three eggs and two others had four eggs, each in various stages of incubation. The sets were simply laid in depressions in moss off the margins of "ponds."

15. GREATER YELLOWLEGS. Saw a number up on the "plains" where the bird's harsh cries may be heard at any time. A nest of this species was found, June 3rd, with 4 badly incubated eggs, which were simply laid on a hill adjoining a large tract of spruce bog. On June 13th, two others were discovered in a similar location, four handsomely marked eggs being the complement in each case.

16. LESSER YELLOWLEGS. Saw two individuals on the barrens, but no nest was found.

17. SPOTTED SANDPIPER. Common along the shores of lakes and streams.

18. WELCH PTARMIGAN. In a dry place in a large area of spruce bog, and at one of the highest points reached by the Railway, we flushed a bird of this species off her nine fresh eggs, on June 6th. The nest was merely a depression in moss amongst spruce sprouts and thinly lined with feathers and grasses. Two other birds were seen out on the barrens in the same neighborhood, but investigation failed to reveal any more nests.

19. AMERICAN GOSHAWK. We saw a few specimens in the mountain regions, but they are not very common.

20. PIGEON HAWK. On June 6th a noisy pair were located in some heavy spruce timber at the base of a small precipice. After carefully looking for the nest in the trees, it was eventually found with four young, on a ledge of rock on the mountain side.

21. AMERICAN OSPREY. Not numerous. A few birds seen flying from the sea inland.

22. BELTED KINGFISHER. Fairly common along the Humber River, where a nest containing seven fresh eggs was taken on July 1st.

23. NEWFOUNDLAND WOODPECKER. Common in the mountainous country and breeding in large dead birch trees which had been charred by forest fires.

24. DOWNY WOODPECKER. Probably common, but we only saw half a dozen specimens.

25. ARCTIC THREE-TOED WOODPECKER. Saw three birds in the higher levels.

26. NORTHERN FLICKER. Common. Flushed one bird out of a hole in a dead birch, June 9th.

27. NIGHTHAWK. Saw a number flying over the cliffs at Bay of Islands.

28. KINGBIRD. A few specimens were seen along the shore of the Humber River.

29. ALDER FLYCATCHER. This species arrived about June 10th, at Bay of Islands; a few days later it was quite common.

30. LABRADOR JAY. A pair, or more, of these birds were observed at every point, and a few of them used to feed around our camp.

31. NORTHERN RAVEN. Fairly common, especially in and about the Bay of Islands. One pair had their nest of sticks on the cliffs of Gregory Island, but the young had already left.

32. CROW. Saw a few along the Railway line.

33. PINE GROSBEAK. Several old nests of this species were found and the birds observed to be fairly common.

34. AMERICAN CROSSBILL. Saw two individuals at Bay of Islands.

35. REDPOLL. Saw a flock of six or seven near the Humber River, June 7th.

36. SAVANNA SPARROW. Abundant and nesting everywhere in spruce bogs. Several nests were found during the last week in June, sunk in "caribou" moss and lined with grasses. We also noted this bird breeding on the graminaceous slopes of Gregory Island, which is nothing more or less than a perpendicular cliff rising out of the water and situated many miles out at sea.

37. WHITE-CROWNED SPARROW. Three birds only seen in stunted spruce woods.

38. WHITE-THROATED SPARROW. A common resident and abundant breeder. Many nests found on the ground in spruce woods during the first week in June, the sets ranging from two to four eggs.

39. CHIPPING SPARROW. Common, especially at Bay of Islands.

40. SLATE-COLOURED JUNCO. Not many birds seen. A nest with three incubated eggs was located on the ground in spruce woods, July 18th.

41. SWAMP SPARROW. Only two birds noted.

42. FOX SPARROW. A very interesting and abuundant species and a wonderful singer. This bird's flute-like notes were heard in the stunted spruce country at all times of the day. The following, by Mr. William Brewster, who visited Southern Labrador in 1881, well describes the song of the Fox Sparrow:—

"What the Mocking Bird is to the south, the Meadow Lark to the plains of the West, the Robin and Song Sparrow to Massachusetts, and the White-throated Sparrow to northern New England, the Fox Sparrow is to the bleak regions bordering the Gulf of St. Lawrence. At all hours of the day, in every kind of weather late into the brief summer, its voice rises among the evergreen woods filling the air with quivering, delicious melody, which at length dies softly, mingling with the soughing of the wind in the spruces or drowned by the muffled roar of the surf beating against the neighboring cliffs. To my ear the prominent characteristic of its voice is richness. It expresses careless joy and exultant masculine vigor, rather than delicate shades of sentiment, and on this account is perhaps of a lower order than the pure, passionless hymn of the Hermit Thrush; but it is such a fervent, sensuous and withal perfectly-rounded carol that it affects the ear much as sweet-meats do the palate, and for the moment renders all other bird music dull and uninteresting by comparison."

The Fox Sparrow is an early breeder. The birds arrived, we were told, about the last week in April and by the first of June many young were on the wing. From June 3rd to 5th about a dozen nests were found, with young in various stages of growth, and two others contained three fresh eggs each. The majority were placed two to five feet up in stunted spruce; two were located amongst the branches of fallen spruce, while a few were sunk in moss on the ground. At the end of the month several other nests were found containing three and four eggs. These, no doubt, were second sets. Most of the nests were composed of moss, rootlets, etc., with a lining of caribou hair, while those placed at an elevation were usually built externally with spruce twigs. The eggs are pale bluish-green, spotted and blotched with reddish-brown, or uniform chocolate brown.

43. TREE SWALLOW. Saw several specimens at St. George's Bay.

44. BANK SWALLOW. Several pairs starting to nest in some low-lying sand-pits at St. George's Bay, June 10th.

45. BLACK AND WHITE WARBLER. A fairly common breeder, nesting in spruce woods about June 15th.

46. YELLOW WARBLER. Several specimens noted, amongst the alders, June 7th, at Bay of Islands. A nest with four badly incubated eggs was found, June 27th, in a birch tree.

47. MYRTLE WARBLER. On June 8th we saw a bird of this species carrying nesting material. Not very common.

48. MAGNOLIA WARBLER. Six or seven birds seen in the stunted spruce along the Humber River, June 8th.

49. CHESNUT-SIDED WARBLER. Rare. Only two birds noted in some mixed woods, June 8th.

50. BAY-BREASTED WARBLER. Two individuals noted at Grand Lake, June 8th.

51. BLACK-POLL WARBLER. The most abundant warbler seen during our visit. They were seen everywhere in the spruce country. A nest with four fresh eggs was found, June 27th, in a small spruce tree.

52. BLACK-THROATED GREEN WARBLER. Heard many in the large hemlocks and pines at Bay of Islands, June 10th.

53. YELLOW PALM WARBLER. We heard this species singing every morning early around our camp at Grand Lake.

54. WATER THRUSH. Fairly abundant. A nest found, June 4th, in the upturned roots of a tree. The bird had not started to lay.

55. NORTHERN YELLOWTHROAT. Common amongst the alders and willows along the Humber River.

56. WILSON'S WARBLER. Common and observed wherever we pitched our camp.

57. CANADIAN WARBLER. Fairly common in the spruce woods.

58. WINTER WREN. Heard this species singing all day long in damp evergreen woods.

59. RED-BREASTED NUTHATCH. Saw several in the mountainous country, where they were breeding.

60. CHICKADEE. Common all over the country.

61. RUBY-CROWNED KINGLET. Very abundant. This species, like *Passerella iliaca*, is a very interesting one and a delightful singer. For such a small frame the bird has extraordinary powers of song, and from the tops of stunted spruce he can be heard at all hours of the day. On June 4th a nest with four fresh eggs was found. On June 9th, 15th and 28th, three others of nine eggs each, respectively, were discovered, all the nests being suspended from the branches of stunted spruce trees. They were built of moss, fine strips of bark and heavily lined with feathers of various birds.

62. WILSON'S THRUSH. Not as common as the following species, but a few specimens were seen at different points.

63. HERMIT THRUSH. Abundant. A nest found on June 4th, contained three fresh eggs. Several other nests were located later in the month. Another wonderful singer. It was worth while making the trip just to hear the present species, the White-throated Sparrow, the Fox Sparrow and Ruby-crowned Kinglet in their favorite songs.

64. ROBIN. Abundant everywhere, nesting commonly the first week in June.

Our party consisted of Mr. E. Arnold, Montreal; H. W. Beers, Bridgeport, Conn. and the writer. We are all looking forward to a return visit next year.

THE ALGAE OF THE BRUCE PENINSULA.

BY A. B. KLUGH, M.A.,
(Botanical Department, Queen's University, Kingston, Ont.)

The Bruce Peninsula lies between Lake Huron and Georgian Bay in Ontario. The Peninsula consists of limestone which forms high cliffs on the Georgian Bay shore, while the Lake Huron shore of the lower part of the Peninsula is low and sandy with some limestone points.

Algal habitats are abundant on the Peninsula. In addition to the shores of Georgian Bay and Lake Huron there are several

lakes near the base of the Peninsula, three of which are joined into a chain by rivers. Springs and small streams abound, and swales and swamps are common. Near the Lake Huron shore are extensive bogs and at Mud Lake is a large bog.

The places mentioned in these notes are located as follows:—Wiarton, Colpoy's Bay, Cape Croker, Hope Bay, Barrow Bay, and Lion's Head on the shore of Georgian Bay; Oliphant and Golden Valley on the shore of Lake Huron; Adamsville, Purple Valley and Mar in the interior.

These notes are not presented in the belief that they constitute a complete list of the algae of the region, since they are the result of but two months' work—May and June, 1911—and no forms are included which were not in perfect shape for identification. In the case of *Anabaena*, *Spirogyra*, *Vaucheria*, *Zygnema*, and *Oedogonium*, this limits the list very considerably since fruiting material is always rare compared with that in a vegetative condition. The majority of the species recorded constitute first records for Canada.

CYANOPHYCEAE.

Chroococcus turgidus, Naegeli. Bog, Mud Lake, near Colpoy's Bay June 7; Marsh, Oliphant, June 14.

Gleocapsa rupestris, Kuetzing. Common on stones in pools in rock of limestone point on shore of Lake Huron at Oliphant, June 14.

Microcystis marginata, Kuetzing. Floating among other algae at windward shore of Sky Lake, near Oliphant, May 28; Bog, Mud Lake, near Colpoy's Bay, June 26.

Coelosphaerium kuetzingianum, Naegeli. Floating among other algae at windward shore of Sky Lake, May 28.

Merismopedium glaucum, Naegeli. Plankton, Pool on the Commons, Colpoy's Bay, May 8, 1911; Swale, Colpoy's Bay, May 20; Pool, McGregor's Harbour, Cape Croker, May 30; Shore of Lake Huron at Oliphant, June 14; Sky Lake, May 28.

Oscillatoria tenuis, Agardh. Damp place on rock. Colpoy's Bay, May 11.

Oscillatoria subtilissima, Kuetzing. Damp place on rock, Colpoy's Bay, May 11.

Oscillatoria formosa, Bory. On timber in a small stream near Colpoy's Bay, May 27.

Nodularia paludosa, Wolle. Swale near Colpoy's Bay, May 20; Swamp, Golden Valley, June 1.

Anabaena torulosa, Lagerheim. Swale, Colpoy's Bay, May 20; Swamp, Golden Valley, June 1.

Scytonema crispum, Bornet. Rock pool, rocky point, shore of Lake Huron at Oliphant, June 14.

Scytonema mirabile, Bornet. Sky Lake, near Oliphant, May 28.

Scytonema myochrous, Agardh. Bog, Oliphant, May 28.

Tolypothrix lanata, Wartmann. Sky Lake, near Oliphant, May 28.

Stigonema mamillosun, Agardh. Bog, Mud Lake, near Colpoy's Bay, June 7.

Calothrix parietina, Thuret. Damp place on limestone rock, Colpoy's Bay, May 11.

CHLOROPHYCEAE.

Ophiocytium cochleare, A. Braun. Swale, Colpoy's Bay, May 20; Swamp, Golden Valley, June 1; Swamp near Boat Lake, June 16; Ditch, Oliphant, June 14.

Ophiocytium parvulum, A. Braun. Swale, Colpoy's Bay, May 20; Swamp, Golden Valley, June 1; Bog, Mud Lake, June 7; Swamp, near Boat Lake, June 16; Ditch, Oliphant, June 14; Pool, Hope Bay, June 8.

Ophiocytium gracilipes, Rab. Scarce, in a collection from a marsh on the Cape Croker road, May. 30.

Conferva bombycina, Agardh. Swamp, Golden Valley, June 1; Swamp, Mar road, June 5. Ditch, near Boat Lake, June 16; Stream in sandy shore, Oliphant, June 14.

Zygnema leiospermum, De Bary. Common near mill at Lake Isaac, June 5.

Spirogyra catenaeformis, Kuetzing. Bog, Mud Lake, June 26.

Spirogyra varians, Kuetzing. Common, with abundant zygospores, in ditch near Wiarton, May 5. By May 26 it had completely disappeared though the ditch still contained plenty of water. Scarce in a swamp near Boat Lake, June 16, zygospores present.

Spirogyra orthospira, Naegeli. Small stream from spring, Oliphant, June 14, in all stages of conjugation; Ditch, Colpoy's Bay, June 23.

Spirogyra weberi, Kuetzing. Common in pools in sand of shore of Lake Huron at Golden Valley, in all stages of conjugation, June 1; Ditch, Lion's Head, June 8, just beginning conjugation; in small stream in sandy shore at Oliphant, June 14, spores mature; Swamp, Adamsville, June 8.

Spirogyra insignis, Kuetzing. Ditch, near Wiarton, June 4, spores nearly mature.

Mougeotia genuflexa, Agardh. Common in a small marsh near Purple Valley, May 30, very sparingly fruited; Swamp, Golden Valley, June 1.

Mougeotia scalaris, Hassall. Near mill, Lake Isaac, June 5; Pool in swamp at Mud Lake, June 6.

Mougeotia viridis, Wittrock. Common in swale, Colpoy's Bay, May 20.

Chlamydomonas communis, Snow. Abundant in a collection from a swamp on Mar road, June 5..

Chlamydomonas globosa, Snow. Common in pools and swamps throughout the Peninsula.

Haematococcus pluvialis, Flotow. Common in pools in holes in limestone point on Sky Lake, near Oliphant, May 23.

Pandorina morum, Bory. In small marsh at Sky Lake, May 28; in marsh on Cape Croker road, May 30; Swamp, Golden Valley, June 1; Abundant in a collection from a swamp on Mar road, June 5.

Volvox aureus, Ehrenberg. Scarce in a collection from a swamp on Mar road, June 5.

Tetraspora lubrica, Agardh. Common in a stream in a pasture, Colpoy's Bay, April 30; in pools along a bush road, near Mar, May 10. In a stream between Colpoy's Bay and Purple Valley, May 27.

Chlorococcum humicola, Rabenhorst. Common under dripping water.

Characium naegelii, A. Braun. Common on other algae, particularly on *Conferva bombycina* throughout the peninsula.

Characium ambiguum, Hermann. On *Conferva bombycina* in swale near Colpoy's Bay, June 20.

Rhaphidium falcatum, Cooke. Swamp, Mar road, June 5; Ditch, near Boat Lake, June 16; Pool, Hope Bay, June 8; Shore of Lake Huron at Oliphant, June 14.

Rhaphidium falcatum aciculare, Hansgirg. Swale, Colpoy's Bay, May 20; Pool near Colpoy's Bay, May 30; Common in swamp near Golden Valley, June 1.

Nephrocytium agardhianum, Naegeli. Swamp on Mar road, June 5.

Tetraedron minimum, Hansgirg. Pool, Hope Bay, June 8; Small stream, Oliphant, June 14.

Scenedesmus bijuga, Wittrock. Pool, Hope Bay, June 8; Pond or Commons, Colpoy's Bay, May 11.

Scenedesmus obliquus, Kuetzing. A common plankton form throughout the Peninsula.

Scenedesmus quadricauda, Brébisson. A common plankton form throughout the region.

Scenedesmus quadricauda abundans, Kirchner. Pool, McGregor's Harbour, Cape Croker, May 30; Ditch, near Boat Lake, June 16.

Coelastrum proboscideum, Bohlin. Swale, near Colpoy's Bay, June 5; Marsh, Oliphant, June 14.

Sorastrum spinulosum, Naegeli. Scarce, in collection from a pool at Hope Bay, June 8.

Hydrodictyon reticulatum, Lagerheim. Forming a sheet over the surface of a large pool at edge of swale near Colpoy's Bay, June 5.

Pediastrum boryanum, Meneghini. A very common plankton form throughout the Peninsula.

Pediastrum tetras, Ralfs. Scarce, in collection from a marsh at Oliphant, June 14; Pool, Hope Bay, June 8.

Ulothrix aequalis, Kuetzing. This species and *Ulothrix zonata* are the commonest filamentous forms on the rocks of the shores of Georgian Bay. They occur in patches consisting of one species only. Gametes were mature on April 30.

Ulothrix zonata, Kuetzing. Common on rocks along shores of Georgian Bay; fruiting on May 7.

Oedogonium capillijorme, Kuetzing. Swale, Colpoy's Bay, June 5.

Chaetosphaeridium globosum, Klebahn. On *Oedogonium capillijorme* in swale, Colpoy's Bay, June 5.

Chaetophora elegans, Agardh. Forming globular gelatinous masses about 5mm. daimeter on stones in a pool on the Cape Croker road, May 30; forming light green spheres from extremely minute size up to 1 mm. diameter on sticks at edge of a willow swale near Colpoy's Bay, June 5.

Chaetophora incrassata, Hazen. Attached to log in a ditch, near Wiarton, May 12; common on stones at bridge over Patanelly River, near Mar, June 1.

Stigeoclonium lubricum, Kuetzing. Common in a little stream from a spring near Wiarton, May 5.

Draparnaldia acuta, Kuetzing. In pools with *Tetraspora lubrica* on a bush road near Mar, May 10, Stream near Wiarton, May 19; Stream near Golden Valley, June 1.

Draparnaldia glomerata, Agardh. Swale, Colpoy's Bay, May 20; Swamp, Golden Valley, June 1.

Pleurococcus vularis, Meneghini. Common on trees, walls, etc.

Tretepohlia aurea, Martius. Scarce on limestone rocks in *Populus-Thuja* scrub along Mar road, June 20; forming bright orange velvety cushions from 1 to 2 dm. in extent; Forming light orange-colored patches on rocks along the shore road at Colpoy's Bay, June 25.

Cladophora callicoma, Kuetzing. Scarce in stream at Colpoy's Bay.

Vaucheria sessilis, D.C. Common in swale along Wiarton road, oöspores not yet mature, June 23.

Vaucheria geminata racemosa, Walz. Swamp near Boat Lake, June 15.

THE FERTILIZING VALUE OF RAIN AND SNOW.

BY FRANK T. SHUTT, M.A.

In the ascension and descension of water—the continuous rise of aqueous vapour from land and water surfaces, and its interrupted fall as rain and snow—we have natural phenomena of the greatest importance to the maintenance of vegetable and animal life on the earth. Some few years ago the writer traced in a lecture before the Ottawa Field-Naturalists' Club, the various ways in which this constant circulation of the world's water supply affected our health and commerce, and how above all it was necessary for the growth of our crops. As one of the minor ways in which rain and snow contributed towards the maintenance of plant life, it was pointed out that in their fall through the atmosphere they cleansed it of certain nitrogen compounds—ammonia and nitrates—gaseous compounds arising from the combustion of fuel, from the oxidation of food in animals, from the decomposition of nitrogenous organic matter in the soil and from electric discharges in the atmosphere, and it was further shown that these compounds brought down by the rain and snow furnished to our crops a notable amount of most valuable food. It was with the object of determining, as closely as might be possible, the average annual amount of available nitrogen so furnished per acre, that some years ago the analysis of each fall of rain and snow was undertaken in the chemical laboratories of the Experimental Farm, Ottawa. This work has afforded interesting data, some of which may now be presented.

During the year ending February 28, 1911, the rainfall was 19.67 inches and the snowfall 73.0 inches, a total precipitation of 26.97 inches—practically 10 inches below the average for this locality. Omitting many of the details we may state that this precipitation furnished 5.271 lbs. of nitrogen per acre. This is about 1 lb. more than we obtained for the first year of observation (ending Feb. 29, 1908), but markedly less than that for the following year (ending Feb., 1909), viz. 8.364 lbs. per acre. This latter we concluded was abnormally high and was to be accounted for by the extensive bush fires which heavily charged the atmosphere with smoke for at least two of the summer months in 1908. A summary of the four years' investigation may be given in tabular form.

PRECIPITATION AND AMOUNT OF NITROGEN PER ACRE, OTTAWA, 1908–1911.

	Rain in Inches	Snow in Inches	Total Precipitation in Inches	Pounds of Nitrogen per Acre
Year ending—				
February 29, 1908....	24.05	133.0	37.35	4.322
" 28, 1909....	22.99	96.25	32.63	8.364
" 28, 1910....	28.79	80.75	36.87	6.869
" 28, 1911....	19.67	73.00	26.97	5.271

It will be observed that the present figure (5.271 lbs.) is practically the mean of the amounts recorded for the two years 1908 and 1910. It probably represents therefore, approximately, the amount of the nitrogen furnished per acre annually by the rain and snow in the neighborhood of Ottawa.

The analytical data show that of this amount, 4.424 lbs. (approximately 84 per cent.), was contained in the rain, and .847 lbs. in the snow. These proportions (though not the amounts) are those of the previous year—an interesting fact. The data further indicate that of this total amount of nitrogen, 3.733 lbs. were present as ammonia compounds and 1.538 lbs. as nitrates and nitrites, all of which from the agricultural point of view may be considered of equal value, the ammonia compounds readily undergoing conversion into nitrates (the form in which plants absorb their nitrogen), in the soil.

THE OCCURRENCE OF THE LARVA OF THE WANDERER, FENISECA TARQUINIUS, IN NOVEMBER.

BY ALBERT F. WINN, MONTREAL.

This butterfly, whose habits are wholly unlike those of any other species in North America, has never been taken in any numbers on the Island of Montreal, though it fairly abounds all through the Laurentian hills within forty miles to our north, wherever the alder and its clusters of woolly lice are found. Students of insects are familiar with its curious life-history, and extraordinary chrysalis, but the finding of the larvæ feeding upon the lice on the first of November, after we had had about two nches of snow, was to me, at all events, rather unexpected and

must indicate that the butterflies fly as late as October. In 1902, at Lake Lachigan, the butterflies were common on September 1st in all conditions, from freshly emerged specimens to those which had scarcely sufficient fragments of wings left to enable them to fly, but from the larvæ which I brought home, although some turned to pupæ early in September, the butterflies did not appear till the end of November and through December and January. They were, of course, kept indoors in a warm room.

In species which have more than one annual brood it is difficult to define the dates of appearance and disappearance of all but the first, but judging by my experience it would be absolutely impossible to state how many broods there were annually of *F. tarquinius*. Like several others among our butterflies, *Colias philodice* for example, it appears to keep on laying eggs, which continue to hatch into larvæ, which continue to eat until one day becomes too cold for their existence or that of their food supply, and every stage is wiped out except the one which Nature ordained should pass the winter. In *F. tarquinius* the chrysalis hibernates, and again Nature has in some way arranged that the butterflies do not all appear at once, a most necessary provision, as the supply of food for the young larvæ would soon be exhausted if the eggs were laid and hatched about the same time. Not only do the butterflies appear extended over a considerable period of time, but the egg-laying period is a long one, how long I do not know. Any one who has watched one of the females flying about the alders picking out a cluster of lice in the midst of which to deposit an egg or possibly two, will realize what a slow process it is. The butterflies seem to understand perfectly when there are enough of their larvæ to each cluster of lice and do not lay eggs in clusters already tenanted, until such time as there is a certainty that the big larvæ will be out of the way by the time the little ones hatch.

I have never seen *F. tarquinius* larva leave one cluster and journey along a stem to another, and think they seldom leave the spot where they first hatch. If they did this I fear there would be little chance of their escaping the attack of parasitic hymenoptera, which are always to be seen around the snowy clusters of lice.

The relation of insects to their food is one of the most important matters for an entomologist to consider, in fact everything, both from an economic and scientific standpoint depends on a thorough understanding of these. To anyone fond of nature who wishes to have a great deal of pleasure without a knowledge of ten thousand ever changing Latin (or Greek) names, we should recommend studying the life of some one common insect in its entire annual life-history, its relation to the plants on which it feeds and the parasites or other enemies that feed upon it.

BOOK NOTICE.

LANDS, FISHERIES, GAME AND MINERALS: Commission of Conservation, Canada.

This most valuable publication has recently been issued by the Dominion Commission of Conservation. It is a book representing a great deal of exacting research work, and will be found exceedingly instructive and entertaining to everyone interested in this great country of ours. The volume is a large one of some 525 pages, substantially bound in cloth and fully illustrated throughout with maps, diagrams and two-colour photo engravings.

The section devoted to Lands describes the agricultural survey of one hundred representative farms in each province, made by the Commission of Conservation in order to ascertain just what the condition of agriculture is in Canada. Some of the subjects on which information was obtained are: rotation of crops, use of manures, prevalence of weeds and insect pests, water and fuel supply and the use of selected seed. One of the striking facts revealed is that not more than nine per cent. of the farmers of Canada follow any intelligent and effective rotation of crops. By the adoption of more scientific methods which could readily be put into effect, it is estimated that the field crops of the country could be doubled in twenty years. The report is replete with argicultural information, valuable because it is not hearsay, but a statement of actual facts scientifically obtained by men in the field. An article on Agricultural Production in Canada indicates just what each province has produced of field crops, fruit and live stock since 1891, and also gives crop areas and comparative crop yields.

The part on Fisheries and Game is a valuable compendium of facts and conclusions by various experts. On account of the frequent disputes over jurisdiction in the case of fisheries between the Provinces and the Dominion, an analysis is given of the clauses of the British North America Act referring to fisheries, showing what powers each authority has. Following this is a digest of the Federal and Provincial fisheries laws and regulations.

Mr. James White, Secretary of the Commission, has an important article on the North Atlantic Fisheries Dispute in which he traces the historical development of the case leading up to the late Hague arbitration, gives the terms of settlement and recounts the advantages accruing therefrom to Canadian fishing interests.

The Canadian Oyster Industry is dealt with by Mr. J. Patton, Assistant Secretary of the Commission. The statement is made that Canada pays out annually over $350,000 for oysters

imported from the United States, when the natural conditions in this country are excellent for producing all that is required for home consumption. The Canadian output has decreased from 64,646 bbls. in 1882 to 38,535 bbls. in 1909, in spite of the fact that prices have risen 240 per cent. in the past 20 years. This degeneration of the industry is due very largely to the long-standing dispute over jurisdiction between the Provincial and Dominion authorities, which has left the oyster fisherman in such a state of uncertainty as to his holdings that he will not undertake the artificial cultivation of oysters. The article relates the experiments of other oyster-producing countries and shows that the only means of rehabilitating the industry is by definitely settling the jurisdictional dispute so that oyster culture may be confidently engaged in by private individuals.

Mr. C. W. Gauthier, a practical fisherman, in an article on "Whitefish in the Great Lakes," strongly advocates the estabment of more hatcheries for the artificial propagation of that species of fish. Maps are reproduced showing the area frequented by whitefish in each of the Great Lakes. Following these, is a statistical article on Fish Culture in Canada, which points out that last year only fifty-six per cent. of the appropriation voted for this purpose by the Dominion Parliament was expended. In other articles the fisheries of Manitoba, Prince Edward Island and British Columbia are described and measures necessary for their conservation suggested.

In the section on Game there is a full description of the game and game fisheries in Nova Scotia, Prince Edward Island, Quebec, Saskatchewan and British Columbia. This portion of the report will be found of especial value to the sportsman in search of good hunting and fishing territory. At the end of the section a statistical article gives the amount of revenue derived from the fishery and game resources of each province.

The Minerals section of the report opens with a summary of the Provincial and Dominion laws and regulations respecting mining. An exhaustive article on the conservation of mineral resources, by Mr. W. J. Dick, Mining Engineer for the Commission, takes up each mineral of economic importance in Canada, showing the extent of the deposits, the consumption, and the methods of mining; and recommends measures for conservation. Mining accidents in Canada and in foreign countries are fully dealt with in another article and suggestions are advanced pointing out how the heavy death rate in Canada from this cause may be reduced.

The volume is perhaps the most thorough and complete record of investigation and research that has ever been issued by any government in Canada.

NOTES.

AN UNUSUALLY EARLY RECORD OF THE ARRIVAL OF THE BLACK-THROATED GREEN WARBLER (*Dendroica virens*) AT OTTAWA.—The arrival of this species of wood warbler was noted last spring by Miss V. Lees and Mrs. Brown, of Ottawa East, when they saw and heard one of these birds on the canal bank near Bank Street on the 15th April. Miss Lees saw it first and an hour or two later Mrs. Brown, passing the same way, also saw and heard it near the same spot.

BLUE JAY IMITATING RED-SHOULDERED HAWK.—In the April number of the NATURALIST, Mr. L. M. Terrill, of Westmount Que., correctly ascribed the authorship of some Red-shouldered Hawks' notes, which he heard when none of those birds were in evidence, to the Blue Jay. It may be added that this is a very common performance on the part of the Blue Jay. Its very exact imitation of the Red-shoulder's notes may frequently be heard, e.g., at Beechwood, Ottawa, where both birds are found. It is proficient in the imitation of the notes of other birds also.

G. EIFRIG, ADDISON, ILL.

BIRD RECORDS.—The following records which I made in the early part of the present year may be of interest to some readers of THE OTTAWA NATURALIST.

1911

Jan.	5—Yarmouth, N.S.,	flock of Bluebirds.
	21—Meteghan, N.S.,	Gold-crowned Kinglet.
Feb.	2— do	Robin.
	18—Weymouth, N.S.,	Robin.
	19— do	Robin.
	23— do	Two Meadowlarks.
	24— do	Robin.
	26— do	Meadowlark.
Apl.	13—St. Stephen, N.B.,	Bluebird.
	14— do	Red-winged Blackbird.

Although only one date for Golden-crowned Kinglet is mentioned above, I afterwards saw these birds abundantly along the shore of Digby and Yarmouth counties in Nova Scotia, where they were feeding on weed seeds.

G. E. SANDERS.

The Ottawa Field-Naturalists' Club.

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