1909 VOL. XXIII. 1910

THE

OTTAWA NATURALIST,

Being Volume XXV. of the

TRANSACTIONS

OF THE

OTTAWA FIELD-NATURALISTS' CLUB.

Organized March, 1879. Incorporated March, 1884.

The Ottawa Field-Naturalists' Club.

Patron:

THE RIGHT HONOURABLE EARL GREY,
GOVERNOR-GENERAL OF CANADA.

Council 1909-1910

President:

Mr. A. E. Attwood, M.A.

Vice-Presidents:

Mr. A. Halkett. Rev. G. Eifrig.

Librarian:

Mr. C. H. Young, Geological Survey.

Secretary:

Mr. T. E. Clarke, B.A.
(470 O'Connor Street).

Treasurer:

Mr. Arthur Gibson,
(Central Experimental Farm).

LIST OF MEMBERS OF THE OTTAWA FIELD-NATURALISTS' CLUB, 1909 - 1910

Adams, *Prof.* F. D., *M.Sc.*, *Ph.D.* (Montreal).
Ami, H. M., *M.A.*, *D.Sc.*, *F.G.S.*, *F.R.S.C.*
Ami, Mrs. H. M.
Ami, S. T.
Anderson, Miss Constance.
Anderson, James R. (Victoria, B.C.)
Anderson, *Lieut.-Col.* W. P., *C.E.*
Attwood, A. E., *M.A.*

Baker, R. M., *B.S.A.*
Baldwin, J. W.
Ballantyne, James.
Bangs, J. S.
Barber, H. G.
Barlow, A. E., *M.A.*, *D.Sc.* *F.G.S.A.* (Montreal).
Bate, Miss Marjorie St. H. (Eastbury, Watford, Eng.)
Beaupré, Edwin, (Okotoks, Alta.)
Bell, Robert, *B.A.Sc.*, *M.D.*, *LL.D.*, *F.R.S.*, *F.R.S.C.*, *F.G.S.A.*
Bennett, Miss K. E.
Bennett, L. H., (Regina).
Bentley, Miss W. K.
Billings, C. M.
Billings, W. R.
Binnie, T. H., *B.S.A.*
Blackader, *Dr.* E. H.
Blackadar, Lloyd.
Blackhall, John, (Toronto).
Bond, W.
Borden, *Hon. Sir* F. W., *M.D.*
Bowen, Miss Alice, (Quebec).
Bradshaw, G. H. (Morden, Man.)
Brainerd, Dwight, (Montreal).
Brewster, W. (Cambridge, Mass.)
Brittain, John, (Macdonald College, Que.)
Brock, R. W., *M.A.*

Brown, Mrs. R. D.
Brown, W. J. (Westmount, Que.)
Brown, T. A.
Bruce, L. (Rossland, B.C.)
Bryce, P. H., *M.D.*
Burgess, T. J. W., *M.D., F.R.S.C.* (Montreal).
Burt, Miss F. M.

Calder, Alex. (Winnipeg).
Cameron, E. R., *M.A.*
Cameron, Roy.
Camsell, C., *B.A.*
Carter, J. J.
Carson, W. H.
Casson, *Rev.* C. W.
Campbell, D. A., *B.A.*
Campbell, A. M.
Campbell, J. G. (Magog, Que.)
Campbell, R. H.
Carman, Mrs. F. W.
Clark, G. H., *B.S.A.*
Clarke, T. E., *B.A., B. Paed.*
Cobbold, Paul A. (Haileybury, Ont.)
Cole, H. W.
Cole, John (Westboro', Ont.)
Collins, J. Franklin (Providence, R.I.)
Collins, W. H.
Connor, M. F., *B.Sc.*
Coté, J. C.
Crabtree, C. A.
Craig, *Prof.* John (Ithaca, N.Y.)
Cram, A. S.
Criddle, N. (Treesbank, Man.)
Currie, P. W.
Curry, Miss E. E.

Dawson, S. E., *C.M.G., Lit.D., F.R.S.C.*
Dearness, J., *M.A.* (London, Ont.)
Deam, C. C. (Bluffton, Ind.)
Dempsey, J. H. C. (Hamilton).
Dent, W. A. (Sarnia, Ont.)
Dewar, Miss Ethel.
Director, Christian Brothers' Academy.
Dixon, F. A.
Dowling, D. B., *B.A.Sc.*
Dulau & Co., (London, Eng.)
Dunne, J. P.
Dwight, Jonathan, Jr., *M.D.* (New York).

Eddy, E. D., *B.S.A.*
Eifrig, *Rev.* G.
Ells, R. W., *LL.D., F.G.S.A., F.R.S.C.*
Evans, Jno. D., *C.E.* (Trenton, Ont.)
Ewing, W. C., *M.A.*
Ewart, D.

Farley, Miss J. E.
Farley, F. L. (Red Deer, Alta.)
Farr, Miss E. M. (Philadelphia).
Finn, J. P., *B.A.*
Fisher, *Hon.* Sydney A.
FitzHenry, W. (Myrtle, Man.)
Fitzpatrick, *Hon.* Chas.
Fleck, A. W.
Fleming, J. H. (Toronto).
Fleming, R. F.
Fleming, *Sir* Sandford, *K.C.M.G., C.E., F.R.C.I., F.R.S.C.*
Fraser, Geo., (Ucluelet, B.C.)

Gallup, A. H.
Gibson, Arthur.
Gibson, J. W., *B.A.*
Gilbertson, Miss B.
Glashan, J. C., *LL.D., F.R.S.C.*
Gorman, M. J., *LL.B.*
Graham, W.
Grant, *Sir* J. A., *K.C.M.G., M.D., F.R.C.S. Edin., F.R.S.C., F.G.S.*
Grenfell, Miss C. P., *B.A.*
Grisdale, J. H., *B.Agr.*
Grist, Miss Mary L.
Groh, H., *B.S.A.*

Haldane, Miss Maude.
Halkett, Andrew.
Hamilton, Mrs. F. L. H.
Hampson, E., *B.A.*
Hann, H. A. (Summit, N.J.)
Harcourt, Geo. (Edmonton, Alta.)
Hargrave, Miss I. (Sherbrooke, Q.)
Harmer, Miss G. (Entwistle, Alta.)
Harrington, W. Hague, *F.R.S.C.*
Harrison, *Lieut.-Col.* Edward.
Hart, F. C., *B.S.A.*
Harvey, R. V. (Victoria, B.C.)
Hay, George, Sr.
Hay, G. U., *D.Sc., M.A., Ph.B., F.R.S.C.* (St. John, N.B.)
Hayes, J. A., (Calgary).
Hennessey, F. C.
Herriot, W. (Galt, Ont.)
Hewit, H. O.
Hodge, C. F., *Ph.D.* (Worcester, Mass.)
Hodson, F. W.
Hope, James.
Houghton, J. A. (Bennington, Vt.)
Hunt, Miss L. E.

Ide, Wm, *B.A.*
Irwin, *Lieut.-Col.* D. T.
Irvin, Ward M.

Jackson, Miss Queenie.

Jacobs, Miss C. M. (Hamilton, Ohio).
Jacombe, F. W. H., *M.A.*, *M.F.*
Johnson, Miss A. E.
Jamieson, Thos., *B.A.*
James, C. C., *M.A.* (Toronto).
James, H. C.
Jenkins, S. J., *B.A.*
Jennings, O. E. (Pittsburg, Pa.)
Johnston, W. A., *B.Sc.*
Johnstone, Miss A.
Jones, Harold (Maitland, Ont.)
Jones, J. W., *B.A.*, (Macdonald College, Que.)

Kearns, J. C.
Keefer, Thos. C., *C.M.G.*, *C.E.*, *F.R.S.C.*
Keele, J., *B.A.Sc.*
Kingston, A. G.
Klotz, *Dr.* Otto.
Klugh, A. B. (Kingston).
Knechtel, A.

Labarthe, J. (Trail, B.C.)
Lajeunesse, *Rev.* J. A.
Lambart, *Hon.* O. H.
Lambart, The *Hon.* Mrs.
Lambe, L. M., *F.G.S.*, *F.G.S.A.*, *F.R.S.C.*
Latchford, *Hon.* F. R., *B.A.*
Lee, Miss K. G. (Clinton, N.Y.)
Lees, Miss V.
Lemieux, E. E.
Le Sueur, E. A.
Le Sueur, Miss Helen.
Letourneau, Jos. A.
Lewis, J. B., *C.E.*
Leyden, Miss M.
Lochhead, W., *B.A.*, *M.Sc.* (Macdonald College, Que.)
Lyman, H. H., *M.A.* (Montreal).

McCready, *Prof.* S. B. (Guelph).
McDougall, Miss J. C.
McDunnough, Jas. (Berlin, Germany).
McElhinney, M. P.
McElhinney, *Dr.* M. G.
McElroy, *Rev.* W. A.
McGill, A., *B.A.*, *B.Sc.*
McGillivray, H.
McIlmoyle, Miss M.
McInnes, Wm., *B.A.*
McLeod, Miss M. F.
McMillan, H. R., *B.S.A.*
McMillan, Thos. (Seaforth).
McNeill, Alex.
McNeill, Miss F. J. (Toronto).
McVeigh, Miss K.
MacCraken, John I., *B.A.*
MacKay, A. H., *LL.D.*, *B.Sc.*, *F.R.S.C.* (Halifax).
MacLaughlin, T. J.
Macnamara, C. (Arnprior).
Macoun, *Prof.* John, *M.A.*, *F.L.S.* *F.R.S.C.*
Macoun, J. M.
Macoun, W. T.
Malcolm, Jno. (Fergus, Ont.)
Mallock, G. S., *B.A.*
Matthews, Miss Annie L.
Megill, W. H. T., *B.A.*
Meldrum, A. E.
Metcalfe, W.
Michaud, Geo.
Millar, H. H. (Chicago).
Miller, *Prof.* W. G. (Toronto).
Milne, Wm.
Moore, W. H. (Scotch Lake, N.B.)
Morris, F. J. A. (Port Hope, Ont.)
Morris, H. U.
Moule, Miss F., *B.A.*
Munro, J. A. (Toronto).
Murphy, John.
Murray, James, *B.S.A.* (Brandon, Man.)

Nash, C. W. (Toronto).
Nelles, D. H., *D.L.S.*
Newcombe, C. F., *M.D.* (Victoria, B.C.)
Newman, L. H., *B.S.A.*
Nieuwland, *Rev. Prof.* J. A., (Notre Dame, Ind.)

O'Brien, S. E.
Odell, W. S.
Orde, J. F.
O'Sullivan, Owen.

Perney, F. E., *B.A.*
Pitts, H. H.
Poole, T. C.
Power, J. F., *B.A.* (Toronto).
Prince, *Prof.* E. E., *B.A.*, *F.L.S.*
Putman, J. H., *B.A.*, *B. Paed.*

Raine, Walter (Toronto).
Raynor, T. G., *B.S.A.*
Richard, *Rev.* A. E.
Ritchie, Miss Isabella.
Robertson, C. N.
Robertson, *Prof.* J. W., *LL.D.* (Macdonald College, Que.)
Robinson, Miss M.
Robinson, Hiram.
Rodman, Miss A. E.
Rose, C.
Rush, M. L., *B.A.*

Saunders, Wm., *C.M.G.*, *LL.D.*, *F.G.S.*, *F.L.S.*, *F.R.S.C.*
Saunders, W. E. (London, Ont.)

Saunders, H. S. (Toronto).
Scott, Geo. Inglis.
Scott, Mrs. G. I.
Scott, Norman M.
Scott, John A.
Scott, Harry S.
Scott, Miss Mary McKay.
Scott, W., *B.A.* (Toronto).
Scott, *Rev.* C. T. (Montreal, Que.)
Seton, E. Thompson (Coscob, Conn.)
Shannon, Frank.
Shearman, F. J. W.
Shutt, F. T., *M.A.*, *F.I.C.*, *F.C.S.*, *F.R.S.C.*
Simpson, Willibert.
Sinclair, S. B., *B.A.*, *Ph.D.* (Macdonald College, Que.)
Skales, Howard (Mt. Forest, Ont.)
Small, H. Beaumont, *M.D.*
Smythe, J. E.
Snider, W. W.
Soper, John.
Sowter, T. W. E.
Souliere, O.
Spence, J. C., *B.A.*
Spencer, A. G., *M.S.*
Spreckley, R. O.
St. Jacques, H.
Summerby, Wm. J., *M.A.* (Russell, Ont.)
Sutherland, J. C., *B.A.* (Richmond, Que.)
Sutton, Mrs. L. L.
Swaine, J. M. (Macdonald College, Que.)
Symes, P. B.

Taylor, F. B. (Fort Wayne, Ind.)
Terrill, L. M. (Montreal).
Thompson, R.
Thompson, *Rev.* B. W., *B.A.*
Thorne, James, *B.A.*
Topley, Mrs. W. J.
Tufts, H. F.
Tyrrell, J. B., *B.A.*, *B.Sc.*, *F.G.S.*, *F.G.S.A.* (Toronto).

Venables, E. P. (Vernon, B.C.)

Waddell, Miss K. F.
Walker, B. E., *F.G.S.* (Toronto).
Walker, E. M., *B.A.*, *M.B.* (Toronto).
Walker, Bryant (Detroit).
Wallace, J. S. (Toronto).
Wallis, J. B. (Winnipeg, Man.)
Warwick, F. W., *B.Sc.* (Buckingham, Que.)
Weld, Wm. E.
Weston, T. C., *F.G.S.A.*
Whelen, Peter.
Whelen, Miss A.
White, E. G.
White, George R.
White, James (Snelgrove, Ont.)
White, J. F., *M.A.*, *LL.D.*
White, *Lieut.-Col.* W., *C.M.G.*
Whiteaves, J. F., *LL.D.*, *F.G.S.*, *F.R.S.C.*, *F.G.S.A.*
Whyte, Miss Ida.
Whyte, Miss Isabella.
Whyte, R. B.
Wight, E. C.
Williams, Miss M. B., *B.A.*
Williams, J. B. (Toronto).
Willing, T. N. (Regina, Sask.)
Wilson, Morley E.
Wilson, Miss L. (Toronto).
Wilson, W. J., *Ph.B.*
Wilson, E. (Armstrong, B.C.)
Winchester, H. S.

Young, C. H.
Young, Wm., *B.Sc.*

CORRESPONDING MEMBERS.

Bethune, Rev. C. J. S., *M.A.*, *D.C.L.*, *F.R.S.C.*, Guelph, Ont.
Greene, Dr. E. L., United States National Museum, Washington, D.C.
Hill, Albert J., *M.A.*, *C.E.*, New Westminster, B.C.
Holm, Theodor, *Ph.D.*, Brookland, Washington, D.C., U.S.
Merriam, Dr. C. Hart, Department of Agriculture, Washington, U.S.
Smith, Prof. John B., *D.Sc.*, Rutger's College, New Brunswick, N.J.
Taylor, Rev. G. W., *M.A.*, *F.R.S.C.*, *F.Z.S.*, Nanaimo, B.C.
Wickham, Prof. H. F., Iowa City, Iowa, U.S.

THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, APRIL, 1909 No. 1

THE REPORT OF THE COUNCIL OF THE OTTAWA FIELD-NATURALISTS' CLUB FOR THE YEAR ENDING MARCH 16TH, 1909.

MEMBERSHIP.

With the view of increasing the membership, a letter was prepared, outlining the work of the Club, and copies of this letter were sent to persons known to be interested in such work. During the year, 47 new members have been elected, making the present membership 321, composed of 313 Ordinary Members and 8 Corresponding Members. This represents a net gain of 30 for the year, and makes the present membership the largest in the history of the Club.

SOIRÉES.

Acting on the suggestion of Dr. J. F. White, Principal of the Normal School, the various scientific and literary societies prepared a joint lecture programme for the year 1908-1909. The object was to provide a series of lectures of somewhat popular interest to be given at intervals of two weeks in the Assembly Hall of the Normal School. The plan has been completely successful. There has been no clashing of dates as in former years, the various societies have been brought into closer relationship, and large audiences have marked the entire course.

The societies under whose auspices addresses have been given are: The Ottawa Field-Naturalists' Club, The Literary and Scientific Society, The Royal Astronomical Society, The Women's Art Association, The Women's Historical Association, The Dickens' Fellowship, McGill University Club, Queen's University Club, Toronto University Club, and The Normal School. Those who lectured under our auspices were Dr. A. P. Knight, of Queen's University, and Dr. Jas. Robertson, C.M.G., Principal of Macdonald College. Dr. Knight read an able paper on December 11th on the subject of "Water and Disease." Dr.

Robertson spoke on February 5th on "The Call of the Land," and by special request gave a twenty-minute talk on the work of Macdonald College. This meeting was graced by the presence of His Excellency the Governor-General, who moved the vote of thanks to the lecturer, which in turn was seconded by Hon. Sydney Fisher, Minister of Agriculture.

As in former years, the Soirées Committee prepared a programme of fortnightly meetings. It was their sad duty to make the first of these a Memorial Meeting for the late Dr. James Fletcher. Lt.-Col. Wm. White, C.M.G., the first president of the Club, acted as chairman, and tributes were paid to the memory of our lamented leader by Mr. A. E. Attwood, Lt.-Col. Wm. White, Dr. Wm. Saunders, Mr. W. H. Harrington, Mr. R. B. Whyte, Mr. Arthur Gibson, Prof. John Macoun, Dr. H. M. Ami, Prof. F. T. Shutt, Rev. C. G. Eifrig, Mr. E. R. Cameron, Mr. T. J. MacLaughlin, Mr. W. J. Topley and Dr. S. B. Sinclair. Verbatim reports of these tributes appear in the Fletcher Memorial Number of The Ottawa Naturalist.

On January 5th, Rev. C. G. Eifrig gave an address in the Normal School on "Our Canadian Birds." The lecture was illustrated with the Bickmore series of lantern slides on this subject, which were kindly lent by McGill University for this special lecture. Mr. Eifrig's address was rich in material gained by actual observation in the field, and his talk was followed with keen interest by an audience that completely filled the large Assembly Hall.

On January 19th, Mr. Thos. W. Sowter read a paper on "Algonquin and Huron Occupation of the Ottawa Valley." Mr. Sowter, who has done excellent research work in the district, presented three distinct sets of evidence to prove that the Hurons had occupied portions of the Ottawa Valley. The lecturer opened up a field that was new to most of the audience, and his paper was also a masterly literary effort. This paper is to be published in The Ottawa Naturalist.

Prof. R. W. Brock, Director of the Geological Survey, delivered "A Popular Address on Minerals" on February 16th. Prof. Brock's lecture was made specially interesting by means of his excellent use of a large number of specimens.

March 2nd was "Ladies' Night" on the programme, a pleasing innovation. Miss M. McKay Scott spoke on "Stories about Flowers and their Healing Powers," dealing particularly with the part flowers have played as symbols and emblems from the earliest times of the race. Miss Florence Burt followed with a paper on "Mimicry in Nature." Various interesting examples of

mimicry in the animal world were described and the underlying principles were dealt with in a skilful manner. Miss B. Gilbertson, the third speaker, told "How to Become a Field-Naturalist." Miss Gilbertson treated the question from a psychological standpoint, tracing clearly the development of the spirit that produces the field-naturalist.

The final lecture of the course, "The Weather" is to be delivered this evening by Mr. A. McNeill, one of the leaders of the Meteorological Branch.

Under the joint auspices of the Ottawa Field-Naturalists' Club and the Ottawa Teachers' Association, an address on Forestry was given by Mr. A. Knechtel, Inspector of Dominion Forest Reserves, in the Normal School on February 26th, with Dr. J. C. Glashan, Inspector of the Ottawa Public Schools, in the chair. The large audience present listened to one of the most interesting addresses ever given before the Club. The address was illustrated with a collection of remarkably fine slides, a special lantern having been secured for the occasion.

EXCURSIONS.

In previous years it has often been found necessary to cancel an excursion completely because of rain. In order to obviate this, the Excursions Committee of the present Council announced in the April number of The Ottawa Naturalist that on rainy Saturdays the Club would meet in turn at the Fisheries Museum, the Seed Division, and the Geological Survey. The time of meeting for sub-excursions was changed from 3 o'clock to 2.30, and the Council is pleased to note that the change has proved acceptable to the members of the Club.

The following programme, embracing the names of a number of localities that had not been visited by the Club in recent years, was drawn up for the spring excursions:

April 25th, Rockliffe.
May 2nd, Beechwood.
May 9th, Queen's Park, Aylmer.
May 16th, Beaver Meadow.
May 23rd, Ironsides and Wright's Island.
May 30th, Cumberland (General Excursion).
June 6th, Brennan's Wharf.
June 13th, Cache Bay, Hull.
June 20th, McKay's Lake and Outlet.
June 27th, Eastman's Springs (General Excursion).

The first excursion was cancelled because of rain, but the Club met at the Fisheries Museum where a pleasant hour was

spent in examining the exhibits under the leadership of Mr. A. Halkett, Naturalist of the Marine and Fisheries Department and Curator of the Museum. It was found necessary to make some other changes in the programme. The excursions to Brennan's Wharf and Cumberland were cancelled because of the abnormally high water of the Ottawa, which made landing at these places impossible. Other excursions were substituted, however, reports of which have appeared in The Ottawa Naturalist.

The programme of fall excursions was as follows:

Sept. 12th, Fairy Lake and Beaver Meadow.

Sept. 19th, Experimental Farm, a joint excursion of the Ottawa Horticultural Society and the Ottawa Field-Naturalists' Club.

Sept. 26th, Rockliffe and McKay's Lake

The fall excursions were carried out as arranged, and proved most successful in every respect. Prof. McCready, of the Ontario Agricultural College, Guelph, was present at the first of these excursions and gave an interesting account of the nature study work being done by the Macdonald Institute. Reports of all the fall excursions appear in the November number of The Ottawa Naturalist.

THE OTTAWA NATURALIST.

Volume XXII of The Ottawa Naturalist, the official organ of the Club, has been published in monthly numbers. This volume is larger than the average, consisting of 270 pages and 8 full page plates. The earlier numbers were issued under the editorship of Mr. J. M. Macoun, and the later numbers, published during Mr. Macoun's absence from the city, were edited by Mr. Arthur Gibson.

The January number takes the form of a memorial number to the late Dr. James Fletcher. It consists of almost fifty pages and contains two excellent full page photographs of the late Dr. Fletcher. It gives complete reports of the tributes paid to his memory by all the speakers at the memorial meeting, it furnishes a six-page reference list of his published articles, and is in every respect a worthy tribute to this great man.

The following are among the papers that appear in this volume:

ON GEOLOGY.

1. "Notes on Silurian Stromatoporoids from Hudson's Bay," Wm. A. Parks, Ph.D.

2. "Report on a Collection of Fossil Woods from the Cretaceous of Alberta," D. P. Penhallow, D.Sc.

3. "The Pelecypoda or Bivalve Mollusca of the Chazy formation in Canada," Dr. J. F. Whiteaves.

ON BOTANY.

1. "Conditions Unfavorable to the Resumption of Growth by the Dormant Embyro in Seeds," G. H. Clark, B.S.A.
2. "Observations on Seedlings of North American Phænogamous Plants," Theo. Holm.
3. "Is Rhus Glabra in Canada?" Ed. L. Greene.
4. "Two Newly Introduced Plants," Dr. James Fletcher.

ON ENTOMOLOGY.

1. "The Dragonflies of the Ottawa District," E. M. Walker, B.A.
2. "Fauna Ottawaensis: Hymenoptera—Superfamily III—Vespoidea," W. H. Harrington, F.R.S.C.
3. "A Remarkable Visitation of the Snow-white Eugonia," Arthur Gibson.
4. "Notes on the Species of Phæocyma found in Canada," John B. Smith, D.Sc.
5. "Notes on the Lepidoptera of Lake Rosseau District, Muskoka, Ontario," Arthur Gibson.
6. "Gall Midges of the Goldenrod," E. P. Felt.

ON CONCHOLOGY.

1. "Lymnæa umbilicata in Canada," Bryant Walker.

ON ORNITHOLOGY.

1. "Winter Birds of the Cobalt Region," Rev. C. G. Eifrig.
2. "Bird Migration, 1907; observations made on Sable Island," James Bouteiller.
3. "Nesting of Henslow Sparrow in Ontario," W. E. Saunders.
4. "Some Bird Habits," Norman Criddle.
5. "Blue Birds of the Maritime Provinces," W. H. Moore.
6. "Birds Observed at Ottawa, Winter of 1908-1909," Rev. C. G. Eifrig.

ON ZOOLOGY.

1. "Infant Cannibalism among Animals," Prof. E. E. Prince.
2. "The Cotton-tail Rabbit in Ontario," J. H. Fleming.
3. "Caribou on the Queen Charlotte Islands," J. H. Keen.

ON METEOROLOGY.

1. "Meteorological Optics," Otto Klotz, LL.D.
2. "Some Sanitary Considerations Regarding the Construction, Health and Ventilation of Houses," Dr. P. H. Bryce.

ON NATURE STUDY.

1. "The Importance of Nature Study with some suggestions as to methods," J. F. Power, M.A.

In addition to the above-named papers, this volume contains reports of excursions, meetings of the Branches, and meetings of the Council. It also includes an unusually large number of short notes contributed from collectors and observers in different parts of Canada.

REPORTS OF BRANCHES.

The Branches again report an active year. No better evidence could be furnished to show the all-round activity manifested by the Club than the fact that every Branch has contributed materially during the year either to the pages of The Ottawa Naturalist or to the lecture programme.

THE GEOLOGICAL BRANCH.

The Geological Branch reports that collections of fossils have been made during the year from the vicinity of Ottawa, and that several new species have been described from one of these made by Mr. Walter Billings. One or more of the leaders have attended the field excursions and have given what assistance they could in the study of the rock in the localities visited The leaders point out the grand opportunities for live students who are willing to take up this subject systematically, both in collecting fossils and studying out the boundaries and relations of the different formations which outcrop within easy reach of the city.

THE BOTANICAL BRANCH.

Meetings have been held at the homes of various members of the Branch throughout the winter. It is the custom of the host of the evening to present a paper, after which there is a discussion of it by the members present. The following subjects discussed during the past winter will give some idea of the work done by this department.

"Methods of Forestry," at residence of Mr. E. R. Cameron; "Meanings of Some Common Plant Names," by Mr. A. E. Attwood; "Mendel's Law," by Mr. J. M. Macoun; "The Habitat of Wild Plants," by Prof. Macoun; "Some Inter-relations of Soils and Plants," and "Recent Work on the Longevity of Seeds," by Mr. G. H. Clark; "The Origin of our Cultivated Fruits" by Mr. R. B. Whyte.

Prof. John Macoun is at present collaborating a Flora Ottawaensis. This will include the names of all species that have

been found in what is known as the Ottawa district, embracing the area within a radius of thirty miles in every direction from Ottawa. It will describe the characteristic habitat of each species collected and will give the names of the localities where it has been collected as well as the name of the collector and the date of collection. The work is being submitted in parts to local workers so that each may add the results of his own field work. Every record in the late Dr. Fletcher's Flora Ottawaensis is to be included, and the work, when completed, cannot fail to prove a valuable local guide to the botanists of the Club.

THE ENTOMOLOGICAL BRANCH.

This Branch of the Club's work has had an active year. During the collecting season, as mentioned in the annual report of the Branch read at the evening soirée held on January 19th last, several of its members collected rather extensively in distant parts of Canada, thus adding considerably to the known range of many species of insects. These collections have not, as yet, been fully worked up, but some of the species are being recorded in the "Entomological Record for 1908," which has been prepared by Mr. Gibson, and which is being published in the annual report of the Entomological Society of Ontario, for that year.

The local members of the Branch have all been busy, and several interestnig additions have been made to the Ottawa list. Two valuable papers appeared in the Ottawa Naturalist during the year, which are of particular interest, viz.: Dr. E. M. Walker's article on "The Dragonflies of the Ottawa District," and Mr. W. H. Harrington's paper on "Fauna Ottawaensis: Hymenoptera—Superfamily III—Vespoidea."

THE ORNITHOLOGICAL BRANCH.

The ornithological section has made progress in its work during the past year inasmuch as regular monthly meetings have been held at which papers have been read by the various members. Some new blood has been infused into this Branch by the addition of some young and capable ornithologists. Headway has been made in the revision of the Ottawa list of birds, and new and interesting records have been made. Particular attention might be drawn to the unusual bird visitors of the present winter as recorded in the November number of The Ottawa Naturalist.

THE ZOOLOGICAL BRANCH.

The Committee have to report that various members have carried on active field work; but of actual results there is little

to report. The chairman was absent on official work, in the course of which some interesting points in the life-history and migrations of the shad were decided, and a note of these will appear shortly in The Ottawa Naturalist. Mr. Halkett was again for some months in the Northwest Provinces, visiting remote lakes, where interesting observations were made in fish life in the Provinces of Alberta and Saskatchewan. The Biological Stations at St. Andrews, N.B., on the Georgian Bay, near Penetanguishene Ont., and at Nanaimo, B.C., have carried on important researches. At the last named station *Ronquilus jordani* was taken by the Rev. G. W. Taylor and Mr. Halkett in October, the first record for Canada of this interesting trachinoid. A further series of Biological Reports (forming Part III.) will be issued at an early date. Three specimens of the interesting Rocky Mountain Whitefish (*Coregonus williamsoni*) have just been received at the Fisheries Museum, and a short account of this peculiar species is being prepared.

THE LATE DR. FLETCHER.

In the death of Dr. James Fletcher the Club has sustained the greatest loss in its history. Dr. Fletcher was one of the founders of the Club, and from its inception, thirty years ago, he continued to take an active part in all its affairs up to the time of his death. The present volume of The Ottawa Naturalist contains contributions from his pen, and the published reports of excursions and branch meetings of the past year bear witness to his untiring zeal. No member ever brought to the work of the Club greater genius, displayed a more charming personality, or gave more unselfishly of his time and talents. It is quite fitting, therefore, that the Club with which he was so closely identified should take the initiative in the movement to erect a permanent memorial to him. A circular letter has been prepared and sent to societies and individuals interested in his work, and the committee in charge of the movement anticipates a generous response to its appeal for contributions towards the proposed memorial.

THE LIBRARY.

During the year a great many sets of The Ottawa Naturalist have been transferred from the room in the basement of the Normal School to the Geological Survey, where they are stored under the direct supervision of the Librarian, Mr. C. H. Young. The Council is pleased to be able to report that the question of making the exchanges more accessible to the members at last bids fair to be settled satisfactorily, as two definite plans for

accomplishing this are to be submitted to this meeting for its consideration.

On May 2nd, 1908, the Evening Journal printed a full page illustrated article on the Ottawa Field-Naturalists' Club, prepared by Mr. Andrew Halkett and Mr. Arthur Gibson. The article dealt with the history of the Club, its aims and its methods of working. Some four hundred copies of this issue were kindly supplied by the Evening Journal to the Club for distribution.

The president, Mr. A. E. Attwood, M.A., represented the Club at the May meeting of the Royal Society of Canada.

The Treasurer's Report shows a balance on hand of $58.64.

The thanks of the Club are again due to Principal White for the use of the Normal School Assembly Hall, to the Library Board of the City Council and the Librarian, Mr. L. J. Burpee, for the use of the Lecture Hall of the Carnegie Library, and to the Press of the city for its co-operation in furthering the aims of the Club.

All of which is respectfully submitted,

T. E. CLARKE,
Secretary.

THE FLETCHER MEMORIAL FUND.

The members of The Ottawa Field-Naturalists' Club, and friends of the late Dr. James Fletcher, will be glad to learn that the Committee having charge of the above fund is meeting with very encouraging responses to the appeal for subscriptions, which was sent out a few weeks ago. Already the sum of $1,100 has been promised. The Committee is much pleased with the varying amounts which have been subscribed by many friends of the late Dr. Fletcher living outside of Ottawa. There are, however, many local members of the Club who doubtless desire to contribute something towards the fund and who have not yet sent in their subscription blanks to the undersigned. It would help the Committee very much if these friends would indicate soon, the amount they intend to give. It is hoped that the sum of $1,800 will be raised.

ARTHUR GIBSON,
Sec.-Treas. of Committee.

TREASURER'S STATEMENT FOR YEAR ENDING 16TH MARCH, 1909.

RECEIPTS.

Balance from previous year		$ 197 24
Subscriptions—1908-1909	204 00	
Arrears	98 00	
		$ 302 00
Advertisements in OTTAWA NATURALIST		104 40
OTTAWA NATURALISTS sold		40 01
Authors' extras sold		32 44
Maps of Ottawa sold		60
Net proceeds, General Excursion to Chelsea, May, 1908		9 05
Government Grant		200 00
		$ 885 74

EXPENDITURE.

Printing OTTAWA NATURALIST, Vol, XXII, 12 Nos., 270 pages, including cover	$455 52	
Illustrations	60 45	
Authors' extras	62 13	
Miscellaneous printing—circulars, mailing envelopes, post cards, etc	54 65	
	$632 75	
Postage on OTTAWA NATURALIST	35 84	
Editor	50 00	
	$718 59	
Less 2 per cent. for cash on printers' accounts	12 33	
		$ 706 26
Secretary		25 00
Treasurer		25 00
Soirée expenses		34 64
Library expenses		2 50
Sundry expenses, postage, etc		33 70
Balance		58 64
		$ 885 74

ARTHUR GIBSON, Treasurer.

Examined and found correct,

R. B. WHYTE,
F. T. SHUTT, } Auditors.

SUBSCRIPTIONS FOR THE NEW CLUB YEAR ARE NOW DUE, AND SHOULD BE PAID AT ONCE.

It is to be hoped that members will carefully examine the advertisements in this volume of THE OTTAWA NATURALIST, and make a point of dealing with those firms who thus help the Club.

CANADIAN SPECIES OF THALICTRUM.—I.

By EDWARD L. GREENE.

The Dominion of Canada being a northern country, at least when compared with Mexico, or even the United States, our census of *Thalictrum* species may as well begin with that northernmost member of the genus *T. alpinum*.

That familiar books and lists are correct in attributing this North-European species to Canada is a proposition that must, first of all, be put to the usual test. An end ought to be made of the practice of merely subscribing to, and reiterating the opinions of past generations about the identity of our native plants.

What is that Old World plant like which first obtained the appellation *Thalictrum alpinum*? That is the first question; and the next is: Have we in Canada anywhere any plant which as to essential marks, responds to the original description of that Old World type? Queries like these send us back in search of the first beginnings of the history of *Thalictrum alpinum*; and the excursion will prove an interesting and instructive one.

Although the name now in vogue for the type dates from Linnæus, the thing itself was better known and had been better described before that nomenclator was born than it ever was by him. The earliest records I have been able to find of the plant show it to have been discovered originally in the mountains of the northern part of Wales. The discoverer was an Oxford student, native of Wales, Edward Lloyd by name, the same to whom Salisbury, more than two centuries after Lloyd's death, dedicated the liliaceous genus *Lloydia*.

The discoverer brought roots of the plant to Oxford, where they were said to be flourishing at the time when the first description of the species was published, that is, in the year 1699.* Lloyd himself had named his new plant *Thalictrum montanum minimum praecox foliis splendentibus*; and it is hardly possible to indicate the essential peculiarities of the species more clearly than was thus done by Lloyd more than two centuries since in those six words. As compared with all other members of the genus as then known, this was alpine, was diminutive, very early flowering, and had a polished or shining green foliage. Bobart, in the place of Morison's Historia cited below, in a very full and admirable description (containing about a hundred words), says that the leaves are as shining as if oil had run over the surface of them. This, however, only of the upper face, the lower being pale and dull, he says.

*Bobart, in Moris. Hist. Pl. III, 325.

There are before me two sheets of specimens, both of which were collected—one of them fifty years since, the other seventy—by the late Mr. John Ball, and which must be understood to represent the plant of Lloyd, of Bobart and of Ray. One of the sheets Mr. Ball gathered in 1859 on mountains near Llanberis, North Wales—the very region whence *T. alpinum* was first obtained—the other is from Glen Isla, Forfarshire, Scotland. In the interests of the future investigation of the alpine meadow-rue in America I shall here give a precise account of these two sheets of British and indubitably typical specimens. Those from Wales are in flower only, those from Scotland in fruit.

Plants at early flowering 1½ to 2¼ inches high, the leaves themselves 1 to 1¼ inches long, normally of 11 leaflets, these broad at base and with little suggestion of the cunate, the whole leaflet broader than long, the terminals 3-lobed, the laterals 5-lobed, all lobes obtuse; upper face dark-green and polished, lower face glaucous, but between the veins only, the veins themselves, fine, delicate, not at all prominent, deep-green, in no degree glaucous; fruiting pedicels long, filiform, firmly ascending, but abruptly curved downwards just under the head of carpels.

Nothing well answering to the Welsh and typical *Thalictrum alpinum* is known to occur on our side of the Atlantic; yet in North America, north of the British Boundary, there exist at least three notably different plants, all of which are in so far at agreement with genuine *T. alpinum* as to admit of their being treated as varieties of it, if not indeed as sub-species. Their proposed names, and the peculiar marks of each, are subjoined.

THALICTRUM ALPINUM, var. GASPENSE. Plant of twice the size of the type, often 6 or 8 inches high; leaflets normally 11, longer than broad, manifestly cuneate, less deeply lobed, dark-green and lustrous above, glaucous beneath even to the veins and veinlets, these more prominent than in the type, and colored green only during early stages; pedicels filiform, spreading away from the rhachis and curved downward throughout their whole length, never abruptly bent under the fruit; carpels (immature) 3 or 4.

Damp ledges, on the banks of the Grand River, Gaspé Co., Quebec, 30 June and 3 July, 1904, M. L. Fernald.

THALICTRUM ALPINUM, var. MICROSPERMUM. Plant very tall, often a foot high; leaflets normally 11, always longer than broad, cuneate, few more than 3-lobed, deep-green and shining above, very white beneath with bloom even to the not very prominent veins and veinlets; pedicels short, firm, even wiry, curved throughout and not at summit only; carpels minute, obliquely oblong-oval, sessile, seemingly one only from each flower.

In a marsh near the confluence of Exploits River and Badger Brook, Newfoundland, 13 August, 1894, Robinson and Schrenk, their n. 26 as in Herb. Canad. Geol. Surv.

THALICTRUM ALPINUM, var. NESIOTICUM. Nearly as large as the last, stouter; leaflets about 17, the terminals cuneate, some of the laterals not so, but broader than long, all lightly lobed, dark and shining above save as there marked by very light-colored anastomosing veinlets, beneath only moderately glaucous; pedicels firm, curved slightly throughout, not at apex; carpels 1-3, narrowly obovate, tipped with a straight beak, and conspicuously as well as rather slenderly stipitate.

Said to be common in gravelly places along rivers on the Island of Anticosti, Jupiter River, 20 August, 1883, John Macoun; the specimens at that season in quite mature fruit. Types in Herb, Canad. Geol. Surv.

THALICTRUM ALPINUM, var. PUDICUM. Size of the last; leaflets normally 21, all manifestly cuneate below and longer than broad, dark and shining above, glaucous beneath even to the veins; pedicels firm but altogether drooping, being curved downward from almost the base and above the base almost straight; carpels 2 or 3, abruptly tapering at base rather than definitely stipitate.

I do not here take into consideration Greenland specimens of these plants, except to say that as far as they are known to me, they can form no part of any rational *Thalictrum alpinum*, lacking, as they do, the essential character of a dark-green shining foliage. Those very high-northern congeners have leaves that are of the same dull glaucous green on both faces. This type is also plentiful in Europe outside of Great Britain—perhaps present locally even there—occurring in Lapland, Norway, and even on alpine summits in middle and southern Europe. Again and again have these wholly glaucous plants been held separate and segregate from the original British type by most competent systematists.

CRATAEGUS DOUGLASII, LINDL.

A note in the November OTTAWA NATURALIST recorded the finding of *Crataegus Douglasii* near Lake Abitibi. Mr. W. J. Wilson found this species along the Abitibi River and at the mouth of Black River in 1901 and again about 100 miles below Black River in 1902. His record was printed in THE NATURALIST for February 1903. Mr. Wilson in 1906 again found *C. Douglasii* east of Lake Abitibi so that it is probably a species of wide distribution in that region. It has also been collected in Michigan and on islands in both Lake Huron and Lake Superior.

J. M. M.

MEETING OF BOTANICAL BRANCH.

Held at the residence of Prof. John Macoun, February 20th, at which were present, in addition to the host, Messrs. Attwood, Cameron, Whyte, Clark, Bond, Reid, Groh, Newman, Campbell, J. M. Macoun and W. T. Macoun.

The subject for the evening's discussion was "The Habitat of Plants and Its Relation to Cultivated Varieties."

In opening the meeting, Prof. Macoun described the development of a well informed botanist. In the colleges he was trained to learn plants from a biological standpoint, and even was given some lessons in systematic botany. The relationships of plants to one another was also now given considerable attention in the class-room, by means of the improved methods of studying the parts of plants which had been preserved in liquids. But while he could from books and miscroscopical examinations get some idea of the conditions under which the different species grew in Nature, it was necessary for him to go to the field and see and learn for himself if he were to become accurately informed and make the best use of his knowledge. Having become acquainted with the habits of the wild species he could then put his knowledge to practical use. In the examination of land, for instance, he would be able to tell fairly accurately from the wild plants which grew on it, the character of the soil and whether it was dry, moist or wet. In exploring or surveying unsettled districts it would be possible to tell by analogy what the climate was likely to be from the plants which grew there and which grew in some settled district. Prof. Macoun told of how he had used his knowledge in this respect when he explored the Northwest about thirty years ago. Finding wild species of grasses there which ripened well and knowing that the same species grew and ripened at Belleville, Ont., in about the same season as wheat, he used this knowledge in forming his conclusion that immense areas in the Northwest were suited for wheat growing. Considerable discussion followed bearing on the hardiness of plants, especially in regard to the cause of apple tree killing in the Northwest. The conclusion reached by a number of the members was that the trees were dried out owing to long continued, severe cold and drying winds. It was felt, however, that when the newer and hardier sorts were more widely tested, it would be found that abundance of apples could be grown in many sections. This part of the discussion brought out the fact that fruits from wild species in cold climates did better in cool soils than those from a comparatively warm climate, instances being on the one side the gooseberry, raspberry and currant, and on the other the peach.

W. T. M.

Stephoceras Nicolense

THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, MAY, 1909 No. 2

DESCRIPTION OF A NEW SPECIES OF AMMONITE, OF THE GENUS STEPHEOCERAS, FROM SOME ROCKS OF PRESUMABLY JURASSIC AGE IN THE NICOLA VALLEY, B. C.*

By J. F. Whiteaves.

The generic name *Stepheoceras* was proposed by Mr. S. S. Buckman, in 1898,† for the Ammonites of the "Humphreysianus-group", which had previously been regarded as the most typical section of Waagen's genus *Stephanoceras*. But, as Mr. Buckman has pointed out, the latter name was "preoccupied ‡ when proposed by Waagen" in 1869, and "must lapse altogether on account of prior use". *Stepheoceras*, as its author is careful to say, is "only an alteration of the name *Stephanoceras*", and perhaps is not altogether free from objection on that account. Still, the genus itself seems to be quite a natural one, and as such is accepted as valid by Hyatt, in 1900, in his revision of the Ammonoidea in the first volume of Eastman's translation of Zittel's Text-book of Palæontology.

The type of *Stepheoceras*, which, so far as known, is an exclusively Jurassic genus, is the *Ammonites Humphreysianus* of Sowerby. In a well preserved specimen of that species, from Dundry, in the Museum of the Geological Survey of Canada, which is five inches and three-eighths in its maximum diameter, there are at least six rounded and slender whorls; the ombilicus is wide and open, exposing a considerable portion of each of the inner whorls; and the surface is marked with straight and transverse ribs, which trifurcate from a tubercle on the middle of each side.

In 1876 Dr. G. M. Dawson made a collection of fossils from

* Communicated by permission of the Director of the Geological Survey of Canada.

† Quarterly Journal of the Geological Society of London, vol. LIV, p. 454.

‡ By Ehrenberg, in 1838, for a genus of Rotifera.

some volcanic rocks of mes ozoic age on the Iltasyouco River and Tigutlat or Tsehouts Lake, in the coast range of British Columbia. These fossils were reported on by the writer in 1878, in the Report of Progress of the Geological Survey for 1876-77, in which the Ammonites were determined by Professor Hyatt. Among them there is an Ammonite from Tigutlat Lake that Hyatt referred to *Stephanoceras Humphreysianum*, and that the writer identified with *Olcostephanus Loganianus* of the Queen Charlotte Islands in 1884, and figured under that name on Plate XXIII, fig. 1, of the first volume of "Mesozoic Fossils" published by the Canadian Survey. It has long been obvious, however, that this Ammonite can no longer be safely identified with either of the species named, and it would now seem that it probably indicates a previously unnamed species of *Stepheoceras*, which it will be convenient to designate as *S. Pluto*. It seems to differ from the typical *O. Loganianus* chiefly in its much wider and more open umbilicus.

On the evidence of specimens recently collected in Alaska, Dr. Stanton regards the two species of Ammonite from the Queen Charlotte Islands which the writer described and figured in the first volume of "Mesozoic Fossils" under the names *Perisphinctes Carlottensis* and *Olcostephanus Loganianus*, as of Jurassic rather than Cretaceous age, and refers them both to *Stephanoceras*, Waagen.* If this view be correct these two species, also, may possibly be referable to *Stepheoceras*, but the sutural line of both is unknown, and their exact generic position is still uncertain.

In August, 1904, Dr. R. W. Ells and Mr. R. A. A. Johnston, of the Geological Survey staff, collected a few specimens of a large Ammonite, which is by far the most typical and distinct species of *Stepheoceras* that has yet been found in Canada, from a small outlier of compact and readily weathering limestone on the side of a mountain about a mile and a half north of a point in the road midway between Nicola and Coutlee, in the Yale district of British Columbia.

These specimens are two casts of the interior of most of the septate portion of the shell, and eight fragments.

The larger of these two casts was originally about eighteen or nineteen inches in its maximum diameter, but a piece of the anterior end of it has been mislaid, and the specimen is now only fourteen inches across.

The smaller cast is about eight inches in its greatest diameter, and has most of the two outer whorls exposed on one side.

Neither of these casts show any evidence of septation, but

* In Bulletin of the Geological Society of America, June, 1905, vol. 16, p. 402.

some of the fragments, which must have formed part of as large specimens as the larger of them, are conspicuously septate.

The eight fragments are pieces of the anterior end of the coil of large casts of the septate portion of the shell, which not only give clear evidence of septation, but also show the outline of a transverse section of the coil, with the emargination caused by the contact furrow on the dorsum.

The species indicated by these specimens may be provisionally named and described as follows:—

STEPHEOCERAS NICOLENSE, SP. NOV.

Shell very large, with rounded whorls, and a wide and open umbilicus. Whorls nearly circular in transverse section anteriorly but concavely emarginate on the dorsum by a well defined longitudinal furrow of contact. They increase rather slowly in thickness, the earlier ones being quite slender, but they ultimately become robust and strongly convex. Their number appears to be about five or six, but only four are visible in the largest specimen known to the writer, the earlier whorls being either not preserved or covered with the matrix.

Umbilicus occupying considerably more than one half of the entire diameter, fully one half of each of the inner whorls being exposed.

Test unknown; surface of the cast everywhere strongly and regularly ribbed, the ribs being straight, transverse, and much narrower than the concave grooves between them. On the outer whorl each rib trifurcates from a low and obscurely defined tubercle on the umbilical margin. As thus divided, the three ribs in each set pass uninterruptedly over the venter, and reunite at a corresponding tubercle on the umbilical margin of the opposite side.

Body chamber, and finer details of the sutural line unknown.

HOW THE ENGLISH SPARROW IS ADAPTING ITSELF TO NEW CONDITIONS OF LIFE.

BY NORMAN CRIDDLE, TREESBANK, MAN.

The English, or House Sparrow, was introduced into the United States in the early fifties of last century and into eastern Canada in 1854. Probably but few colonies were started in the Dominion, but in the United States small lots were liberated in many of the larger cities, both on the coast and inland. As a result of those early introductions, House Sparrows are now to be found in nearly every portion of the continent. It is uncertain when the first individuals invaded Manitoba. They

were certainly rare fifteen years ago, even in the cities, and it is only within very recent times that the country farm buildings have become inhabited by them. The western birds almost surely introduced themselves from the south, as the wide chain of hills to the east would greatly retard a movement from that direction. It is, however, of small importance how the birds arrived; they are here to stay and their injurious habits present us with an excellent example of the danger of introducing animals of questionable value.

The most remarkable attribute of English Sparrows is the way in which they have already become adapted to wide climatical conditions. Heat, cold, wet or dry, has apparently little effect in retarding their increase. This is unquestionably due, in part, to their habit of seeking shelter in buildings from weather extremes, especially cold. There is, however, a limit, as was shown in Manitoba last January during an exceptionally cold spell, when shelter of some sort became absolutely necessary for the preservation of life. Where this was not secured there is no doubt that great mortality occurred, even shelter in sheds, etc., not being sufficient to save them.

During the period mentioned above, lasting ten days, with an average temperature of about 21 degrees Fahr. below zero and a minimum of 40 below,* sparrows were found dead in city streets and around farm buildings by observant farmers in many parts of the province, while a number of the birds hardly able to fly were also noticed. The chirp so commonly associated with them remained unheard for days, as if the fear of death was upon them and all were struggling for very existence, as indeed was the case with those individuals obliged to pick up a living in the open air. Many undoubtedly perished from cold and starvation, the latter being the direct result of the former.

Thus it is seen that there is a limit to the birds' range, so far as open air is concerned. This was also demonstrated in southern Greenland by introduced sparrows failing to survive more than a few seasons.

There are, therefore, but two ways in which the House Sparrows can withstand our northern climate: (1) by sheltering themselves in buildings containing animals of some kind, or (2) by migrating to warmer regions during the colder months. Both these methods have already been adopted. Migration has taken place, to some extent, for several years past and is apparently becoming rapidly more general, so that now it is not an uncommon occurrence to see fifty or more birds moving south or north according to the time of the year. Of course,

* These researches are from the meteorological station at Aweme.

many birds move into the cities to winter, but apart from this there is undoubtedly a movement south and back again. The southern flight takes place at many odd times, but chiefly during November, and the return in March and April.

The other group confines itself almost entirely within buildings throughout the colder months and only appears outside during the warmer hours of each day, or when the weather is not excessively cold. Thus we have the domicile birds seeking winter quarters at home and the more restless individuals preferring to move to milder climates, even though that entails a long journey twice yearly. The question is, will this lead, in time, to two distinct races? Or, will the individuals of both inclinations, or habits, mix? By watching the resident birds I am led to believe that these commence to breed earlier than their migratory-inclined relatives, and if this is so it is possible to conceive that use or disuse of wing power, accustoming the eyes sufficiently to partly dark buildings to pick up food, different winter conditions and many other considerations might eventually cause a change; just as geographical conditions have caused so many local races to appear.

I believe much valuable information might be secured as to migration and acquired habits, by a careful study of the English Sparrow, especially if observations were made in all parts of the continent. The birds are already learning to migrate and to build nests in trees away from buildings, in fact they are showing marvelous powers of adapting themselves to new conditions of life, and it would be a great pity to lose an insight into their evolutionary characters through lack of careful study.

It would be interesting to know how far the birds move south, whether they become more plentiful in any special State during the winter months than in the summer. Does the winter movement exceed the southern limit of the summer range? and, are there any differences in the habits of securing food, etc., in those parts of the continent where shelter from cold is unnecessary?

THE FOREST RESERVES.

(Synopsis of a lecture given by Mr. A. Knechtel, Inspector of Dominion Forest Reserves, on Feb'y 26th, 1909, under the joint auspices of the Ottawa Field-Naturalists' Club and the Ottawa Teachers' Association.)

It would almost seem as if the white race had begun wrong on this continent. Needing cleared land for agriculture, we began in the woods, and now when we need the woods we begin

on the cleared land. The prairie should have been placed near the Atlantic and the woodland in the Northwest. Arranged as it was with the forest on the land that was close to the market for its products, forest destruction was at first a necessity and later became a habit. Fire, the good servant in clearing the land, ran rampant, carrying forest destruction far beyond the necessities of the people.

The earliest settlers coming from Europe were used to forest conservation. They had practised it in the countries from which they came. Forest destruction was to them a new thing; but the forests were so vast that they thought there never could be a scarcity of wood, and they reasoned that the more the forest was destroyed the more the agricultural interests of the country would be advanced. But the modern settler sees the forest in a different light, especially so in the great Northwest, where, on the wide prairie, wood is a luxury. To him forest conservation is the necessity, not forest destruction. He has no delight in the devastation of the woods by fire, and he hails with hope legislation and management tending to improve the condition of the forest. He sees clearly that his comfort and his agricultural interests are closely dependent upon a plentiful supply of wood.

The country is so vast and the demand for wood so great that it is a tremendous problem to so manage the forests that this demand may be met continuously. Hope seems to lie in the creation of forest reserves, and the policy of setting aside land to be used as forest reserves is now pretty well established by the Dominion Government.

The Dominion Forest Reserves are intended to preserve and produce a perpetual supply of timber for the people of the prairie, the homesteader's needs being considered of first importance. They are not intended to furnish wood for the lumber trade. Hence the policy of the reserves is favorable to small mills rather than to large ones which need large tracts of forest, and manufacture lumber beyond the needs of the settlers.

Let us consider some of the various purposes that forests subserve. In the first place, we need them to supply us with wood, and wood we must have to cook our food; to build and furnish our houses, our railroads, our steamships; to erect our telegraph and telephone lines; to mine our metals and our coal, which takes no small amount of wood; to supply us with paper, charcoal, tan-bark, dynamite, boxes, tools, pails, matches, and many innumerable articles.

On going from a forested country to a prairie, one realizes the importance, convenience and cheapness of wood to a home. To be sure, coal and gas may be used for fuel, and brick, stone, cement and iron for building; but wood is still largely used

for such purposes in places where it must all be imported and is very high in price. Even in Venice, Italy, the lecturer saw in the canals several barges laden with firewood and he was astonished at the quantity of wood used for other purposes. In Italy the use of wood is reduced to the minimum, and yet the country finds it necessary to import twenty-five million cubic feet annually, although she herself produces two hundred and forty-five million cubic feet annually.

Then, we need forests to give an even flow of water in the streams, to prevent the washing away of the soil, and to act as a break to the wind. In some parts of the Northwest the soil is a peculiar clay loam that breaks beneath the feet like ashes. In other parts it is a light sand. Such soil is picked up and carried by the wind as if it were light snow. To prevent this drifting of soil the settlers are planting shelter belts in many places. The Dominion Government has already sent out from Indian Head eleven million trees free of charge for this purpose.

Forests are needed also for health, rest and recreation, and to furnish food and shelter for the game and the fish. The esthetic value the forests have for the country one learns to appreciate in travelling over it. The trees with their variety of form and richness of coloring, clothing the hills and bordering the lakes and streams, lend a peculiar grace and loveliness to the landscape.

Some of the reasons why forests should be preserved have now been given. They furnish wood, feed springs, prevent floods, hinder erosion, shelter from storms, protect the game and fish, and give the country esthetic features. How then can the forests best be preserved?

To protect the forest from fire is the first law. In our forests where old rotten logs lie everywhere on the ground, and where the lumberman leaves the tops of trees, and gathers the brush into heaps as if getting the woods ready for burning, the question is difficult. In Europe, where the brush is all utilized, and where even the stumps are taken out of the ground for fuel, the problem is comparatively simple.

The Forestry Branch of the Department of the Interior keeps constantly in the woods a large force of fire rangers, whose duty it is to prevent and extinguish forest fires. They prevent fires by posting along roads, trails and streams cloth notices which state the law in regard to the use of fire. They also call upon the farmers and caution them in regard to burning fallows, logs, stumps, brush, grass and straw stacks in violation of the law.

Then, these fire rangers extinguish fires that start in the woods. It is their duty to warn out the settlers, who are obliged by law to obey the summons, and direct them in fighting the fire.

When a forest fire occurs there is a deplorable loss. The forest is a great chemical laboratory, taking air, and earth, and water, and combining them together for the use of the people. Fire comes along, the laboratory is burned, wood production stops and the people must do without.

There is a common notion that the forest will restore itself, and that valuable species of trees will by natural seeding again cover the soil. Such hope is in most cases vain. Poplar and white birch will probably occupy the ground; but the hope that the spruce and the tamarac will again cover the soil is just a poetic dream. These, to be sure, do reproduce in certain places and on certain soils; but if one observes carefully the conclusion is forced upon him that this kind of reproduction of the conifers is not going on with sufficient rapidity to furnish a perpetual supply of timber to meet the demand of the country. If the conifers are to be kept in the reserves in commercial quantity they will need to be reproduced artificially, either by sowing the seed or planting small trees. The Canadian Government has already begun thus to provide for the future.

The forest cannot be properly managed without the cutting of trees. Like the farmer, the forester has his seed time and his harvest. Agriculture produces food crops; forestry, wood crops. The lumberman harvests the natural wood crop, which Nature has taken about two hundred years to produce; the forester harvests an artificial one, which takes him about eighty years to produce. The lumberman takes in his harvest everything from which he can make present profit; the forester leaves the smaller trees in the forest to grow into future values. It is of no concern to the lumberman if the falling timbers crush little trees or the skidding tear them out by the roots. They offer no present profit and he looks upon them as worthless; but the forester sees in these young trees his future harvest and gives them his most earnest care. The lumberman's path has been full of fire. In many places he has been followed by flaming forests and dense clouds of smoke. But in the forester's tracks the green trees grow, forests again flourish on the denuded wastes, and shed upon the whole country their benign influences.

REPORT OF THE ENTOMOLOGICAL BRANCH, 1908.

The members of the Entomological Branch have been active during 1908. The season on the whole from the collecting standpoint was better than it has been for several years, notwithstanding the continued drought which began in early June and lasted well on into September. Many interesting species

of insects have been taken during the season in the Ottawa district by local members.

The Entomological Branch, in the death of its foremost leader, Dr. James Fletcher, has sustained an irreparable loss. It is hardly necessary to refer here other than briefly to this sad event which is felt so keenly by the Club, as the January issue of the OTTAWA NATURALIST is a Memorial Number containing tributes from leading members.

In August we were glad to welcome to the Branch, Mr. Herbert Groh, a new Assistant in the Division of Entomology and Botany of the Dominion Experimental Farms.

During the winter months the fortnightly meetings of the Branch have been continued. These meetings are most helpful. Many specimens of great interest are exhibited at each meeting and much information given concerning their habits, etc. At these meetings it is customary for each member to bring something to exhibit or some paper to read. New books on entomology are shown from time to time, and in this way the members are kept in touch with publications as they appear. It is a pity that more members of the Club do not take an interest in insect life. There is no more promising field for good work of a scientific nature than in entomology, and certainly no subject of more intense interest. The pleasure derived from watching an insect emerge from its egg, or a caterpillar change to the chrysalis state, or a moth issue from its cocoon, is most fascinating.

As in previous years some of our local members brought back with them from their distant fields of labour, small collections of insects of special interest. Mr. Joseph Keele, of the Geological Survey, made some valuable collections at the mouth of the Gravel River and along the McKenzie River adjacent, on the eastern slope of the Rockies. Mr. C. H. Young, of the same department, spent the months of August and September at the Biological Station, Departure Bay, B.C., with our highly esteemed Honorary Member, the Rev. G. W. Taylor, who is now there as Curator of the Station. Mr. Young collected insects of several orders, among which are some of much interest. Mr. Douglas H. Nelles, of the Alaska Boundary Survey, spent the summer in the Yukon district between Whitehorse and the 141st Meridian and brought back with him a small collection of butterflies. Mr. Andrew Halkett, of the Fisheries Museum, returned to Ottawa in November, with a small collection of insects taken in Alberta. Dr. Fletcher made a hurried trip to British Columbia in September and October and while stopping over for a day or two each at Nepigon, Ont., Regina, Sask., Banff, Alta., and Departure Bay, B.C., collected many insects

of value. Mr. Arthur Gibson spent the most of July at Youghall, N.B., and while there made collections in all orders.

The members of the Branch were delighted to have with them in Ottawa during spring and early summer, Mr. Norman Criddle, of Aweme, Man. Mr. Criddle while here attended the spring excursions of the Club and also did some splendid collecting in the neighborhood.

During the year Mr. Harrington completed a paper on Superfamily III of the Hymenoptera of the Ottawa District, which was published in the July number of the OTTAWA NATURALIST. Dr. Walker's paper on the Dragonflies of the Ottawa District appeared in the April and June numbers of the NATURALIST. This has been of much help to members of the Branch.

Among the more interesting insects taken during the year at Ottawa, within the area limited by the Club, as the Ottawa District, the following may be mentioned:—

LEPIDOPTERA:

Brenthis triclaris, Hbn. Mer Bleue, June 6, three specimens, (Young, Criddle, Gibson).

Phyciodes tharos, Dru., var. *packardii*, Saund. Mer Bleue, (Young).

Phyciodes batesii, Reakirt. On railway track between Cache Bay and Beaver Meadow, June 13, (Gibson).

Pholus pandorus, Hbn. Larva on Virginian creeper, moth emerged July 8, (Gibson).

Hyphoraia parthenos, Harr. July 1, (Baldwin).

Catabena lineolata, Wlk. July 20, (Baldwin). New record for the district.

Platysenta videns, Grt. June 6, (Gibson).

Pachnobia monochromata, Morr. Mer Bleue, July 3, (Young).

Agrotis geniculata, G. & R. Meach Lake, August 31, (Fletcher).

Mamestra gussata, Sm. April 24, (Young).

Homoptera minerea, Grt. Britannia, June 20, (Baldwin).

Homoptera helata, Sm. Britannia, June 20, (Baldwin).

Crambus bidens, Zeller. Mer Bleue, July, (Young).

Crambus zeellus, Fern. July 15, (Gibson).

Crambus youngellus, K. Mer Bleue, July 2-10, (Young).

Eucosma medioviridana, K. August 21, (Young).

Coleophora elæagnisella, K. Larvæ abundant on *Elæagnus argentea*; moths emerged July, (Fletcher and Gibson).

Lithocolletis basistrigella, Clem. Bred from oak, March 11, (Young).

Argyresthia laricella, K. Mer Bleue, reared from terminal twigs of *Larix americana*; moths issued June 12-23, (Fletcher and Gibson).

COLEOPTERA:

Hydrophilus ovatus, G. & H. May 12, (Fletcher).

Acanthocinus ædilis, S. A specimen of this fine European beetle was found at Ottawa by Mr. R. B. Whyte among some packing in a box of chinaware received from Germany.

HYMENOPTERA:

Bombus rufocinctus, Cress. September 20, (Fletcher). This species is rare in eastern Canada.

Bombus virginicus, Oliv. Mer Bleue, June 6, (Gibson).

Ephialtes gigas, Walsh. Hull, June 13, (Gibson).

HEMIPTERA:

A number of species new to the Ottawa list have recently been determined by Mr. E. P. Van Duzee. Among these may be mentioned:

Telamona ampelopsides, Harr., July 14, (Gibson).

Cyrtolobus vau, Say. June 29, on red oak, (Fletcher).

Cyrtolobus griseus, Van D. On oak, August 25, (Metcalfe).

Scolops sulcipes, Say. On goldenrod, September 5, (Groh).

Liburnia foveata, Van D. Mer Bleue, June-September, (Metcalfe).

Phlepsius irroratus, Say. October 8, (Fletcher).

Thyreocoris unicolor, P. B. Aylmer, August 29, (Groh).

Geocoris limbatus, Stal. Mer Bleue, uncommon, (Metcalfe).

Plagiognathus obscurus, Uhler. Aylmer, August 29, (Groh).

Corythuca marmorata, Uhl. June, rare, (Metcalfe).

Ranatra quadridentata, Stal. July, (Metcalfe).

Hydrometra martini, Kirby. July, (Metcalfe).

W. H. HARRINGTON,
ARTHUR GIBSON,
C. H. YOUNG,
J. W. BALDWIN,
—Leaders.

BOOK REVIEW.

Thirty-ninth Annual Report of the Entomological Society of Ontario: Ontario Department of Agriculture, Toronto. This is a volume of 152 printed pages, with 19 excellent plates. Like all its worthy predecessors, it is a publication which can be perused with interest, not only by the scientific and working entomologist, but equally by the novice and merely casual reader. It contains the official report of the proceedings of the annual meeting of the Society, held at Guelph in November last, including the reports of the Branch Societies, and of the District Directors and other officers, the discussions on insect pests of the

season, and the various papers presented during the two days' session. Among the latter are several by members of the Ottawa Field-Naturalists' Club who attended the meeting, viz.: *Hydroecia micacea* in Canada, by Arthur Gibson; Some Beetle Haunts by an Amateur Botanist, by F. J. A. Morris, Port Hope; Notes on the Occurrence of Lachnosternas in 1908, and, Collecting with a Lantern-trap in 1908, by J. D. Evans, Trenton, Ont.; The Strawberry Weevil, by Prof. W. Lochead, Macdonald College, Que.; The Farmer's Woodlot, by Rev. T. W. Fyles, Levis, Que; Life History of *Euchaetias oregonensis*, by H. H. Lyman, Montreal; and, Injurious Insects in Ontario in 1908, by Rev. Prof. Bethune, Guelph. Two excellent papers by Dr. E. P. Felt, Albany, N.Y., The Economic Importance and Food-habits of American Gall Midges, and, The Interpretation of Nature, also appear. An article of more than ordinary value is the Catalogue of the Gall Insects of Ontario, by T. D. Jarvis, Guelph, which arranges the species which he has found in his several years of collecting, under their host plants, and furnishes means of identification by the galls. A bibliography of references completes his useful treatment of the subject. The Entomological Record, which has for some years been contributed by James Fletcher and Arthur Gibson as a regular feature, again appears, presenting in a concise way the most valuable of the results of Canadian collectors' activities during the year. Also, the loss which entomology has suffered in the removal by death of two of its foremost representatives, Dr. Fletcher, late President of the Society, and Dr. W. H. Ashmead, of Washington, is given suitable recognition in brief references to their respective careers.

H. G.

OBITUARY.

THE LATE REV. CANON BURMAN, B.D.

The death of Canon W. A. Burman, which occurred on January 20th, is a heavy loss to the people of Winnipeg and of the Northwest. For so many years he has been among us that his place will indeed be difficult to fill.

The late Canon, who was a member of the Ottawa Field-Naturalists' Club for many years, was an Englishman by birth and came to Manitoba in the late seventies. He entered the ministry in 1879 and soon became well known and loved for his work among the Sioux Indians. He was made Rural Dean of Brandon in 1886, and was given charge of the Rupert's Land Industrial School (Indian) in 1889. In 1893 he came into Winnipeg as incumbent of St. Peter's, combining with his duties there

those of the Rural Dean of Lisgar. The work proving too onerous, he resigned in 1903, to take up the position of bursar and steward of St. John's College, Winnipeg, which, with the position, in the same institution, of lecturer in botany and the English Bible, he held until his death.

As a botanist Canon Burman was widely known. An enthusiastic collector, his herbarium of local plants is easily the finest in Manitoba. Not only local plants are represented however. Some five years ago, I well remember a delightful evening of the Manitoba Natural History Society, when Canon Burman showed a splendid collection of Arctic plants.

To know the Canon was to admire and love him. Quiet, unassuming, he was always engaged in work for the benefit of others, as the history of our Humane Society and that of our Children's Aid Society testify.

Some years ago it was found he was suffering from tubercular trouble, and nothing could be done to check its inroads. Just before Christmas I spoke to him and he told me of an intended visit to Texas in January. His illness took a worse turn and he was unable to leave. For several weeks he suffered intensely but with marvellous fortitude and then death intervened.

Truly Canada has reason to mourn that two such men as Dr. Fletcher and Canon Burman—warm personal friends—have been called away within such a short space of time.

J. B. WALLIS.

MEETINGS OF THE BOTANICAL BRANCH.

At the Botanical Branch meeting of February 27th, a discussion on the inter-relation of soils and plants was led by Mr. George H. Clark, sixteen members of the Club being present.

Evidence was presented to illustrate that plants are grouped in nature according to the physical, chemical and biological conditions of the soil. A knowledge of plant relations, range of conditions respecting their habitat, and their habits of growth under those varying conditions, serves the botanist as an index to the range of temperature of the district, the moisture, and the physical, chemical, and, to some extent, the biological conditions of the soil on which the species are found.

"De Candolle's theory of the excretions of plants" and the results of recent experiments and observations pertaining to toxic excretions from the roots of plants were discussed. Experiments in the seed laboratory at Ottawa showed that after making germination test with cereal grains, it was necessary to discard the soil from the boxes before making a subsequent

germination test with cereals. Aeration and drying of the soil produced only a slight improvement. The average percentage germination from twelve tests of oats in a good fresh compost soil was 86 per cent. When the same soil was used for subsequent germination tests, after being aerated and dried, the average percentage vitality of twelve tests of the same oats (100 grains of oats being used for each test) was reduced to 76 per cent.

If the theory of toxic root excretions is to be accepted as an explanation for this falling off in vitality, as would be shown by soil test, it would seem that the poisonous excretions from the first crop of oats proved to be fatal to the weaker plants from the second and subsequent crops. Since the oat plants had been left in the soil fourteen days only, the reduction in plant food would be inconsiderable.

If, as contended by supporters of the "De Candolle theory of root excretions," plants excrete from their roots substances which impair growth within themselves and render the soil less suitable to the growth of other plants belonging to the same order or having the same requirements in respect to plant food, then the necessity of crop rotation in agriculture and horticulture becomes more obvious; the reasons for the so-called clover sickness in some soils, "fairy rings" of mushrooms, and much in connection with plant relations in nature also becomes easier of explanation.

It was suggested that, in consideration of how plants feed, it would seem reasonable to expect that these toxic root excretions, if any, would be more abundant with a given species on some soils than on others, owing to the relation between the requirements of the plant and the mineral constituents in solution in the soil; also that bacterial life and the fermentation induced by it in the soil might be expected largely to overcome the effects of toxic excretions from plant roots.

A short discussion on the longevity of seeds and recent work by Dr. Ewart, of Melbourne University, Australia; Dr. Croker, of Chicago University, and Dr. Duval, of Washington, D.C., was also taken up, and the progress results of some work that is being conducted by Mr. William Bond, of the seed laboratory staff, in making periodic germination tests of weed seeds that were collected in 1902, were presented. The evidence now available would seem to make clear that weed seeds and other seeds which are buried in the soil do not retain their vitality as long as when stored in a cool, dry place. There are relatively few kinds of seeds which will retain their vitality for a longer period than, approximately, fifteen years. Ewart found from exhaustive tests that of the species which are best able to retain

vitality in their seeds for a long period, those belonging to the Leguminosæ are in greatest numbers.

G. H. C.

"The Origin of Our Cultivated Fruits" was the main subject under discussion at a meeting of the Botanical Branch held at the home of Mr. R. B. Whyte on March 6th. There were present in addition to the Chairman, Messrs. Attwood, Campbell, Bond, T. E. Clarke, Geo. H. Clark, Eddy, Binnie, Groh, Morris, and W. T. Macoun.

The origin of our cultivated fruits had evidently been thoroughly investigated by Mr. Whyte, who gave a very interesting account of what was known in regard to it. Most of our fruits have been cultivated for such a long time that there is little definite information as to their origin. It is known that the Romans cultivated the apple, for Pliny wrote about it. An apple was also exhibited by Mr. Eifrig at a former meeting of the Botanical Branch taken from the ruins of the habitations of Lake Dwellers in Switzerland who lived probably a thousand or more years before the Roman era. Practically all of the cultivated apples are derived from European species, the only named variety with American blood being the Soulard crab, one of whose parents was *Pyrus coronaria*. The pear is also a native of the old world and has evidently been cultivated since very ancient times. One of the first historical references to the pear is in Virgil, where it is stated that "Varieties of pears are almost countless and nine-tenths are unworthy of census." The two species of pears from which most of the cultivated varieties came are *Pyrus communis* and *Pyrus sinensis*.

The peach is another fruit of which little is known regarding its origin, but it is believed to be a native of China and taken to Persia in very early times, in which country it has been improved very much.

The early history of the European plum is also wrapt in mystery, but it is supposed to have been derived from *Prunus spinosa* and later from *Prunus domestica*. The Asiatic species from which comes the Japanese plums is *Prunus triflora*. The Apricot plum, *Prunus Simoni*, from China is another Asiatic species. In America improvement is just beginning with the native species, *P. americana*, *nigra*, *hortulana*, and *angustifolia*.

The European grapes are derived from *Vitis vinifera*, improvement evidently having been begun in very early times. In America, hybrids of *Vitis Labrusca*, the fox grape, and this European species had given marked results. One of the earliest known grapes of American origin is the Catawba, found wild in Maryland in 1819. It probably has European blood. The

Isabella also appeared about the same time. The Concord grape, a pure seedling of *Vitis Labrusca*, was introduced in 1853. Rogers' Hybrids followed in 1856, and since that time many have been introduced. No grapes of high quality have yet been originated from the Canadian species including *Vitis riparia* and *V. cordifolia*, although some improved varieties have been introduced.

All our cultivated red currants have been originated from the European species *Ribes rubrum*. This fruit has been cultivated since the middle ages as has also the black currant which has also been derived from the European species *Ribes nigrum*. No good improved forms of our native *Ribes floridum* have been introduced.

The European gooseberry, *Ribes Grossularia*, began to be cultivated in the 16th century. It is a very important fruit in Great Britain, where it has been cultivated for 300 years. The greatest improvement has taken place in the last 100 years and to-day specimens are produced weighing two ounces each. The climatic conditions in most inland places in America are not suited for the European gooseberry and it does not thrive well except under specially favourable conditions. The native American species, *Ribes oxyacanthoides* is the parent of the Houghton, an improved form, and from the Houghton has sprung the Downing, probably with some European blood in it. The Pearl, one of Dr. Wm. Saunders' productions, is a hybrid between Houghton and a European variety. *Ribes Cynosbati* has not given any good variety yet, but this has been improved by Dr. Saunders by crossing it with the European gooseberry.

The red raspberry has been cultivated since the 4th century and probably before. It became popular in the 16th century in Europe. The European varieties are derived from *Rubus Idæus*. For the most part, these are not hardy in the colder parts of America. Most of the named sorts grown in Canada are from the native species, *Rubus strigosus*, which began to be cultivated about 1831. The Herbert raspberry originating with Mr. Whyte, has probably considerable European blood and may claim as its parent some two of the varieties Herstine, Clark and Franconia.

Practically all the named black cap raspberries grown to-day are chance seedlings of the wild species, *Rubus occidentalis*, as are the cultivated blackberries of *Rubus alleghensis* and its varieties. Other fruits of less importance were also dealt with by Mr. Whyte.

The lines of improvement in our cultivated fruits suggested by him were: the raising of new sorts of apples from seed specially suited for certain conditions; improvement of American

plums to ameliorate the skin; the breeding of red currants for greater mildness, and black currants for size; the raising of seedlings of the European gooseberry to obtain varieties more immune from disease; and the raising of seedling grapes from the many hybrid forms already in existence.

In the discussion which followed, Mr. Whyte stated it as his belief that the growing of seedlings under very favourable conditions would change, and cause to be perpetuated, the characteristics of a seedling in respect to vigor of plant, size and flavor of fruit, etc. In other words, that after a seed had germinated the merits of that seedling would not necessarily depend on inherited characteristics, but would be largely influenced by the environment up to time of fruiting. A curious freak was shown by Mr. Geo. H. Clark, it being a cane of Cuthbert raspberry which instead of being of the usual shape was quite flattened out, having grown this way.

In order to ensure a record being kept of the meetings of the Botanical Branch, it was decided to recommend a Botanical Associate Editor to the new council of the Club, Mr. W. T. Macoun being nominated for this office.

W. T. M.

CANADIAN SPECIES OF THALICTRUM.—II.

BY EDWARD L. GREENE.

The species discussed in our first paper, namely, *T. alpinum*,* is in many particulars widely different from every other; so very different that no member of any other group leads up to it. The transition to any others is abrupt; therefore it is unimportant what other meadow rue be selected to immediately succeed it in a systematic sequence of the species. It may as well be that other northern type, or aggregation, that passes under the name of *T. dioicum*.

Out of the great diversity of plants so designated in books and herbaria there is not one that can to any certainty, or even with any high probability, be identified with that of Linnæus. There is nothing in the name itself that is indicative. Almost all meadow rues, certainly the greater proportion of the American species, are dicœcious. Moreover, the short Linnæus description would be wholly inadequate to the determination of his type, even if the description were not also in two points false for anything that botanists have heretofore called *T. dioicum*; for he says that both the sepals and the filaments of his plant are

* cf. Ott. Nat. xxiii.

white.† To every one knowing American meadow rues such an expression will seem to point to something belonging to the group of *T. polygamum*; yet when he assures us that the plant he has in mind is hardly a foot high, and is also distinguished from all other members of the genus by a drooping foliage, we seem to see that he probably had something of this *T. dioicum* sort before him.

I have met with no good evidence that this type of *Thalictrum* was known before Kalm; though Philip Miller says that Parkinson grew the plant a hundred years earlier.‡ I can not, however, verify this by anything which I find in Parkinson.

Out of that multitude of things which, while answering to the Linnæan account of the size and habit of *T. dioicum*, are still widely dissimilar among themselves in essential marks of flower and fruit, it is necessary that some one marked type be selected, and that of necessity arbitrarily, to be described, as not one of them ever yet has been, with something approaching fulness and precision. To such a type, though arbitrarily chosen from among others, the name *T. dioicum* may be assigned, according to the now prevailing custom; though from several points of view it would seem wiser to abandon that name altogether, as one that has never been adequately published.

THALICTRUM DIOICUM. *Thalictrum dioicum*, Linn., Sp. Pl. 545. Stem solitary, 1-2 feet high, upright from a tuft of fleshy-fibrous widely spreading and not deeply seated roots; leaves 2 or 3, ample for so small a plant, long-petioled, thin and delicate, deep-green above, pale beneath, glabrous; terminal leaflets in maturity 1 inch broad or more, of suborbicular outline, commonly with subcordate base, the length seldom quite equalling the breadth, primary lobes 3, reaching to near the middle, the central one broadly equally and shortly 3-lobed, the other two unequally 2-lobed, or sometimes entire, all lobes short and very obtuse; lateral leaflets smaller, in general 3-5-lobed with little or no distinction of primary and secondary lobes: staminate plant with fewer flowers and less ample inflorescence than the pistillate, its sepals 4, oval, obtuse, thin, pale, often purplish-tinged, delicately parallel-veined; anthers green, not quite as long as the purplish filaments, linear, acutely rather long-pointed: achenes rather light-green, less than 5 mm. long, of somewhat obliquely elliptic outline, the about 10 ribs thick but acutely edged, the furrows between them as broad and acute.

Billings' Bridge, Ottawa, Ont., J. M. Macoun, 12 May, 1891,

† Linn. Sp. Pl. 545.

‡ Mill. Dict. Ed. vii (1749).

being Geol. Surv. No. 841, a rank staminate plant in flower; also from the same station and by the same collector, June, 1898, Geol. Surv. 59,615, the summit of a plant in mature fruit; also "Whirlpool Woods," Niagara, Ont., 9 May, 1901, Geol. Surv. 33,609, staminate plant in flower; Wingham, Ont., J. A. Morton, May, 1891, Geol. Surv. 840.

Numerous localities for the same type as occurring within the United States need not here be cited.

THALICTRUM DIOICUM var. ADIANTINUM. Leaves of a more vivid and rather metallic green above, also marked with delicate dark veins and veinlets; both terminal and lateral leaflets more slightly lobed primarily as well as secondarily, the secondary extremely short and subtruncate, thrice, and even more than thrice as broad as long: achenes a trifle shorter and notably thicker than in the type, being 4 mm. long and of oval-elliptic outline, the ribs very thick, turgid, broadly rounded, the intervening furrows, when not nearly obsolete, very narrow and sometimes deep.

Southwestern Ontario, near St. Thomas, Mr. Macoun, 24 June, 1907, Geol. Surv. 72,515.

The specimens of this quite remarkable and very handsome meadow rue consist of the terminal portions of two fruiting plants. The largest is a foot long, and shows but one of the usually two or three leaves. The leaflets, no less clearly than the achenes, indicate relationship of some more or less close degree to the foregoing. If when flowers of plant become known, especially the staminate, these show as much divergence from the type as do the leaflets and the fruits, the rank of a distinct species will be assured for it.

THALICTRUM DIOICUM, var. HURONENSE. Size and habit perfectly as in the type, but leaflets almost without distinction of primary lobes and secondary, being not very unequally 5-7 crenate-lobed: sepals of staminate flowers, more green-herbaceous, purplish-edged, the veinlets faint; anthers much elongated, longer than the filaments, greenish-yellow, pointless, not even mucronulate but rather obtuse, or at least obtusish.

Port Huron, Michigan, 4 May, 1896, Charles K. Dodge; the type specimen being in Herb. Univ. of Wyoming. The remarkably long and quite blunt anthers no less than the peculiar cut of the foliage mark this as a thing not to be confused with our type of *T. dioicum*. The fruit when known may confirm it in the rank here assigned, or may demand its promotion.

There is a fragment of a pistillate specimen mounted with the staminate, purporting to have been obtained a week later in the same neighborhood; but the one leaf which this fragment bears shows leaflets of a cut so extremely different that

I am unable to think of it as representing the same species. The fruits of this fragment are immature.

Since Port Huron, whence this new variety comes, is only separated from Ontario by the St. Clair River, it becomes extremely probable that this plant will be found also on the Ontario side; so that it ought to be here inserted at least provisionally as a Canadian type.

THALICTRUM DIOICUM, var. LANGFORDII. Stem 2 feet high, marked for 6 or 8 inches up to the first and sometimes the only well developed leaf; leaflets much smaller than in the type, seldom subcordate or even subtruncate at base, and more inclined to flabelliform, their lobes somewhat less obtuse: filaments short, purplish; anthers also not long as in other forms, somewhat uncinate-mucronate: achenes long and narrow, obliquely oblong, fully 5 mm. long, their 10 ribs not very thick, closely approximate, more or less wavy.

Vanorder's Grove near Kingston, Ont., T. E. Langford, 1897, the flowering specimens on the 10th, the fruiting on the 25th of May. Type specimen in Herb. Field Museum, Chicago, sheets 83,939 and 83,940.

While the foliage of this beautiful form does not so widely differ from that of ordinary *T. dioicum*, the carpels, with their irregular outline and undulating rather thin ribs, might well be thought to mark a species. The same is in Herb. Field Mus., sheet 190,985, from Hamilton, Massachusetts, by the late Thos. Morong, in 1875, the flowers in May, fruit in June; the waviness of the ribs less pronounced.

THE FLETCHER MEMORIAL FUND.

Since the appearance of the note in our April issue, a further number of subscriptions have been received from members of the Club and friends of the late Dr. Fletcher. There must still, however, be many members who are desirous of contributing something to the above fund, and it would help the work of the Committee very much if they would intimate the amount of their subscription, at an early date, to the Secretary-Treasurer, Mr. Arthur Gibson, Central Experimental Farm.

THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, JUNE, 1909 No. 3

THE PRONG-HORN ANTELOPE.

(*Antilocapra americana*, Ord.)

By Professor Edward E. Prince, Dominion Commissioner of Fisheries, Ottawa.

Like most railway travellers, crossing our vast wastes of prairie in the west, I have found one of the most interesting occupations to be that of observing the mammals, birds, etc., which from time immemorial have peopled the lonely plain between Brandon and the foot-hills of the Rockies. It has been my lot to make the journey nearly a score of times, but it never proves wearisome if one keeps a sharp lookout for living creatures on these grassy wilds. On my last recent trip I saw once more the usual gophers. prairie hares, hawks, ducks, geese, and sea-gulls in numbers, the beautiful prairie wolf or coyote with bushy tail, either wandering deviously like a lost sheep-dog or taking a survey from a rising knoll, while the appearance of a badge shambling along rewarded my sight. These I had seen before, yet in spite of my keen watch for antelopes, I had crossed the prairie time after time without seeing those wonderfully interesting animals. On one occasion, however, when travelling from Prince Albert to Regina, in the company of His Grace Monsignor Pascal, and I was in the act of expressing my disappointment at always failing to see any antelope, His Lordship suddenly turned to the right as we stood on the rear platform of the car, exclaiming, "Why, there is a band of them," and, lo, five or six of these lovely creatures proudly pranced along not more than 100 yards from the train. With heads aloft and stepping high on their nimble feet, they recalled the action of trained ponies in a circus. They were going northward as our train sped south, so that my near view was brief, but the beautiful animals were so near and apparently so fearless that I had ample time to notice their form, colour, and general appearance. Their active graceful actions delighted me. Few experiences in the wilds, and

I have had many, have given me greater pleasure, and I felt rewarded for my long disappointment in failing to see before that remarkable mammal the prong-horn antelope of Canada.

Several years have since elapsed and I continued to keep a keen outlook on the occasion of my many recent journeys, but I was not privileged to see the antelope again until a few weeks ago. In the first week of May, about 70 miles west of Swift Current, a western man in the Pullman car was calling my attention to a large herd of cattle scattered over some low hills, 400 or 500 yards from the railway track, when he excitedly exclaimed, "There's a small band of antelope beside them." A group of four or five prong-horn antelope were grazing about one hundred yards from the cattle. They fed nervously and every few seconds one or other of them would raise his head and look round, keeping watch. They were plainly to be seen, though less favourably than the group which I had observed a few years before. My friend had the keen acute vision of the western man, familiar with the moving objects of the plains, and he had made no mistake. Indeed, one can make no mistake about this graceful prairie animal as it haughtily tosses its head and looks round, the dark perpendicular horns resembling a high crown on its forehead and adding to its proud bearing. The slender neck held erect, the sharp nose, high forehead, small ears not unlike those of a pony, and the forked curved horns, impart to it a peculiar aspect, very characteristic, and not readily forgotten. There is a resemblance to the goat, the delicate trim feet and the erect horns being so goat-like, but the expression of the eyes and the light graceful bearing recall the deer tribe. Our prong-horn antelope is indeed neither a deer nor true antelope nor goat, but is intermediate in position, and combines their zoological features. Like the giraffe, which is also a unique Ruminant, the antelope of the Canadian prairie occupies a position by itself amongst mammals. The Ruminantia form the highest group of the even-toed Ungulates or hoofed animals. This group includes the Bovidæ or hollow-horned cattle, oxen, sheep, goats, and true antelopes; the Cervidæ or deer, the Ruminants with solid horns; the Camelidæ or Camels; and two peculiar families, the Giraffidæ or Giraffes, and the Antilocapridæ or Prong-horn Antelopes. These two last families are remarkable as containing each only one species. unless there be two species of Giraffes. The Prong-horn is therefore a unique species in a unique family, and cannot be ranked with any other living ruminant. In height our antelope is about three feet at the shoulder and about forty-eight inches from snout to tail, while its weight averages 70 pounds, being therefore much smaller than the Virginia deer (*Cariacus virginianus*),

which is usually four feet high and about five feet in length and averages 100 to 175 pounds in weight. The general ground-colour is almost white with a kind of saddle or saddlecloth patch on the back and the side of the body, of a light yellowish brown; the neck is brown with two bands or collars of white across the throat, there is a dark patch on each cheek, the nose is dark and the chin and sides of the mouth pale ochre. The tail is almost black, and a large patch of white surrounds the tail region. The white hairs forming this large rounded patch are said to be erectile, and in extreme fear or anger they rise and give a very peculiar appearance to the prong-horn. This complex arrangement of white, yellow, and dark brown would be grotesque were it not for the grace and delicacy of the form and action of the wearer of these colours.

The sharp goat-like muzzle, the high precipitous forehead, the bright piercing grey eyes near the summit of the brow and close below the root of the horns, the slender erect neck, perpendicular short ears and the deer-like body make a peculiar combination. The creature is a goat with its trim delicate legs, not an antelope; its hair is coarse, tubular and fragile just as is the hair of a deer. But it has no tear-canal near each eye with the double lachrymal apertures of the deer, and the posterior accessory hoof or "deer claw" is absent. There is a mane, not unlike that of the moose, consisting of firm, erect red hairs projecting four or five inches from the back of the neck. But the most striking feature is the pair of horns standing upright on the summit of the brow, 10 or 12 inches high and of a black or dark brown colour, thicker at the base and for a third of the total length, at which point the prong or sharp knob projects forward, while the sharp upper part curves backward like a hook. The short anterior fork on each horn imparts a peculiar jaunty aspect to the head, and justifies the name "prong-horn." But still more remarkable is the fact that this hollow horn is deciduous or shed annually. All the deer tribe have solid antlers, which are shed each season, but in the oxen, antelopes, goats, sheep, etc., the horns which are of the nature of a sheath covering a projecting bony core of the frontal bone, are not shed but permanent through life. Alone amongst cavicorn or hollow-horned ruminants, the prong-horn sheds these ornaments which are possessed by both sexes. The hollow horn becomes loose in mid-winter after the "battles of the fall," and in January or earlier they drop off. The frontal process or core, if examined after the old horn has dropped, is found to show fine white projecting hairs developed in a soft epidermal layer. At the tip these hairs are black and dense and they coalesce to form the new horn. A writer in *Forest and Stream* (New York) stated that:—

"Towards autumn the periosteum becomes thicker, and takes on the character of skin, and from this skin grows the fine hair, which, as stated, finally pushes the sheath of the old horn away from its supporting bone, and at the extremity of the skin becomes new hard horn. After the sheath has been shed, the hair continues to grow, and as it grows it becomes matted together below the tip, dark and hard, and gradually working down toward the head, changes from a covering of single hairs, which are white in color, to a mass of black agglutinated fibres, precisely like the sheath which the animal carried the year before. This process gradually extends further and further down the horn, until at the base it is sometimes difficult to be certain just where the sheath ends and the skin of the head begins.

"During September and during the first half of October, antelope use their horns to some extent in fighting, and often come together with considerable force and energy, and push head to head for a long time. It is not probable, however, that such battles are ever severe enough to loosen the horns, or that they have anything to do with the annual loss of the sheath, which has been described."

It is an interesting fact that the female prong-horn possesses these ornaments, but they are smaller, rarely more than 3 or 4 inches long, if hunters are to be trusted. Packard gives an interesting figure, after Hays, of a young prong-horn with a pair of sharp conical horns, not pronged, but covered with hair like the rest of the head. Its method of feeding is unlike that of the deer for it crops grass but never nibbles leaves or shrubs. It is nomadic and so far as I could learn has no special local haunts.

Formerly large bands numbering thousands roamed over the prairie, but it is now scarce, indeed in some of the western states it is quite exterminated, so that where fifteen years ago in a county, in Colorado, fifty thousand of these beautiful creatures were known to exist, to-day there are not fifty. They never frequent wooded or sheltered districts, but constantly roam over the open plains where they are exposed to the hunter's rapacity. East of the Rockies, in Canada, small bands may be found, but excepting in California where a few have occasionally been noticed, the prong-horn is absent from the coast country west of the mountains. Only in severe storms do they forsake the open country, and seek shelter on the slopes of coulees, and they have been known to migrate hundreds of miles in winter to find slopes where the snow was light and feed obtainable. They cannot subsist on the rich eastern grasses, or live confined in sheltered reserves, and in captivity very little grass must be given if the captives are to be kept in health.

Even on the prairie they are subject to mysterious maladies, due no doubt to improper food, and they have been noticed to be plentiful one year and very scarce the next from this cause. The year 1873 (or 1874) was said to be a scarce year for prong-horns. Owing to their rapid nimble gait they can cover long distances, especially when disturbed. "In fleetness", says Caton, "they exceed all other quadrupeds of our continent." When feeding out in the open, usually standing prominently on some rounded grassy area, they are visible from a long distance; but on the lower flats, and near coulees, they are less easily detected as their peculiar patched coloration effectually masks them. When watched one sees them feeding for a few moments and then moving on, one or two of the herd constantly raising the head and keeping a lookout. The wolves are their main enemies, apart from the insatiable cruelty of man, and in June when the young are born, the prong-horns are especially on the alert. Theodore Roosevelt tells of the spectacle described by a western rancher who saw a prong-horn attacked by two eagles. It was a brave contest, the animal rearing on his hind legs and striking like a goat with his horns and hoofs. Curiosity is so strong in these animals that it makes them an easy prey. When suddenly startled they make several leaps, high from the ground; then stop and stare wildly. They are easily shot then. Often a band will run a few hundred yards, wheel about and stare vacantly, and return almost to their starting point. This "circling" habit enables the unscrupulous hunter to slaughter a whole herd, indeed a hunter has been known to shoot a wagon load of them before the remnant of the herd fled away. When once started in full cry they veritably fly, apparently scarcely touching the ground; but they are soon exhausted and a horse has no difficulty in keeping up with them if the chase is prolonged. A bright cloth waved on a stick will cause a herd to approach a partly hidden hunter. The older larger animals are the most inquisitive, and the hunter can make sure of the finest prong-horns. Curious, nervous, swift in flight, they have the reputation of being plucky when cornered and make a gallant and dangerous fight. When leisurely trotting along at their leisure, as I saw them from the end of a Pullman car, nothing could be more easy, elegant, and confident. I have only once tasted prong-horn or antelope steak, and I found it juicy, fine-grained and of exceedingly good flavour.

Why is it that this lovely and scientifically interesting native animal is allowed to be exterminated? Its numbers on our prairie are few compared with the large bands of twenty years ago. Unlike the buffalo, as settlement proceeds, it need not become extinct if protection is afforded and our prairie

settlers educated to care for, and not destroy, this almost unique creature. The vast herds of buffalo had to go, the huge savage bovine defied the settler: but this swift and timid animal would keep out on the lonely waste far from danger, and would survive, were anything done to prevent merciless slaughter.

Antilocapra americana, Ord., is dissociated in every way from the typical antelopes of the old world and is neither a deer, a goat, a sheep, nor an ox. One American author says, "It is like an island in a vast sea, unrelated," though it would be more true to say that it is a connecting link related to many diverse branches of the Ruminantia. Its horns are hollow like the Bovidæ, but deciduous like the Cervidæ; yet it has the gall-bladder which no deer possesses. Scent glands which antelopes and deer exhibit, the prong-horn lacks, nor has it the tear sinus, nor the posterior hoof or "deer claw." Mr. Roosevelt characterizes it as "the extraordinary prong-buck, the only hollow-horned ruminant which sheds its horns annually"—and it is the sole species in the family Antilocapridæ, a family all by itself. It combines features of the deer, antelope, goat and sheep, and can be compared only to the giraffe in this respect as occupying an isolated zoological position amongst the Ungulates.

In confinement it makes a great pet, but rarely lives long and, until June, 1903, none had been known to have been born in captivity. It is difficult, if not impossible, to domesticate completely and, since it was first scientifically described in 1855, and its peculiar features studied in a captive specimen in the Zoological Gardens, London, its numbers have continued to decrease so that it bids fair to soon become one of the rarest of our interesting larger native mammals.

WINTER BIRDS AT POINT PELEE.

BY W. E. SAUNDERS, LONDON, ONT.

The most southerly piece of land in Canada is the south end of Point Pelee, the latitude being about 41′ 55°, while London is almost exactly 43′ and Ottawa about 45′ 25°. It will readily be seen that there is sufficient variance between these places to make a radical difference in the winter bird population and it was, therefore, with much interest that Mr. J. S. Wallace and I undertook this year a couple of journeys to determine what the winter population of the Point actually was.

In the midst of a mild season it happened that the two closing days of January and the 1st of February produced the

most severe weather that had been seen at Point Pelee during the whole winter, so that, as far as enjoyment was concerned, it could not be called first class, but for the real purpose we had in mind, namely, to find out just what birds stayed at the Point through the winter, it was perhaps ideal. If the birds have the power of foretelling weather and desired to miss the most strenuous spells, they certainly would have been absent from the Point at this time. The two closing days of January were one continuous blizzard, and yet, in the midst of weather of this character, the Carolina Wrens were still to be heard singing. Cardinals ought to be fair winter singers, but the weather overcame their spirits. They and the Carolinas are usually to be found even in summer, in that part of the Point which we call "The Jungle," composed of a tangle of grape vines with shrubbery in a rather open forest growth, and here were grouped most of the birds that we saw, and a queer group it was. Bluebirds and Robins, Carolina Wrens and Cardinals, Redpolls and Goldfinches, Evening Grosbeaks and Cedar birds, with three Bohemian Waxwings, all living under practically the same conditions, although at varying heights from the ground. In the list which is appended, everything which we expected we might find is not included, and on the contrary, of those which we found we are inclined to think are not regular winter residents. For instance, our one Brown Thrasher and Chipping Sparrow, although in good condition physically were probably left behind through some unusual, and perhaps individual cause. The lone Cowbird was not in good health and doubtless felt unable to make the crossing.

It would seem, however, that the Hermit Thrushes, Chewinks, Vesper and White-throated Sparrows, Bluebirds, Robins and Flickers must be regular winter residents. It chanced that we saw only one Song Sparrow on two separate days, but it is hardly to be doubted that further exploration of the thickets would have resulted in the discovery of more.

In the following list the numbers noted are those taken from the days of greatest abundance. As we were working the same ground every day it would be manifestly unfair to consider that we saw different birds each day, but the probability is that we saw rather more than the numbers given.

Bluebird	40	Redpoll	50
Robin	15	Purple Finch	60
Hermit Thrush	5	W. W. Crossbill	1
Golden-crowned Kinglet	40	Evening Grosbeak	3
Brown Creeper	15	Cedar Bird	15
Carolina Wren	11	Bohemian Waxwing	3

White-breasted Nuthatch.	3	Flicker	8
Brown Thrasher	1	Downy Woodpecker	10
Cardinal	8	Dove	1
Chewink	5	Crow	1
Cowbird	1	Blue Jay	5
Junco	25	Prairie Horned Lark	1
Snowflake	50	Marsh Hawk	3
Vesper Sparrow	4	Cooper's Hawk	10
Song Sparrow	1	Red-shouldered Hawk	1
Tree Sparrow	100	Bald Eagle	3
Chipping Sparrow	1	Long-tailed Duck	500
White-throated Sparrow	9	Am. Merganser	10
Goldfinch	30	Golden Eye Duck	1
Pine Finch.	10	Herring Gull	25

Our next visit to the Point was on March 14, 15 and 16, by which time a large number of changes had taken place. We arrived late in the afternoon of the 13th and the next morning our ears were greeted by songs of the Robin, Song Sparrow and Cardinal, and the call of the Chewink. Before the day had fully dawned we were on our way to the end of the Point to see, if possible, the northern migrations in the very act of arrival from the south. On our way down the Carolina Wrens were added to the above-named chorus and numbers of other birds were heard, particularly Bluebirds and Crows. At the end of the Point we found we were doomed to disappointment as we saw nothing whatever arrive from the south. To our surpirse we saw a small number of English Sparrows migrating south and this experience was repeated in the days following, but northern migration of the same species was also noted on the latter days. A short distance away from the end of the Point we saw a large flock of Cedar Waxwings which we judged were just arriving, and on the 15th a flock of Cowbirds in the same condition, but both of these were flying vigorously and might have rested near the end of the Point.

Two curious facts were noted, first, three Shore Larks came from near the end of the Point and flew north-east across the Lake, only a few feet above the water. They disappeared in the distance still holding the same direction. The other occurrence was that of a small flock of about nine Crossbills which flew almost directly east up the Lake. We watched them also until they had disappeared, still holding their course.

The jungle chorus on this trip was something to be remembered. The birds seemed to congregate in the same locality as that in which we found them six weeks before but their numbers were very much increased and the later date brought

them into a much more musical frame of mind. The group found on this trip consisted of about 20 or 30 each of Redwings and Rusty Blackbirds, 50 Purple Finches, 100 Tree Sparrows, 5 White-throats and 50 Redpolls, with an occasional Carolina Wren. All of these were singing nicely, though of course they had not yet their full spring voices. Added to these were others, such as Juncos, Bluebirds, Waxwings and Goldfinches, which were not as yet singing at all but the melody produced by all these sweet voices was exceedingly agreeable to our ears, eager as we were for bird music. Each day this group of birds was to be found in the same spot which was evidently the song centre for the whole Point.

On our former trip we saw four Vesper Sparrows and toward the end of February Messrs. Taverner and Swales also saw four of these, but on the present occasion only one was noted. This, however, is sufficient to show that this species does winter in Canada, although in small numbers.

With the thawing of the ice in the marsh the muskrat trapping had begun and the ducks were returning. Black Ducks were in the majority but Redheads, Ruddys and Buffles were also there, and on the open Lake the two large Mergansers and the Golden Eye, nearly 200 altogether were seen.

The Bohemian Waxwings of our former trip were gone and we saw no Grosbeaks either, but winter had left one representative behind in the person of a Snowflake. We had not a very good view of this bird but it appeared to be acquiring the black spring plumage.

The last birds which we added to our list were the Kildeer and Bronzed Grackle, only 7 of the latter. At London one is puzzled to know which Blackbird arrives first and my own idea has been that the Bronzed is ahead of the others, but our experience at Pelee seems to point to the Redwing and Rusty as the earlier species, with the Cowbird next, followed closely by the Bronzed, of which there had been no noteworthy arrival up to March 15th. Of course the relative date of arrival in other years might vary from that of 1909, but certainly Point Pelee seems to be the place where migrations can be studied under advantages which cannot be obtained elsewhere.

One exceedingly striking point noted during last autumn, and this spring so far, has been the entire absence of any migratory movement on the part of the Chicadee. One bird, I think, comprises the whole number seen in about eighteen days' observation during the period mentioned, showing that this bird sometimes, at least, is practically resident.

The following list comprises as nearly as possible the birds seen on the three days of this latter trip:—

Bluebird	300	Red Cross Bill	13
Robin	100	Redpoll	100
Hermit Thrush	1	Cedar Bird	100
Golden-crowned Kinglet	75	Flicker	5
Brown Creeper	2	Downy Woodpecker	4
Carolina Wren	10	Crow	400
White-breasted Nuthatch	1	Blue Jay	5
Red-breasted Nuthatch	1	Prairie Horned Lark	15
Cardinal	15	Marsh Hawk	4
Chewink	10	Great Horned Owl	1
Cowbird	150	Bald Eagle	1
Bronzed Grackle	7	Kildeer Plover	2
Red-winged Blackbird	150	Red-head Duck	40
Rusty Blackbird	75	Buffle-head Duck	12
Meadow Lark	25	Black Duck	150
Junco	50	Golden Eye Duck	7
Snowflake	1	Blue Bill Duck	8
Vesper Sparrow	1	Ruddy Duck	2
Song Sparrow	100	Am. Merganser	150
Tree Sparrow	150	Red-breasted Merganser	150
White-throated Sparrow	5	Ring Billed Gull	10
Goldfinch	30	Herring Gull	50
Purple Finch	50		

MEETINGS OF THE ENTOMOLOGICAL BRANCH.

December 17th, 1908. Meeting held at the residence of Mr. W. H. Harrington. Present: Messrs. Halkett, Groh, Baldwin, Gibson, Young, Wilson, Eifrig, MacLaughlin, Harrington (in the chair), and Master G. Eifrig.

On opening the meeting the Chairman referred to the great loss which the Entomological Branch, in the death of Dr. James Fletcher, had sustained. He spoke of his remarkable knowledge of all things concerning insects, and how much he would be missed by all the members of the Branch, by all of whom he was much loved. The December numbers of the Canadian Entomologist, Entomological News, Le Naturalist Canadien, and the Journal of Economic Entomology, all of which had full obituary notices, were shown by Mr. Harrington, and read by those present. The Chairman also referred to the death of Dr. William Ashmead, of the United States National Museum, and showed his photograph. Dr. Ashmead was one of the leading scientific entomologists of North America, being the highest authority on the large order, the Hymenoptera. Mr. Harrington also showed Fascicule No. 62 of Genera Insectorum, on the subfamily

Pimplinæ. This was much admired by all present. He also placed on view several cases containing his collection of local species. These were of much interest.

Mr. Groh exhibited a box containing about eight species of plant lice illustrating the differences in size, wing venation and general structure. Mr. Groh reported that he had given special attention to the collection of plant lice during late summer and autumn and had found these insects on about 70 different plants.

Mr. Baldwin exhibited some lepidoptera, in all 20 specimens. These were all of local species which had been collected during the past summer. Some fine specimens were noticed of *Oligia festivoides*, *Melalopha apicalis* and *Azelina ancetaria*.

Mr. Young exhibited some living chrysalids of one of the Orange-tips, (*Anthocharis*). These are curious objects with their conspicuous keel-shaped projection. The specimens were collected by Mr. Young at Departure Bay, B.C. He also showed some parasitized larvæ, and living pupæ of a species of *Alcis*, a geometrid moth. A general discussion followed on the pupation of the Rhopalocera.

Mr. Gibson showed a small collection of named Ephemeridæ which had been collected in Manitoba, chiefly at Winnipeg, by Mr. J. B. Wallis. It was pointed out that good work could be done in making collections of these insects and in observing their habits, as little was known concerning the greater number of Canadian species. A box of Hemiptera taken at Vernon, B.C., by Mr. E. P. Venables was examined with interest. Among these were specimens of *Eurygaster carinatus*, *Carpocoris remotus*, *Nysius scolopax* and *Geocoris uliginosus*, var. *limbatus*.

Rev. G. Eifrig exhibited a small collection of lepidoptera which he had made in Germany in 1908. Also a few specimens of the large handsome *Morpho* from Brazil. These were much admired. A. G.

January 7th, 1909. Held at the residence of Mr. Arthur Gibson. Present: Messrs. Harrington, Simpson Baldwin, Eifrig Jr., Groh, Halkett, Metcalfe, Young and Gibson.

Mr. Harrington spoke at some length on the sub-family Pimplinæ of the Hymenoptera. He had been re-arranging his local collection of these insects; and stated that 70 different species are known to occur at Ottawa. Of these he exhibited 48 species and gave information concerning many of them. The sub-family Pimplinæ belongs to the super-family Ichneumoidea, the members of which have unusually long and slender bodies. They are decidedly beneficial in nature, preying upon injurious kinds of insects; they thus render very important service to the agriculturist.

Mr. Metcalfe showed *Anisota rubicunda*, a very beautiful moth, also specimens of the injurious leaf-hopper, *Typhlocyba rosæ*. The insects known as leaf-hoppers occur on grasses and trees and shrubs of all kinds, and many are decidedly destructive. Mr. Gibson spoke of the injury caused last year in eastern Ontario to potatoes, beans and other plants by the apple leaf-hopper, *Empoasca mali*.

Mr. Baldwin exhibited specimens of *Silvanus surinamensis* which had been found in Ottawa on bags of flour. This little beetle is a well known enemy of stored grain, dried fruits, etc. He also showed a small general collection of coleoptera, among which was noticed a specimen of *Pityobius anguinus* which is rare at Ottawa.

Mr. Young brought to the meeting a box of micro-lepidoptera beautifully mounted. Among these were co-types of recently described new species, viz.: *Crambus youngellus*, *Crambus polingi*, *Crambus nevadellus*, and *Thaumotopsis coloradella*.

Mr. Groh showed examples of the Greenhouse White Fly (*Aleyrodes*) in the egg, larval and perfect states. He mentioned that these insects were of considerable economic importance, and outlined some experiments in destroying them by fumigation with hydrocyanic gas, which he had carried on while attending the Ontario Agricultural College at Guelph.

Mr. Halkett spoke of some dipterous larvæ which he had found in the Northwest feeding in the head of a bird. The flies had been reared but as yet had not been identified.

Mr. Gibson showed a collection of Sesiidæ most of which had recently been named by Mr. W. Beutenmuller, of the American Museum of Natural History, NewYork. None of the species were particularly rare, but the exhibit as a whole was interesting. These moths resemble rather closely wasps or hornets. The larvæ are borers living in the stems, trunks, roots, or branches of living trees. A fine pair each of *Catocala coccinata*, taken at Winnipeg, Man., by Mr. J. B. Wallis, and *Hepialus hyperboreus*, collected at Hymers, Ont., by Mr. H. Dawson, were also shown.

A. G.

January 28th, 1909. Held at the residence of Mr. W. Simpson. The members present were: Messrs. Harrington, Halkett, Metcalfe, Groh, Eifrig Jr , Gibson, Baldwin, Young and Simpson in the chair. Numerous specimens were exhibited by the various members in turn, all of which called forth keen discussion

Mr. Harrington showed a number of flies of the curious genus Microdon, and read portions of an article on them by Wheeler in the Journal of the New York Entomological Society.

The larval and pupal stages, which are spent in the nests of ants have always been a source of perplexity to many collectors, and even to naturalists of experience, as is evident from the fact that they have been repeatedly named and placed in genera even outside of the insect world. They are especially liable to be taken for snails. The larvæ seem to be tolerated by the ants, and evidently do them no harm. It is not known with certainty on what they feed.

Mr. Groh had some cockroaches, with their egg-masses attached. The eggs of these creatures are all laid at once, enclosed in a sort of capsule, which is large for the size of the insect. They are carried about for some time before being deposited.

The Chairman exhibited several cases of specimens, commenting on specimens of particular interest. Among them were many insects which were examined closely.

Mr. Metcalfe showed a box of miscellaneous insects, among which were a species of *Machronycus* and *Stenelmis crenatus*. These are acquatic in their habits, and somewhat snail-like in motion.

A box of lepidoptera, shown by Mr. Baldwin, included several species uncommon at Ottawa. Mention may be made of *Euchalcia venusta*, *E. putnami*, *Hyphoraia parthenos*, and *Haploa confusa*. They were all taken during 1908 at light.

Mr. Young exhibited a small collection of British Columbia coleoptera, which contained several specimens of the handsome, large wood-borer, *Rosalia funebris*.

Mr. Gibson reported that some nests of the dreaded Brown-tail Moth had been found in shipments of nursery stock imported into Ontario from France. This necessitated a close inspection of all such shipments coming into Canada. He showed actual nests which had been taken from fruit seedling stocks found to be infested. He also exhibited specimens of the curious little Byrrid, *Exoma pleuralis*, collected at Metlakatla, B.C., by the Rev. J. H. Keen.

Mr. Halkett read some interesting paragraphs on the duration of the life of insects from a work entitled "The Prolongation of Life," by Elie Metchnikoff, sub-Director of the Pasteur Institute, Paris, France, and also paragraphs from the same work on "The Social Life of Insects." He also showed a number of living mites which had been handed to him by Mr. Henry, the taxidermist, who had found them on canaries.

H. G.

MEETINGS OF THE BOTANICAL BRANCH.

Held at the residence of Mr. D. A. Campbell, 226 Clemow Avenue, Saturday evening, March 20th, 1909. There were present in addition to the host, Messrs. Attwood, Whyte, Clarke, Gibson, Michaud, Bond, and W. T. Macoun.

The subject for the evening's discussion was "The Stems of Seed Plants." Lantern slides, photographs and drawings of sections of various stems were used to illustrate the types discussed. After a reference to the monocotyledon stem, a series of slides was exhibited showing the various stages leading from the soft herbaceous stem with relatively small wood bundles to the woody stem with the wood bundle the major portion of the stem. These furnished the material for the discussion. Among the topics dealt with were growth in length and in diameter, and the elements of the stem which contributed to this growth, the chief active living portion of the stem being the cambium, the medullary ray cells, the younger inner bast, and the young outer wood. The function of each of these parts of the tree stem was dealt with. The wood cells of the heart of the tree gave stiffness, the wood cells of the sap wood were the channels for water from root to leaf, the sieve tubes of the bast carried food from leaf towards root, the cambium was the source of new cells added to wood and bast, the medullary rays served to carry water and plant food across the stem.

In the discussion on sap flow and ascent of water in the stem, some of the members were in doubt as to the existence of such a force as root pressure and some were not prepared to accept the proposition that living plant cells have the power to select certain substances from the soil. It seems necessary to assume a root pressure to account for the ascent of water in a glass tube tied tightly a few inches above the soil to the cut end of a stem.

In reference to selective absorption it was pointed out that two trees may grow in the same soil and one may contain more ash than the other. Barley and red clover in flower grown in the same soil have about the same total ash or mineral matter, yet the clover contains over five times as much lime as the barley and the barley about eighteen times as much silica as the clover.

Reference was made to a recent explanation of the ascent of water in trees of great height. This explanation will be considered more fully at some future time. It was generally considered that the known forces seem inadequate to fully account for the phenomenon.

D. A. C.

Held at the home of Mr. R. B. Whyte, Saturday, April 3rd, 1909. Present: Prof. John Macoun, Messrs. Whyte, Attwood, Clarke, Bond, Cameron, Campbell, W. T. Macoun, Groh, and Newman. As per previous arrangement, Mr. L. H. Newman acted as Chairman and opened the discussion on the following subject: "Certain Biological Principles and their Relation to Plant Improvement." The speaker outlined some of the principle theories respecting the methods of organic evolution and made some deduction from the behavior of plants in Nature which he considered to be suggestive of how plants growing under domestication might be improved. A most interesting discussion followed the presentation of this subject and many important observations were submitted as contributions to our knowledge of the various factors and circumstances which have a bearing upon the development and improvement of our domestic plants.

At the request of the Associate Editor of the Club in Botany the Chairman agreed to prepare his remarks in the form of a special article to appear in THE OTTAWA NATURALIST at an early date.

L. H. N.

OUR FIRST EXCURSION OF THE SEASON OF 1909.

The excursion of the Ottawa Field-Naturalist's Club, on the afternoon of the 24th of April, was not much favored by the weather. Although there was no rain, the sun even shining overhead in all its brightness, yet the thermometer hovered between 35 and 40°, which, together with a cold, fitful wind, made people shiver. In spite of that, about forty members and friends of the Club assembled at the Experimental Farm at 2.30 in the afternoon. This is not only one of the main show and beauty spots of the Capital, but also a ready source of interest and information to nature lovers.

Under the leadership of Dr. W. Saunders, Mr. F. T. Shutt, and Mr. W. T. Macoun, the big barn with its up-to-date machinery and agricultural implements was first inspected, and then the different breeds of fine cattle in the basement. The arrangement here is, as is to be expected, a model one. The different kinds of farm animals are certainly well worth seeing.

Next, the beds of fine crocuses in bloom near Dr. Saunders' residence were admired. Thence we wended our way into the Arboretum, where Mr. Macoun gave much instruction on native and exotic species of trees, especially conifers and shrubs, and pointed out differences between closely allied species. A tinge of sadness was also interspersed in his remarks, when he pointed

out the trees planted twenty years ago by our late friend, Dr. Fletcher, as well as young trees sent last fall by him from British Columbia, namely, of *Larix occidentalis*. Last year at about the same time he had been with us going over the same places and speaking in his usual kindly, animated way. Let us, who knew him, never forget him, and emulate his noble example.

Birds were conspicuous by their absence, which in view of the cold wind was not to be wondered at. In general, the first migrants with the exception of the Crow and Prairie Horned Lark were one to two weeks later than usual this spring. Birds like the Junco, Robin, Bluebird, Red-winged and Bronze Blackbirds and the Song Sparrow did not come this year until the first week in April, instead of March 21st to 23rd. However, a few Robins and Song Sparrows were seen and heard, and while we were in the Arboretum a Flicker was loudly calling and hammering. Beside these only a small flock of Golden-crowned Kinglets and one Brown Creeper were seen. Had there been no wind a great many more species would undoubetdly have been observed.

Humor was also not entirely lacking. While all were inspecting a queer-looking bush, with branches recurved to the ground, *Picea excelsa inverta*, it was found that a hare, our varying species, *Lepus americanus*, had made its home under it. With admirable generalship, Mr. MacMurray, of the farm staff, had the little tree or bush surrounded by the younger element of the party, in order to catch the rabbit, as it was termed, although we have no rabbit here. However, the frightened animal broke through the cordon and, pursued by Mr. MacMurray with flying coat-tails, made good his escape. To duly impress the difference between hare and rabbit for future occasions, our indefatigable President, Mr. Attwood, quickly drew up this set of differences:—

The Hare.	The Rabbit.
Ears longer than head.	Ears equal in length to head.
Lives above ground.	Lives in burrows.
Young born with eyes open.	Young born with eyes closed.
Solitary.	Gregarious.
Hind legs longer than head.	Hind legs not longer than head.
Fur turning white in winter.	Fur not turning white.

It was interesting to note the zigzag course of the hare's flight, which proved rather puzzling for Mr. MacMurray and the two dogs accompanying him.

At the close of our walk short addresses were made by Mr. McNeill on the weather which, by reason of the poor brand he had supplied for the day, caused more hilarity or resentment than would otherwise have been the case. He, however, made

a strong plea that the members should use the barometer and weather charts to better advantage. Mr. Halkett, our expert in herpetology and "frogology," made some general remarks, not pertaining to his branch, since batrachians, etc., and insects, were absent on account of the cold weather. Only in one pool of the swamp below St. Louis Dam a vigorous chorus of frogs could be heard, and not one in the other pools. Beside these two gentlemen Messrs. Macoun, Attwood and the undersigned spoke briefly. G. EIFRIG.

COUNCIL MEETINGS.

The first meeting of the Council for the year 1909-1910 was held in the Carnegie Library on March 23rd.

Members present: Messrs. A. E. Attwood, A. Halkett, C. H. Young, A. G. Kingston, A. McNeill, L. H. Newman, and T. E. Clarke; Miss F. Burt, Miss B. Gilbertson, and Miss M. McK. Scott.

Ordinary members elected:

Miss C. P. Grenfell, B.A., Ottawa.

Miss Frances Moule, B.A., Ottawa.

At this meeting standing committees and leaders for the excursions were appointed. The name of the Publishing Committee was changed to Publications Committee, and the duties of the committee were enlarged to include all business relating to exchanges. The following motion was carried: That for the ensuing year it be the duty of the Chairman of the Excursion Committee, after an excursion is held, to have a report of the same sent to the Editor of the OTTAWA NATURALIST for publication; and similarly that it be the duty of the Chairman of the Soirées Committee to have reports of the soirees sent to the Editor.

Mr. L. J. Burpee, Librarian of the Carnegie Library, appeared before the Council at the request of the Library Committee. He extended to the Club the privilege of placing its important exchanges on file in the Carnegie Library, and he submitted a list of scientific periodicals not now received by either the Club or the Carnegie Library, with the proposal that the Club might secure a number of these in exchange for the OTTAWA NATURALIST.

April 29.—Members present: Mr. A. E. Attwood, Rev. C. G. Eifrig, Messrs. A. Halkett, J. W. Gibson, A. McNeill, L. H. Newman, and T. E. Clarke; Miss F. Burt, Miss B. Gilbertson, and Miss M. McK. Scott.

Ordinary members elected:

Mr. Wm. Smeaton, B.A., Ottawa.
Mr. A. D. Watson, Ottawa.
Miss A. J. Wilson, Ottawa.
Mr. A. Effingham Fleck, Vancouver, B.C.

The President suggested the formation of branches or small affiliated clubs in places near Ottawa such as Carp and Stittsville. These branches would carry on local field work and could be visited each year by the Club at some time when a joint field day could be held. The Council approved of the plan and appointed Mr. J. W. Gibson to make preliminary arrangements for the organization of such a branch at Carp.

T. E. C.

NOTES.

DIOSCOREA VILLOSA.—On page 184, Vol. XXII. of THE OTTAWA NATURALIST, Mr. W. A. Dent describes a delightful retreat for the nature lover where Lake Huron has gradually narrowed into the St. Clair River.

Referring to the rarity of the slender twiner found there popularly known as the Wild Yam (*Dioscorea villosa*) he invites reports of its distribution. It is not rare in wooded flats along the Thames River westward from London. There is a fine patch of it in a thicket by the bank of the River within the city limits.

J. DEARNESS, London, Ont.

SNAKE BEHAVIOR.—The observation which follows seems worthy of presentation, if not as an unusual occurrence, yet as one which may be new to many. My own opinion is that it might be less unusual than it probably is, if the reception almost invariably accorded to members of the snake fraternity did not render it next to impossible.

One morning last April, while strolling among the ruins of an old building, I came upon a large garter snake, which was making strenuous efforts to get out of my way. As soon as I noticed it I stopped short, only a couple of feet away, and was rather surprised to see it do the same. Evidently it was aiming to avoid detection until I should pass on. With the object of seeing what would follow, I waited motionless, and for a whole minute or more nothing took place. Finally it began to venture on escape, and in the most cautious way drew itself forward a trifle, so slight as almost to escape notice. After another wait a slightly bolder hitch forward was made. This procedure was repeated many times with increasing confidence and more substantial progress each time, until it had got about four feet away from me, when it glided quietly off among the weeds.

I was sufficiently interested by what I had seen to wonder if the snake would repeat its successful ruse; and so I overtook it once more at a little distance, stopping when within a foot or two of it. It stopped as before, drawing back its head, and throwing its body into considerable curves. What followed was substantially the same as I have already described, but was if anything even more cautious, and longer in accomplishment. The markings of the snake were admirably suited for harmonizing with its surroundings and in doubling from side to side, the body's motion did not greatly break the homogeneity with the waving grass. The creature's self-possession and apparent confidence in its tactics, impressed one particularly, whenever the peculiarity of its mode of travel compelled it to direct its head almost squarely toward the quarter from which it sought to escape. Needless to say, its well-earned liberty was gladly granted; and, I suppose, if it succeeds in running the gauntlet of human persecution until a like occasion again presents itself, it will all the more instinctively rely on what has once proved safe wood-craft, and if the next intruder also witnesses the little drama of which he is the cause, will furnish him with another instance of the marvels of animal sagacity.

HERBERT GROH, Ottawa.

BIRD NOTES.—In the Montreal Witness of February 13th, 1909, a note reporting the appearance of a solitary robin in the vicinity of Montreal, called forth another from Ottawa. Quoting from the Ottawa Journal this correspondent says, that small flocks of robins have been frequently seen at Ottawa during the winter.† This is so unusual that we should be pleased to learn something more about these wintering robins; particularly as to their feeding habits and whether they were immature birds or not.

Pine Grosbeaks and Redpolls have been unusually common here this winter, the Grosbeaks feeding on seeds of Mountain Ash and apple trees. Prairie Horned Larks were first noticed on the 28th of February, when I saw four birds; a week later saw six, apparently mated.

On February 21st, my attention was attracted by the grating notes of a Northern Shrike. It was unusually tame, permitting a near approach to its perch in an apple tree, though becoming very nervous and excited, whilst emitting a series of cries, one of them a good imitation of an alarmed Catbird and yet another reminding me of the Blue Jay's cry. At intervals it also indulged in its customary warble, suggesting that of the Purple Finch. The body of a Redpoll impaled on a twig of the

†See also Ottawa Naturalist, March 1909, p. 265.—Ed.

apple tree explained the cause of all this outcry. The head of the Redpoll was almost completely eaten away, pointing to a fact which I have noticed with the Migrant Shrike, namely, that the head contains what is to them the greatest delicacy. In fact although I have often come across the larder of the Migrant Shrike and occasionally that of the Northern, usually in the shape of small birds or mice, I have always found the body fairly intact, while the head would be missing. Evidently, they do not suffer for want of food. We remained for several minutes in the vicinity and during that time the Shrike kept up its imitating notes, perhaps thinking to frighten us away from its booty. L. McI. TERRILL, Westmount, Que.

INTIMACY WITH NATURE.—There are some men to whom intimacy with Nature in her obvious aspects and forms appears to be an inheritance; they are born into it, and are never conscious of the hour from which it dates. Their eyes see the world about them with a clearness and accuracy of observation which turns their hours of play into unconscious study of science. Flowers, trees, shrubs, birds and animals seem akin to them, and are recognized at first sight, and put into proper place and order. Other men, failing of this birth-gift and missing the training of the senses in childhood, must slowly and of set purpose piece out a defective power of observation by habits formed in maturity. This introductory relationship with Nature is a source of inexhaustible delight and enrichment; to establish it ought to be as much a part of every education as the teaching of the rudiments of formal knowledge; and it ought to be as great a reproach to a man not to be able to read the open pages of the world about him as not to be able to read the open page of the book before him. It is a matter of instinct with a few; it may be a matter of education with all. Even those who are born with the eyes and ears of naturalists must reinforce their native aptitude by training.

The man who goes into the woods, and by self-forgetfulness becomes a part of the woods, is aware not only of a freshening of his nature and a deepening of his thought, but also of a revelation of a knowledge through closer fellowship with the order and beauty which enfold them. There enters into his mind, in such moods, something more enduring than the scene about him, something to which a poet will give expression in verses which are not only touched with the beauty beyond that of words, but in which that beauty becomes the symbol of truth. The man who lacks the gift of expression will not write the verse, but he will see the beauty and be enriched by the truth.

HAMILTON WRIGHT MABIE, in NATURE AND CULTURE.

THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, JULY, 1909 No. 4

ALGONKIN AND HURON OCCUPATION OF THE OTTAWA VALLEY.

By T. W. E. Sowter, Ottawa.

To the student of Indian archaeology, the great highway of the Ottawa will always be a subject of absorbing interest. As yet, it is almost a virgin field of inquiry, as far as any systematic effort has been made to exploit it. As yet, there are vast stores of information, along this old waterway, which await the magic touch of scientific investigation, to be turned into romance chapters of Canadian history. Sooner, or later, we must appreciate these potential opportunities for the collection of data that may solve many important ethnic problems, which have been transmitted to us from the dim twilight of prehistoric times and are, as yet, only presented to us in the will-o'-the-wispish light of tradition. The Ottawa River may yet furnish us with clues to the elucidation of much that is problematical in regard to areas of occupation, migrations and dispersions of some of our great native races, who were leading actors in many of the tragic wilderness dramas, that were played out in Canada before and after European contact.

The early Jesuit missionaries have left us, in their Relations a priceless record of Algonkin and Huron sociology, as well as an invaluable basis for the study of such of the Indian tribes of Canada as came within the sphere of their activities, As those gentle and lovable pioneers of the Cross were among the first Europeans to come in contact with these red children of the forest, they enjoyed exceptional opportunities for observing their habits of thought and action, ere their primitive folk-lore and traditions had been modified by the cradle stories of the pale-faces.

We are told by Parkman, one of the most trustworthy historians of modern times, that "By far the most close and accurate observers of Indian superstition were the French and Italian Jesuits of the first half of the seventeenth century. Their

opportunities were unrivalled; and they used them in a spirit of faithful inquiry, accumulating facts, and leaving theory to their successors." It is for this reason that the Jesuit Relations should be regarded as the groundwork of Indian archaeology, as far as Canada is concerned. They were written by men of absolute integrity, who have given us as much of the life history of the individual, the clan and the tribe, as came under their observation; or as they were able to obtain from the most trustworthy sources. They describe the Indian, as they found him, embowered in the seclusion of his native forests; surrounded by innumerable okies or manitous, both benevolent and malignant, to whom he appealed for aid in the hour of his need, or propitiated with sacrifices; venerating, with a sentiment akin to worship, such animal ancestors as happened to be the prototypes of his various clans; adhering to mythologies that agreed fairly well in essentials though somewhat loosely defined in matters of detail; believing, in his Nature-worship, in the soul or spirit of the lake, the river and the cataract; but without any vestige of belief in that personification of benificence called "The Great Spirit" who was presented to him afterwards by the missionaries, as the archetype of mankind, and recommended to him as the Supreme Being whom he should worship.

That the Jesuit record has been dictated by a spirit of truthfulness, is apparent from its impartial treatment of Indian tradition and worship; for, while some writers have endeavored to interpret Indian mythology in such a manner as to make it conform to the bias of preconceived theories, these worthy apostles of the Cross have given us the simple truth without embellishments. Examples of this kind may be found in Ragueneau's Relation, of 1648, in which he refers to the Hurons as having received from their ancestors no knowledge of God; and in the denial of Allouez, in his Relation of 1667, that any such knowledge existed among the tribes of Lake Superior. It is not probable that these men would have failed to recognize any such belief had the case been otherwise. Thus, these subtle reasoners, and past-masters in theological disquisition, were unable to discover, in such manitous as Manabozho, or the Great White Hare of the Algonkins, or, in Rawen Niyoh, the great oki of the Huron-Iroquois, beings analogous to the white man's God.

Now, the writer is convinced that this field of archaeological inquiry should be entered, with the assistance of the "open sesame" of the historical record; and that, by following up the clues, transmitted to us by the Jesuits and other contemporary writers, we should devote our attention to such portions of this field as are most likely to yield the best results, under careful and methodical cultivation.

The great stream, which forms the main boundary between the provinces of Ontario and Quebec, was called in early times the River of the Ottawas; but, it might have been named, also, the River of the Hurons. Owing to its geographical position, it offered the advantages of a direct and convenient highway between the French settlements on the St. Lawrence and the Indian tribes of the Great Lakes. This river, especially in the seventeenth century, was traversed by Algonkins and Hurons, Frenchmen and priests, following, either along its shores or at its distant terminals, their varied pursuits of explorers, fur-traders, scalp-hunters or ministers of the gospel. Sometimes, huge fleets of canoes, bearing red embassies from the west, or white punitive expeditions from the east, consignments of furs to the St. Lawrence trading posts, or native supplies for the winter hunt, black robed Jesuits with donnés or artisans for their western missions, passed up or down this great highway; while, at other times, fugitive parties, both white and red, crept along the shadow of its shores to avoid some scalping-party of the ubiquitous and dreaded Iroquois.

We are thus indebted to historical testimony for much of our knowledge of what took place on the Ottawa, since the beginning of the French régime. We should now endeavor to amplify this knowledge, by the accumulation of such data as may be derived from the domain of archaeology. The prospects in this direction, though somewhat dubious at first sight, are much improved upon closer acquaintance.

It is no great tax upon our ingenuity to discover traces of the presence of French and Indians on the Ottawa, in bygone times. The Indian dictum that, "water leaves no trail," applies, only to the deeper parts of the stream; for the writer, has in his collection, stone tomahawks of native manufacture, together with trade bullets, which were taken from the shallow shore-water of this river. It is, however, in the ancient camping grounds, which dot the shores of the Ottawa at frequent intervals, that we should search for traces of early human occupation. As the recovery of the loose leaves, which have been lost out of some old story book, is necessary to complete the tale; so is the interpretation of the sign language of these camp-sites, a requisite for the recovery of many lost or unwritten pages of our historical manuscript.

Great care should be taken in the examination of these places. The ground should be all gone over on the hands and knees, as, with his nose to the ground, so to speak, one is not liable to overlook anything of importance. As he is about to turn up a chapter on the social and domestic life of a native community, he should observe the topographical features of the

site and the position it occupies relative to the main river, whether situated on its margin or at any considerable distance away from its shores; and also, its proximity to smaller streams that might have been navigated by canoes before the deforestation of the district. He should first of all examine the surface before disturbing it; after which he may search out the secrets concealed in the ashes of dead camp fires, by passing the ashes through a sieve, so as to retain such works of art as might, otherwise, pass unnoticed. Every work of art, or portion thereof, should be studied with great care, even to apparently insignificant fragments. The composition of pottery should be noted and efforts made to discover if its ingredients are obtainable in the vicinity. All forms of arrow-heads should be noted, as well as the color and character of the flint, or other material, from which they have been fabricated, and, if possible, the source from which this material has been derived should be ascertained. Arrow-heads, that appear to be of foreign make, as differing from the prevailing forms, should be noted for future reference and comparison. Search should also be made amidst the usual litter of the flint workshops, in the locality, for evidences of domestic manufacture, such as pieces of raw material, flakings or heads that have been spoilt in the making and discarded by the ancient workmen. This flint refuse is found in greatest abundance about the bases of large boulders, which appear to have been utilized by the prehistoric artificers, as convenient work-benches in their primitive industries. Articles of European workmanship, which are too apt to be considered as of little consequence, should be searched for with the greatest diligence, making due allowance of course, for the difference in relative values between such finds as the rude pistol flint of the ancient hunter, and the metal cap or stopper from the pocket pistol of the well equipped modern fisherman. A sharp lookout should also be kept for implements of slate, especially such as are fabricated from the Huronian variety; and, as a last but most important recommendation, the location of the camp site should be kept a secret from relic hunters, until its examination has been completed.

C. C. James, in his Downfall of the Huron Nation, says that "The history and downfall of the Hurons may be studied in three sources. 1st. The traditions of the Indians themselves. 2nd. The letters of the Jesuit Fathers, the written records commonly called The Jesuit Relations. 3rd. Modern archaeological research and ethnological investigation. These three contributers to a common story are widely different in method, and when they verify one another we are bound to accept the conclusions as facts of history." It may be said also that the

same sources of information are available in studying the question of Algonkin and Huron occupation of the Ottawa Valley. We have already considered the value of the Jesuit writings, let us now examine some of the traditions of the Indians themselves.

Life on the old Ottawa, during the greater part of the seventeenth century, was always strenuous and frequently dangerous. On this rugged old trade route, during the French régime, the fur-traders from the interior, both white and red, experienced many vicissitudes while conveying the products of the chase to the trading posts on the St. Lawrence. Shadowy traditions of those days of racial attrition, have been transmitted from father to son, from the old coureurs de bois and their Indian confreres, to their half-breed descendants of the present day. These traditions account for the human bones washed out some years ago at the foot of the old Indian portage at the Chats, and those that are scattered in great profusion at Big Sand Point, lower down the river; also, for quite a number of brass kettles found at one time near the mouth of Constance Creek, for the Indian burials on Aylmer Island, as well as for the presence of arrowheads, stone celts, flint knives and other native implements in the gravel beds at the foot of the Chaudière, and,without pausing to consider whether these relics of a departed people are not the ordinary litter of Indian camp-sites, or the disinterred bones from Indian burial places, tradition, as usual, takes charge of them as the ominous tokens of a period of violence.

At Big Sand Point there is a sand mound or hillock, fringed with scrubby trees, which has the uncanny reputation of having been once the home of a family of Wendigoes. These Wendigoes, as is usual with this species of manitou, were a source of constant annoyance to the native dwellers on the shores of Lake Deschênes but more particularly to an Algonkin camp on Sand Bay, quite close to the headquarters of these malignant spirits. The old man, who possessed the gigantic proportions of his class, was frequently seen wading about in the waters of the bay, when on foraging expeditions after Indian children of whose flesh, it is said, he and his family were particularly fond. The family consisted of the father, the mother and one son. The bravest Indian warriors had, on several occasions, ambushed and shot at the old man and woman without injuring either of them, but, by means of sorcery, they succeeded in kidnapping the boy, when his parents were away from home. Holding the young hopeful as a hostage, they managed to dictate terms to his father and mother and finally got rid of the whole family.

The writer heard this story one night while camping at the Chats and, though far from believing than any sane Indian of the old school would have laid violent hands on even a young

Wendigo, he is quite satisfied that, had one of those legendery monsters of the American wilderness loomed suddenly out of the dark shadows of the forest and approached the camp fire, the poor half-breed, who was "spinning the yarn" would have immediately taken to his canoe and left the Wendigo in undisputed possession of the island.

As it is around this same sand mound, the old Wendigo homestead at Big Sand Point, that the scattered bones, already alluded to, are found, it seems strange that the story tellers do not represent them as the remains of the cannibal feasts of its former occupants. These evidences of mortality, however, are accounted for in another tradition, that tells of a war-party of Iroquois who, having taken possession of and intrenched or barricaded the old Wendigo mound, defended themselves to the death against a force of French and Indians, who surprised them in a night-attack and butchered them to a man.

This story seems to carry us back to that period of conflict which was inaugurated by the onslaught of the Iroquois upon the Huron towns, which was continued with unparalled ferocity and terminated only by the merciless destruction of a once powerful nation and the final dispersion of its fugitive remnants, together with such bands of Algonkins as happened to come within the scope of that campaign of extermination. It is supposed that our tradition has reference to one of the many scenes of bloodshed which reddened the frontiers of Canada, while the Confederates were thus making elbow-room for themselves on this continent, and were putting the finishing touches on the tribes to the north of the Great Lakes and the St. Lawrence. At this time all the carrying-places, on our great highway, were dangerous, for war-parties of the fierce invaders held the savage passes of the Ottawa, hovering like malignant okies amidst the spray of wild cataracts and foaming torrents, where they levied toll with the tomahawk and harvested with the scalping-knife the fatal souvenirs of conquest.

Sand Bay, at the outlet of Constance Creek, in the township of Torbolton, Carleton Co., Ont., is a deep indentation of the southern shore line of the Ottawa, extending inland about a mile. The entrance, or river front of the bay, is terminated on the west by Big Sand Point, and on the east by Pointe à la Bataille, the two points being about a mile apart. The latter is now shown on the maps as Lapotties Point, a name of recent origin and doubtless conferred upon it by some ox-witted yokel, who thought it should bear the name of its latest occupant, rather than that which probably commemorated some tragic incident of a bygone age. The French Canadian river-men,

however, with much better taste, still retain the name by which it was known to the old voyageurs.

A great many years ago, so the story goes, a party of French fur-traders, together with a number of friendly Indians, possibly Algonkin and Huron allies, went into camp one evening at Pointe à la Bataille. Fires were lighted, kettles were slung and all preparations made to pass the night in peace and quietness. Soon, however, the lights from other camp fires began to glimmer through the foliage on the opposite shore of the bay, and a reconnaisance presently revealed a large war-party of Iroquois in a barricaded encampment on the Wendigo Mound at Big Sand Point. Well skilled as they were in all the artifices of forest warfare, the French and their Indian companions were satisfied that something would happen before morning. It was inevitable that the coming night would be crowded with such stirring incidents as would leave nothing to be desired, in the way of excitement. There lay the Iroquois camp, with its fierce denizens crouched like wolves in their lair, though buried in the heart of the enemy's country, yet self-reliant in the pride of warlike achievements, whose military strategy had rendered them invulnerable as the gloom of the oncoming thundercloud, and as inexorable as the fate of the forest monarch that is blasted by a stroke of its lightning.

Now, the golden rule on the Indian frontier in those strenuous times, was to deal with your neighbor as you might be pretty sure he would deal with you, if he got the chance. Of course it was customary, among the Indians to heap coals of fire on the head of an enemy, but as it was the usual practice, before putting on the coals, to bind the enemy to some immovable object, such as a tree or a stout picket, so that he was unable to shake them off, the custom was not productive of much brotherly love. Moreover, when the success of peace overtures could be assured only to the party that could bring the greater number of muskets into the negotiations, it will be readily understood why the French, who were in the minority, did not enter into diplomatic relations with the enemy. On the contrary, it was resolved to fight, as soon as the opposing camp was in repose, and attempt a decisive blow from a quarter whence it would be least expected, thus forestalling an attack upon themselves, which might come at any time before the dawn. The French and their allies knew very well that if their plans miscarried and the attack failed, the penalty would be death to most of their party, and that, in the event of capture, they would receive as fiery and painful an introduction to the world of shadows as the leisure or limited means of their captors might warrant.

Towards midnight, the attacking party left Pointe à la

Bataille and proceeded stealthily southward, in their canoes, along the eastern rim of Sand Bay, crossed the outlet of Constance Creek and landing on the western shore of the bay advanced towards Big Sand Point through the pine forest that clothed, as it does to-day, the intervening sand hills. This long detour, of about two miles, was no doubt a necessity, as, on still nights, the most trifling sounds, especially such as might have been produced by paddles accidently touching the sides of canoes, are echoed to considerable distances in this locality.

The advance of the expedition was the development of Indian strategy, for, by getting behind the enemy, it enabled the French and their allies to rush his barricades and strike him in the back, while his sentinels and outliers were guarding against any danger that might approach from the river front.

The attack was entirely successful, for it descended upon and enveloped the sleeping camp like a hideous nightmare. Many of the Iroquois died in their sleep, while the rest of the party perished to a man, in the wild confusion of a midnight massacre.

Such is the popular tradition of the great fight at the Wendigo Mound at Big Sand Point, and the bones that are found in the drifting sands at that place, are said to be the remains of friend and foe who fell in that isolated and unrecorded struggle.

Let us now descend the river, as far as the Chaudière, and we find ourselves once again in the moccasin prints of the Iroquois; for those tireless scalp hunters were quite at home on the Ottawa, as well as on its northern tributaries. War expeditions of the Confederates frequently combined business with recreation. They would leave their homes on the Mohawk or adjacent lakes and strike the trail to Canada by way of the Rideau Valley, hunt along that route until the spring thaws set in, and manage to reach the Ottawa in time for the opening of navigation. Then they loitered about the passes of the Chaudière and waited, like Wilkins Macawber, for something to turn up.

While waiting thus for their prey to break cover, from up or down the river, they devoted their spare time to various occupations. To the oki, whose thunderous voice was heard in the roar of the falls, they made sacrifices of tobacco; while the Mohawks and Onondagas each gave a name to that cauldron of seething water which is known to us as The Big Kettle. The Mohawks called it Tsitkanajoh, or the Floating Kettle, while the Onondagas named it Katsidagweh niyoh or Chief Council Fire. It is possible that our Big Kettle may be a modified or corrupted translation of the Mohawk term.

(To be continued).

WHAT IS A "SPECIES"?

BY F. H. WOLLEY-DOD, MILLARVILLE, ALTA.

There is perhaps no word in the English language of which the true meaning, as applied to living organisms, has been discussed at greater length than the word "species." Strictly speaking, of course, the word is a latin one, which has become anglicized under what we believe to be its original form, or at any rate as the Romans used it in the time of Julius Caesar, and we shall find the same meaning given whether we look it up in an English or a Latin Dictionary, viz., "a sort", or "kind", "an aggregate of individuals". As a matter of fact the wholly unscientific man, "the man in the street" rarely uses the word at all. He doesn't understand its meaning. "A kind", or "sort" is expressive enough for him, and anyone can understand what that means. But for the naturalist the third meaning here given, "an aggregate of individuals" is the one which better expresses his meaning when he talks of a "species".

So long as we do not think too much about it that meaning is good enough, that is to say we use it to mean an individual kind, an aggregate of individuals,as entirely distinct from another individual kind or aggregate of individuals. He would be an argumentative man indeed who would dispute the fact that an oak was quite a distinct kind of tree from a fir, or that a pheasant was quite a distinct bird from a duck, or, amongst animals, a fox distinct from a bear. And most people will be quite willing to admit that there are different kinds, or more technically, "species", of oaks, firs, pheasants, ducks, foxes, and bears. That is to say that there are certain aggregates of individuals or "species" of each of the above named things that are more or less easily to be distinguished from other aggregates of individuals of the same class. That these kinds are to be distinguished each by certain characters of colour, form, habit, etc., not possessed by the other kinds is implied by the use of the word "species". Naturalists may tell us, for instance, that the grizzly bear is quite distinct from the brown bear by the colour of its fur, the shape of its head, the comparative size or shape of certain bones in the body or limbs, habits of feeding, etc. Or botanists, that a certain species of oak is distinguished from another by the shape of its leaves or acorns, or the exact way in which they grow from the twigs, by the form of growth, or shape of the tree itself, by the colour or texture of its wood, and in each case that these characters are not possessed by any other species. But why these kinds should be considered separate because they differ in these parts, or what degree of difference is necessary before

two kinds or aggregates of individuals may be spoken of as distinct species, is involved in the title of this paper, "What is a species"?

The query is not an easy one to answer where very similar forms, and, in many instances, even where totally dissimilar forms are concerned. For it must be understood from the first that dissimilarity of form does not necessarily indicate distinctness of species in the broadest sense of the word. The late Charles Darwin wrote volumes dealing in one way or another with the subject. From his point of view, about the best definition that can be given a species is "an aggregate of individuals capable of producing, under natural conditions, progeny of their own form, through successive generations". That is the most exclusive sense in which the term can be used. But it is obvious that the difficulty of discussing how far that ability exists, or whether it exists at all, in a very large proportion of the multitudinous forms of organic life, has given rise to much of the past or existing controversy of the relationship of forms or kinds. The power of reproduction exists in very many instances between allied kinds generally admitted to be distinct species; generally speaking the more closely allied two species are, the more frequently will crosses between them be found in localities where the two live together. But amongst animals, with few exceptions,the reproductive power in such cases is not transmitted to the offspring. In other words, true hybrids, i.e., the progeny of crosses between different but allied kinds, are themselves infertile, or sterile, or, in the case of the few exceptions, they become sterile in the subsequent generation. This does not apply in the same way to plants, in which the means of perpetuation are very different, hybrids much more frequently fertile, and species still harder to define.

It happens that while some species are confined to very small areas, called "local species", others exist all over a continent, and are called "generally distributed" species.

Now, supposing it were possible to apply this reproductive test to all the various forms in different groups throughout, say, North America, it would be found that in some cases one species existed in much the same form wherever it was found, that is, that different individuals in the same district showed little or no variation one from the other, and that an individual or specimen from a district, say, on the east coast, differed in no essential characters from one from the west coast. Such is called a constant or non-variable species. In other species, individuals or "specimens" may be found varying much from others in the same locality, it may be in colour, size, relative dimensions of different parts, etc. Specimens so differing are

called varieties of the species, which is then called a variable species. "Specimen" is the word naturalists use to indicate a single individual or example of a species. The reasons why one species should be variable and another constant, or one very local and another widely distributed, are very obscure and intricate, and must be sought for amongst hereditary tendencies of bygone ages. They cannot be dealt with in the present paper, which treats of facts rather than causes.

It will often be found, if we trace a "generally distributed" species throughout the various districts where it occurs, that some of the specimens from one locality differ slightly in certain points or characters from others from a neighboring district. The lower down in the scale of life we look for illustrations of this the more easily we shall find them. It is less noticable in the higher than in the lower forms of animal life. It is found to some extent in birds, still more in insects, and in plants more than in either. Some specimens will be found exactly alike from the two districts, others will differ considerably. They are obviously still the same species, but present what is called local variations, or varieties. Follow the species up into a third district, and perhaps a greater number of specimens will be found which differ more or less from those in the first. Follow it up further, comparing numbers of specimens throughout various districts right across the continent. The difference between individuals in different districts will probably be found to vary not nearly so much according to the actual distance of the localities apart, as to the difference between the *geological and climatic* conditions. These conditions differ enormously, say, on the Altantic and Pacific coasts. But as it is not possible to draw, so to speak, any actual line or lines of distinction between those different conditions anywhere in that area, nor even to follow through any gradual regularity of change from one to the other, so, in the case of our widely distributed but variable species, we shall find neither any sudden change of variation or form, nor any gradual regularity of change. And though we may be able to find no district in which the varietal forms differ entirely from those on all the rest of the continent, those from the most climatically or geologically dissimilar districts will probably be found the least like each other, and may even be entirely different in appearance. In other words, the species exists in the different localities as a different "local race," the difference varying probably according to the difference of conditions under which it has to exist. We may have every reason to assume a distinct blood relationship between the various forms. Are we then to call the extremes different "species"? Would they, if brought together under perfectly natural conditions, perpetuate the race, or mixture of

races, *ad infinitum*? It must not be lost sight of that perfectly natural conditions are necessarily the only ones under which the test of specific relationship is a fair one, as it is well known amongst naturalists that domestication or confinement entirely alters the reproductive abilities even of a large number of the higher animals. This is a fact quite apart from the one that most of the various forms, strains, or "breeds" of our domestic animals, birds, or plants are not "species" at all in the scientific sense, but rather variations specialised by man's careful selection. Under complete domestication specific identity soon becomes entirely lost.

In the foregoing illustration of extreme geographical or climatic varieties or local races, it has been assumed that it has been possible to trace relationship clearly through from one extreme to the other. When such relationship exists it seems to suggest that the aggregate of all these varying forms should constitute the species. Yet the extremes cannot possibly meet under natural conditions, so that that test cannot be made. Are the extremes to be considered different species?

There can be little doubt, if Darwin's theory be admitted, that it is through the formation and subsequent isolation of such local races that distinct species have been formed through courses of millions of years. Isolation, whether of climatic changes such as the glacial epoch, or by the formation of continents, inundations by sea, upheavals of mountains, etc., effectually prevented the mingling of many races ages ago, which may subsequently have become modified in different ways, and so become quite distinct species from our point of view, or non-variable species may have become so divided, and the isolated portions of them have remained similar or nearly similar to our eyes. Through countless ages they have lost their blood-relationship, and yet they look alike. Are they to be considered distinct species? These things we can only judge for ourselves from close observation and much study in each particular instance.

Not only do multitudinous forms occur, perhaps side by side so enormously variable within certain limits, or so exactly like forms of another supposed species found in one locality, and like forms of others elsewhere, that without the actual reproductive test we can merely draw deductions from close observation; but probably no two men who have given much thought to the subject have exactly the same idea as to what degrees of difference are necessary, or what exact distance of relationship must exist before two forms can have a right to be called different species. It is unquestionable that many species do exist which show no very close relationship to any others wherever they occur. But a very large number, more particularly amongst insects and

plants, are to be found under such a variety of forms, that division into "species," as naturalists generally use the word, is almost a matter of degree.

Even Darwin, who paid at least as much attention to the subject as any man has ever done, was unable to lay down any hard and fast rules as to where a line, so to speak, was to be drawn between one species and another. It will usually be found that the larger the area from which a student has made his studies of the subject, the wider his views as to what "aggregate of individuals" should be taken to constitute a species. The collector in a small district has a much better chance of judging whether two similar forms in that locality are really one or two biological species than the one who merely examines material collected by another. It is impossible to do more than merely introduce this very old and extremely complex subject in the space here available.

THE FLETCHER MEMORIAL FUND.

The following is a list of the subscribers to the above fund, with the amounts subscribed set opposite each name. The Committee feels that there must still be a goodly number of friends of the late Dr. Fletcher who desire to contribute something towards the proposed memorial, before the list is finally closed. Of the proposed forms of memorial, as stated in the circular sent out by the Committee, the one referring to the erection of a Drinking Fountain at the Central Experimental Farm has proved to be the most popular. Before the Committee, however, can definitely decide, it is necessary to make a further appeal to those who wish to subscribe something, but who have not as yet notified the Secretary-Treasurer of the Committee, Mr. Arthur Gibson, Experimental Farm, Ottawa. Any therefore who desire to do so, will help very much in this work of the Club, by attending to this matter at their early convenience.

Hon. Sydney Fisher, Ottawa.	$100.00	O. P. Schreiber, Ottawa.....	$25.00
Dr. & Mrs. H. M. Ami, Ottawa.....	50.00	R. B. Whyte, Ottawa.....	25.00
Hon. Sir F. W. Borden, Ottawa.....	25.00	T. N. Willing, Regina, Sask..	25.00
D. Brainerd, Montreal.....	25.00	Dr. J. W. Robertson, Macdonald College, Que.....	25.00
Dr. T. J. W. Burgess, Montreal.....	25.00	Bishop of Ottawa & Mrs. Hamilton, Ottawa.....	20.00
Rev. Prof. Bethune, Guelph..	25.00	Prof. F. D. Adams, Montreal.	15.00
W. H. Harrington, Ottawa...	25.00	Prof. A. Baker, Toronto.....	15.00
H. H. Lyman, Montreal.....	25.00	Dr. R. Bell, Ottawa.....	12.00
Dr. W. Saunders, Ottawa....	25.00	Lt.-Col. W. P. Anderson, Ottawa.....	10.00

C. B. Alladice, Montreal . . . 10.00
R. W. Brock, Ottawa 10.00
Rev. G. Bryce, Winnipeg 10.00
Dr. W. Barnes, Decatur, Ill . . 10.00
Miss M. E. Blatchford, Cambridge, Mass 10.00
E. R. Cameron, Ottawa 10.00
R. H. Campbell, Ottawa 10.00
Norman Criddle, Treesbank, Man 10.00
G. H. Clark, Ottawa 10.00
N. H. Cowdry, Waterford, Ont 10.00
Geo. Y. Chown, Kingston, Ont 10.00
Col. G. T. Denison, Toronto . . 10.00
W. T. Ellis, Ottawa 10.00
Sir Sandford Fleming,, Ottawa 10.00
Arthur Gibson, Ottawa 10.00
Andrew Halkett, Ottawa 10.00
T. D. Jarvis, Guelph, Ont 10.00
W. D. Kearfott, New York . . 10.00
Hon. O. H. Lambart, Ottawa 10.00
L. M. Lambe, Ottawa 10.00
F. J. A. Morris, Port Hope, Ont 10.00
A. H. Mackay, Indian Head, Sask 10.00
J. A. Ruddick, Ottawa 10.00
Mr. & Mrs. Gerald Spring-Rice, Pense, Sask 10.00
Frank T. Shutt, Ottawa 10.00
Dr. S. H. Scudder, Cambridge, Mass 10.00
W. J. Topley, Ottawa 10.00
Dr. J. F. Whiteaves, Ottawa. 10.00
Ottawa University, Ottawa . . 10.00
Montreal Branch of the Entomological Society of Ontario, Montreal 10.00
L. M. Fortier & family, Ottawa 8.00
W. Simpson, Ottawa 8.00
J. R. Anderson, Victoria, B.C 5.00
Mr. A. & Miss Alexander, Hamilton, Ont 5.00
E. H. B., Ottawa 5.00
M. R. Baker, Ottawa 5.00
Dr. H. T. Barnes, Montreal . . 5.00
A. H. Bush, Vancouver, B.C. 5.00
Mrs. W. A. Burman, Winnipeg 5.00
Walter Burman, Winnipeg . . 5.00
L. J. Burpee, Ottawa 5.00
T. E. Clarke, Ottawa 5.00
Prof. J. H. Comstock, Ithaca, N.Y 5.00
M. F. Connor, Ottawa 5.00
Prof. J. Craig, Ithaca, N.Y . . . 5.00
Miss E. E. Curry, Ottawa . . . 5.00
Rev. Prof. W. Clark, Toronto 5.00
J. W. Cockle, Kaslo, B.C 5.00
Dr. S. E. Dawson, Ottawa . . . 5.00
F. H. Wolley-Dod, Millarville, Alta 5.00
J. D. Evans, Trenton, Ont . . . 5.00
J. H. Fleming, Toronto 5.00
Hon. Chas. Fitzpatrick, Ottawa 5.00
J. H. Grisdale, Ottawa 5.00
Dr. G. P. Girdwood, Montreal 5.00
Dr. W. L. Goodwin, Kingston 5.00
C. E. Grant, Orillia, Ont 5.00
L. Gerin, Ottawa 5.00
J. A. Guignard, Lausanne, Switzerland 5.00
Lt.-Col. Ed. Harrison, Ottawa 5.00
Dr. G. U. Hay, St. John, N.B. 5.00
Rev. V. A. Huard, Quebec, Que 5.00
Jos. Keele, Ottawa 5.00
J. C. Kearns, Ottawa 5.00
Rev. J. H. Keen, Metlakatla, B.C 5.00
Hon. W. L. Mackenzie King, Ottawa 5.00
Dr. Allan Kinghorn, Liverpool, Eng 5 00
E. E. Lemieux, Ottawa 5.00
Prof. W. Lochhead, Macdonald College, Que 5.00
Dr. W. D. LeSueur, Ottawa . . 5.00
J. M. Macoun, Ottawa 5.00
Prof. John Macoun, Ottawa . . 5.00
W. T. Macoun, Ottawa 5.00
J. I. MacCracken, Ottawa . . . 5.00
W. McInnis, Ottawa 5.00
Dr. A. H. Mackay, Halifax, N.S 5.00
A. McNeill, Ottawa 5.00
James Murray, Brandon, Man 5.00
Geo. Murray, Montreal 5.00
C. W. Nash, Toronto 5.00
L. H. Newman, Ottawa 5.00
W. S. Odell, Ottawa 5.00
R. M. Palmer, Victoria, B.C . . 5.00
B. Spring-Rice, Pense, Sask . . 5.00

Dr. S. B. Sinclair, Macdonald College, Que.	5.00
Dr. H. B. Small, Ottawa.	5.00
P. B. Symes, Ottawa.	5.00
Dr. J. B. Smith, New Brunswick, N.J.	5.00
D. C. Scott, Ottawa.	5.00
R. F. Stupart, Toronto.	5.00
N. B. Sanson, Banff, Alta.	5.00
John Smith, Ottawa.	5.00
Prof. F. Sherman, Raleigh, N.C., U.S.	5.00
E. J. Zavitz, Guelph, Ont.	5.00
Lt.-Col. W. White, Ottawa.	5.00
J. B. Wallis, Winnipeg, Man.	5.00
Dr. E. M. Walker, Toronto.	5.00
Prof. H. F. Wickham, Iowa City, Iowa.	5.00
Tom Wilson, Vancouver, B.C.	5.00
Prof. F. L. Washburn, St. Anthony Park, Minn.	5.00
A. E. Attwood, Ottawa.	3.00
E. Criddle, Treesbank, Man.	3.00
R. H. Carter, Fort Qu'Appelle, Sask.	3.00
Rev. G. Eifrig, Ottawa.	3.00
J. W. Gibson, Ottawa.	3.00
A. G. Gilbert, Ottawa.	3.00
Jas. MacDunnough, Berlin, Germany	3.00
John Reade, Montreal.	3.00
Mrs. M. P. McIlhinney, Ottawa.	2.50
H. A. & Master Allen D. Harvey, Ottawa.	2.10
Miss A. M. Bishop, Ottawa.	2.00
Paul A. Cobbald, Haileybury, Ont.	2.00
J. G. Campbell, Madoc, Ont.	2.00
Percy Criddle, Treesbank, Man.	2.00
Stuart Criddle, Treesbank, Man.	2.00
H. W. Charlton, Ottawa.	2.00
L. Caesar, Guelph, Ont.	2.00
G. Chagnon, Montreal.	2.00
A. T. Charron, Ottawa.	2.00
W. B. Dawson, Ottawa.	2.00
Prof. J. Fowler, Kingston, Ont.	2.00
A Friend, Ottawa.	2.00
A. A. Girault, Centralia, Ill.	2.00
Miss M. L. Grist, Ottawa.	2.00
Dr. O. Klotz, Ottawa.	2.00
J. Labarthe, Trail, B.C.	2.00
A. D. MacGillivray, Ithaca, N.Y.	2.00
W. H. T. Megill, Ottawa.	2.00
Prof. S. B. McCready, Guelph, Ont.	2.00
D. H. Nelles, Ottawa.	2.00
C. P. Newman, Lachine, Que.	2.00
Dr. W. W. Newcombe, Detroit, Mich.	2.00
Jos. Perrin, Halifax.	2.00
Prof. C. V. Piper, Washington, D.C.	2.00
M. L. Rush, Ottawa.	2.00
W. A. Riley, Ithaca, N.Y.	2.00
B. J. Reynolds, Indian Head, Sask.	2.00
W. E. Saunders, London, Ont.	2.00
Miss McKay Scott, Ottawa.	2.00
W. J. Summerby, Richmond, Que.	2.00
Mrs. L. L. Sutton, Ottawa.	2.00
D. L. Van Dine, Dallas, Tex.	2.00
Harry Vane, Treesbank, Man.	2.00
J. B. Williams, Toronto.	2.00
Dr. J. F. White, Ottawa.	2.00
C. Weld, Farmers' Advocate, Winnipeg, Man.	2.00
W. Ayers, Stockton, Man.	1.00
W. Bond, Ottawa	1.00
Prof. W. E. Britton, New Haven, Conn.	1.00
Miss A. F. Braun, Cincinnati, Ohio.	1.00
Miss M. Brown, Halifax, N.S.	1.00
A. M. Campbell, Ottawa.	1.00
G. P. Clinton, New Haven, Conn.	1.00
A. Cooper, Treesbank, Man.	1.00
C. R. Crosby, Ithaca, N.Y.	1.00
Miss F. Davidson, Ottawa.	1.00
E. H. Dewart, Stockton, Man.	1.00
W. Dewart, Stockton, Man.	1.00
E. D. Eddy, Ottawa.	1.00
H. Groh, Ottawa.	1.00
Miss G. Harmer, Entwhistle, Alta.	1.00
F. C. Hennessey, Ottawa.	1.00
Miss I. Hargrave, Toronto.	1.00
Prof. L. R. Jones, Burlington, Vt.	1.00
F. D. Jacobs, Winnipeg, Man.	1.00
Miss K. Lee, Clinton, N.Y.	1.00
W. Milne, Ottawa	1.00

Harold U. Morris, Ottawa	1.00	H. S. Saunders, Toronto	1.00
G. Michaud, Ottawa	1.00	A. G. Spencer, Ottawa	1.00
G. F. Matthews, St. John, N.B.	1.00	E. P. Venables, Vernon, B.C.	1.00
Miss I. Ritchie, Ottawa	1.00	C. Vane, Treesbank, Man.	1.00
T. G. Raynor, Ottawa	1.00	E. Vane, Treesbank, Man	1.00
Miss Ruby M. Rothwell, Ottawa	1.00	Also a number of smaller subscriptions for amounts less than one dollar.	

MEETINGS OF THE ENTOMOLOGICAL BRANCH.

Held at the home of Mr. J. W. Baldwin, March 11, 1909; present Messrs. Metcalfe, Binney, Groh, Young, Eifrig, Gibson and Baldwin.

Mr. Metcalfe exhibited some interesting specimens of Hemiptera. He called attention especially to some species of *Ranatra*, viz., *R. quadridentata*, *R. kirkaldyi* and *R. fusca*. These are narrow, long-legged water bugs which he had collected during the past season at Pickerel Point on the Ottawa River. *Cyrtolobus griseus* from oak and *Cligenes minutus* were included in the box, both of which species were new records for the Ottawa district.

Mr. Groh spoke of some galls which he had found on Willow on Parliament Hill, and which were the work of *Rhabdophaga triticoides*. The gall is known as the Willow Bud Gall. The bud scales become elongated, the larva living within a cavity in the interior.

Mr. Young showed a box of lepidoptera which he had just received from Dr. Barnes, of Decatur, Ill. These were all rarities, mostly from Arizona. Among the specimens were some of the interesting genus *Schinia*.

Mr. Gibson read an account of an interesting occurrence of Telephorid larvæ at Charlottetown, P.E.I. Specimens had been received for identification from Mr. Lawrence W. Watson, which had been found alive in considerable numbers in February on ice and snow. These larvæ are known as "snow worms". The species was probably *Telephorus bilineatus*.

Mr. Baldwin exhibited some cases from his collection of lepidoptera, calling attention to some of the more interesting specimens which he had collected during 1908. He gave an account of some of the catches which he had made on certain evenings when collecting at the Electric Railway power station near Britannia. The brilliant lights at this station are certainly very attractive to night flying insects. The writer has visited the station on several occasions and each time came away with his poison bottles and pinning boxes well filled. During the

past season we found the lamellicorn beetle, *Ligyrus relictus*, quite abundantly on several evenings. This beetle which is a close relative of the common May Beetle, or so-called June Bug, has not in the past been at all common in the Ottawa district.

A. G.

The meeting of the Branch at the residence of Mr. Arthur Gibson on the 25th March, was very informal in nature. Those present were Messrs. Halkett, Metcalfe, Groh, Baldwin and Gibson.

Owing to the few exhibits which were made the discussions were of a very general nature. Mr. Metcalfe showed a box of Psyllidae, some of which had recently been named by Mr. Schwarz, of Washington, through the courtesy of Dr. L. O. Howard. These little insects have not received very much study in North America as yet. They are known popularly as "jumping plant lice" from their active habits, although they resemble much more closely a miniature Cicada.

The work of the Birch Skeletonizer, *Bucculatrix canadensisella*, was exhibited by Mr. Groh, along with specimens of the beautiful little moth. Some years this insect does much harm to the foliage of birch trees. It has been found commonly in the Ottawa District.

Some parasitized chrysalids of *Papilio turnus* and *Hyperchiria io*, were shown by Mr. Baldwin. The parasites were probably Tachina flies.

Mr. Gibson exhibited a large potato shaped gall on *Rubus nutkanus*, which had been received from Mr. J. R. Anderson, of Victoria, B.C. Specimens of the hymenopterous gall maker, doubtless one of the Cynipidæ, were also shown. These had emerged indoors during March. A series of the noctuids, *Graphiphora praeses* and *Stretchia normalis*, also from British Columbia, was exhibited. Sir George Hampson's Vol. VII, of the catalogue of the Lepidoptera Phalænæ in the British Museum was laid on the table with the accompanying plates, and was examined with much interest by those present These volumes are of the greatest value to lepidopterists the world over.

A. G.

Dr. E. L. Greene, of the United States National Museum, Washington, D.C., who has been studying plants of the genus *Thalictrum* in western Ontario, was in Ottawa for a day, or two, last month.

EXCURSIONS.

The excursions arranged for May 1st and 8th were cancelled, the former because on the day before a great mass of sleet and snow had fallen, which made woods and roads impassible, the latter because of much rainfall up to the day before. However, that Saturday turned out to be fine, thus again upsetting all preconceived plans and well meant intentions.

BRITANNIA.

On May 15th the excursion to Britannia was held. It was a lovely day, perhaps the first all-round satisfactory one up till then of the season.

About 40 or 50 members of the Club assembled at the park, where Vice-president Halkett gave out the shibboleth for the day. The botanists under the leadership of Dr. Blackadar, turned to the left to Graham's woods, a good spot for the first wild spring flowers. The zoologists with Mr. Halkett as leader, the geologists under Mr. Wilson and the ornithologists with the undersigned, went to the right into the tamaracs and gravel pit, the ornithologists going farthest afield, beyond the Richmond Road.

After two hours the party assembled again at the starting point. Dr. Blackadar showed specimens of many of the plants that had been found, and spoke at length on the flowers of the trees, especially the poplars, maples, elms, birches and alders. Mr. Wilson, for the geologists exhibited a piece of conglomerate, the process of whose forming could be seen bodily in the exposed lower strata of the adjoining gravel-pit. The undersigned spoke on the birds observed during the short perambulation, which numbered 40 species, as follows: 4 Kingbirds, 1 Least Flycatcher, 1 Crested Flycatcher, 1 Phoebe, 3–4 Meadowlarks, 2 Redwinged Blackbirds, 4–5 Bronzed Grackles, Crows (one nest), 2 Baltimore Orioles, many Robins, 4–5 Veeries, 4 Bluebirds, many Song, White-Crowned, Clipping and Vesper Sparrows, all in song, 2 Juncos, 2 Rose-breasted Grosbeaks and Goldfinches; Chimney Swifts, and even Kingfishers were common, about 8–10 of the latter being seen or heard, (in the gravel-pit several nesting tunnels); Tree, Barn and Bank Swallows (already making nesting holes), 5–6 Flickers, 1 Sapsucker, 2 Downy Woodpeckers, 2 Yellow Warblers, 3–4 Black and White Creeping Warblers, 2 Black-breasted Green, 2 Myrtle, 1 Parula, 1 Palm Warbler, 1 Yellowthroat and 1 Water-thrush; 4–5 House Wrens and 2 Brown-breasted Nuthatches, 2 Spotted Sand Pipers, and 2 Greater Yellow Legs.

Mr. Halkett exhibited quite a collection of batrachians,

mostly leopard frogs, as well as many invertebrates, crustaceans, spiders and worms. Altogether it was a delightful and instructive outing. G. EIFRIG.

BEAVER MEADOW, HULL.

The third outing took place in the afternoon of May 22nd to Beaver Meadow, Hull, perhaps the most profitable field for the Club's out-door work. Owing to fear of the high water then raging in the Ottawa River, which had already flooded a short stretch of the Aylmer Road at the end of Hull, or for some other reason, there was only a small attendance in spite of the fine weather. About 15 persons took part, including only two ladies. For this reason the party did not divide itself up, but stayed together and went out along the west bank of the meadow to the quarry and then crossed on logs, etc., over to the east bank, returning on it. The west bank is perhaps the most prolific place near Ottawa for the botanist, rare plants like the showy orchis (*Orchis spectabilis*) being found there, as well as other kinds of commoner ones in profusion. The ferns fairly revel there, the dainty maiden hair, and the two oak ferns occurring in great clumps. The east bank, again, is a splendid locality for columbine (*Aquilegia Canadensis*), *Habenaria hyperborea*, and the only place in the vicinity of Ottawa where the Red or Wood Lily (*Lilium philadelphicum*) may be found. Many water and swamp plants also abound. Mr. A. H. W. Cleave, Superintendent of the Royal Mint, who has since been added to the membership roll of the Club, exhibited a great amount of small and semi-microscopic life-forms, which he with an ingenious contrivance fished out of the stagnant waters along the way. Besides larvae of mosquitoes, dragon flies and mayflies he showed specimens of *Daphnia* and *Cypris*.

Although the day was fine and the migration of birds at its height, they were not as plentiful as was to be expected, only 27 species being noted. These were: several Chimney Swifts, 1–2 Nighthawks, 1 Phoebe, 1 Crested Flycatcher, 5–6 Bronzed Grackles, 1 Flicker, 10–15 White-throated Sparrows, and many Song and several Clipping Sparrows, the Tree, Bank and Barn Swallows, 1 Blue-headed Vireo; the following warblers, Bay breasted, Nashville, Myrtle, Yellow, Chestnut-sided, Black and White- Creeping, Blackthroated Green, the Ovenbird, Redstart, Yellowthroat, the House, Winter and Short-billed Marsh Wrens, many Robins,several Bluebirds and Veeries or Wilson's Thrushes, 2–3 Catbirds and 1 Killdeer. The habitant living at the entrance to the lane into the meadow had a queer cage-bird, caught that day, in the shape of a Sora Rail (*Sora Carolinana*). A nest of the Red-shouldered Hawk, about 35 feet up in an elm tree was in-

spected by Mr. Groh, who proved the best climber, and found it to contain two eggs. The female only left the nest, noiselessly, when the climber was half-way up. The nest was about two feet in diameter, the inner cup about 8 inches, lined with pine twigs, stripes of birch and soft inner bark and down of the bird itself. They use the same nest over and over again, but each year decorate it with green branches of pine, whereby it can be seen at once from below whether it is a used hawk's nest or not.

Insects were beginning to appear in numbers but nothing of special rarity was met with during the afternoon. Mr. Arthur Gibson noted a few nests of the American Tent Caterpillar. These were just beginning to assume a conspicuous size. A few specimens of the small early spring blue butterfly were seen, and one or two of the Pure White. Some beetles and other insects were collected by the entomologists present from under the bark, etc., and a small collection of spiders was made.

G. EIFRIG.

CHELSEA, QUE.

The general excursion to Chelsea was held on Saturday, June 5th.

Owing to the uncertain state of the weather, the attendance was not as large as usual. However, despite the clouds and humidity, among those present were Mr. Attwood, Rev. Mr. Eifrig, Mr. W. J. Wilson, Mr. and Mrs. J. H. Putman, Mr. McGillivray, Mr. R. H. Campbell, Miss Christie, Mr. Shannon, Miss Matthews, Mr. H. S. Winchester, together with a number of Normal lady students in charge of Mr. and Mrs. Thos. Brown.

On reaching Chelsea the members were divided into groups. Mr. Wilson led the geological branch, while Mr. Attwood and Mr. Eifrig jointly took charge of the botanists and ornithologists. After making a tour through the woods, visiting Gilmour Island and rapids, the second party moved along the west bank of the Gatineau River, till the old boom house was reached, ascended the hill, recrossed into the woods and finally reached the railway, near the Chelsea summit, after gathering flowers and studying the birds, under direction of the leaders, as they passed along.

The geological party examined the rock cuttings along the railroad. A good exposure of garnetiferous gneiss is seen a short distance north of Chelsea Station. The foliation is well shown, the rock being smoothed and polished by ice action. The striae run nearly south at this point. Resting on the gneiss there is a good section of the pleistocene deposits. Boulder clay with striated boulders lies directly on the rock, next there is a mass of Leda clay and on top of this the Saxicava sand. These deposits vary from almost nothing to twenty or thirty feet

in thickness. Specimens of *Saxicava rugosa* and *Macoma Balthica* were found in the clay and sand on Saturday, and on former visits a few specimens of *Leda (Portlandica) Arctica* and *Balanus crenatus* were collected. These four species live only in salt water and their presence proves that these deposits were laid down in the sea or on its shore, and therefore the relative height of the land at Chelsea has changed at least four hundred feet since their deposition.

On returning to the station, Mr. Attwood called on Mr. R. H. Campbell, who addressed the gathering, giving much useful information regarding tree plantation and the need of better preservation of certain coniferous trees whose reproduction is slow owing to the seeds requiring two or three years to mature. He also drew attention to the wonderful attraction exercised by the sun upon the leaves, and to the fact, that when the leaves of a tree happen to be small, there is always a greater number of them to make up the requisite leaf surface.

Mr. Eifrig followed, speaking on the migration of birds and their habits. He stated that they were moved by two impulses, food supply and the propagation of their species, that the latter was the stronger, leading many of them to the far north, where they were reared, from regions as far south as Bolivia and Peru. Referring to the comparatively few birds seen during the afternoon, he attributed it to two reasons, viz., the nesting season and the depressing state of the weather, which always exerts a quieting effect upon birds whose organisms are delicately balanced. However, the following birds were seen:—Chimney Swift, King Bird, Alder Flycatcher, Meadowlark, Blackbird, House Wren, Goldfinches, Junco, Bank and Barn Swallows, Ovenbird, Black-throated Blue Warbler, Hermit Thrush, Chickadee, Black-throated Warbler, many Song, White-throated and Clipping Sparrows, Blackpoll and Chestnut-sided Warblers, and the Vesper Sparrow, who sang his loud and musical song as the train started for Ottawa, thus concluding one of the most enjoyable revels that the writer has ever had with Dame Nature.

E. C. W.

CARP, ONT.

The excursion to Carp on May 29th was not so largely attended as was expected owing to the uncertainty of the weather, and yet there was a goodly number on board when the train left the Central Station at 11.50 a.m. On arriving at Carp the party proceeded to the school house and was received there by the teaching staff, who did all in their power to make the afternoon an agreeable and profitable one. The school building is a fine one, and stands on an eminence which commands a splendid

view of the surrounding country. The outlook from the windows should often give fresh inspiration to both teachers and pupils, when their tasks threaten to become wearisome. The gardens which are a part of the Carp school, showed no signs of life as yet, but were only waiting for the advancing season to complete the work of the youthful horticulturists.

Inside the building were many evidences that the study of nature was not neglected. Among other things were noticed a display of colored prints of birds, and an arrangement of glass, in which the development of butterflies and moths, from their earlier stages could be conveniently observed.

After those who had not had luncheon had satisfied the inner man from their own baskets in the school rooms, or had availed themselves of the resources of the village, the party proceeded to a grove that was not far distant, and there separated under the different leaders. The geological division climbed the Laurentian rocks, a rather trying exertion in the hot sun, but there were clusters of fresh green ferns growing in the crevices of the rocks, and other beauties to cheer them on their way, and, at the top, the surprise of green pools of water with the little sweet-scented white violets growing on their margins well repaid even those who were quite ignorant of matters scientific for their labors. It is true these same charming pools produced numerous mosquitoes, an evil which, there being no remedy for it, each of the excursionists endured with all the patience he or she could command.

In the course of the afternoon the uncertain weather changed to the certainty of a brief thunder storm, which was not an altogether uninteresting episode, although it curtailed the explorations of the more timorous spirits. The addresses, when the party reassembled, were given in front of the school house, and afterwards hot tea was served in the building.

After a few remarks by the President, Mr. Attwood, Mr. T. E. Clarke was first called on to speak of the botanical specimens collected. The botanical field at Carp, while not extensive is quite varied. Close to the village, as above mentioned, there is a grove where the typical plants of rich woodlands are to be found. To the left is a low flat, through which the Carp river flows, while at some distance to the right are two rocky ridges, more or less wooded. Of the rarer plants collected, *Polygala paucifolia* was found in the open woods on the sandy hill just beyond the school garden, and *Trillium erythrocarpum* on lower ground. The Blood-root, *Sanguinaria canadensis* was observed in flower in great numbers. Unfortunately the rain prevented an examination of the ridges, where some interesting species were obtained on the occasion of a former excursion.

Miss Norton of the Carp High School, in a few well chosen words spoke of the pleasure derived from the visit of the Ottawa Field-Naturalists' Club. As a member of the Committee chosen to consider the formation of a branch of the club at Carp, she felt sure that such an organization would be a help to those engaged in teaching, and a pleasure to all who would join with the club in such a work.

Mr. Arthur Gibson spoke briefly of some of the insects which had been observed during the afternoon. Mosquitoes were out in full force and the relation of these pests to malaria and some other diseases was mentioned. A few nests of the American Tent Caterpillar had been observed, as well as a few of the early butterflies, such as the Spring Blue, the Clouded Sulphur, the Small White Cabbage and the little black Skipper. Specimens of the White Grub were shown and information asked as to its economic importance. This well known insect, the larva of the May beetle, or June Bug, annually does serious damage to the roots of grasses and other plants.

Mr. W. J. Wilson spoke of the geological formations in the vicinity of Carp and exhibited samples of mica, hornblends, feldspar, magnetite and apatite, and explained briefly some of their physical properties. The most interesting was a specimen of apatite in which the crystals were considerably curved, owing to long continued, steady pressure. Similar crystals were noted by Dr. Ami at a former visit of the Club to this place. Evidence that the land had been under the sea at a comparatively recent date, geologically speaking, is found in the fact that the sand and gravel abound in marine shells, specimens of which were shown. These forms live in the ocean at the present time.

Mr. F. T. Shutt congratulated the people of Carp on the fact that they were about to form a branch of the Field-Naturalists' Club and said it would be the aim of the Club to give all possible assistance.

Rev. Mr. Eifrig spoke of the birds the ornithological party had seen, viz., Flycatchers, 2 Phoebes, 6 Kingbirds, 3 Pewees, 1 Crested Flycatcher, 5 Chebecs, Blackbirds, etc., 10 Bronzed Grackles, 10 Meadowlarks, 8 Bobolinks, 4 Red-winged Blackbirds 2 Baltimore Orioles, Crows, Woodpeckers, 1 Flicker, Sparrows: 2 White-throated Sparrows, many Clipping, 4 Vesper, many Song, 5 Savanna, a flock of about 20 Goldfinches, English Sparrows, (many nests with 4–6 eggs in a barn). Swallows: 6 Purple Martens, 10–20 Barn Swallows, (1 nest with 7 eggs, 2 with 2 eggs), many Bank Swallows, Warblers, 6 Yellow, 4 Black and White, 2 Blackpoll, 2 Chestnutsided, 1 Blackthroated Blue, 4 Yellow-throats, Thrushes, many Robins (nest with 3 young), 8 Blue-birds, Wrens, etc., 5 House Wrens, 1 Winter Wren, 1 Brown

Thrasher, all singing beautifully, besides 2 Spotted Sandpipers, 1 Kingfisher, many Chimney Swifts, 1 Humming Bird, 4 Redeyed Vireos, 1 Killdeer, 1 Red-shouldered Hawk, 2 Nighthawks. Total, 41 species. In closing he exhibited a number of birds' eggs which had been collected by a young lady of Carp.

Mr. J. W. Gibson, of the Ottawa Normal School, and Mr. G. A. Moore, Principal of the Carp High School, briefly addressed the gathering.

Between some of the addresses, Mr. T. A. Brown and the Normal Students furnished some excellent music.

The evening after the rain, was indescribably lovely and must have brought a "suspension of disgust" to use a Bryonic phrase, to any world-weary individuals of the party, if such there were, and none could leave so restful a scene without regret.

E. McQ.

CROSSBILLS NESTING IN SOUTHERN ONTARIO.

BY W. E. SAUNDERS, LONDON, ONT.

A nest of Crossbills, species unknown, was found last April by Mr. Harold J. Clark in a small woods about two miles east of London. On April 28th the nest was taken. It contained three eggs, with a bluish-white ground, sparingly streaked and spotted with black and brown. The nest was placed in a maple tree against the trunk, 45 feet from the ground, and was composed mainly of bark strips with additions of grasses and twigs and was lined with fine bark strips. The nest contained also, the egg of a Cow Bird which shows that the latter species does not intend to lose any opportunity for reproduction, this being a very early date for Cow Bird's eggs to be found.

This forms the first stated record of Crossbills nesting in lower Ontario and it is to be regretted that the nest was not seen *in situ* by someone who could have identified the species before the eggs were taken. It is likely, however, that the nest belonged to the American Crossbill, as no white wing-bars were noticed and this species has been moderately common during parts of the past winter.

Some years ago, I received a report of the occurrence of White Winged Crossbills in spotted plumage, young birds of course, which were taken near London, in April or May, and had doubtless been raised in the vicinity, but the specimens had been lost when I heard of it and no re-occurrence of the event had been suspected until the present year. As the Crossbills belong to the most erratic group of sparrows, as regards nesting habits, we need not be surprised if such occasional records are made.

THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, AUGUST, 1909 No. 5

CERTAIN BIOLOGICAL PRINCIPLES AND THEIR PRACTICAL APPLICATION IN THE IMPROVEMENT OF THE FIELD CROPS OF CANADA.

By L. H. Newman, B.S.A., Secretary, Canadian Seed Growers' Association, Ottawa.

To learn what is true in order to do what is right is the summing up of the whole duty of man.—T. H. Huxley.

Modern science has done much to awaken a greater interest in the improvement of the lot of man by giving us a better understanding of life processes. A more comprehensive knowledge of the laws which determine our well-being in the physical world has resulted in the control of many dread diseases. A greater knowledge of the interaction of, and the relation between, hereditary forces and environment places within the reach of man a remarkable power in guiding and controlling the creative forces of nature. This last makes possible the betterment of the condition of man through the improvement of his food.

The world's supply of food to-day is directly dependent upon one great kingdom—the vegetable kingdom. At first man depended for his livelihood upon the chase and the fruits, seeds and herbs which nature provided. This source, however, soon required to be supplemented so that we find even our primitive races resorting to the raising of crops as a means of sustenance. The native forms of plant-life which were utilized soon responded to the hand of man, and from this early beginning dates the improvement of plants.

The great complexity and diversity in the forms of vegetation which clothe the surface of the earth has long been a question to haunt the mind of the scientist and the philosopher. That new species were constantly being produced in nature was a recognized fact as long ago as before the birth of Christ, but the exact manner in which these were brought into existence has long remained obscure and puzzling.

For many years our leading naturalists and biologists have been engaged in investigating these problems and in classifying their observations under natural and well defined laws. It is only within recent years, however, that the student of natural progression has been able to deduce from his observations and study any suggestion as to how plants under domestication might be "bred up" by the applications of principles common to all living phenomena.

HISTORY OF THE PROGRESS OF THE IDEA OF SPECIES FORMATION.

In order that we may clearly understand the possibilities of the artificial interference in plant life as a means of evolving improved races and strains, and that we may see how far such work is based on scientific and, therefore, sound principles, we shall examine briefly some of the various theories and ideas which have been advanced respecting the manner in which our present species, varieties and strains have come into existence.

We find that the idea of organic progression or evolution had its birth among the early Greeks, its renaissance among the early natural philosophers beginning with Bacon and extending to the time of Herder (1744-1803) and that these men in turn served to inspire further investigation and study by Buffon, Erasmus Darwin and Goethe, all of whom are considered as contemporaries of Darwin, the first real propounder of evolution.

Evolution, as a natural explanation of the origin of the higher forms of life, developed from the mythological teachings of the early Greeks into the general conception of Aristotle (384-322 B.C.) who, over 2,200 years ago, believed that higher forms of life originated or were developed from lower forms in some mysterious way. Development or the gradual perfection in the structure of an organism was Aristotle's main thesis and constituted the principle thought in his natural philosophy. He was also a strong believer in the law of adaptation and in atavism. The principle of Syngenesis was recognized long before Aristotle's time by Empedocles, who may be said to be the father of evolution. Empedocles conceived the idea of "The survival of the fittest" six centuries before Christ.

Epicurus (341-270 B.C.) established the distinction between natural and supernatural causation, and gathered arguments from his predecessors to support the principle of natural law.

The idea of the changing rather than of the fixed order of things had its origin among the Greeks in Heraclitus (505-475 B.C.)

For many centuries all study was subject to the approval of the church so that from the time when Christian doctrines shook off Aristotelianism or the scientific reading of the Bible until

Suarez' time in the middle of the 16th century no progress was made in the evolution idea.

In the latter part of the seventeenth century and in the early part of the eighteenth there were three main classes of writers, viz.:—The Naturalists, the Speculative Evolutionists and the Natural Philosophers. To the latter class belong such eminent writers as Bacon, Descartes, Leibnitz and, belonging to the German School, Kant, Herder, Lessing and Schelling.

Bacon (1561-1626) was the most active of the early writers in pointing out the evidences of the mutability of species and in attempting to show the bearing which variation has upon organic progression. There was also shown at this time the analogy between artificial selection and natural selection. It is interesting to know that at this early period (beginning of 17th century) mutability of species was recognized and looked upon as a live question.

SCIENTISTS OF THE EIGHTEENTH AND NINETEENTH CENTURIES.

In the eighteenth and early nineteenth centuries, we find many writers of note propounding theories as to the manner in which species have originated. De Maillet (1656-1738) tried to show the influence exerted by habit and environment in inducing changes in the nature and form of a plant, but, unfortunately he went to extremes by claiming that modifications acquired during a single life were transmitted in toto.

Maupertuis (1698-1759) advanced a theroy of generation resembling closely that of Darwin, and which anticipated to some extent the modern idea as to the causes of fortuitous variations.

Linnæus, a Swede, (1707-1778) the great father of botany, marked the beginning of zoology and botany as now understood. The binary system of nomenclature proposed in his great work Systema Naturae enabled him to show the relation of animals and plants to each other. At first, Linnæus looked upon species as having been created directly by the Creator and he believed in the absolute fixity of species. Later, however, he was compelled to alter his views somewhat owing to the multiplication of species which he observed everywhere in nature. We therefore see in the revision of Systema Naturae, which he made in 1760, a pronounced change, the mutability of species being more clearly recognized.

Buffon (1707-1788) took more radical views re the mutability of species than did Linnæus, and laid the foundation of modern evolution in zoology and botany. He was the first to point out clearly the relationship between mutability of species and environment. He is thus the first to indicate some of the causes of mutability.

Erasmus Darwin (1731-1802), grandfather of Chas. Darwin, was one of the poets of the evolution idea. Like some of the early Greek writers he believed in the doctrine of spontaneous generation, but in the lower forms of life only. In the chapter on Generation in his "Zoonomia" (1794) he takes little account of the laws of heredity, but believes that by the addition of parts resulting from changes of environment exciting the "living filament" into action, new characters are acquired and these are capable of being transmitted. This theory it will be seen anticipated that of Lamarck.

THE LAMARCKIAN THEORY.

Lamarck (1744-1829) was the real founder of the modern theory of descent and is the most noted scientist and writer between the time of Aristotle and that of Chas. Darwin. Laboring under discouraging conditions and receiving nothing but disdain by the majority of his contemporaries he succeeded nevertheless in contributing much to natural science. In his "Philosophie Zoologique" (1809) he expresses certain views which correspond closely with those held by E. Darwin and expressed by him in his Zoonomia. The main theory which Lamarck advanced and which is now known as the Lamarckian theory in contradistinction to the Darwinian theory, claims that evolution takes place through the inheritance of characters acquired during the lives of individuals so that in time new species may be created. The endeavour to satisfy certain wants brings about certain modifications which are inherited in part at least. This theory made no great impression at the time although it has been revived within recent times by a school known as the Neo-Lamarckians to which school Herbert Spencer and other prominent scientists belong. While the theory seems to explain many of the facts of inheritance yet it fails to show a case wherein a single acquired character has been permanently transmitted. As an instance we have the continued docking of horses and lambs, yet there is no case on record of one of these animals being born without a tail.

Goethe (1749-1832), the great poet of evolution, developed the "unity of type" idea in 1796. This led him to explain the existence of vestigial structures which constitutes one of the strongest evidences of evolution.

Bory de St. Vincent (1780-1846) believed that species are formed spontaneously and that this process goes on more rapidly in countries of comparatively modern formation. His idea was that the existence of a long series of ancestors tends to fix the type.

Isidore St. Hilaire, (1805-1861) son of Geoffroy St. Hilaire, advanced the theory that species were limited in their mutability. He claimed that new characters may be produced as a result of two forces:

(1) The modifying influence of new surroundings,

(2) The conserving influences of heredity.

Dr. W. C. Wells in 1813 was the first to apply the principle of "The survival of the fittest." He based his theory on the observation that no two individuals are alike and that those which are best fitted to withstand the exigencies of a particular country or locality are most likely to survive. In 1831 Patrick Matthews applied a similar view in a book on naval timber.

THE DARWINIAN THEORY.

It remained with Chas. Darwin (1809-1882), to bring out a well rounded theory attempting to explain the origin of species and varieties. His great work under this name was inspired by an essay by Malthus on "Population" written in 1798. After many years of most thorough work in which he collected an immense amount of evidence he crystallized his views on the subject into a theory known as the "Theory of Natural Selection." In a word this theory implies that favorable variations are preserved while the injurious or inferior variations are rejected. That is to say that in the struggle for existence only the strongest individuals survive while the weaker succumb to the various active forces of nature. This principle assumes that constant variation is going on within the race and that by the gradual accumulation of slight favorable variations new species are formed. Darwin based his theory of natural selection largely upon the results realized by man in artificially selecting from his flocks and herds. He recognized that variation might be induced as follows: (1) By environment. (2) By the use or disuse of parts. (3) By certain inherent forces causing definite variation. (4) By the tendency of variations to become co-related. (5) By reversion. (6) By telegony. Two main classes of variation were recognized, viz.: fluctuating variation and discontinuous variation. Darwin believed that fluctuating variations had been utilized most by the breeder although it is difficult to distinguish between the two. According to Quetelet, Galton and others, these fluctuating variations are grouped around a "mean" in such a way that approximately half are below the mean and half above.

Wagner claims that variation, isolation or selection, and heredity constitute the tripod of organic evolution. In other words, plants are constantly changing in character, and, since like tends to beget like in plants just as in animals, the isolation

or selection from year to year of the most desirable individuals results in a gradual improvement in the race until certain limits have been reached.

While natural selection is, without doubt, a potent factor in the developing or creating of new species in nature, and while its action there may suggest the value of artificial selection as a means of improving domestic types, yet, it fails to account fully for the existence of our present species. This assertion is based on the following facts: (1) Natural selection is based upon variations which it cannot explain. (2) Certain of these variations cannot have been of any possible use to the individual and, hence, cannot have operated in its evolution. (3) Life, according to certain authorities has not been possible on the earth for a sufficient length of time to allow the development of all of our present species, had these been developed as slowly as would be required by the action of natural selection. (4) The numerous transitional links between species, which would of necessity exist had evolution come about as gradually as would be required by the natural selection of the "fittest," are not found.

We must, therefore, look to some internal factor upon which to base the laws governing the origin of species. Darwin himself recognized the insufficiency of his theory at a later date, and attempted to supplement it with his theory of "Pangenesis," but failed to contribute much toward the elucidation of the problem.

ATTEMPTS TO FIND INTERNAL CAUSES OF VARIATION.

Passing on from the time of Darwin we find the leading investigators searching for an internal force to explain the origin of variation. The German botanist Nageli was the first to attempt to find within the organism itself a force which might account for the appearance of strange characters in the offspring. He assumed the existence within the organism of a tendency toward progression or perfect development and believed that in accordance with this tendency organisms are continually varying so as to rise in the scale of nature. He failed, however, in explaining the origin of this internal force, so contributed little toward our better understanding of the question involved.

Another theory is advanced by Mivart to the effect that species have arisen suddenly and not by slow modifications hence the theory of "extraordinary births." An instance of the application of this theory is found in connection with an experiment conducted by Dr. Godron, of Nancy, with *Datura Tatula*, (Purple Thorn Apple), the seed capsules of which plant are normally covered with spines. Seeds of this plant were sown and produced plants among which was found a plant whose seed capsules were

smooth. The seeds of this were preserved and again sown with the result that all the plants coming from them showed the same peculiarity. Each successive progeny from this seed showed the same characteristics as long as the experiment was conducted. When the smooth variation was crossed with the original forms true hybrids were produced which, in the second generation, reverted to the original type.

We probably have many so-called rare species at the present time which have been created in a like manner. Mivart believes that all species arise in this way. He claimed to be able to recognize an internal law presiding over the action of every part of every individual and of every organism as a unit. His theory is a sort of a compromise between evolution and special creation. While it has many things in its favor and while many of the objections which apply to the theory of natural selection do not apply in this case, yet it will not account for all of the facts of nature, and can only be considered to constitute one of the possible factors in organic evolution.

WEISMANNIAN THEORY, OR NEO-DARWINISM.

In 1883, Weismann, a German Naturalist, undertook to show how acquired characters cannot be transmitted and how permanent variations can originate. He outlined the development of the individual from the single cell, the fertilized egg, showing how the cell divides and how, while those cells which go to build up the different parts of the body become differentiated, other cells, the reproductive or germ cells, remain constant. Continuing he attempted to show that the property of being able to transmit definite characters to the offspring is peculiar only to the germ cell, hence permanent variations must emanate from this cell. Since environment can effect the body or soma cells and not the germ cell, it is clear, according to Weismann, that acquired characters cannot be permanently transmitted. At the same time it is reasonable to believe that the temporary "fattening" or "starving" of the germ cell due to the favorable or unfavorable environment of the individual which bears it would be noticeable for one or two generations as indeed seems to be the case.

Galton in his book on "Natural Inheritance" disparages the idea that progression can take place only by the accumulation of minute variations, and characterizes such an inference as fallacious.

Bateson, in his "Material for the Study of Variation" refers to the two possible ways in which variations may arise and points out the principle objections to the claims made for fluctuating variations while at the same time he collates many facts respecting the importance of discontinuous variations.

(*To be continued*)

ALGONKIN AND HURON OCCUPATION OF THE OTTAWA VALLEY.

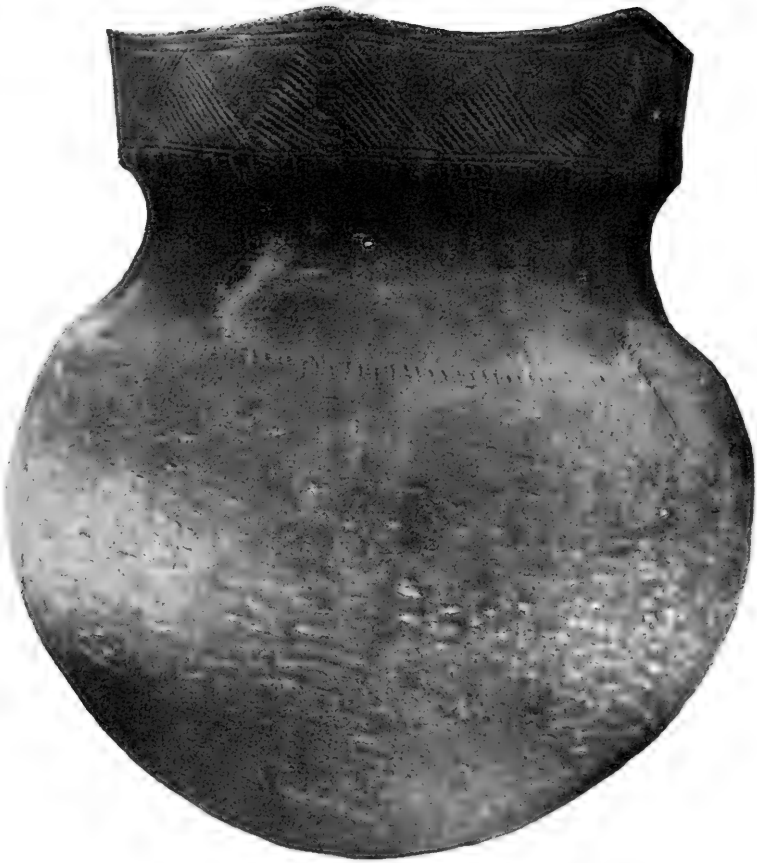
BY T. W. E. SOWTER, OTTAWA.

(Continued from page 68)

Iroquois tradition assigns to Squaw Bay, called also Cache Bay, at Tetreauville, the reputation of having been one of the favorite lurking places of these war-parties. It must have been in those days, an ideal spot for an ambush or concealed camp, as it occupied, for the purposes of river piracy, as unique a position on the old trade route, as does one of our present day toll-gates, for controlling the traffic on a turnpike road. There is no doubt of the place having been used as an Indian camping ground, at least in prehistoric times, as the shores of the bay are littered in all directions with fragments and flakes of worked flint. This is an instance in which tradition is corroborated, to some extent, by archaeology.

It is also said that Brigham's Creek, called also Brewery Creek, a narrow channel of the Ottawa, was the old Indian portage route for overcoming the rapids of the Chaudière. It may be seen by glancing at a map of the city of Hull, that parties of Algonkins or Hurons, as the case may have been, upon emerging on the main river at the head of this portage, were liable at any time to receive a warm welcome from some surprise-party of Iroquois visitors at the Squaw Bay camping ground. If descending the rapids of the Little Chaudière, they faced a far worse predicament, as, unable to escape or defend themselves in the swift current, they would have been caught, like passing flies that are blown into a spider's web.

It is said that Indian cunning was at length successful in evolving a plan to outwit the military strategy of the Iroquois. As the old portage route had become dangerous it was resolved to have an alternative one. In ascending the Ottawa, this new portage started from the western shore of Brigham's Creek at a point now occupied by the International Cement Works. It continued thence in a westerly direction, skirting the foot of the mountain and passed down Breckenridge's Creek to the outlet of that stream into Lake Deschênes. It was rather a long portage of about a dozen miles, but the Algonkin and Huron had learned in the school of bitter experience, that, in their case, the longest way round was the shortest way home. An aged squaw, who lived in Aylmer many years ago, spoke of a similar forest trail that extended, in the early days, from a point on the Gatineau



This figure represents a clay vessel, which was found by Mr. James Lusk, on his farm, Lot 20, Range XI., Township of Eardley, Wright Co., Que. It was purchased from Mr. Lusk in the year 1903, and is now in the Archaeological Section of the Geological Museum at Ottawa, where it is indexed as No. 3282A. The vessel is 11 inches in height and 33 inches in circumference.

(The photograph, from which this reproduction was made, was kindly furnished by the Geological Survey Department.)

near the site of Chelsea, thence by way of Kingsmere to a point on Lake Deschênes, now occupied by the town of Aylmer.

Reference has already been made to Indian camping grounds, which dot the shores of the Ottawa at frequent intervals. Let us see what can be made out of them, by a close examination of the relics they have yielded. The writer is convinced that these camp sites are of Algonkin origin, and that they bear evidences of casual contact, if not of more prolonged social intercourse with the Hurons. That is to say, that it looks as if the Hurons had been friendly visitors, who had spent much of their time in these Algonkin camps. These camp sites seem to have been selected with a view to observation, defence or escape in cases of sudden attack. The Hurons built their villages at some distance from the water highways, so as to escape observation by inquisitive tourists, who might wish to attack them. They also selected their village sites where the land, within a convenient distance, was suitable for agriculture. The highways of communication used by these village communities, were the innumerable forest trails, which traversed the Huron country in all directions. On the other hand, the Algonkins of the Ottawa have left traces of their camps along the edges of the river, on points of land which afford a good view up or down stream. They have been called canoe Indians and were at home on the water. As they were much more expert in the management of their birchen vessels than the Iroquoian races, they were in a position, on the shores of the river, to escape by water from a too powerful enemy approaching by land, or they could retire to the forest if an overwhelming fleet appeared in the offing.

These camp sites are strewn with fragments of blackish flint, evidently procured from the Trenton limestone at the Chaudière, where it is found in great abundance, especially along Brigham's Creek, the old Indian portage route. Arrow-heads, fabricated from these fragments, are also found on these Algonkin camp sites. But there is also found an arrow-head of a different pattern, that is made from flint that has a lighter color and a broader and cleaner conchoidal fracture than the Algonkin forms. These arrow-heads bear a striking resemblance, in every respect, to those from the Huron country in western Ontario, and there are no flakings of this latter flint to show that they were fabricated in these Algonkin workshops. This seems to be negative evidence that they were not made on the Ottawa, but may have been brought there by Huron visitors. It is not, of course, conclusive evidence of Huron occupation, but rather of Huron contact, more or less prolonged. A long knife of Huronian

slate, discovered on the Ottawa, by George Burland, with a broken gorget and a crescent shaped woman's knife, each of Huronian slate, found on the Bonnechere by Edward Moore, of Douglas, Ont., seem to be additional evidence of the presence of Hurons in the Ottawa Valley.

There are two other camp sites, however, that differ essentially from the foregoing and are without doubt distinctly Huron. The former of these was discovered by R. H. Haycock, of Ottawa, and the latter by Dr. H. M. Ami, of the Geological Survey.

In the fall of 1859 and the spring of 1860, the late Edward Haycock built a residence in the city of Hull, on the point now occupied by Gilmour's Mill. While making excavations for the foundation of a summer house, the workmen laid bare several ash-beds, at a depth of from two to three feet below the surface. Among other things, these beds contained fragments of Indian pottery in great abundance.[1] Mr. R. H. Haycock examined them closely and reports them as having been of a dark brown color, decorated with incised lines, notches and indentations. According to Mr. Haycock's description, this pottery, both in composition and decoration, was similar to that unearthed from old ash-beds in the Huron country, in Ontario.

One may observe, on approaching Hull by the Alexandra bridge, an extensive cut bank of sand and gravel, between the E. B. Eddy Co.'s sulphide mill and the end of the bridge, and between Laurier Ave., and the river. This is the place from which the late Edward Haycock procured sand for building purposes on the Eastern and Western Blocks of the Departmental buildings, at Ottawa. During the excavation of this bank, a great many Indian relics were discovered, such as womens' knives, arrow-heads, tomahawks and pottery, but no description of this pottery is obtainable. Here, according to white and red tradition, many bloody encounters took place between parties ascending or descending the river.

In the archaeological department of the Geological Museum at Ottawa, there is a large array of pottery fragments collected by Dr. H. M. Ami, some years ago, from an old ash-bed at Casselman, Ont. In the same cases, are specimens of Huron pottery from village sites in western Ontario, and, in comparing the two collections one is quite satisfied that both are products

[1] "In some places rude pottery is found at a considerable depth, from different causes. In fire-places this may come from the practice of placing the fire in excavations in the ground" Earthenware of the New York Aborigines. William M. Beauchamp, Bulletin, New York State Museum, Vol. 5, No. 22, p. 80.

of the same school of ceramic art. The ash-bed was large and deep and Dr. Ami is of the opinion that it had been used as a fire-place for a considerable length of time. There is no doubt that Dr. Ami's discovery is of the highest importance in establishing proofs of Huron occupation of the Ottawa valley.

There are, also, in the Museum, two perfect specimens of Indian pottery from lot 20, range 11, Eardley township, Wright Co., Que. They were procured from James Lusk, who discovered them on his farm, where they had been washed out of the banks of a small creek during a freshet. They are suberb examples of aboriginal art, and it is difficult to understand how they could have been brought to such symmetrical proportions without the use of a lathe. Compared with similar vessels figured in the Ontario Archaeological Reports, it seems impossible to doubt that they are of Huron origin. These vessels are similar in pattern and have been fabricated from the same clayey composition, with the same band, decorated with characteristic incised lines, about the top, and a wave-like edge on the summit of the rim, as are found in some of the Huron forms. As to whether the spot where this pottery was found is an ancient village site, will be an interesting subject for future investigation.

Let us now consider another phase of the question of Huron occupation, that seems to be more conclusive even than the discovery of ash-beds or pottery, the evidences of ossuarial burial. The graves of a nation are indexes of its intellectual development, from the rude cairn of the wandering savage to the Taj Mahal of the imperial ruler. Could we have mingled in the activities of palaeocosmic man, and witnessed the rite of sepulture by which the Old Man of Cro-Magnon was laid to rest in his cave-sepulchre on the Vezére, in the Dordogne Valley, then, the last rites about the grave of that post-glacial patriarch might have yielded us a store of knowledge that would have been invaluable to us in studying the savage culture of ancient Europe, such as the rude efforts of primitive man to interpret natural phenomena or to recognize in the variant manifestations of natural forces the evidences of divine anger or approbation. So, also, if we could have witnessed the burial rites of the Huron nation, in what was called the Feast of the Dead, they would have proved most instructive. They might have cleared up much that is obscure in regard to the ultimate destiny and relationship of the two souls, the one that took flight to the land of spirits, at the hour of death, and the other that awaited the final interment, before taking its departure. They might have given us an insight into the philosophy of Indian burials; which would have explained the presence or absence of warlike or domestic implements in Huron ossuaries. But, fortunately for

archaeology, the Jesuits and other contemporary writers have told us much that is invaluable concerning this important festival.

Reverence for their dead was a marked characteristic of the Huron people, a sentiment that was common among all the red races. It is doubtful if those refinements of Christian feeling that find expression in the mortuary rites of our civilized white races, are one whit more profound than those outpourings of sorrow, which were lavished by the Hurons upon the remains of their departed relatives, at their periodical Feasts of the Dead.

When the early settlers, in western Ontario, were clearing up their lands, they were frequently puzzled at the discovery of large pits filled with human bones, together with warlike and domestic implements and articles of personal adornment, all crowded together in these communal sepulchres. These bone-pits or ossuaries were at first attributed to burials for the disposal of the slain after great battles, or of those who had perished during epidemics of disease. Their true origin, however, was established beyond conjecture by the Jesuit Relations.

Parkman, in the Jesuits in North America, has given us graphic details of what the Hurons considered their most solemn and important ceremonial. It was witnessed by Brébeuf at Ossossané, in the summer of 1636, and a report of it embodied in his Relation of the same year. The following brief description of the solemnity, compiled from the works of these writers, may answer our purpose, without going into details.

Every ten years, or so, each of the four nations of the Huron confederacy held a Feast of the Dead. The time and place, at which the feast should be held, was decided by the chiefs of the nation, in solemn council. All preliminary arrangements having been made, the dead of the past decade were collected from far and near and conveyed to the common rendezvous. Previously however, the corpses which had, as usual, been placed on scaffolds or, more rarely, in the earth, for the time being, were removed from their temporary resting places and prepared by loving relatives for the final rite of sepulture. The bones of such as were reduced to skeletons were tied up in bundles like faggots, wrapped in skins and clothed with pendant robes of costly furs. The bodies of the more recent dead were allowed to remain entire and were clothed also in furs. Then these ghastly bundles of mortality were hung on the cross-poles, which later on sustained the corn harvest, of the principal long-house in the village, and, while the mourners partook of a funeral feast, the chiefs discoursed upon the public or domestic virtues of the deceased. Then commenced the wierd funeral march along the woodland paths

through the gloomy pine forests of old Huronia, the mourners uttering, at intervals, dismal wailing cries, supposed to resemble those of disembodied spirits wending their way to the land of souls, and thought to have a soothing effect on the consciousness still residing in the bundles of bones, which each man carried.

The Jesuits had been invited, by the chiefs of the Nation of the Bear, to come to Ossossané and witness the rite. This great town of the Hurons lay some distance back from the eastern margin of Nottawassaga Bay, in the midst of a pine forest. What a sight it must have been to those Europeans, as, one after another, the weird funeral corteges, converging from the various towns of the Bear, issued from the surrounding forest.

During the delay, in awaiting the complete assemblage of the nation's dead, the squaws ladled out food for the inevitable feast, while the younger members of both sexes contended for prizes, donated by mourners in honor of departed relatives. So great was the assemblage that the houses were crowded to suffocation and large numbers had to camp out, in the adjacent forest. The bundles of dead were hung from the cross-poles in the houses, and in the one where the Jesuits were housed upwards of one hundred packages of mortality decorated the interior of the building. The Jesuits passed the night in one of these places, and endured the ordeal with Christian fortitude.

Finally, the signal was given, by the chiefs, for the consummation of the concluding rite. The packages of dead were opened and tears and lamentations lavished upon their contents. Brébeuf refers to one woman in particular, whose ecstasies of grief, over the bones of her father and children, were pathetic in the extreme. She combed her father's hair, and fondled his bones as if they had been alive. She made bracelets of beads for the arms of her children, and bathed their bones with her tears. It was the same divine light of motherhood, which thus irradiated the savage dens of the Hurons, as that which shines in the eyes of the Christian mother, as she weeps over the cold form of one whose brows have been sealed with the sign of the Cross.

The various processions now re-formed and proceeded to a spot in the forest, where a clearing of several acres had been made. In the centre of this open space a huge pit had been dug, ten feet in depth and thirty feet in diameter. Around this pit a rude scaffold had been erected, very high and strong. Above this scaffold rose a number of upright poles with others crossed between, upon which to hang the funeral gifts and remains of the dead.

The different groups of mourners were assigned places around the edge of the clearing. The funeral gifts were now

displayed, among them being many robes of the richest fur that had been prepared, years before, in anticipation of this ceremony. The kettles were then slung and feasting went on until the middle of the afternoon, when the bundles of bones were again taken up. Then, at a signal from the chiefs, the crowd rushed forward from all sides, like warriors at the storming of a palisaded town, climbed, by means of rude ladders, to the scaffolding and hung their dead, together with the funeral gifts, to the cross-poles. Then they retired and the chiefs, from the scaffolding, made speeches to the people, praising the dead and extolling the gifts given in their honor.

During this speech making, the vast grave was being lined throughout with robes of beaver skin, with three copper kettles in the centre. The bodies, which had been left whole, were then cast into the pit amidst great confusion and excitement, and, as darkness was now coming on, the ceremony was adjourned until the next day, the assemblage remaining about the great watch-fires, which blazed about the edge of the clearing.

Just before daylight, the Jesuits, who had retired to the village, were aroused by an uproar fit to wake the dead. Guided by the noise, they hastened back to the clearing where they beheld a spectacle that surpassed anything they had ever witnessed. Brébeuf says that nothing had ever figured to him better the confusion among the damned. One of the bundles of bones had fallen from the poles into the pit and precipitated the conclusion of the rite. Huge fires which blazed about the clearing lit up a fearful scene. On and about the scaffold, wild forms, howling like demons, hurled the packages of bones into the pit, where a number of others moved about amidst the ghastly shower and with long poles arranged the bones in their places. Then the pit was covered with logs and earth and the ceremony concluded with a funeral chant that resembled the wail of a legion of lost spirits. It was the death song of a lost people, the knell of a passing race.

One can imagine, as a spectator of this weird scene, the stalwart form of Brébeuf, towering in the majesty of his fore-doomed martyrdom, and glorious in the might of that indomitable courage that triumphed, in the hour of his death, over the ingenuity of his tormentors, evolving in his mind such subtle arguments as might subordinate to higher ideals the rude Nature-worship of Huronian clanship, and win to the service of his Master these hordes of heathendom.

Residents of the Capital will be surprised to learn that a Huron Feast of the Dead, similar to the one already described, was once held in Ottawa, on the spot that now occupies the north-west angle formed by the intersection of Wellington and

Bay Streets. This is no fiction, but a fact, supported by the most trustworthy evidence. The proof is contained in an article in the Canadian Journal, Vol. 1, 1852–1853, by the late Dr. Edward Van Courtland, which describes an Indian burying ground and its contents discovered at Bytown (Ottawa) in 1843.

Dr. Van Courtland states that in 1843 some workmen, who were digging sand for mortar for the old suspension bridge, unearthed a large quantity of human bones. He immediately hurried to the spot and found that the contents of an Indian burying ground were being uncovered. The doctor continues:—"Nothing possibly could have been more happily chosen for sepulture than the spot in question, situated on a projecting point of land directly in rear of the encampment, at a carrying-place and about half a mile below the mighty cataract of the Chaudière, it at once demonstrated a fact handed down to us by tradition, that the aborigines were in the habit when they could, of burying their dead near running waters. The very oldest settlers, including the Patriarch of the Ottawa, the late Philemon Wright, and who had located nearby some thirty years before[2] had never heard of this being a burying place, although Indians existed in considerable numbers about the locality when he dwelt in the forest, added to the fact that a huge pine tree growing directly over one of the graves, was conclusive evidence of its being used as a place of sepulture long ere the white man in his progressive march had desolated the hearths of the untutored savage." After two days digging the results were as follows:

"One very large, apparently common grave, containing the vestiges of about twenty bodies, of various ages, a goodly share of them being children, together with portions of the remains of two dogs' heads; the confused state in which the bones were found showed that no care whatever had been taken in burying the original owners, and a question presented itself as to whether they might not have all been thrown indiscriminately into one pit at the same time, having fallen victims to some epidemic, or beneath the hands of some other hostile tribe; nothing however, could be detected on the skulls, to indicate that they fell by the tomahawk, but save sundry long bones, a few pelvi, and six perfect skulls the remainder crumbled into dust on exposure to the air, in every instance the bones were deeply colored from Red Hematite which the aborigines used in painting, or rather in bedaubing their bodies, falling in the form of a deposit on them when the flesh had become corrupted. The material appears to have been very lavishly applied from the fact of the sand

[2]Philemon Wright, with 25 followers, arrived at the site of the present City of Hull on the 7th of March, 1800.

which filled the crania being entirely colored by it. A few implements and weapons of the very rudest description were discovered, to wit:— 1st, a piece of gneiss about two feet long, tapering, and evidently intended as a sort of war-club; it is in size and shape not unlike a policeman's staff. 2nd, a stone gouge, very rudely constructed of fossiliferous limestone; it is about ten inches long, and contains a fossil leptina on one of its edges; it is used, I lately learned from an Indian chief, for skinning the beaver. 3rd, a stone hatchet of the same material. 4th, a sandstone boulder weighing about four pounds; it was found lying on the sternum of a chief of gigantic stature, who was buried apart from the others, and who had been walled round with great care. The boulder in question is completely circular and much in the shape of a large ship biscuit before it is stamped or placed in the oven, its use was, after being sewed in a skin bag, to serve as a corselet and protect the wearer against the arrows of an adversary. In every instance the teeth were perfect and not one unsound one was to be detected, at the same time they were all well worn down by trituration, it being a well known fact that in Council the Indians are in the habit of using their lower jaw like a ruminating animal, which fully accounts for the peculiarity. There were no arrowheads or other weapons discovered."

It will be seen, from the foregoing, that the worthy doctor had unearthed a small Huron ossuary, similar in its general features to the much larger one at Ossossané, and if the doctor's description is compared with reports on communal graves, in western Ontario, by such eminent archaeologists as Dr. David Boyle, curator of the Provincial Museum at Toronto, A.F. Hunter, George E. Laidlaw and others, one must be convinced that the Wellington Street ossuary was of Huron origin. When the doctor raises the question as to whether the bodies had not all been "thrown indiscriminately into one pit at the same time" he suggests a mode of sepulture that was actually observed by Brébeuf at the Huron Feast of the Dead at Ossossané.

Another small ossuary was uncovered some years ago, on Aylmer Island, when the foundation for the new lighthouse was being excavated. The writer was not present at the exhumation of its contents, but the light-keeper, Mr. Frank Boucher, informed him that the skeletons were all piled together, indiscriminately. It is difficult to estimate the number of bodies interred in this grave, but it yielded about a wagon load of bones. A number of single graves have also been found at this spot, and these, together with the ossuary would seem to prove that Algonkin and Huron occupied this part of the Ottawa Valley and used this island in common as a place of sepulture.

Embowered in the solemn grandeur of a mighty forest of gloomy pine, old Lac Chaudière—our Lake Deschênes—was a fitting theatre for that weird ceremonial, the Huron Feast of the Dead. Resting on the old Algonkin camping ground at Pointe aux Pins—now the Queen's Park—some roving coureur de bois might have seen this great sheet of water fading away into the vast green ocean of foliage to the south, and witnessed from his point of vantage the uncanny incidents of the savage drama. From various points on the lake he might have seen, converging on the island, great war canoes, freighted with the living and the dead, the sad remnants of a passing race. He might have heard the long drawn out wailing cries of the living, as they floated in unison across the water, outrivalling the call of the loon or the dismal and prolonged howl of the wolf, as they echoed through the arches of the forest, and as the island rose before his vision, tenanted with its grotesque assemblage of dusky forms, engaged in the final rite of sepulture, he might have mused upon the mutability of human life, in its application to the red denizens of the wilderness, whether in the dissolution of a clan, a tribe or a nation.

We have now reviewed three distinct sets of evidence, which verify one another and sustain, collectively, the hypothesis of Huron occupation of the Ottawa Valley. We have Huron arrowheads and slate implements on Algonkin camping grounds, we have Huron pottery from ash-beds that smouldered, possibly, in Huron long-houses, for considerable periods of time, and lastly, we have ossuaries or communal graves, a mode of sepulture characteristic of the Huron people, and one which would indicate a permanent and somewhat lengthened period of occupation.

Of course, it will be urged that no band of Hurons would have built a village so near the river as the site of the old ash-beds at Gilmour's Mill, in Hull, but, as the Algonkins lived, sometimes, in the Huron country and adopted, to some extent, the customs of their confederates, might not the Hurons, if they came to live with the Algonkins on the Ottawa, have followed the usage of the latter in the selection of their dwelling places.

The evidence, so far obtained, seems to have given us fairly conclusive proofs of Huron occupation of the Ottawa Valley, and the beginning of a new chapter in the history of one of the great native races of Canada, but, as yet, we have no data that gives us a clue to the time of this period of occupation. Our two ossuaries, already referred to, yielded nothing that could be traced to the white trader; yet this is not negative evidence that the interments were made before European contact. The Wellington Street ossuary held quite a number of implements, while that on Aylmer Island had none. As Dr. David Boyle remarks: "The

truth is we are yet in the dark regarding the philosophy of aboriginal burials, and, perhaps will ever remain so." So that in the absence of evidence we can indulge only in conjecture.

It will be remembered that, after the four nations of the Huron Confederacy went down in red ruin beneath the merciless tomahawks of the Iroquois, the conquerors turned their victorious arms against the Neutrals or Attiwanderons; stormed and took their palisaded towns, together with hundreds of prisoners, whom they burnt or adopted, and left a trail of fire and blood along the northern shores of Lake Erie . Then they wheeled in their tracks and rushed, like a pack of famished wolves, upon the Eries or Cats, a kindred tribe to the south of Lake Erie, whom they destroyed utterly in one of the fiercest Indian battles recorded in history. Meanwhile, on the eastern frontiers of the Iroquois Confederacy, the Mohawks were at war with their Algonkin neighbors, the Mohicans, and with their own Iroquoian kinsmen, the Andastes or Conestogas. During a decade of conflict with these opposing forces, a series of bloody reverses had humbled the Mohawk arrogance, when the other four nations of the Iroquois league took up the strife, in the Andaste war. For fifteen years the Iroquois' war-parties traversed the forests towards the Susquehanna before the heroic Andastes were wasted away by the attrition of superior numbers and finally overcome by the Senecas, about the year 1675. Thus, in a period of twenty-five years, from the downfall of the Hurons to the conquest of the Andastes, the Iroquois had triumphed over all the neighboring nations and peace reigned, for a time, over the blood stained wilderness. But, during all these wars, the Confederates were able to send war-parties on the trail to Canada, that kept New France in a turmoil, by cutting off her outposts and wasting her outlying settlements. It is not likely, however, that any of these expeditions went out of their way to attack Algonkin or Huron stragglers on the Ottawa, and these fugitive bands may have remained unmolested for a few years, until their final destruction or dispersion could be made an incident in some more important enterprise of the Iroquois.

Let us now return to the Hurons. In the year 1650, after a terrible winter made horrible by famine, death and the Iroquois, the Jesuits abandoned their last mission fort of Ste. Marie on Ahoendoé —St. Joseph's or Christian Island—and led some three hundred of these unfortunate people to Quebec, by way of the Ottawa. A much larger number, however, who were left behind, were forced by the Iroquois to abandon their fort and retire to Manitoulin Island and the northern forests. But the Iroquois were on their trail; so, finally, loading their canoes, about four

hundred of them took the route of the Ottawa to join their kindred who had preceded them. Other scattered bands followed, from time to time, of which we appear to have no definite record. By this time the whole Ottawa River had been swept by the tornado of Iroquois ferocity and its shores had become a solitude.

Now for our conjecture. Cases are not infrequent in which Indian communities have been forced to abandon their homes, through stress of war, but have again returned to them after some years, when the war cloud had given place to the sunlight of peace. Doubtless, in their wanderings on the northern tributaries of the Ottawa, Algonkin and Huron had alike eaten the bread of adversity and drunk the water of affliction and were ready for any asylum that would afford them a brief period of rest. Now, while the time of the Iroquois was fully occupied in the terrible wars already enumerated, may it not have been possible that some of the fugitive remnants of the Hurons, on their way to Quebec, stopped and settled on the Ottawa, together with similar bands of Algonkins, who had returned to their old camping grounds?

A serious objection, of course, to the theory of Huron occupation of the Ottawa Valley, in the latter half of the seventeenth century, is the presence of Huron pottery in the ash-beds at Hull and Casselman, as the Indians are supposed to have discarded their native earthenware for the brass or copper kettles of the white trader, soon after the advent of Europeans, still, however, it should be borne in mind that the craggan, (see Annual Archaeological Report 1906 (Toronto 1907) pp. 16–18), an earthen vessel of domestic manufacture, made from unrefined clay and similar in design and finish to the very crudest forms of our Indian pottery, was made and used until quite recently—if it is not used, even, to-day—in the kitchens of several of the Scottish Islands, and that these vessels were preferred, for many purposes, to the more costly and highly finished products of modern ceramic art. These craggans were made by housewives to serve, among others, the purposes of drinking vessels and pots for boiling; so that if such prehistoric pottery could have survived among the Scottish Islanders, to a time within the memory of the living in competition with domestic innovations of centuries of civilization, why should not the Hurons of the Ottawa have retained, for a few years at least, the earthenware of their ancestors, under somewhat similar conditions? Finally, William M. Beauchamp[3] refers to a

[3]Earthenware of the New York Aborigines. Bulletin of the New York State Museum, Vol. 5, No. 22, October, 1898, p 80.

similar survival of the use of pottery, among the Iroquois, as follows: "Refuse heaps, by village sites, usually contain a great deal of earthenware, out of which fine or curious fragments are often taken, and these occur also in the ash beds of the old fireplaces. This is so on some quite recent sites, for while the richer Iroquois obtained brass kettles quickly from the whites, their poorer friends continued the primitive art till the beginning of the 18th century at least." Another statement by the same writer, is important, as it would exclude the probability of our pottery being referable to the Algonkins. He writes, in the Bulletin referred to, at page 76, as follows: "In fact, the Canadian Indians do not appear to have used earthenware in early days, with the exception of the allied Hurons and Petuns, the Neutrals and the Iroquois of the St. Lawrence, all of these being of one family. . . . . The nomadic tribes, however, preferred vessels of bark, easily carried but not easily broken. In these they heated water with hot stones, as the Iroquois may sometimes have done."

The above theory, as to the time of Huron occupation, is only a suggestion, unsupported at present by sufficient evidence to prove it. It may turn out, eventually, that the fireplaces of this vanished race grew cold, on the Ottawa, in the dim twilight of a more remote antiquity. Is it possible that, before the coming of the white man, the old Wyandots or Tionnontates, in the course of their traditionary wanderings, so admirably described by William E. Connelley, may have remained for a time on the Ottawa, and left us only their ashbeds and ossuaries to puzzle over?

Another question also suggests itself. Where did the Hurons go to after leaving the Ottawa? They appear and disappear on the stage of tribal activities, either standing boldly forth in some historic incident, or dimly silhouetted by the light of tradition, on the dark back-ground of prehistoric time. Did they migrate, finally, to join their kindred in their distant resting places? Did they fade away, by adoption, into other tribes? Or, were they absorbed by the red cloud of massacre, to disappear forever in the darksome shadow of the illimitable wilderness?

NOTE ON MEGORISMUS FLETCHERI.—In August, 1908, the Destructive Pea Aphis was present in large numbers in the Ottawa district, field and sweet peas in gardens being severely injured. From collected material a number of parasites were reared by me, one kind of which proved to be a new species of hymenoptera This was recently described by Mr. J. C. Crawford* as *Megorismus fletcheri*. The parasitized plant lice were conspicuous on sweet peas in my garden. —ARTHUR GIBSON.

*Canadian Entomologist, March, 1909.

THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, SEPTEMBER, 1909 No. 6

CERTAIN BIOLOGICAL PRINCIPLES AND THEIR PRACTICAL APPLICATION IN THE IMPROVEMENT OF THE FIELD CROPS OF CANADA.

By L. H. NEWMAN, B.S.A., Secretary, Canadian Seed Growers' Association, Ottawa.

(CONTINUED FROM PAGE 91)

THE MUTATION THEORY.

From the evidence brought forth in connection with the theories held by biologists since Darwin's time, it is apparent that the efficacy of natural selection and of the use of fluctuating variations in explaining the facts of evolution, have been steadily losing ground. On the other hand there has been a gradual tendency to regard the part played by "discontinuous" variations or "mutations" as being of more importance in this connection. The supporters of the latter idea have received much encouragement from the work of DeVries of Amsterdam, which work with that of Mendel has served to place the problems of heredity in an entirely new light. The law of Mendel respecting the transmission of characters when two plants are crossed is a large subject in itself and shall not be discussed now. Suffice it to say that the hybridization of varieties as effected in the light of this law is probably the most potent means of producing new varieties that is now within the reach of the expert breeder. The work of DeVries is worthy of special consideration since his discoveries may be said to have marked a new epoch in the long line of investigations of the factors in evolution.

DeVries' idea is that plants and animals are made up of "distinct units" which correspond to atoms in chemistry. By crossing one individual with another the units involved may be combined but never split, just as combinations may be made in chemistry. Transitional forms do not exist between the elements themselves, which assumption goes to support the theory of

descent rather than that of transmution as applied by Darwin and his followers. According to this theory it is possible for new forms to arise suddenly without passing through a transitional stage. The theory of DeVries has the support of certain evidence deduced from results gained from experiments with *Œnothera Lamarckiana*. At least 50,000 plants were cultivated by DeVries in his garden for a number of generations, and out of this number about 800 were found to possess characters distinct from those peculiar to the parent forms. These new forms, moreover, proved to be constant by breeding true in succeeding generations. The occurrence of these forms under domestication may account for the numerous "elementary species" that are found in nature.

The theory of DeVries is not new. We have noticed how the idea of the creating of new species by the sudden variation of organisms prevailed among some writers of a comparatively early period. In 1864 Von Kolliker, convinced of the weakness of the natural selection theory, promulgated the theory that new and distinct species are born suddenly by leaps. In 1899, Korschinsky, a Russian botanist, as the result of certain observations and study, formulated the mutation theory. The publication in 1901 by DeVries of his first book on "Die Mutationstheorie" was the first public recognition of importance which this theory received. DeVries' theory is alternative with that of Darwin's as regards the formation of new species, but as regards the general course of evolution and the great principles which govern it the mutation theory is not in contradiction to the descent theory through natural selection, but is rather supplementary to it.

After considering the main principles which are associated with the various theories we have outlined we are forced to make the following conclusions, viz.:—

(1) That no two plants are exactly alike.

(2) That while "like begets like" in the main yet there is a constant and continual variation going on within the species.

(3) That some of these variations are fluctuating and unstable while others are discontinuous and determinate.

(4) That artificial selection of desirable fluctuating variations may raise the standard above the average of the race at least, although the limitations of this method of selection are recognized.

(5) That the artificial selection of discontinuous variations may result in the developement of superior new strains.

(6) That a combination of desirable characters through hybridization may result in the creation of hybrids possessed of special merit.

With these conclusions in mind it is a comparatively simple matter to draw up a plan whereby man may systematically and scientifically utilize the forces of nature to his own advantage. The systematic selection of what we are now pleased to call fluctuating variations in field crops with a view to preventing deterioration is a very ancient practise. The idea of actually improving our crops is, however, of comparatively recent origin. Once improvement was considered possible several systems were devised. The Germans followed Darwin's enunciation that improvement was a gradual process resulting in the accumulation of slight favorable variations, hence, we have "The German system of plant improvement." We have a concrete example of the improvement that may be effected by this system in the famous Schlanstedt rye originated or developed by Rimpau. This system is practised largely in Canada at the present time by members of the Canadian Seed Growers' Association.

Le Couteur, an Englishman who worked during the beginning of the 19th century is said to be the first to apply the principle of selection to the improvement of cereals by selecting elementary types from the growing crop. One of his most noted selections is the Bellevue de Talavera wheat which originated from a single plant selected from the regular field. This was apparently a mutation as it continues to breed true and to show very slight deviation.

Patrick Sherriff, another Englishman, working about the middle of the 19th century produced the Mungoswell's wheat after making many attempts to isolate superior plants. This wheat is still said to be popular in certain parts of Great Britain.

In 1857, F. T. Hallett, of Brighton, England, began a line of work from another point of view. He believed that each plant had one best head and that each head had one best kernel. By making repeated selections through several generations the yield was materially increased when suddenly the maximum seemed to be reached and further improvement ceased.

During the last 20 years Dr. Nilsson, of Svalöf, Sweden, has been engaged in the breeding and improving of cereals and has secured some remarkable results. At first Nilsson practised the selection of such apparent fluctuating variations as appeared in the field sown in the ordinary way. He found, however, that his results by this method were not very satisfactory, so he changed his system and adopted the plan of selecting and propagating individual plants and, by a process of elimination, finally isolating those which were most desirable. This system enabled him to discover and take advantage of some of the mutations which might appear from time to time, and at the

same time to choose a pure, superior elementary type as the foundation for a better strain, believing as he does with DeVries that our ordinary strains are composed of what the latter calls "a motley mixture of types."

This idea seems to have taken root in the minds of the majority of our scientific breeders of to-day who recognize, in the various methods they have adopted, the underlying principles which have been so ably demonstrated by these men. At the same time there is undoubtedly a very practical advantage in following the simpler practice of selecting fluctuating variations, a practice which the ordinary farmer can easily follow on his own farm.

THE CANADIAN SEED GROWERS' ASSOCIATION AND ITS WORK.

Realizing the great national importance of the use of "better-bred" seed on the farms of Canada as a whole, and recognizing the fact that much might and should be done by way of producing such seed on the individual farms throughout the country, the promoters of this work, notably Dr. Jas. W. Robertson, took certain steps which led up to the organization of the Canadian Seed Growers' Association as a means of encouraging its advancement.

The basic principle upon which the work of the Association is founded is that the artificial selection of the best seed from the best plants year after year without interruption is likely to result in a definite improvement within the ordinary strain, although the limitations of this method of selection as a means of improvement are recognized.

As to the exact course which is followed by each member of the Association who desires to improve any one or more of his crops through giving special attention to the matter of "breeding" in his seed this in brief is as follows: The grower first decides upon the variety which is likely to do best on his farm. This is done by testing two or three leading varieties in plots under similar conditions for the first year. The next step is to prepare a special area of land of about one-quarter acre in size and to sow thereon a good clean sample of seed of the chosen variety. When the crop on this plot becomes thoroughly ripe the grower goes through the plot with a basket or sack, picking here a head and there a head, his choice being based upon the vigor and general type, first of the mother plant and secondly of the head which it bears. Enough seed is secured by the selection of these specially desirable heads each year to give a sufficient quantity of seed to sow another plot the following year while the remainder of the plot is harvested in the usual way and the seed used for the main crop.

The above practise is, in essence, the selecting of fluctuating variations which, if continued, results in raising the "mean" of the ordinary strain to a higher plain. Some authorities such as Johannsen, Pearson and DeVries contend that the selecting of fluctuating characters can do little by way of improving the race. They admit, in part at least, that the average or "mean" of the race or strain may be raised by this means, but claim that once selection ceases the erst-while improved strain will return to its original condition. Of this contention Plate says: "This theory is based on forms which have been highly modified within a few years, so that there has not been a sufficient time to modify the original hereditary tendency established by centuries. Many facts indicate that the intensity of heredity depends upon the number of generations during which selection has been practised. Long inherited characters are difficult to eradicate; recent ones easy. Many gradually selected races of doves are now almost entirely constant. A race developed artificially by slow, persistent selection for a great number of years would show the same relative fixity of types as do our natural species." The results realized thus far by the Association through this method of selection strongly show that a definite improvement has been made in the original strain. This improvement has taken the form of increased yields, better quality, greater uniformity and purity, greater vigor and greater ability to resist disease. Though it may be necessary to continue the selection from year to year in order to maintain the standard yet such seems to be justified by the results accruing therefrom.

In the past certain specially progressive and observant growers have found heads of grain in their fields which were so distinctly different from any others that they kept them separate and sowed the seed secured therefrom in their garden with the result that in many cases new varieties have been developed. These strange plants were undoubtedly mutations. As examples of these we have the Dawson's Golden Chaff wheat, Goldthorpe barley and many other well known varieties. This is a line of work which should be encouraged as much as possible.

Other members of the Association have found time to follow the more complicated system of selecting and propagating individual plants separately, and by a process of elimination finally isolating pure so-called "elementary" types. This latter method which is based on the DeVriesian theory, is probably the quickest and safest to follow, but on account of the amount of careful work and detail which is involved it is not a system which the Association is strongly recommending at present for the average farmer in the improvement of his smaller grain crops.

In the case of corn and potatoes, however, this method is being followed with most gratifying success.

This article is designed to correlate the practical and the scientific side of plant improvement. Once the creation and development of forms of plant life become associated with recognized laws and principles, the prosaic element quickly disappears and we regard these things in an entirely new light. Then it is that real progress is possible. The associating of natural law with the every-day industry of crop raising is the primary aim of the Canadian Seed Growers' Association.

FIELD NOTES OF CANADIAN BOTANY. I.

BY EDWARD L. GREENE.

Twenty years ago I had botanized a little in the beautiful woodland wilderness that then lay within an hour's walk of Victoria, Vancouver Island; also at several points on the British Columbian mainland, and even on the prairies of Manitoba. Never, however, until this season of 1909, had I done any field work in any part of the Dominion lying eastward of the Great Lakes.

Such readers of the OTTAWA NATURALIST as may have noted my rather numerous botanical papers published herein during at least a dozen years past, and may have observed that these contributions were all made upon specimens communicated to me by mail, supplemented by the field notes of those who had sent them—such readers will easily imagine that I would be likely to enter upon field studies of Ontario vegetation myself with keenest interest, not to say with some enthusiasm.

It was a little before the middle of June that from Port Huron, Michigan, I crossed into Ontario. Certain critical observations on the surpassingly rich flora of the Port Huron district—where my herborizings were greatly helped and furthered by Mr. Charles K. Dodge, the resident botanist—had induced me to make my first halt within Ontario at a distance of only some fifty miles to the eastward of Port Huron and Sarnia. At Sarnia, just on the Canadian border, Mr. Dodge had done much field work, and, as he informed me, he had once had the happiness of conducting to its richest botanical garden spots, the veteran Professor John Macoun. I sought, as I always prefer to do, newer ground, and had fixed upon Strathroy in Middlesex as a first stopping place; this without having taken counsel of any one except the maker of my pocket map of Ontario, and partly because I had never heard that any one had botanized there.

However, Strathroy was indicated as one of the small towns, and from such, good botanizing is apt to be found at the end of very short walks. Also, according to the map a river—the Sydenham—seemed to course near this town; an augury of more diversity in the flora and silva than strictly prairie or mere upland districts are favored with.

Landing at the railway station of this pleasant village a half-hour before noon of June 12th, less than two hours later, portfolio in hand, I walked forth on my first herborizing stroll in Ontario. Having reached within a few minutes the furthermost and half meadowy outskirts of the town, I beheld close at hand a depression in the open landscape, out of the midst of which arose the familiar narrowly cone-shaped heads of larches and arbor vitæ. No prospect could have pleased me more; and within a very few minutes I was in the midst of this tamarack marsh. The arboreal vegetation of this I found to be quite different from that of such tamarack swamps of southern Wisconsin as I had been familiar with long years ago. There the larches had been the only trees, and these so closely set as to form a thicket hard to penetrate. Here there was no density of arboreal growth. The larches stood somewhat apart from one another, and there was arbor vitæ freely interspersed; and there was no dearth of deciduous trees, red maple, ash, basswood and some others; but these small for their kind and slender; and the habitat of them all was subaquatic; for everywhere one had to pick his way along tufts of sedge, and the superficial roots of trees, to avoid sinking over shoe in water.

Between the dry bank that encircles the swamp and its wooded portion one crosses in most places a narrow belt or rim of Carices without shrubs or even much other herbaceous vegetation; usually more or less of marsh marigold and skunk cabbage. Here the ground is firmer and less aqueous.

Another treeless and shrubless portion of the tract is central, and consists of a somewhat sinuously outlined shallow pond, occupied mostly by yellow pond lilies, the muddy shore of it beset with *Calla palustris*, this not yet in flower in the middle of June.

Bounded on the outside by the narrow rim of the caricetum, and within by the considerable expanse of the calla-nymphæa pond, the main body of the marsh, where grow the hydrophile trees already listed, is the really paradisiacal part of it, as viewed by the botanical eye; for here, the woods being quite open, the open spaces are filled with a rich diversity of herbaceous plants,

Geum rivale, *Spathyema fœtidum* and *Caltha parnassifolia** in a particularly tall and robust form being among the largest. In one place only I saw a colony of *Smilacina trifolia*, this just past flowering; and there were observed several groups of *Clintonia borealis*, some of the plants still in flower ; but *Unifolium canadense* was almost everywhere, as also *Trientalis americana*. *Naumburgia thyrsiflora* was frequent, also larger than I am used to seeing it, but *Comarum palustre* was not seen, neither *Menyanthes*. No cranberry was seen, or any orchids whatsoever. In these particulars this Ontario larch swamp was in marked contrast with those I had become acquainted with in regions lying to the westward of Lake Michigan.

On my first entrance to the swamp I was delighted by the sight of a large decaying stump beautifully mantled with *Linnæa borealis* in full bloom. I did not again meet with the plant in this bog, or even in the Strathroy district anywhere.

On account of my deep interest in northern violets I regretted the lateness of my arrival in western Ontario, for I knew that by the middle of June all the earlier species would have passed their season of petaliferous flowering. In the caricetum border of this marsh I observed what seemed to be *V. cucullata*, growing as usual among the tufts of hydrophile sedges, but no flowers were seen. It was quite too late for them. At this moment, however, and scarcely two rods away, though now hidden from view by the trees and shrubbery intervening, there was blooming beautifully and almost copiously my *V. prionosepala*, as I shortly discovered. Within this sparsely wooded and bushy portion of the marsh all sorts of very wet spaces not occupied by larger herbaceous plants were quite filled with the combination of a small galium, a slender stellaria, and this particular violet, and there was no other violet associated with it. This was the first time I had seen the species growing; at least the first time since my publication of it. I had described it from very excellent herbarium specimens, supplemented by full, intelligible and most satisfactory notes, all supplied by valued correspondents.† As I now revert to my original account of this fine species, it is something of a gratification to read how perfectly, even if mainly by the light of the mere dried specimens, I had divined the nature of this plant's habitat as compared with that of *V. cucullata*. The plants of *V. prionosepala* are

*During some years past I have been convinced that we have no *Caltha palustris* in North America; and that our plant is specifically distinct from the European type of the genus was seen by Rafinesque more than a hundred years since. It was in 1807 that he published our plant as *C. parnassifolia*, in heating, among other characters the important one of its elliptic sepals. Those of the Old World plant are broadly round-obvate.

†VIOLA PRIONOSEPALA, Greene, Pittonia, V. 99 (1902).

sepala grow singly as I had said, never like the other in tufts; and it would be difficult to name another acaulescent purple violet the leaves of which are so far from being describable as cucullate. Their almost absolute flatness contrasts strongly with the constantly involute foliage of the other. Not one of the marks at first attributed to *V. prionosepala* seems thus far to fail; but not until I had seen the two flourishing in their native haunts, and on the same acre of wild land, did I apprehend the matter of the difference in their respective times of flowering.

At one or two points in this Strathroy swamp I observed colonies of *V. blanda:* Over and above these two I saw here no other stemless violets.

THE PRAIRIE WARBLER (*DENDROICA DISCOLOR*) IN NORTHERN ONTARIO AND OTHER NOTES.

BY G. EIFRIG, OTTAWA.

On May 11th of this year the writer found a specimen of the Prairie Warbler on the edge of Lake Doré, near Eganville, Renfrew County. This is a distinctly southern form, whose metropolis is, say in the latitude of the State of Maryland. The northernmost points at which it has been taken so far are at Mt. Forest, Wellington County—and that once only, if I mistake not—and at Toronto, twice. So its finding in Renfrew County means quite an extension northward of its hitherto known range. Its occurrence there proved all the more remarkable, since it was a single female seen and taken, whereas in nearly all species of birds, if the two sexes do not migrate together, it is always the males that arrive first. Besides, the weather before the 11th had been so uninviting, cold and rainy—the thermometer stood at 35°-45° for more than a week previously, with the exception of two warmer days—that there were very few of even the hardy northern warblers to be seen, only one Myrtle Warbler and one Black and White Creeping Warbler being seen in a stay of hours at the edge of the lake and in the vicinity. Furthermore, whereas in its true home it is a bird that confines itself strictly to warm, dry hillsides and similar dry localities, this one was laboriously clambering about in the alder bushes at the water's edge, sometimes over the water. The bird was taken and is now in the writer's collection.

The occurrence of this southern species so far north seems to lend weight to a theory the writer has held for several years past, viz., that there is a distinct movement northward discernible on the part of the birds. Thus, the Chewink (*Pipilo*

erythrophthalmus), otherwise almost unknown at Ottawa, has been seen and taken here for two or three years past, even at Buckingham, Quebec. This spring, already, it has been noted twice on Parliament Hill and at Marshall's Bay near Arnprior. Likewise the Mourning Dove (*Zenaidura macroura*) seemingly is forging northward, as it has been seen the past three summers at Shirley's Bay, near Ottawa. And it is interesting to note how the Carolina Wren (*Thryothorus ludovicianus*) is becoming commoner all the time in southern Ontario and advancing a little further northward each year. If this apparent tendency in birds is a fact and will remain and increase in strength, it is certainly a state of things much to be wished for by all nature-lovers in this vicinity.

It may be of interest to ornithologists generally, that the flock of Evening Grosbeaks (*Hesperiphona vespertina*), which took up their abode in Ottawa, February 7th (see OTTAWA NATURALIST, Vol. xxii, p. 263), and were not seen after the end of March, were rediscovered by Mr. H. Groh in swampy woods at the end of the dump, Patterson's Creek, on April 29th, and the next day made their appearance again at the home of Mr. Odell, corner Cartier and Somerset Streets, who had reported them first and on whose trees they stayed the greater part of the time during their first stay in the city. And then they remained in the Patterson Creek woods in ever diminishing number *until May 15th*, when the last two were seen by Mr. Groh. That is a remarkably long stay for this bird, which, when it comes southward into civilization at all, usually departs again to its northern haunts in March. It may also be added here, what had been forgotten in the article in the March number, that already in November an Evening Grosbeak had been seen and taken by Mr. Wm. McComber, of Bouchette, in the Gatineau Valley, Quebec, who upon being asked for more information, wrote that the specimen had been alone, seemed dazed and lost and did not feed while under observation, a fact borne out by the stomach examination made by the writer.

Last spring was an unusually backward one hereabouts. March, April and the first part of May were unusually cold and wet. There were few nights in April without frost. As might be expected the birds were also late in their coming. The first migrants that come in a wave about March 21st to 27th, like the Song Sparrow, Junco, Redwings, Bronzed Grackles, Robins and Bluebirds, were, as a wave, more than a week late. And this lateness kept on during April. Some species, however, do not let any cold, etc., bring them out of their usual time, like the Crow and Killdeer, the former of which were even earlier

this year than in others. Of course, when anything like the usual amount of warmth comes, the lateness of arrival stops with most species, some even coming earlier than their usual average time, and several interesting anomalies are thus produced. This year, the Blackpoll Warbler (*D. striata*) and the Baybreasted Warbler, (*D. castanea*) *as a wave*, apparently keep up the late setting in of the first migrants, for the former have so far not been observed by the writer and the latter only in a few stray individuals.

There was also an unusual abundance of Redpolls (*Acanthis linaria*) here last spring, a condition reported also from many places in the New England and Middle Atlantic States. They were more common here than other seasons throughout the winter, but in April they appeared in veritable clouds. On April 15th, the writer saw two to three large flocks near the Rifle Range, and on the same day an immense flock covered as it were a large part of Rideauville, individuals being seen on every branch and twig of every tree for quite a distance. And strange to say, these flocks at this time were flying south. On April 27th, Mr. Bedard, the Rifle Range Keeper, saw a flock he estimated at 2,000. And these large flocks were coming and going up to May 6th.

Ottawa, 26th May, 1909.

A REMARKABLE MIGRATION OF YELLOW-BELLIED SAPSUCKERS.

BY A. B. KLUGH, KINGSTON, ONT.

On the morning of April 17th, 1909, the city of Kingston, Ontario, was alive with Yellow-bellied Sapsuckers.

From my study window I saw some twenty of them on the trees at the lodge of the park and on going out to investigate I found from one to four on nearly every tree. As a conservative estimate I placed the number of birds in the park at three hundred.

In the grounds of Queen's University I found the same conditions prevailing.

Mr. Edwin Beaupre informed me that the birds were abundant in Princess Street (the main thoroughfare of Kingston) on the telegraph poles and woodwork of the doors and windows of the stores.

Mr. C. L. Hays of the Queen's University Naturalist's Club told me that every tree along University Avenue had at least one bird on it and that on one tree he counted seven.

Mr. R. F. Kelso, another member of the Club, said that every tree along Johnston Street had its Sapsucker, and from various sources I learned that the birds were equally abundant all over the city. The great majority of the birds were males, though here and there a female was to be seen.

A very conservative estimate of the number of Yellow-bellied Sapsuckers in the city would be five thousand; in fact Mr. Beaupre believes that there were far more than this present on the morning of April 17th.

For the next few days the Sapsuckers were still very common in the city, and were still so when I left on April 22nd. After this they decreased rapidly in numbers as my father wrote me a few days later and said that only a few were then to be seen.

The Sapsuckers were very busy on the maple trees (mostly Acer saccharinum), and in many cases trees which I examined had rings of holes completely round them, but the holes were not close enough together to "girdle" the trees.

The probable cause of this immense wave of Yellow-bellied Sapsuckers striking Kingston lies in the strong gale from the north which was blowing on the night of April 16th, the birds apparently dropping as soon as they had crossed the lake.

THE RAPID EXTERMINATION OF THE BALD EAGLE.

BY W. E. SAUNDERS, LONDON, ONT.

There has been a good deal of discussion during the past decade or two concerning the usefulness or otherwise of the various species of birds of prey. As regards the diurnal birds of prey, debate has usually ended in a favorable verdict towards all those that spend the summer in Ontario, with the exception of two species. With reference to this small number which has fallen under the ban, I must say that my faith in the wisdom of the Creator in placing such birds on the earth is too strong to be shaken by any evidence that may be produced to show that somebody has lost a few dollars by these birds in any particular year. However that may be, the subject of this article has never, I think, been condemned as injurious. His daily fare is gleaned mostly from the edges of the large waters, and while his scavenging habits cannot be held up for admiration, yet a substantial plea may be made for the protection of the Bald Eagle on the ground of the added picturesqueness which he gives to the landscape. It is to be deplored that every large bird is a mark for the wanton gunner, and under this head I am sorry to say most of our sportsmen fall, when

judged on the basis of the needless slaughter of large birds for which they have no use.

Of course, the Eagle is wary. Were it not so he would long since have become extinct as far as Ontario is concerned, but even with all his craft, the bird is far less numerous to-day than twenty years ago and is yearly suffering a steady diminution in numbers. He is usually to be seen along the larger bodies of water, and there is no wild thing in which as much interest is taken by the tourist on the steamers, or persons along the lake shore, than the presence of this great bird. "There is an Eagle" is an exclamation that instantly draws the attention of every person within hearing, during travel by boat in the summer, and everyone enjoys seeing these great birds wing their easy way. How splendid it would be if legislation could be enacted giving protection which would eventually restore this species to something like its former numbers. In years gone by every lake of more than a few acres had its pair of nesting Eagles and along the big lakes every few miles would disclose a nest. Within the writer's recollection, in fact within fifteen years, there was along the north shore of Lake Erie a nest more frequently than every ten miles.

Most hunters and farmers regard big things solely as something to be shot and consequently the Eagle is growing scarcer and scarcer with each succeeding year.

It seems necessary for every nature lover to take this matter to heart and to make it his personal business to propagate the idea of protection for large birds.

BOOK REVIEW.

OUR INSECT FRIENDS AND ENEMIES—The Relation of Insects to man, to other animals, to one another, and to plants, with a chapter on the War Against Insects. By John B. Smith, Sc.D. Philadelphia and London, J. B. Lippincott Company, 1909. This splendid work of 314 pp., by the above recognized authority, is a very welcome addition to the literature of Entomology. Dr. Smith has divided the book into 12 chapters, viz.: (I) Insects in their Relation to the Animal Kingdom; (II) Insects in their Relation to Plants as Benefactors; (III) Insects in their Relation to Plants as Destroyers; (IV) Insects in their Relation to each other; (V) Insects in their Relation to the Animals that feed on them; (VI) Insects in their Relation to Weather and Diseases that affect them; (VII) Insects in their Relation to other Animals; (VIII) Insects in their Relation to Man as Benefactors;

(IX) Insects in their Relation to Man, as Carriers of Diseases; (X) Insects in their Relation to the Household; (XI) Insects in their Relation to the Farmer and Fruit Grower; (XII) The War on Insects.

From the above titles it will be seen that the work is of a very wide nature. It is impossible in the space here available to refer at any length to any portions of the book. It is one which will be found of much value, not only to the student of insects, but to anyone who is at all interested in the lower forms of animals. Chapter IX on Insects as Carriers of Diseases, will be found of special interest just now, in view of the wide-spread investigations which are being held in this direction. The whole work is full of information and will doubtless have a very wide sale. It is illustrated by many figures in the text, and at the beginning there is a full-paged coloured plate of some of the commoner insects which are troublesome in houses. The work is well printed, and we congratulate the author on this latest of his many publications. A. G.

OBITUARY NOTICE.

J. F. WHITEAVES, LL.D., F.G.S., F.R.S.C.

It is difficult to realize that the distinguished Palæontologist of the Geological Survey, Joseph Frederick Whiteaves, has passed from amongst us! By his death, which occurred on Sunday, the 8th of August, after an illness of some months' duration, the Geological Survey has lost one of the ablest of its members, and Canada one of her best known workers in geological science.

Dr. Whiteaves was born in Oxford, England, in 1835, and first came to this country in 1861 on a short visit. The following year he again crossed the Atlantic, this time to remain in Canada, taking up his residence in Montreal. Here he was for twelve years officially connected with the Montreal Natural History Society as its recording secretary and scientific curator of its museum.

In 1876 he was appointed to the staff of the Geological Survey as Palæontologist in succession to the late Mr. E. Billings, the first palæontologist to the Survey. How wise a selection this was, after years amply proved. He was made one of the Assistant Directors in 1877, and Zoologist in 1883.

As a boy he attended private schools in Oxford and London, and early developed a liking for natural science. Following the bent of his inclinations he studied the fauna and flora of Ox-

fordshire and became deeply interested in the geology of the neighbourhood of Oxford. At this time he took advantage of lectures to advanced students delivered by eminent professors of the day in the university of his native town.

At the age of twenty-two his first paper "On the Land and Fresh Water Mollusca inhabiting the neighbourhood of Oxford," was published by the Ashmolean Society, of which society he was shortly after made an honorary member. In 1859 he was elected a Fellow of the Geological Society of London. Two years later, as the result of his study of fossils of his own collecting, during a period of several years, near Oxford, he published two palæontological papers, one "On the Invertebrate Fauna of the Lower Oölites," the other on the fossils of the Coralline Oölites. These contributions established his reputation as a palæontologist, and served as an index to what might be expected of him in the future.

Coming to Canada and residing in Montreal he continued zoölogical and palæontological studies in a vastly enlarged field. Between the years 1863 and 1875 whilst connected with the Natural History Society of Montreal, besides publishing papers on the fossils of the formations of the island of Montreal and vicinity, he was the author of a number of valuable reports on the results of deep-sea dredging operations conducted by him, in the Gulf of St. Lawrence, the cost of which were defrayed by the Dominion Government.

It was, however, when he was appointed Palæontologist to the Geological Survey, in 1876, that his mental energy and natural aptitude for palæontological research found full scope. He then had ample opportunity to prove himself a most worthy successor to the distinguished scientist who preceded him in office. That this opportunity was fully utilized is proved by the long list of his official reports, and papers, contributed to scientific journals, during the last thirty-three years of his career. His volume of "Contributions to Canadian Palæontology," his monumental works on the Palæozoic and Mesozoic Fossils of Canada, and his splendid descriptions of the fossil fishes of Quebec and New Brunswick would alone have earned for him a world-wide reputation as a careful observer, a close reasoner, and a lucid writer. Space admits only of a brief reference to the published results of his studies of the recent marine invertebrata of the Atlantic and Pacific coasts of the Dominion. The wide scope of his palæontological and zöological writings can be fully realized only after reading through a list of his many publications. These number nearly one hundred

and fifty, in which over four hundred and fifty genera, species, and varieties are described as new to science.

The benefit resulting from the application of his palæontological knowledge to the solving of geological problems in this country cannot be overestimated. His untiring industry, backed by a clear perception and thorough grasp of the essentials of palæontology in its relation to geology, has given us enduring results which will carry his name down to posterity inseparably linked with those of Logan, Selwyn, Dawson, George Dawson and Billings. His scientific reputation was world-wide.

Dr. Whiteaves was one of the original Fellows of the Royal Society of Canada. He was also a Fellow of the Geological Society of London, an honorary member of the Yorkshire Philosophical Society, England, a member of the Manitoba Historical and Scientific Society, of the Montreal Natural History Society, and of the American Association for the Advancement of Science. In 1900, the honorary degree of LL.D. was conferred on him by McGill University, and in 1907 he was awarded the "Lyell Medal" by the Geological Society of London

He was a member of the Church of England and was twice married. He leaves a widow, a son and two daughters, resident in Ottawa.

Of a generous and kindly disposition and always ready to impart information when his aid was invoked, Dr. Whiteaves was an ideal type of a man imbued with the professional spirit, striving for the best results, not satisfied with half measure, and ever urged on by the love of his work. With a keen sense of humour, well versed in literature, and an ardent admirer of all that is best in art, his companionship was sought after and much appreciated by all who were fortunate enough to be brought into contact with him. His life was indeed an example of intellectual culture founded on a sound moral basis.

His death is a national loss; the Geological Survey of Canada in particular will feel the adverse effect of his removal; his name will ever remain emblematic of all that is honourable, true and upright in a man.

L. M. L.

ANNUAL SUBSCRIPTIONS. Members of the Club who have not paid their fee for the year 1909-1910 are particularly requested to send the same to the Treasurer at an early date.

THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, OCTOBER, 1909 No. 7

NOTES FROM THE HERBARIUM OF THE GEOLOGICAL SURVEY OF CANADA.

By James M. Macoun.

Arabis Whitedii, Piper, Bull. Torr. Bot. Club, xxviii: 39.

Near Sidley, west of Midway, B.C., 1905. Herb. No. 70,820. (*W. Spreadborough*). New to Canada. Only flowering specimens were collected and these in general appearance resemble *Lesquerella* rather than *Arabis*. Determined by Dr. Greene.

Lepidium campestre, (L.) R. Br.

Becoming common in Eastern Canada, especially in Ontario. Collected at Lower Montague, Prince Edward Island, by Mr. Geo. A. Amear.

Spiræa pyramidata, Greene, Pittonia II: 221.

S. Douglasii, var. *Nobleana*, Can. Rec. Sci., 1895, p. 3.

The plant which was referred above by the writer to *S. Douglasii*, var. *Nobleana*, proves to be *S. pyramidata*. It was collected at Sicamous, B.C., by Prof. Macoun. A single bush over five feet high of what is doubtfully referred here was found growing along the trail near Lake House, Skagit River, B.C., by J. M. Macoun, June 27, 1905, No. 69,957. The flowers were too immature for definite determination, but unless a hybrid between *S. lucida* and *S. Menziesii*, both of which grew near, it is probably this species. Spreadborough in 1906 found a bush in flower at 4,500 ft. alt. near Chilliwack Lake, B.C., No. 72,872, and again with *S. lucida* and *S. Menziesii* which makes it more probable that this white-flowered bush is a hybrid.

Spiræa densiflora, Nutt.; Torr. & Gray. Fl. I: 414.

S. betulæfolia var. *rosea*, Gray.

S. arbuscula, Greene.

Recorded from the Selkirk Mts., B.C., by many collectors. Not rare in the Chilliwack Valley, B.C., between 4,000 and 6,000

feet altitude, Nos. 34,822, 34,823; abundant at 5,000 feet altitude on one mountain near the second summit west of Skagit River, B.C., No. 69,949. Not seen elsewhere in the Skagit Valley. (*J. M. Macoun.*)

SPIRÆA DOUGLASII, Hook.

Abundant at Chilliwack, B.C., No. 34,819, and Sumas Lake, B.C., No. 34,820. (*J. M. Macoun.*) Not before recorded from the B. C. mainland.

PETASITES DENTATA, Blankinship, Mon. Agr. Coll. Sci. Stu. I: 64.

P. sagittata, Macoun, Cat. Can. Pl. I: 260 in part.

Long separated from *P. sagittata* in our herbarium but without a name. The shape of the leaf is intermediate between those of *P. palmata* and *P. sagittata*. Pursh described the radical leaves of *P. sagittata* as being "oblongis acutis sagittatis integerimus, lobis obtusis." The specimens he saw were from Hudson Bay. Gray in order to include western specimens changed the description of the leaves to "deltoid-oblong to reniform-hastate, from acute to rounded-obtuse, repand-dentate." A common species throughout the prairie region extending west at least to the Rocky Mountains. In British Columbia it is replaced by *P. speciosa*. Dr. Greene, (*Leaflets* p. 180), described a plant collected by Prof. Macoun at Emerson, Man., in 1880, (Herb. No. 72375), calling it *P. vitifolia*. The configuration of the leaf is quite unlike that of any of the specimens referred to *P. dentata*.

VERNONIA CORYMBOSA. Schweinitz.

Damp prairies, near Morris, Man., Aug. 8th, 1906, No. 23,104. (*John Macoun.*) Not before recorded from Canada. Vernonias are abundant in southwestern Ontario and from that region we have specimens which have been referred to *V. gigantea*, *V. jasiculata* and *V. Drummondii* and what appear to be typical plants of all three are in our herbarium, but other specimens cannot certainly be determined so that they cannot yet be recorded.

DISCOURSES UPON THE LEPIDOPTERA.
I. VARIATION.

BY. F H. WOLLEY-DOD, MILLARVILLE, ALTA.

In Europe, more particularly in the British Isles, species of lepidoptera are less frequently confused, and variation far better understood, than on the North American continent. Many of

the reasons for this are obvious. Collecting dates back to much earlier times, and a very large proportion of existing species have been repeatedly bred. Not only is the population far greater than in this country, but the proportion of collectors amongst them is greater also. The latter fact is perhaps due to hobbies being more encouraged, and more people having leisure and opportunities for their pursuit. Access to the best named collections is easier, and there are far more well illustrated books on the subject. From all this it follows that there is a wider interest taken in the study of lepidoptera by those who have a taste for the science, and there is less diversity of opinion as to correct names. On this continent the scarcity of illustrated literature, and difficulty of getting any expert opinion at all, owing to the distances which specimens have to be sent, at considerable risk and trouble, is in itself some deterrent to the few interested, not to mention the time which must elapse before receiving any opinions at all, the difference of opinion received from different quarters, or at different times from the same quarter—it may be even on the same specimen—besides the toll sometimes levied for opinion given, all tend in some degree to discourage the hobby.

The variation in some well known European species of lepidoptera has, by careful breeding from known parents, been proved to be enormous. Some closely allied species which may perhaps be almost exactly alike, show certain slight points of difference which neither ever exceed. In other instances, the prevailing forms of two species may be entirely dissimilar, yet one or both may ordinarily develop varieties looking, to the untrained eye, not only exactly like the other, but like several other usually quite dissimilar species. In a country like England it is rarely that a specimen is found which cannot be recognized by an expert as a known form of some species, notwithstanding its greater resemblance in very many points to other species. It sometimes happens that a species does not possess any characters, whether of color, individual markings, or even shape of wing, which do not vary to apparently well within the limits to which other species extend. Particularly is this the case in the genus *Euxoa*, or *Paragrotis*, as some authors call it. In general, however, such species have, to those familiar with them, something by which the relationship may be correctly discerned, it may be either by a character, or combination of characters, or by the general appearance so confusingly like, yet, in some indefinable way, as a whole, disassociable with, another species. Yet occasionally specimens occur which puzzle even those who know the species best.

A special study is made by many European collectors of local variation. Some species seem to appear in the same form wherever they exist, scarcely varying at all in any essential

characters, either in any one locality, or differing in one locality from another. Such are called constant species. Others may be very constant in any one locality, yet appear in more or less modified forms in different localities, according to geographical, geological, or climatic conditions. Others may be constant in one locality, but show considerable range of variation in another; or may vary to a greater or less degree towards a certain form in one place, and towards quite a different form in another. But few that vary at all in any locality, vary to the same degree, or within the same limits wherever they occur. In short, whilst some species do not vary to any extent anywhere, others seem, as it were, to lend themselves enormously to local variation. In some instances difference of food-plant is accountable in a great measure for variation in size and color, and it has been observed that the fact of a larva confining itself to different food-plants in different parts of the country does not necessarily indicate different species. Breeding, and careful records of early stages, have often resulted in a distinct specific relationship having been traced through between forms presenting somewhat striking differences in different habitats, which might otherwise easily have passed as distinct species. The expression "specific relationship" must not be taken to mean positive "specific identity," as the legitimate use of that expression will depend on the concise meaning attached to the word "species," briefly discussed in a previous paper.

Some species have seasonal varieties, that is, they pass through their entire metamorphoses more than once a year, and the different breeds assume different characters, according to the season or length of time spent in larval and pupal stages. Others show dimorphic variation, sometimes in one sex, sometimes in both. That is to say, two different forms, suggesting two species, can be bred from the same batch of eggs, even without any actually intermediate form appearing at all. And this may occur regularly in some localities, never in others. In both the foregoing instances, as in many others, unfamiliarity with the species concerned has resulted in the separation of what are merely varieties into species. In some years too, a species shows a stronger tendency to a certain form of variation than in others.

A species varying differently, or appearing under a modified form, in different localities, is said to exist in those localities in the form of a "local race," which is sometimes referred to, with doubtful justice, as an "incipient species." It is questionable whether a truly distinct species can ever be evolved whilst direct specific relationship can be maintained by interbreeding, on what may be called, for convenience, the confines of their range, or where the races meet. Complete isolation from blood relationship for a lengthy period under special conditions, is probably necessary before a race can be said to begin to exist

under a truly specialized form, i.e., pass from an incipient species to a "subspecies" and finally to a true "species" in its most exclusive sense.

BIRDS OF STONY PLAIN, ALBERTA.

BY SIDNEY S. S. STANSELL.

Name of Bird	When First Seen 1908	When First Seen 1907	Does it Breed	Remarks
Blue Jay	Jan. 1	Apr. 12	yes	Quite common.
Canada Jay	" "	" 1	"	Our most abundant Jay.
Hudsonian Chickadee	" "	.....	?	Probably breeds.
Chickadee	" "	Apr. 1	yes	Very common.
Western Great Horned Owl	" "	June 19	"	A great many.
Arctic Three-toed Woodpecker	" "	.....	.....	Common in early winter.
Gray-crowned Leucosticte	" "	.....	no	Abundant winter resident.
Snow Bunting	" "	.....	no	Abundant winter resident.
Pine Grosbeak	" "	.....	.....	Common in early winter.
Redpoll	" "	Apr. 1	.....	Common during early winter.
White-winged Crossbill	" "	July 30	yes	Common.
Northern Hairy Woodpecker	" "	.....	"	Quite Common.
Northern Downy Woodpecker	" "	.....	"	These first 16 species are our
Yellow-bellied Sapsucker	" "	May 26	"	common winter residents.
Rough-legged Hawk	" "	" 26	"	
Canada Ruffed Grouse	" "	Apr. 1	"	
Saw-whet Owl	" "	.....	"	One specimen taken.
Cedar Waxwing	Apr. 6	June 11	"	Quite common.
Mountain Bluebird	" 6	May 26	"	Common in settled parts.
Raven	" 6	Mar. 31	.....	But one seen.
Goshawk	" 13	Apr. 18	yes	Not as common as formerly.
Canada Goose	" 13	.....	no	Quite a common migrant.
Mallard	" 13	May 10	yes	Nest in upland, away from water.
Tree Sparrow	" 14	Apr. 28	no	Common in spring and fall.
Golden Eagle	" 14	" 1	yes	Several.
Robin	" 15	May 10	"	Very abundant.
Junco (J. hyemalis)	" 16	" 10	"	Very abundant.
Redwinged Blackbird	" 16	" 10	"	Quite common.
Rusty Blackbird	" 16	" 10	"	Most common blackbird.
Bohemian Waxwing	" 18	June 1	"	Quite common.
Pintail	" 19	Apr. 28	"	Quite common.
Song Sparrow	" 19	May 20	"	Very numerous.
Lesser Scaup Duck	" 19	June 4	?	Not common.
Ring-necked Duck	" 19	May 26	?	Seen but once.
Killdeer	" 19	" 26	yes	Quite common.
Green-winged Teal	" 19	June 14	"	Quite common.
Wilson's Snipe	" 22	May 10	"	Nest with 4 eggs, May 24, 1908.
Yellowlegs	" 22	" 10	"	Quite common.
Sparrow Hawk	" 22	" 26	"	Quite common.
Spotted Sandpiper	" 22	" 26	"	Quite common.
American Goldeneye	" 24	.....	"	Very rare.
Tree Swallow	" 24	May 26	"	Quite common.
Bufflehead	" 25	.....	"	Quite common.
Wilson's Thrush	" 28	May 26	"	Probably the western form.
Loon	May 1	" 26	"	Quite common.
Western Red-tailed Hawk	" 1	June 14	"	But few seen.
Northern Flicker	" 1	May 26	"	Very common.
Phœbe	" 1	" 26	"	Very few.
Northern Shrike	" 1	.....	.....	Seen but once.
Marsh Hawk	" 1	.....	yes	
Richardson's Merlin	" 1	June 8	.....	Seen but once.
Holboell's Grebe	" 1	May 10	yes	Very common.
Western Vesper Sparrow	" 4	.....	"	Very common.
White-throated Sparrow	" 6	May 26	"	Very common.
Bronzed Grackle	" 11	" 26	"	Quite common.
English Sparrow	" 11	.....	"	Common in towns only.
House Wren	" 11	May 26	"	Very numerous.
Brewer's Blackbird	" 11	June 14	"	Common at Edmonton; rare here
Clay-colored Sparrow	" 11	" 1	"	Quite common.
White-crowned Sparrow	" 11	.....	no	Several in spring and fall.
Catbird	" 11	.....	yes	Very rare.
American Merganser	" 11	.....	.....	Seen but once.

Name of Bird	When First Seen 1908	When First Seen 1907	Does it Breed	Remarks
Purple Finch	May 11	.....	Yes	Quite common.
Philadelphia Vireo	" 11	.....	"	Very rare.
Fox Sparrow	" 11	.....	"	Our most beautiful sparrow songster.
Greater Yellowlegs	" 12	.....	"	Quite common.
Western Meadowlark	" 12	May 20	"	Very common.
Eared Grebe	" 12	" 26	"	Very scarce.
Pipit	" 12	" 10	no	A migrant only.
Yellow Warbler	" 12	" 26	yes	Quite common.
Chipping Sparrow	" 12	.....	"	Very rare here.
Sora Rail	" 12	.....	"	Quite common.
Solitary Sandpiper	" 12	.....	"	Nest with 3 young in old Robin's nest.
Ovenbird	" 14	.....	"	About 40 to the square mile in the woods.
Least Flycatcher	" 14	June 11	"	Our most common Flycatcher.
Bittern	" 14	May 26	"	Quite common.
Gray Ruffed Grouse	" 15	.....	?	But one seen.
Redstart	" 15	May 30	yes	Quite common.
Cowbird	" 15	" 26	"	Very numerous.
Rose-breasted Grosbeak	" 17	" 26	"	Very numerous.
Olive-backed Thrush	" 18	" 30	"	Our most common Thrush.
Grinnell's Waterthrush	" 18	.....	no	Common in spring.
Redeyed Vireo	" 18	May 30	yes	Our most common Vireo.
Savanna Sparrow	" 18	" 26	"	Quite common.
Louisiana Tanager	" 18	.....	"	Found nest in 1907.
Cliff Swallow	" 18	.....	"	Very numerous.
Nelson's Sparrow	" 20	June 3	"	Seen but once.
Canvas back	" 20	.....	"	Seen but once.
Pied-billed Grebe	" 20	June 14	?	Seen but once.
Coot	" 20	.....	yes	Breeds within a few miles of here.
Wilson's Phalarope	" 20	.....	.....	Seen but once.
Barn Swallow	" 20	.....	yes	Quite common.
Little Brown Crane	" 20	June 19	?	Seen quite often, but breeding doubtful.
Western Grebe	" 24	.....	.....	Seen but once.
Kingbird	" 24	May 26	yes	Very common.
Virginia Rail	" 24	.....	"	Not very common.
Broad-winged Hawk	" 27	.....	"	Quite common.
Evening Grosbeak	" 27	May 31	"	Found nest; quite common.
Nighthawk	" 27	" 26	"	Very common.
Western Warbling Vireo	" 27	June 9	"	Set of eggs taken.
Black Tern	" 30	May 26	"	Very abundant.
Northern Yellow-throat	" 30	June 8	"	Quite common.
Baltimore Oriole	" 31	May 26	"	Common in more settled parts.
Macgillivray's Warbler	June 4	.....	"	Not very common.
Bonaparte's Gull	" 15	.....	.....	Seen but once.
Redbreasted Nuthatch	" 17	June 19	yes	Saw but 3 during summer.
Pine Siskin	" 17	" 14	.....	Probably nests here; are here all summer.
Bartramian Sandpiper	July 10	May 26	yes	Saw but one pair.
Kingfisher	" 10	" 26	.....	Seen but once.
Humming Bird, sp.?	Aug. 5	July 30	.....	Seen but once.
Crow	.....	Apr. 1	no	Rare.
Gray Gyrfalcon	.....	" 8	"	Rare.
American Hawk Owl	.....	" 18	"	Common.
Cooper's Hawk	.....	May 10	?	Rare.
Wood Pewee	.....	" 26	yes	Common.
Myrtle Warbler	.....	" 29	"	Common.
Gray-cheeked Thrush	.....	June 1	.....	Seen but once.
Goldfinch	.....	" 4	yes	Common.
Blackpoll Warbler	.....	" 9	yes	Common.
Magnolia Warbler	.....	" 10	"	Common.
Horned Grebe	.....	" 14	"	Common.
Arctic Tern	.....	" 14	"	Common.
Golden-crowned Kinglet	.....	" 19	"	One pair nesting.

This is a valuable avifaunal list, from a region from which lists are few and far between. That some species, given as common winter

residents are given so late for 1907 is owing to the fact that Mr. Stansell only arrived at Stony Plain about April 1st of that year. And if some birds marked as common have only been seen late in the year for the first time, that is no doubt due to the little leisure time that Mr. Stansell has from his work. That section is no doubt an interesting one from an ornithological point of view, as witness the breeding there of the Bohemian Waxwing, Evening Grosbeak, etc., and it is to be hoped that Mr. Stansell will hereafter regularly send in bird news to the NATURALIST and thus further elucidate the conditions of bird-life there. A number of the species enumerated in this list will eventually, no doubt, prove to be the western subspecies of the ones named, and perhaps Bonaparte's Gull will turn out to be Franklin's Gull.

G. E.

THE SO-CALLED WHITE WILD OATS AND WHAT THEY ARE.

BY NORMAN CRIDDLE, TREESBANK, MAN.

There has been considerable apprehension among farmers within recent years, through the discovery of white oats which resemble in their nature, or seed form, the wild species *Avena fatua*. These oats were first brought into prominence some two or three years ago by the different agricultural institutions of the country whose experts found it advisable, pending investigation, to class them as "wild oats" when judging grain for seed purposes, and to condemn the sample in which they were found. As this type of oats has become better known, and carefully looked for, examples have been found in nearly every variety of cultivated oats, and, as a matter of fact, there are probably very few that are entirely free from them, either black or white.

As the problem of what these oats were and how they were going to affect the interests of grain growers became a prominent one economically, and as it also became an interesting subject botanically, I devoted some time to it during the last three years with the result that I am now in a position to throw some light upon the question.

One of the first things that attracts attention to these so-called "white wild oats" is their close resemblance, in the seed form, to the variety from which they were selected. There is, however, one striking difference, namely, in every case the supposed wild oat, or as I shall term it in future, the sport, is always awned with a strong twisted black and white awn, and

*This does not refer to albino wild oats which can always be recognized by their close resemblance to the black ones.

it has also the horse-shoe shaped base so characteristic of *A. fatua*. Thus it resembles in colour, shape and size the variety from which it originated and in other respects the wild species, excepting that the basal hairs are absent or nearly so.

The growing plant is also an exact counterpart of its parent. Those selected from "Banner" oats have the spreading head, while the "Storm King" sports are side oats and show the strong stems and massive grains of that variety so that they could not be separated by the plants if it were not for the long awns sticking out of the head. I have not been able to examine many different kinds of oats but what I have gone over carefully—"Banner," "New Market," "Abundance," "Storm King" and "Bumper King"—have all contained some proportion of sports, "New Market" and "Storm King" showing the most.

It is interesting to note that these sports breed true to type apparently without exception, and further that absolutely pure seed is always liable to produce them, the parent from which they spring being easily recognizable in the offspring. There is one other feature of importance from an agricultural point of view, namely the retarded germination so characteristic of *A. fatua* is not a character of these sports, the germination being so far as experiments have shown in exactly the same proportion as the parent variety, so that the apprehension that they might become a bad weed seems to be groundless. Whether they will prove troublesome on account of their awns remains to be seen, but the chances are against this being the case, as sports have probably occurred for ages past in oats but have been overlooked.

It is difficult to arrive at a satisfactory theory as to the cause of these sports; but, granting that the original type, from which cultivated oats were first selected, was heavily awned and had the basal characters of *Avena fatua*, we might surmise that they are retrogressions in the features noted to the original progenitors of present day oats.

It seems strange, however, that this probable form of atavism should be active in all, or nearly all, breeds of oats and that both types—*A. sativa* and *A. orientalis*—should be equally active in producing sports.

I have not attempted to go into the matter of the true nature or cause of what I have termed sports in this paper, as to whether they have relation to the De Vries mutations, or whether any other facts or hypotheses are able to explain them. This is outside my province and may be safely left to men more capable of looking into such matters.

"SNOW-WORMS."

BY ARTHUR GIBSON.

An interesting occurrence of these so-called worms was brought to the writer's attention in February last. Mr. Lawrence W. Watson, of Charlottetown, P.E.I., sent to me some living specimens of coleopterous larvæ, with the statement that they were abundant in a field which was covered with ice of several inches thickness. In a second letter dated March 5th, Mr. Watson says: "I am now able to give you further particulars concerning the larvæ of which I wrote to you a short time ago. The first lot of specimens were collected on February 14th. February 11th, and 12th were fine, cold days. On February 13th we had a thaw followed by cold, and strong wind. February 14th was very cold. The second appearance was on February 23rd. On the 20th there was rain, but frost at night; 21st and 22nd were fine, cold days. On the 23rd it was cold and there were some snow flurries. Upon this occasion the larvæ were not so numerous. On the former appearance there were about two or three to the square foot of ground; upon the second occasion they were more scattered. To-day they are very numerous and occur more in bunches. March 2nd was mild with snow at night. The 3rd was fairly mild; yesterday we had a "silver thaw." To-day it is mild. In every case the larvæ were found in fields and 50 or 100 yards from trees. They were not seen on bare ground, always on ice or snow of a depth of two to six inches. To-day they are very active on snow."

Some of the larvæ sent by Mr. Watson were forwarded to Dr. L. O. Howard, the United States Entomologist, at Washington, D.C. As Dr. Howard's letter in reply gives much interesting information I quote it in full:—

"The larvæ sent by you with your letter of February 26th, and which were found alive on ice at Charlottetown, Prince Edward Island, are what are known as 'snow-worms.' These are the larvæ of the Lampyrid (Telephorid) genus Telephorus, commonly called soldier beetles. They hibernate in the ground among the roots of grasses and when, in wintertime, a peculiar combination of climatic conditions prevails—melting snow, the ground soaked with water, the temperature above freezing point—the larvæ appear above ground, often in enormous numbers of specimens, and crawl about on the surface of the snow. Such climatic conditions, however, do not occur every year, and consequently the interesting phenomenon of seeing multitudes of snow-worms is by no means a common one. However, single specimens of Telephorus larvæ may be seen every year on the surface of snow.

"The snow-worm in the vicinity of Washington and at Detroit, Mich., is the larva of *Telephorus bilineatus* which is also a common species throughout Canada. You will find figures of both larva and imago of this species in Riley's Fourth Missouri Report, page 29. The genus Telephorus contains many closely allied species and it is possible that some of them may have the same habit as *T. bilineatus*."

Occurrences of Telephorid larvæ on snow, similar to the above, have occasionally been recorded in the United States. Dr. Lintner, the late State Entomologist of New York, in his Eighth Report (1891) refers to a remarkable appearance of the larvæ of *Telephorus* which were thought to be the species *bilineatus*. In this instance the larvæ occurred at Center, N.Y., in millions about February 10th during a rain. The snow was literally alive and black with the "worms," for a distance of about half a mile long and about twelve rods wide, while beyond this strip the larvæ were abundant in every direction, but to a less extent. They were active on the snow for a few days. In the article on these insects Dr. Lintner says: "The explanation of the larvæ appearing on the snow would be, that they were drawn from the ground by the (warm?) rain, and with the change of rain into snow, they continued, with its increasing depth to mount to the surface, as other larvæ have been known to do."

Telephorus bilineatus is a common northern species, and it is most probable that the larvæ which were noticed on Prince Edward Island were of this species. The larva of *T. bilineatus* is of a rich velvety-brown colour; the body is narrowed at each end, and the segments are distinctly divided. The late Dr. Riley in the report referred to above, by Dr. Howard, treats of this insect as an enemy of the Codling Moth, one of the worst pests of the apple grower. It is also a well known enemy "of the larvæ of the Plum Curculio, when these enter the ground to pupate."

The Telephorids belong to the family Lampyridæ, known popularly as the fire flies which are familiar to almost everyone. Kellogg, in "American Insects," writes of the Lampyridæ as follows: "The light-giving organ is usually situated just inside of the ventral wall of the last segment of the abdomen, and consists of a special mass of adipose tissue richly supplied with air-tubes (tracheæ) and nerves. From a stimulus conveyed by these special nerves oxygen brought by the network of tracheæ is released to unite with some substance of the adipose tissue, a slow combustion thus taking place. To this the light is due, and the relation of the intensity or amount of light to the amount of matter used up to produce it is the most nearly perfect known to physicists."

THE TRAGIC SIDE OF BIRD LIFE.

BY H. GROH, OTTAWA.

Poetry and song are full of the idealization of bird life; but even bird life has its stern realities. The following notes are gleaned from my field journal for the nesting months of May and June, and include all the nests which came under my observation during that time, in one small swamp within the city limits. Their significance, as bearing upon the small tendency toward increase of our native songsters, is sufficiently apparent without comment.

May 18. Black and White Warbler nest-building. Carrying dead grass into a hole at base of a rotten stump.

May 20. Robin's nest with eggs, in crotch of a tree in full view of public road.

May 24. Robin's nest empty.

May 25. Black and White Warbler's nestcontains first egg.

May 26. Song Sparrow's nest with five eggs.

May 28. Song Sparrow s nest disturbed and eggs gone.

May 31. White-throated Sparrow's nest, containing four eggs, one of them a Cowbird's.

June 2. Nest of Wilson's Thrush containing three eggs.

June 2. Black and White Warbler's nest has now five eggs. By some accident the rotten side of the stump had got crushed down in such a way as to block the entrance to the nest, so that yesterday morning the bird was unable to enter. Cleaned it away, and find this morning that she has returned.

June 3. Nest of Wilson's Thrush torn from its place on a grassy mound, and eggs gone.

June 7. Black and White Warbler's nest found to have been torn out, and eggs missing.

June 7. The White-throated Sparrow has hatched the Cowbirds' and one of its own three eggs. The other two remain in the nest, apparently worthless. The Cowbird distinctly the larger nestling.

June 12. Cowbird in White-throated Sparrow's nest has so monopolized the attention of its foster parents, that it is now fully again as large as their rightful nestling.

June 19. White-throated Sparrow's nest deserted, but after a minute or two the parent birds appeared in the trees above the nest, and by their chirping showed signs of concern. No sign of either young bird.

This last entry completes the history of the nests discovered in this swamp, with the single exception of one belonging to a pair of crows, whose young on June 12 had so far escaped the fate of the other birds, as to be trying their powers of flight.

NOTES ON THE BIRDS OF DURHAM, ONT.

BY W. E. SAUNDERS, LONDON, ONT.

The following observations were made during a brief visit at Durham, covering the 20th to the 22nd of June, 1909, during which time I stayed with Mr. William Mountain, who lives two miles south of the village, and from whom I received valuable information regarding some of the species. Interesting memoranda were also received from Mr. Chris. Firth, who resides about two miles east of Durham, where he has lived for a number of years.

Durham lies about 28 miles south of the Georgian Bay and about 40 miles east of Lake Huron. The latitude of Durham is about 44°-25′, and the elevation is 1,500 feet, or about 900 feet above the lake. The tree growth consists largely of hardwoods, such as maple, elm, oak, and beech, while the conifers are chiefly balsam, cedar, and hemlock.

From a visit of such short duration it would be impossible to give a list of the birds of the vicinity, so I will limit my notes to those that are deemed of special interest:—

Bob White; formerly rare, but now extinct; the last one was seen about 10 years ago.

Dove; rare, only one seen.

Goshawk; prior to 20 years ago this bird bred in the country immediately around Durham, but was not known to do so at present by my informants.

Black-billed Cuckoo; moderately common, but the Yellow billed has not yet appeared. In 1900 I saw two near Wiarton, but in my previous journeys into the North Bruce Peninsula, it was not observed.

Red-headed Woodpecker; rare.

Bob-o-link; rather rare.

Meadowlark; common.

Cowbird; rather rare.

The total number of the various sparrows observed is as follows, arranged in order of abundance:

Vesper	130	Savannah	21
Chipping	80	Swamp	18
Song	75	Junco	18
Goldfinch	38	Chewink	12
Indigo	38	Purple Finch	8
White-throated	36	Rose-breasted Grosbeak	4

Mr. Firth told us that the Chewink had arrived about 1905, but was not observed previously. I saw two of these birds

near Wiarton in 1888, one in 1889, and noted it on four successive days in 1900 all over the base of the Peninsula.

The Tree Swallow is surprisingly rare, only one specimen having been seen. The diminution in the number of this species in Western Ontario is very striking, not a single pair having been observed during the nesting seasons of 1908 or 1909 near London. In the Peninsula they were abundant in '87, '88, and '89, but in 1900 most days revealed only two birds.

Rough-winged Swallow; we were surprised to find two pairs of these birds nesting in a cut bank in the village of Durham.

A single Warbling Vireo was noted in the village, but no Yellow-throats or Blue-heads were seen.

The following warblers were noted in the numbers given, the order being that of abundance as before:—

Black-throated Green	25	Chestnut-sided	7
Black and White	18	Ovenbird	7
Yellow	14	Redstart	7
Canada	13	Blackburnian	5
Water Thrush	11	Mourning	5
Black-throated Blue	10	Nashville	5
Maryland Yellow-throat	7		

Brown Thrasher, of which two or three specimens were seen and heard, was said by Mr. Firth to be a new arrival, never having been observed before the present year, although I have noted it in small numbers, spread well over the Bruce Peninsula where the elevation is about 600 feet.

The common Thrush was the Veery, but we heard also two Hermits and a single Wood Thrush. The Alder, Olive-sided and Least Flycatchers were all rare, Crested, Wood Pewee and Kingbird being the common ones.

PERSONAL.

Members of the Club and friends of the late Dr. Fletcher will be interested to know that the Division of Entomology and Botany of the Dominion Experimental Farms, over which he was for so many years the head, has now been separated into two distinct Divisions, viz., the Division of Entomology and the Division of Botany. The position of Entomologist has been given to Dr. C. Gordon Hewitt, and that of Botanist to Mr. H. T. Gussow, F.R.M.S. Both of these gentlemen have now arrived at Ottawa and are at present busily engaged in connection with the work of their respective Divisions. Dr. Hewitt was formerly Lecturer in Economic Zoology, University of Manchester, Manchester, England, and Mr. Gussow, Assistant to Dr. William

Carruthers, the eminent British botanist. We are very glad indeed to welcome both of the above gentlemen to Ottawa. The Ottawa Field-Naturalists' Club will doubtless receive much benefit from their presence.

In the removal of the Rev. G. Eifrig from Ottawa to Addison, Ill., the Club has lost from the ranks of its active members a most valued officer and leader. From almost the first day he came Mr. Eifrig took a deep interest in the work of the Club. As an ornithologist of recognized standing, he was a welcome addition to our Society, and during his stay with us he did splendid work in encouraging the study of local birds. His papers in the OTTAWA NATURALIST have given much pleasure to our readers and we shall certainly miss his kindly face and interesting talks at our excursions in the field, and at our meetings during the winter months. He has been a faithful member of the Council of the Club, being at the present time the 2nd Vice-President and Chairman of the Excursions Committee. As a true and enthusiastic student of bird life his departure will be keenly felt by many members who followed him at our outings. Mr. Eifrig left Ottawa on September 27th to take up his new work at the College of the Lutheran Church at Addison, Ill. As Professor of Ecclesiastical and Secular History, his best thoughts will be directed along lines of favourite studies. It is also probable that he will teach Natural History. The Addison College is the principal one of its kind of the Lutheran Church in the United States. We extend to Mr. Eifrig our congratulations on this further recognition of his ability, and at the same time wish him continued success and happiness in his new field of labor. We hope to publish in our pages many more of his interesting papers.

BOOK REVIEW.

HYGIENE FOR YOUNG PEOPLE.—A Reader for Pupils in Form III of the Public Schools. By Professor A. P. Knight, M.A., M.D., Queen's University, Kingston. 8vo., pp. 211. Toronto: The Copp-Clark Co.

It was a happy suggestion which prompted the gifted Professor of Physiology in Queen's University, Kingston, Dr. A. P. Knight, to prepare the handsome elementary guide to health, "Hygiene for Young People," just issued in Toronto, under the recommendation of the Ontario Minister of Education. It is published as a reader for Public School use and for School Libraries, and no book could be more admirably adapted for both purposes. As a Birthday or Christmas Gift-book it would be valued by any thoughtful boy or girl. A more attractive and fascinating little work could not be imagined, and it is

popular, wonderfully clear, and thoroughly scientific, in its treatment of matters of daily life, regarding which far too much ignorance prevails. A life-like portrait of the immortal Apostle of Health, Louis Pasteur, forms the frontispiece, while the text is illustrated by sixty-six original drawings and half-tones. The pleasing cover, the paper, the clear large type, and the whole get-up of the book reflect the greatest credit on the author and publisher.

The author's former "Introductory Physiology and Hygiene" has proved its usefulness as a teacher's manual, and the present work was written at the suggestion of a former active member of the Ottawa Field-Naturalist's Club, Inspector R. H. Cowley, and of Inspector W. I. Chisholm. Professor Knight has long been recognized as a leading educationist and few of our Canadian scientific men have had his lengthy and rare experience in the work of instruction. Hygiene, like Political Economy, is too often regarded as a dismal science, a science of "Don'ts," as testified by health notices in every street and tram-car. To make the subject attractive to young people is a difficult task, but Professor Knight has achieved it with marked success. More readable pages could not be written than those on Sunlight, Bathing, the Eyes, Digestion, Exercise, Disease, and Clothing. Any boy or girl will be the better for reading this bright little manual Much of the sickness, which afflicts our children, is due to ignorance, not only on the part of the sufferersbut on the part of parents. Yet, even the most devoted parents cannot watch their offspring all the time. How valuable then to interest the young in the subject of health, treated so ably in this book! The lessons here taught will become second-nature in the child who will avoid dangers to health as naturally as he will avoid a deep hole in the side-walk. Tennyson's sad lines:—

"How dwarf'd a growth of cold and night,
How blanch'd with darkness must I grow."

find effective antidote in Professor Knight's chapter II where the pale face, the stunted growth and the weak frame, characteristic of unnatural conditions, especially city overcrowding, are described, and the causes and the remedies clearly enunciated.

Fresh air, cleanliness, tobacco, alcohol, are all amply treated by the author, with convincing reasonableness. The important chapters, XIII and XIV, treat of the blood and circulation. It is curious that more than a quarter of the blood in the human body is contained in the liver, while through the brain and muscles there circulate five or six parts, by weight, of the total amount, the bones receiving only $2\frac{1}{2}$ per cent. and the skin barely 1 per cent. To the blood is due, as Professor Knight points out, the "pinkish or reddish colour of the skin," and the fine ruddy cheeks of Canadian girls, as compared with their pale cousins in New York or Boston, are partly to be explained

by our colder air. Red corpuscles are more numerous in the blood in a colder environment, and people who live in the country have more red corpuscles than those living in towns. The number of these minute red particles in our blood is surprising. There are between three and a half to five millions of them in a man 20 or 30 years of age. Fishes, such as trout and cod, have not half that number, and the "cold-blooded" sharks are said to have not more than 140,000 to 230,000 in their vascular system. In these days of "suffragette" assertions and claims, man can boast, on scientific grounds, the superior richness of his blood! Man's blood has 12 to 20 per cent. more solid matter than woman's; but woman's blood is always found to be brighter in colour, hence the more attractive complexion when unimproved by alleged artificial aids! Of course the white corpuscles of the blood cannot be ignored, though they are not one-seventh in number, there being 2,284 white to 11,306 red corpuscles in human blood. But Professor Knight has no space for curious details such as these; his object is more direct and practical, and his wise words on "How to breathe," on foul air in the house (p. 44), care of the hands (p. 60), care of the teeth (p. 76), ears and earache (p. 84), eyesight (p. 92), round shoulders (p. 100), and clothing (p. 105) are perfectly admirable. Food and milk form a special chapter, XVI, but one cannot look at a single page of this bright readable work without having the attention at once enchained. Exercise, clothing, and sleeping ("sleep on the right side," says the author), and other vitally interesting and valuable matters are explained in the clearest, simplest and most accurate language. Nothing could be more instructive than the strange experiment by Dr. Hodge of Clark University, U.S.A., with four puppies, and Bum's conversion from habits of intoxication, and Nig's devotion to the whiskey flask, are interesting and pathetic in the extreme. Consumption is amply dealt with in chapter XXV, and indeed all phases of a healthy life and avoidance of common ills are clearly and concisely treated in this splendid little work, in which we have not found a single misprint or typographical error. The only suggestion which a critic might make would be the addition of an explanation that whereas arteries carry arterial blood and veins carry venous blood, as stated on page 97, the reverse is the case in the lungs, in which the pulmonary arteries carry venous blood and the veins carry from the lungs bright, arterial blood.

Thirty years ago a clever English lady, Mrs. Catherine M. Buckton, the first lady ever elected to a School Board, wrote a small handbook entitled "Health in the House," and it was such a success that edition after edition was exhausted in a few years. May Professor Knight's valuable book as rapidly secure a wide circulation and successive new editions be called for by the Canadian public!

E. E. PRINCE.

THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, NOVEMBER, 1909 No. 8

NEW CONTRIBUTIONS TO CANADIAN BRYOLOGY.

By N. Conr. Kindberg, Ph.D., Upsala, Sweden.

The collector of the specimens is Professor *John Macoun*, M.A., F.R.S.C., etc., if no other is indicated.

1. Alsia californica (Hook et Arn.) Sull.
Vancouver Island 1908, (also by Dr. Jal. Roll (1888).

2. Climacium dendroides (L.) Web. et Mohr * Kindbergii (Ren. et Card.) Grout.
Brighton, October, 1888.

3. Calliergon subturgescens.

Allied to the last. Resembles *C. turgescens* (*T. Jensen*) in its julaceous stem, and *C. scorpioides* in its dark brownish color.

Leaves large, broadly oval obtusate obtuse and entire, not decurrent, very densely crowded; only some branch-leaves curved; alar cells large and well-defined, other cells narrow linear; costa generally indistinct. Perichetial leaves long-acuminate subulate and entire. Capsule not large; pedicel about 3 cm. long. Tufts about 10 cm. high. Stem weak. Monœcious.

In a pool at Laggan at 5,200 feet altitude, Rocky Mountains, Alta., July 25th, 1904. No. 45.

4. Calliergon subsarmentosum.

Stem pinnate, brown below the middle. Leaves golden glossy, not reddish and not distinctly decurrent, long-lanceolate and obtuse; alar cells very large and hyaline, reaching to the costa; other cells linear; costa pale vanishing below (but near) the apex. Branch leaves very small. Capsules not seen. Habit of *C. giganteum*. Allied to *C. sarmentosum*.

In wet earth, Shawnigan Lake, Vancouver Island, B.C., June 18th, 1908.

5. CALLIERGON LONCHOPUS.

Allied to *C. molle*, Dicks. Leaves large, suboval obtusate, often apiculate, denticulate above, not curved, more or less densely crowded; alar cells small and well-defined, other cells narrow linear; costa long and double. Perichetial leaves acute, very short-acuminate, generally entire; costa double very long. Capsule not large, pedicel 3.5 cm. long. Tufts green, decolorate below, about 10 cm. high. Stem weak, dioecious? (Male flowers not seen).

In allied European species the pedicel is only 8-10, rarely 12-15 mm. long.

On Sulphur Mountain at Banff, Alta., September, 1904. Nos. 351 and 355.

6. PLAGIOTHECIUM UNDULATUM * P. SUBNECKEROIDEUM.

Differs in the leaves being less crowded, rather distant, and long-decurrent (as in *P. neckeroideum*); also leaves obtusate, mostly obtuse. Capsules not seen. In *P. undulatum* and *neckeroideum* the leaves are acuminate or at least acute.

On earth, Newcastle Island, Departure Bay, Vancouver Island, B.C., July 10th, 1908. Coll. John Macoun.

7. CAMPTOTHECIUM NITENS VAR. MICROTHECA, KINDB. N. VAR.

Capsule small. Perichetial leaves hyaline, not filiform-pointed. Stem not or (rarely) sparingly tomentose. Resembles the arctic form "atrichum, Kindb." in not often having a tomentose stem.

Collected in a bog along Hunker Creek, near Dawson, Yukon, July 27th, 1902. No. 267.

8. CAMPTOTHECIUM NITENS VAR. LEUCOBASIS, KINDB. N. VAR.

Upper leaves green, lower decolorate (dusky); basal, also the alar cells hyaline. Stem not tomentose.

Collected in a bog by Hunker Creek, near Dawson, Yukon, July, 1902. No. 349.

9. ISOTHECIUM AGGREGATUM (MITTEN) KINDB.

Specimens probably belonging to this species, insufficiently described by Lesq. and James, were found near New Westminster, B.C., by Mr. Albert Hill in 1903 and 1904, com. by Messrs. Brotherus and Cufino. This species differs from the others named by me "*Myura*," in long-decurrent leaves.

10. EURHYNCHIUM GLACIALE (BRYOL. EUR.) KINDB., VAR. ANGUSTIFOLIUM, NEW VARIETY.

Leaves narrower, ovate-oblong or ovate-lanceolate; costa short. Otherwise not differing. Pedicels faintly rough.

Fruiting on stones in a brook at Laggan, eastern slope of Rocky Mountains, Alta. Altitude 5,200 feet. June 27th, 1904. No. 152 in part.

11. EURHYNCHIUM GLACIALE * INFRAALPINUM.

Differs. All leaves serrate, less crowded and longer-decurrent. Stem-leaves longer-costate. Perichetial leaves deflexed. Pedicel of capsule very rough. Leaves small. Capsule not seen.

Cape Breton Island, at the base of trees, 1898.

12. EURHYNCHIUM TRACHYPODIUM (FUNCK.) KINDB.

Collected on rocks on Yoho Pass, western slope of Rocky Mountains, B.C. Altitude 5,500 feet. September 2nd, 1904. No. 230.

13. BRACHYTHECIUM PSEUDO-CHLOROPTERUM.

Leaves long-decurrent, recurved below to the middle, serrulate all around, nearly gradually tapering from a subovate base to a rather longish acumen, not or indistinctly striate, nearly crowded *not mamillose at the back*, suberect when dry; cells small, nearly all rhombic-rhomboidal (as in Amblystegium); alar cells large, short subrectangular-quadrate finally *rufescent*; costa subpercurrent or sometimes *short-excurrent*. Tufts loose, decolorate with green branch-tips. Stem sparingly branching, 6-8 cm. high, radiculose at the base, beset below with minute leaves. Dicœcious. Capsules not seen.

Resembles in habit *Eurhynchium chloropterum*, C. M. and Kindb., also in the serrulate and punctulate, not large leaves. It has rather the characters of *Brachythecium* than *Eurhynchium* but definite limits between these "genera" are not existing.

In wet ground in the valley of Pipestone Creek, eastern slope of Rocky Mountains, Alta., July 8th, 1904, altitude 6,000 feet. No. 74.

14. BRACHYTHECIUM RIVULARE (BRYOL. EUR.), * B. COLPOPHYLLOIDES.

Differs from this species in the leaves being narrower and their acumen longer and abruptly tapering to a short twisted point. Capsules and pedicels not seen. It is therefore doubtful that it belongs to *B. rivulare*; but the areolation of the leaves is the same.

On earth in the Yoho Valley, west slope of Rocky Mountains, B.C., altitude 7,000 feet, September 6th, 1904. No. 293.

15. BRACHYTHECIUM CIRRHOSUM (SCHWAEGR) SCHIMPER.

Collected on Southampton Island, Hudson Bay, August 15th, 1904, by Commander A. P. Low. No. 360.

16. HYPNUM (CAMPYLIUM) OBSOLETINERVE.

Leaves very small (as in *H. Halleri*) and crowded, falcate but not circinnate, neither striate nor recurved, entire, not decurrent; insertion often yellowish; cells small and narrow. Stem-leaves from ovate-oblong; base abruptly tapering to a shorter acumen; nearly all cells narrow, the angular sometimes suboblong, but special alar cells not defined; costa *simple*, short and mostly obsolete. Branch-leaves smaller with subovate base, nerveless; all cells narrow. Perichetial leaves hyaline, simply but very faintly costate. Tufts dense and not glossy, brownish below, green above. Stem thin, irregularly divided. Dicœcious. Capsules not seen.

Resembles in habit *Hypnum depressulum*, C. Muell.

On earth in swampy soil at Laggan, Alta., altitude 5,500 feet, June 28th, 1904. No. 163.

17. HYPNUM KNEIFFII, SCHIMPER, *. MICROPTERUM.

Leaves short-decurrent with a few dilated cells below the insertion, alar cells small or indistinct; other cells narrow linear. Habit of *H. vernicosum*. Otherwise as *H. Kneiffii*. Capsules not seen.

On wet earth, Yoho Valley, west slope of Rocky Mountains, B.C., September, 3rd, 1904. No. 296.

18. PSILOPILUM TSCHUTSCHICUM (C. M.) KINDB.

Capsule narrow subcylindric and slightly curved, finally blackish, longer than in *Psilopilum lævigatum* (Wahlenb.) Limpr. Peristome finally fuscescent. Spores 0, 020-0, 025 mm. Basal leaf-cells very large.

A common species on clay banks of Hunker and Bonanza Creeks, in July, 1902. In fine fruit late in July on Hunker Creek, Yukon.

19. POLYTRICHUM APICULATUM.

Differs from our allied species in the minutely apiculate lid of the capsule. Leaves rigid, short-acuminate acute, nearly plane below the middle; apical cells of lamellæ papillate, awn red and rough. Perichetial leaves hyaline; costa brown. Capsule narrow 4-angled with distinct apophysis; pedicel 3-5 cm. long. Stem simple, scarcely 1 cm. high.

Along Molar Creek, eastern slope of Rocky Mountains, Alta., altitude 6,500 feet, July 8th, 1904. No. 96.

20. FISSIDENS OSMUNDOIDES, VAR. OBLIQUUS.

Capsule asymmetric; pedicel 6-8 mm. Leaves generally opaque. Stem without rhizoids.

Growing on old stumps and earth and roots where floods

occur in spring. On old stumps at Sicamous, B.C., July 3rd, 1889. Placed under *F. osmundoides* in Part VI. On dead cedar roots Island Lake and on earth at White Trout Lake, Algonquin Park, July, 1900; on roots and earth by Lake Deschênes, above Britannia, October 27th, 1900. These specimens were named *F. Garberi* in Part VII, p. 204. On an old stump at Hull, Que., October 27th, 1907.

21. FISSIDENS BUSHII, CARD. ET THER.

Owen Sound, Ont., 6th Sept., 1890. New to Canada.

22. FISSIDENS RUFULUS, LINDB.

On rocks by a small waterfall in a brook near the Biological Station, Departure Bay, Vancouver Island, July 3rd, 1908. New to Canada.

23. FISSIDENS (CONOMITRIUM) JULIANUS (SAVI), VAR. AMERICANUS.

Leaves tapering to an acute, often subulate acumen.

Ontario, Hastings Co., Canadian Musci, n. 54 ("Conomitrium Hallianum," not so, named by me).

24. TETRAPLODON URCEOLATUS (BRID.) BRUCH. & SCHIMP. * T. SUBMNIOIDES, NEW SUBSPECIES.

Capsule small rufescent, scarcely reaching above the tufts; its neck scarcely longer; annulus none; pedicel thick yellowish, about 6-8 mm. long, not exserted. Leaves entire oval-oblong, often long-acuminate; costa strong, excurrent in a long point; as in *T. mnioides*. Tufts somewhat lax.

In the true European *T. urceolatus* the leaves are oval and obtusate, abruptly narrowed to a shortish point; costa not distinctly percurrent, capsule blackish-brown; pedicel nearly in its whole length exserted above the very compact tufts.

Although the habit of the present plant is very much different from European specimens, the characters are scarcely sufficient to distinguish it as a proper species. It needs also further observation.

Collected in Labrador in 1891 by the late Rev. A. C. Waghorne.

25. TETRAPLODON MNIOIDES (L. FIL.) BR. & SCH * BREWERI (HEDW.)

It seems to be a subspecies of *T. mnioides*; its leaves are narrower with a very long-excurrent costa. The tufts are not always "loose" (Limpr.)

Collected on Hunker Creek, Yukon (No. 141), barren and loosely tufted; also (No. 143) fruiting and densely tufted; both in July, 1902. Coll. John Macoun.

26. TETRAPLODON MNIOIDES * BREWERI, VAR. BREVICOLLIS.

Differs in the capsule (as in *T. urceolatus* [Brid.] Br. & Sch.) not being shorter than the neck.

Collected on Bonanza Creek, Yukon, July 18th, 1902. Coll. John Macoun. No. 144b(?)

27. DICRANUM SUBSCOPARIUM.

Agrees with *D. scoparium* in its leaves being canaliculate and broadly acuminate, thin cells narrow with large pores, costa not excurrent, perichetial leaves short-aristate, capsule curved; differs in having a sulcate capsule, also in its leaves being more strongly dentate; costa not distinctly bilamellate.

The leaves are undulate, nitid, golden yellow or bright green and nearly straight.

On earth in woods at Laggan, Rocky Mountains, Alta., at an altitude of 5,200 feet, June 28th, 1904. Nos. 55 and 181.

28. DICRANUM STENODICTYON, KINDB.

Collected on Bonanza Creek, Yukon, 1902. The habit of these specimens does not differ from that of the other species of *Dicranum*, as stated in the first description.

29. DICRANUM PERICHÆTIALE, KINDB.

British Columbia. J. M. Macoun.

30. DICRANOWEISIA ROELLII, KINDB., VAR. ATERRIMA.

Differs in the tufts being black when dry, as in *D. crispula* var. *atrata*.

On rocks, 7,000 feet altitude, at Lake O'Hara, Rocky Mountains, B.C., August 9th, 1904.

31. SELIGERIA SUBCAMPYLOPODA, NEW VARIETY.

Leaves entire sublinear, mostly long and acute; costa generally percurrent, rarely short-excurrent. Perichetial leaves obtuse, very much broader and shorter. Capsule (generally broadly) piriform; pedicel long, arcuate when moist. Tufts *dense*, about 0.5 cm. high.

On rocks at the head of Lake Louise, altitude 6,000 feet, Rocky Mountains, Alta., September 13th, 1904. No. 7.

32. GRIMMIA ELATIOR, BRUCH. * RUFESCENS.

Agrees with *G. elatior* in the leaves and their costa being papillose, nearly all the leaf-cells (except the lower basal) sinuous; leaves large, nearly appressed when dry.

Differs in leaves being rufescent, often recurved all around, with longer and more numerous papillæ, and a short, strongly dentate-papillose hairpoint.

It is possible that the capsules, when such are found, can give better characters.

Collected on the shore of Baffin Land, west of Greenland, August 18th, 1904, by Commander A. P. Low. No. 329.

33. GRIMMIA GRANDIS.

Leaves *smooth*, carinate and ovate-lanceolate acuminate acute, wholly recurved at one side, neither crisped nor appressed when dry; the lower very small; cells not sinuous, nearly all short subquadrate, the alar short-rectangular, costa smooth; hairpoint faintly rough often longish. Tufts loose, in the upper part green, fuscescent below. Stem to 5 cm. high, much branching, naked below. Capsules and flowers not seen.

Differs from *G. elatior* in the leaves being smooth, etc.; in *G. elata*, Kindb., resembling in habit, lower leaf-cells are very long and linear.

On rocks at the head of Lake Louise, eastern slope of Rocky Mountains, Alta., altitude 6,000 feet, September 13th, 1904. No. 17.

34. GRIMMIA (PSEUDO-RACOMITRIUM) ELATA.

Leaves quite smooth (not papillose as in *G. elatior*), ovate lanceolate acuminate-acute, carinate, recurved below to the middle on both sides, neither appressed nor crisped when dry; upper cells quadrate not sinuous, middle suboblong faintly (or not) sinuous, basal long-rectangular, alar wider but generally short-rectangular and often hyaline in several rows; costa smooth; hair-point long and denticulate. Capsule (old) oblong, not or scarcely exserted. Dicœcious. Plants robust, 3 cm. high loosely tufted (but cohering), brownish with green branch-tips. Habit of *Grimmia elatior*.

On rocks along Hunker Creek, Yukon, July 26th, 1902. No. 108.

35. GRIMMIA OVATÆFORMIS.

Agrees with *G. ovata*, Weber & Mohr. Tufts low and compact; capsule small and smooth with straight pedicel; leaves recurved, not large, nearly appressed when dry, the upper narrow with long hairpoint.

Differs in nearly all leaf-cells very sinuous, the alar long-rectangular; calyptra cucullate; dicœcious.

G. attenuata, C. M. & Kindb., resembles it in leaf-cells, but differs in having larger leaves and also looser and higher tufts.

On rocks at the head of Lake Louise, eastern slope of Rocky Mountains, Alta., altitude 6,000 feet, September 13th, 1904. No. 19.

(To be continued)

DISCOURSES UPON THE LEPIDOPTERA.
II. FAMILIARITY WITH LOCAL FORMS.

BY F. H. WOLLY-DOD, MILLARVILLE, ALTA.

Errors in naming, omitting such as are the result of carelessness, are principally due, as the late Dr. Johnson would bluntly have expressed it, to "sheer ignorance." To put it more mildly and explicitly, they are the result of unfamiliarity with species.

On the North American continent, very few species of lepidoptera have ever been carefully bred from known parents. Consequently, reliance has had to be made for separation of species upon close observation of the insects in the perfect or winged state,—the *imagines*, that being the correct plural of the word *imago*. It goes without saying that considerable experience is absolutely necessary before deductions of any value can be drawn from appearances. A good foundation of experience is having bred sundry very variable species from the egg, and observed first hand the possibilities and limits of variation in different genera. For not only different species, but, in a general sense, different genera also, vary in different ways. For instance, quite a distinct phase of variation may be expected in a Mamestra, from that prevailing in a Cucullia; and an Euxoa is apt to vary to an infinitely greater degree than say, an Acronycta. Next in value of experience gained by breeding, is a study of long series of known variable species from known localities.

Now, the value of deductions drawn from such a source, depends, of course, very largely upon the conception, or "eye" of the person making the observations. For even with the same amount of experience and material for deductions, some people are known to possess a much better eye for associations than others. It is not a question of keenness of vision, but a fact that some are better able to take in and make due allowances for the general impression conveyed from colour, etc., without being misled by resemblances. The idea is perhaps poorly expressed, but it is undeniable that though "an eye for a species" can be cultivated, it cannot be acquired where it does not naturally exist. The late Mr. A. R. Grote, when it is considered what scant material he had from which to make deductions on North American forms, must be admitted to have had an excellent eye for a species. The same cannot, unfortunately, be said of Mr. Francis Walker, curator of the British Museum of Natural History in the fifties and sixties. Nor can the two men be compared in the amount of care they took in comparison.

But to return to the basis for deductions. Observations of

the insects in a state of nature, living, in their environment, their manner and hours of flight, their preference for certain foods, their attitude when at rest, and, by no means least in importance, their dates of appearance, are all valuable points to be observed and noted in the forming of specific associations. Long series should be studied, and, bearing all the above points in view, the variation noted, every capture of each successive season examined for fresh phases of variation and specimens sought for at all time to fill in apparent gaps in the varietal gradient. Aim should also be made, not only at uniting dissimilar, but dividing similar forms. For, as already pointed out, neither does dissimilarity always indicate distinctness, nor resemblance uniting of species. Though the most expert will not always succeed in thus successfully associating every specimen that comes to hand, it is astonishing how familiar one having a good eye may become in time with the general facies of different but confusingly variable species. It may happen that he has grouped several forms as probable varieties for years. At last, either by accident, by personal observation, or by having differences pointed out by another person, characters considered specific are noticed, separation of the series made, and though difficulties may occur for a while, in course of time, with more familiarity with the distinguishing points and extent of variation in the different series, the differences may seem so obvious to his eye that he will wonder how he could ever have confused them. This may truly be called becoming familiar with a species in one locality. Yet an attempt to point out differences in two very similar forms—or they may be very dissimilar to his own eye,—to another man, however good a judgment or wide an experience he may possess, in such a way as to equally convince him of two species, especially by the submission to him of a few odd specimens only, may fail completely, owing to the lack in that other man of *familiarity* with the species, or with its form in that locality at any rate. The eye of the latter man is not accustomed to the slight, and possibly to the former, indefinable differences, which to him may seem, if noticeable at all, varietal.

Too much reliance should not be placed upon the opinion given upon local forms by experts not actually familiar with the form in that particular locality. "Professor Brown called a specimen I sent him by this name, and he has a wide experience, and is generally accepted as the leading authority on this group.', Precisely! But unfortunately Prof. Brown does not happen to be familiar with the form as it occurs in that locality, and is uqite likely to have been misled into entirely wrong associations by the specimen, or it may have been the few odd specimens submitted to him. Dr. Jones is after all just as much of a

specialist in that particular family, and he called the same thing by quite a different name last year. In fact, Mr. Robinson, who was here only last week, gave the species yet a third name, claiming, from information based on careful notes and personal inspection of the type of that species, that the form was perfectly typical. By-the-way, that same Mr. Robinson wrote a day or two later cancelling his self-chosen name, and saying that he had this time found the real thing in another collection! The truth is that, like Prof. Brown, neither Dr. Jones or Mr. Robinson, however wide experience, good eye, or knowledge of types they may possess, are not, nay cannot be, *familiar* with that particular species, or at any rate in that particular locality, and, assuming that they have taken the trouble to examine the thing closely, have been misled by general resemblances, or have entirely different conceptions of the probable range of variation in that district. You, the collector on the spot, have the best chance of associating or separating allied forms occurring in your own district, and if Messrs. Brown, Jones or Robinson have given you the same name to what you feel convinced are different species, or vice versa, it lies with you, if you will, to assist them, by a few notes or otherwise, into seeing the error of their ways. Recollect, however, that until things have been bred and carefully studied in different stages in different districts and probably even then, differences of opinion are sure to occur in some cases, particularly as, of many species, it is impossible to exactly match in every particular, two specimens in several hundred.

CONTRIBUTIONS FROM THE HERBARIUM OF THE GEOLOGICAL SURVEY.

By JAMES M. MACOUN.

CALOCHORTUS LYALLII, Baker.

This beautiful little species was found growing in abundance on an open hilltop at an altitude of 3,500 ft. near the Similkameen River, B.C., June 14th, 1905. No. 70,212. (*J. M. Macoun*). New to Canada.

SPHÆRALCEA MUNROANA, (Dougl.) Spach.

Malvastrum Munroanum, Macoun, Cat. Can. Pl. I: 87.

Prof. Macoun wrote 27 years ago: "To be looked for along the southern boundary of British Columbia." This beautiful plant may have been found by other collectors, but it has not been reported to us from Canada. It grows in immense clumps

about half a mile west of Osoyoos Lake, B.C., where it was collected by the writer, June 17th, 1905. Herb. No. 73,168. Its brick-red flowers are quite unlike those of any other Canadian plant, except *Malvastrum coccineum*, in color.

PYROLA ELLIPTICA, Nutt.

Shuswap Lake, B.C. No. 15,792. 1889. (*John Macoun*). Ranaka Creek, Port Heney, B.C. (*A. J. Hill*). Chilliwack River, B.C. No. 72,458. (*W. Spreadborough*). Not recorded in Canada west of the Selkirk Mts. Apparently a rare species in British Columbia as it was not found by the writer during five seasons' work in that province.

VACCINIUM ALASKÆNSIS, Howell.

Along the Hope trail near Lake House, Skagit River, one bush was found in 1905. Herb. No. 72,467. (*J. M. Macoun*). Not uncommon near Ucluelet, Vancouver Island, in 1909. (*Macoun and Fraser*). Resembling *V. ovalifolium*, but well characterized by its black fruit on erect pedicels.

HYDROPHYLLUM ALBIFRONS, Heller.

H. occidentale, var. *Fendleri*, Macoun, Cat. Can. Pl. V: 343.

A not uncommon species in the Coast Range at an altitude of 4,000-5,000 ft. Our specimens are from Spence Bridge, B.C. Herb. No. 16,241; Chilliwack Lake, B.C., Herb. No. 54,325; Skagit River, B.C., Herb. No. 76.745. (*J. M. Macoun*).

PEDICULARIS GRŒNLANDICA, Retz. var. SURRECTA, (Benth.) Piper.

Easily distinguished from *P. Grœnlandica* by its long coiled beaks. Though its distribution is given by Piper "British Columbia and Saskatchewan to California and New Mexico," none of our specimens east of British Columbia seem to be this variety. It is represented in the herbarium of the Geological Survey by specimens from Tulameen River, B.C. Herb. No. 17,646. (*Dawson*). Chilliwack Lake, B.C., alt. 5,000 ft. Herb. No. 54,489. (*J. M. Macoun*). Chilliwack Lake, B.C., alt. 5,500 ft. Herb. No. 76,773. (*W. Spreadborough*).

PENSTEMON RICHARDSONII, Dougl.

A few leaves of this species were collected along the Similkameen River, B.C., June 9th, 1905. Herb. No. 76,763. (*J. M. Macoun*). Not before recorded from Canada.

PENSTEMON PRIUNOSUS, Dougl.

Dry ground, Similkameen River, B.C. Herb. No. 76,815. (*J. M. Macoun*). Not before recorded from Canada.

PENSTEMON PINETORUM, Piper.

P. ovatus, Macoun, Cat. Can. Pl. II, p. 355.

Elk River, Rocky Mountains. Herb. No. 17,723. (*G. M. Dawson*). Only known Canadian station.

PENSTEMON OVATUS, Dougl.

A common plant in the valleys of the Chilliwack and Skagit Rivers in 1901 and 1905. Herb. Nos. 76,812–813–814. (*J. M. Macoun*). Previous Canadian records go to other species.

ORTHOCARPUS PUSILLUS, Benth.

Douglas, B.C., April 29th, 1906. Herb. No. 76,832. (*W. Spreadborough*). Not before recorded from British Columbia mainland.

PLANTAGO ELONGATA, Pursh.

P. pusilla, Macoun, Cat. Can. Pl. Vol. I: p. 394.

Mr. E. L. Morris in a recent revision of the *Plantago* section to which this species belongs has shown that all Canadian specimens are *P. elongata*. Known in Canada only from the drier parts of southern Saskatchewan and Alberta.

GRINDELIA PERENNIS, A. Nels.

G. squarrosa of Canadian botanists, in part.

From Manitoba to Alberta and northward to the Peace River. Our specimens of *G. squarrosa*, from which *G. perennisis* separated by its narrow, almost entire leaves, are all from Manitoba or southern Saskatchewan.

MYOSOTIS LAXA, Lehm.

M. palustris, Macoun, Cat. Can. Pl. Vol. I: p. 340 in part.

Piper in his Flora of the State of Washington credits this species to Oregon and Washington but it is remarkable that a plant so common on the Pacific coast should have for so long remain unrecorded. No British Columbia records have been made. Our specimens are from: Ladner's Landing, Fraser River, B.C., No. 17,136. (*Jas. Fletcher*). New Westminster, B.C., No. 692, and Lulu Island, Fraser River, B.C., No. 17,135. (*John Macoun*). Lake House, Skagit River, B.C., No. 76,760. (*J. M. Macoun*). Chilliwack River, B.C., No. 76,759, and Douglas, B.C., on the coast, No. 76,758. (*Wm. Spreadborough*). Prof. Macoun also reports having found this plant on both the east and west coasts of Vancouver Island.

ABRONIA UMBELLATA, Lam.

Abundant along the sea-shore at Pachena Bay, west coast of Vancouver Island. Collected Sept. 10th, 1909, by Mr. George Fraser. This is the first Canadian record for this species, the specimens collected by Dr. Fletcher and recorded, Macoun, Cat. Can. Pl. Vol. I: p. 395, as *A. umbellata* being the next species.

ABRONIA LATIFOLIA, Esch.

Found by many collectors in the vicinity of Victoria, Vancouver Island. Very fine specimens of this species were collected on the west coast of Vancouver Island at Long Beach, north of Ucluelet by Mr. Wm. Spreadborough in 1909. Roots were found which in their dried state are three inches in diameter, they were nearly six inches in diameter when collected.

BIRD MIGRATION, 1908.

OBSERVATIONS MADE ON SABLE ISLAND, NOVA SCOTIA.

BY R. S. BOUTEILLIER.

	When first seen.	Number seen.
Semipalmated Plover	April 17	2 or 3.
Robin	" 20	about 12.
White-throated Sparrow	" 22	several.
Tern	" 25	several.
Piping Plover	May 10	2.
Least Sandpiper	" 14	2.
Roseate Tern	" 14	2.
Swallow	" 14	a few.
Martin	" 14	a few.
House Sparrow	" 21	2.
Phalerope	" 22	about 20.
Black-throated Green Warbler	" 25	1.
Black-polled Warbler	" 25	1.
Maryland Yellow-throat	" 25	1.
Blackbird	June 2	1.
Greater Yellowleg	July 8	2.
Pectoral Sandpiper	" 22	1.
White-rumped Sandpiper	" 24	30.
Black-bellied Plover	Aug. 16	3.
Golden Plover	" 20	several.
Yellow-rumped Warbler	" 15	2 or 3.
Black-throated Blue Warbler	" 16	1.
Least Tern	" 16	several.
Blue-winged Teal	" 19	2.
Pine Grosbeak	" 19	1.
Sora Rail	" 19	1.
Pipet	" 19	several.
Blackbird	" 19	1.

Nuthatch	Aug.	19	1.
House Wren	"	19	1.
Pied-billed Grebe	Oct.	4	1.
American Bittern	"	4	1.
Snow Bunting	"	4	several.
Black and White Warbler	"	4	1.
Flicker	"	8	1.
Yellow-bellied Sapsucker	"	9	1.
Fox Sparrow	"	9	several.
American Hawk Owl	"	9	1.
Wilson's Thrush	"	22	in numbers.
Great Blue Heron	"	28	1.
American Goldeneye	"	28	several.
Ring-billed Gull	Nov.	3	1.
Northern Shrike	"	4	1.
Brant	"	7	1.
Baldpate	"	7	4.
Bufflehead	"	7	several.
Scoup Duck	Dec.	1	in numbers.
Snowy Owl	"	15	2.

ANT ROADS.

BY CHARLES MACNAMARA, ARNPRIOR, ONT.

Ant roads are probably not uncommon in this country, but as they are generally hidden by the grass, and sometimes run underground for considerable distances, they are not often noticed except by those looking expressly for them. Tropical insects, we are told, build paths six inches wide on which a man can easily walk. Our native ants cannot boast of any such elaborate works as these, but they nevertheless construct what are doubtless for them very important highways.

The prime object of the roads is to make some food supply easily accessible, generally to reach some shrub or tree infested by aphides, of whose sweet excretion the ants are very fond. Such are the objective points of a couple of these roads in the vicinity of Arnprior, built by an ant which Mr. Arthur Gibson tells me is the *Campanotus pennsylvanicus*. The roads, which are situated in a level open field edged by small pines and spruce, look like tiny well-worn paths. They are about three-eighths of an inch wide, and are sunken about half an inch into the soil. One is some 85 ft. and the other about 110 ft. long, and they run parallel to each other about 140 ft. apart. There are numerous

small "jogs" and turns in them, and they cannot be said to be the shortest distance between two points, but their general direction is straight enough from the nests to the aphis colonies. They are quite smooth and free from blades of grass or other obstructions, but they are not very easy to trace as the long grass conceals them, and occasionally they disappear entirely in a tunnel a few inches long. In fine weather traffic on them is very active, and numerous parties of workers are continually running to and fro.

Before I regretfully tore one up in tracing it to the nest, thirteen feet of the longer road mentioned above was entirely subterranean, being tunnelled at a depth of about an inch under the sod . My brutal devastation of their work at first caused great excitement among the ants, but before I had left the ravaged scene, the workers had begun repairs in the most philosophic manner, and when I revisited the spot a week or two later, the road was all clear and smooth again. Indeed, their determination to "keep the line clear" seems to be as strong as it is in the most zealous railway superintendent. When traffic is brisk, a pinch of earth placed across the road as a barrier creates a great commotion. There is a tumultuous running back and forth and a climbing over the barrier and around it. But presently a single worker, who has recovered her equinamity sooner than the rest, is seen dislodging particles of the encumbering earth with her jaws and depositing them in the grass at the edge of the road. After a little she is joined by others, and in a comparatively short space of time the obstruction is removed and the road is clear again. Any cricket or grasshopper that blunders on to the highway is promptly attacked and quietly driven off by the menacing jaws of the ants.

THE NITROGEN COMPOUNDS IN RAIN AND SNOW.

Our readers may remember that we presented in the issue for October, 1908, an account of the interesting work carried on by the Chemical Division of the Dominion Experimental Farms in the determination of the fertilizing value of rain and snow. It was there stated that from the analysis of each fall of rain and snow it had been calculated that during the year ending February, 1908, 4.323 lbs. of nitrogen had been furnished to the soil per acre, and of this approximately 75 per cent. had been present in rain and 25 per cent. in the snow.

Reference to the data obtained for the year ending February 28th, 1909, shows that in certain important respects the results differ markedly from those of the preceding year. Thus, the amount of nitrogen (present as free ammonia, albuminoid ammonia and nitrates) washed out of the atmosphere and furnished to the soil per acre, during the twelve months, was 8.364 lbs.—practically twice the quantity reported the year 1907-08. An examination of the monthly precipitations shows that the rain for September, October and November was unusually rich in ammonia. The explanation of this extraordinary abnormal richness of the rain last autumn may be given in the words of the Chief Chemist, Mr. Frank T. Shutt, M.A.: "A very severe drought prevailed during August, September and the first three weeks in October, 1908, the rainfall being considerably below the average for these months. This excessive dryness of the weather allowed the bush fires, which are not unusual at this time of the year, to spread and gain very considerable headway. Fires were common, not only in the district known as the Ottawa Valley, but also over large territories in Ontario and Quebec and the northern part of New York State. These fires raged almost continually, the rainfalls being very light for many weeks, so that for two months, more or less, the atmosphere was heavily charged with smoke. Hundreds of acres of forest were burnt and thousands of dollars worth of timber destroyed. So dense was the smoke at times that for several days together at Ottawa it was difficult to see clearly for many yards, and the irritation to the eyes and mucous membrane of the nose and throat was excessive. Not until the heavy rain of the 24th and 25th of October was the atmosphere again cleared. This smoke naturally contained large proportions of ammonia as a product of combustion and hence the scanty precipitations that occurred during these weeks were exceptionally rich in that constituent. To this cause then we attribute the exceptional and phenomenally high results recorded for the year."

The detailed discussion of the results, appearing in the forthcoming report of the Chemist, will, we are assured, bring out several other interesting points regrading the amount and composition of the year's rain and snow.

NEW MEMBERS.

The following gentlemen have recently been elected ordinary members of the Ottawa Field-Naturalists' Club: Mr. Chas. H. Bennett, Ottawa; Mr. W. H. Bell, Nepigon, Ont.; Prof. S. Blair, Macdonald College, Quebec.; Mr. L. B. Brown, Toronto; Mr. H. C. Duff, Norwood, Ont.; Mr. H. T. Gussow, Ottawa; Dr. C. Gordon Hewitt, Ottawa; Dr. Julius Klotz, Lanark, Ont.

W. A. Parks, del.

PERIGLYPTOCRINUS PRISCUS *Billings* sp.
Viewed in the direction of the left
postero-lateral ray.

THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, DECEMBER, 1909 No. 9

NOTE ON THE ORNAMENTATION OF PERIGLYPTOCRINUS PRISCUS.

By William A. Parks, Ph.D., Associate Professor of Geology, University of Toronto.

With One Plate, No. III.

This beautiful species was described by Billings in Decade IV of Canadian Organic Remains as *Glyptocrinus priscus*. Wachsmuth and Springer in their classical work "The Crinoidea Camerata of North America," establish a new genus, *Periglyptocrinus*, for the reception of those forms, otherwise like *Glyptocrinus*, but in which the arms are biserial instead of uniserial as in all members of the latter genus: the present species evidently belongs to the new genus.

Billings' description, while quite accurate except for the statement that the plates of the cup are smooth, does not enter into the detail necessary for the identification of species of *Glyptocrinus* and its allies. The original figures also are small, indistinct and destitute of the beautiful ornamentation characteristic of the species.

The description given by Wachsmuth and Springer* is couched in the terminology adopted by those authors and is quite adequate for the identification of the species: the profuse ornamentation is however not mentioned nor does it appear in the single figure which accompanies the text. The reason for this omission lies in the fact that the type specimen from which both Billings and Wachsmuth and Springer derived their figures is a young and undeveloped example. The fortunate discovery of two larger and more mature forms, which I cannot but believe belong to this species, justifies some further remarks, particularly with regard to the ornamentation of the plates of the cup.

Judging from the figures of both authors, the size of the type specimen is about 13 mm. from the base to the point of

*The Crinoidea Camerata of North America p. 278

contact of the first pinnules of adjoining arms, and about the same distance measured transversely at the point of origin of these pinnules. The larger of my specimens measures 30 mm. and 15 mm. in these two directions respectively. It is therefore apparent that the mature cup is more elongate than the undeveloped form.

In these specimens, the arrangement of the plates, the character of the posterior interray, the peculiar manner of origin of the first and second pinnulæ and the biserial arms with their three-jointed plumes conform exactly to the description given by the authors cited. A further account of the anatomy of the form is therefore quite unnecessary.

With regard to the ornamentation, Billings states that "A strong, rounded carina, or ridge, runs up each of the primary rays, and, dividing into two on the centre of the third plate, sends a branch up each of the secondary rays to the base of the fingers; the carinæ are also divided on each of the basal plates, and coalesce into one on the centres of the first primary radial plates; in the azygos interradius a sixth rib ascends to the top of the cup, dividing the space into two parts about equal; it bifurcates below on the centre of the large azygos, one branch proceeding to the centre of the two contiguous first primary radial plates." Billings further states that, with the exception of these carinæ, the plates are smooth. The description given of the ornamentation by Wachsmuth and Springer is as follows: "A small species. Dorsal cup obconical with slightly convex sides; section across the costals sharply pentagonal, owing to the conspicuous radial ridges, which pass from the arms down to the centre of the radials, where they divide and are continued to the basals. The ridges, which are rounded, grow narrower towards the middle of the plates, widening at their margins. Surface, except along the ridges, covered with numerous small pustules without definite arrangement."

All the above features are exhibited by the present specimens, but in addition, each plate of the cup, with the exception of a few of the higher brachials and interbrachials, is provided with prominent ridges radiating from the centre to the sides of the plate, where each is continuous with the corresponding ridge of the adjoining plate. In the case of the basals, the radials, the first brachials and the first interbrachials, these ridges coalesce at the centres of the plates, are remarkably lineal in character and are continuous across the sutures; higher up they become more and more petaloid in character. On the outer sides of the main carinæ, where they pass from the radials to the basals after bifurcation, lie secondary parallel ridges, which do not, however, reach the centres of the plates. Somewhat irregularly, similar

secondary ridges appear across the sutures between adjacent radials and also between the radials and the first interbrachials. The parts of the plates, not occupied by the radial carinæ or the above-mentioned ridges, are covered by a delicate granulation. The prominence of these ornamental elevations and their unusually lineal character give the impression of a polygon surrounding each radial, with its angles connected to the centre of that plate like the spokes of a wheel. Less pronounced ploygons also appear around each plate of the third circlet, but higher up the cup, this impression is lost on account of the increasing irregularity of the plates and the more pronounced petaloid character of the ridges.

The beauty of the organism is further increased by the peculiar manner of origin of the first and second pinnulæ. The radial plates bifurcate on the second primibrach (primaxil, second costal) and a row of non-stellate but granulated plates lies between the two divisions of the ray. The prominent carinæ are continued up the secundibrachs (distichals) into the arms. From each of the second secundibrachs, lateral branches of the carinæ pass outwards and upwards into the notch between the arms of contiguous rays. Wachsmuth and Springer interpret these lateral extensions of the carinæ as pinnulæ: they appear however to be an integral part of the plates over which they pass and may be considered as the carinæ of tertibrachs (palmars), the continuation of which into arms has not been completed. This explanation seems reasonable in view of the fact that twenty is the normal number of arms in the *Glyptocrinidæ*. Following Wachsmuth and Springer, however, the third secundibrach (distichal) is without a plume, but from the fourth, a strong pinnule passes inwards and upwards to become confluent with its mate in the depression between the two arms of the same ray. It is this peculiar arrangement of the lower pinnulæ which induces me to believe that my specimens belong to Billings' species. Were it not for this agreement in a unique feature, the difference in ornamentation and in the general shape of the cup might be considered sufficient ground for the establishment of a new species.

Periglyptocrinus priscus, as emended above, is a fairly large and unmistakable species and is the most beautiful form among the many Crinoids from the Trenton Formation in Ontario.

Horizon—Trenton.

Location—Balsam Lake, Ontario.

Collector—Mr. Joseph Townsend.

Specimen Number—649 T. University of Toronto Museum.

THE SHARP-SHINNED HAWK MIGRATION.

BY W. E. SAUNDERS, LONDON, ONT.

Point Pelee is a place of surprises. One never knows what to expect, but can always feel sure that there will be something doing in the bird line, and frequently that something is of unexpected and absorbing interest.

My visit of September 18th, 19th and 20th happened to be just the very time to see the celebrated Sharp-shinned Hawk migration from its inception, and thereby to realize more easily the effect it has on other bird life. When we arrived on the 17th, we were told that the hawk flight was not "on" and on the next morning, we found that this was quite true. There were, of course, a few hawks drifting down from the north and crossing the lake, as there always are in fall but there were not a very great many, while on the other hand there were large numbers of small birds. We recorded, that day, 68 species of birds, of which four were hawks, and among these were 100 Sharp-shins, which always comprise the bulk of the early flight. Other birds were there in numbers; for instance, we recorded 300 Waxwings, 150 White-throated Sparrows, 100 Ruby-crowned Kinglets, 80 Flickers and 50 Olive-backed Thrushes.

The wind, that night, was strong from the west and the temperature rather high. The next morning, we found the hawks very much augmented in numbers, recording six species, in the following numbers, 250 Sharp-shins, 10 Marsh; 10 Cooper's, 2 Pigeon, 1 Duck, and 1 Osprey. The results of the presence of so many Sharp-shins was strikingly visible among the small birds, reminding us forcibly of the old automobile joke, which stated that the quick were those that got out of the way of the automobile, and the dead were those that did not. Some of the birds were apparently wise and got out of the way.

Although the Ruby-crowned migration was just beginning, we saw none after the first day. The White-throated Sparrows dropped from 150 to 20, and the Olive-backed Thrush, which divides with the Cuckoo the doubtful honor of being the favorite food of the Sharp-shinned Hawk, also dropped to 20, and there was a similar diminution in the numbers of almost every species, while the total number of species observed, which was 68 on the first day, was 31 on the second day.

On the third day the conditions became extreme. I was in the observatory from 6 until nearly 10. The Hawk flight began about 6.15 and was unabated when I left. The rate of flight can be imagined by the fact, that when I undertook to count 100 passing me, the task occupied only eleven minutes. A few of

these were returning, probably one dozen out of 100, this would leave 75 which crossed the lake in 11 minutes, which is at the rate of about 400 per hour. They did not fly in these numbers at all times of the morning, but so far as we were able to judge, the flight continued all day and we recorded 900 Sharp-shinned Hawks, 50 Marsh Hawks, 10 Cooper's Hawks, 3 Duck Hawks, and 1 Fish Hawk. The total number of species seen besides these 6 Hawks was only 13, and of small birds that might be considered legitimate prey for the hawk, we saw only 50 specimens divided among eight species, so it will be seen that almos every species vanished completely. The supposition is th birds which lived in the upper branches were all eaten, but t fact that we kicked out of the bushes occasional White-throat etc., goes to show that ground-loving and shrub-loving birds concealed themselves with tolerable efficacy. A pair of wrens scolded me from a clump of juniper, but would not leave their shelter, although I was within 5 or 6 feet of them. Two or three White-throats, which flew out of another juniper clump at my approach, immediately concealed themselves elsewhere and when, after watching them for a little while, I moved again, another one jumped out of the clump within 5 feet of me.

It is hard to say just where these hawks passed the night, but certainly as they went down in the morning, they looked hungry; all of them apparently were hunting for breakfast, and it was not until nearly 10, that a few of them appeared with a visible crop, showing that they had fed. They stooped at one another often and occasionally one would be seen in hot pursuit of some small bird, but in every case the latter escaped. Many of the hawks came through the woods and down the trail at a distance of only a few feet from the ground, hoping no doubt to surprise their prey.

In the few hawks taken, we identified the remains of the Wood Pewee, White-throated Sparrow and Olive-backed Thrush. Nearly all of the feathered clusters seen on the ground, where the meal had taken place, consisted of the remains of the Thrush.

Even mid-winter showed no such lack of birds, as these two hawk-ridden days. The flight had been delayed beyond its usual time and doubtless this contributed to a congestion of hawks, and the fact that such a large percentage of them crossed the water at once, leads one to suppose that their domination will be short this year. Certainly they will not stay where food is not reasonably plentiful, when by crossing the lake and spreading over the country they will be able to get their meals with much greater regularity than by staying on Point Pelee.

At one time I chanced to be watching a hawk, which was about 200 yards away, when, apparently sighting a small bird in

a bush within 25 feet of where I stood, he set his wings and dived with great rapidity almost straight for me. When he came within 50 yards, his feet, which had been kept close up, were brought forward and extended all ready for business, but just before he reached the bush they were partially withdrawn and the little bird, which had moved, escaped.

It seemed strange to move around through the cedars and deciduous woods at Point Pelee and have no birds within sight, except hawks. Some species had apparently learned their lesson especially well, as for instance, the Carolina Wren and the Cardinal, both of which are common throughout the year at Point Pelee. Of the former, two of us recorded four specimens on the first day, but the latter was not observed at all, although it must have been there in considerable numbers.

It was decidedly interesting to watch the few Pigeon Hawks which were noted, their graceful swallow-like flight contrasting strongly with the alternate flapping and sailing of the Sharp-shinned. One of the former which we saw flying along with the others, surpassed them considerably in speed and was apparently playing with them as he came, darting first at one and then another, but only in play, as his food consisted of smaller species, which are doubtless more pleasing to his palate. On several occasions I, as well as others, have seen this bird chase its prey over the water, and on this trip Mr. Norman Wood, of Ann Arbor, noted the same thing occurring at the end of the Point. Later in the day I saw a Pigeon Hawk come in from the lake on the east side. I watched him as he crossed the field and lit on one of the upper dead limbs of a big tree, which was fully one-quarter of a mile away. After marking the spot carefully I made a circuit and on arriving, found him eating a bird, which doubtless he had caught over the water. He paid little attention to me and I was readily able to come within range behind some trees and secure him. Soon after I had located his perch and started to hunt him, I saw another specimen returning from the lake, but was unable to see where it went to. These occurrences lend colour to the idea that it is customary with this species to take its prey over the water when opportunity favours this course.

The following is the full list of birds noted on the three days of the trip:—

September	18th	19th	20th
Olive-backed Thrush	50	20	4
Wilson's Thrush	2	1	....
Ruby-crowned Kinglet	100	...	....
Red-breasted Nuthatch	6	...	....

White-breasted Nuthatch	2	1	....
Winter Wren	8	4	....
House Wren	20	12	2
Carolina Wren	4	...	....
Thrasher	15	5	....
Catbird	5	1	....
Pipit	1	...	....
Redstart	35	...	....
Oven-bird	4	...	....
Black-throated Blue Warbler	2	...	....
Black-poll Warbler	10	...	....
Chestnut-sided Warbler	3	...	....
Magnolia Warbler	5	...	....
Cape May Warbler	2	...	....
Nashville Warbler	1	...	....
Black and White Warbler	1	...	....
Blue-headed Vireo	1	...	....
Red-eyed Vireo	1	...	....
Migrant Shrike	2	.	....
Cedar Bird	300	3	4
Eave Swallow	1	...	....
Red-breasted Grosbeak	1	...	....
Towhee	1	...	....
Lincoln's Sparrow	1	...	....
Song Sparrow	5	3	....
Junco	5	...	....
Chipping Sparrow	10	10	....
White-throated Sparrow	150	20	4
Vesper Sparrow	2	1	....
Gold Finch	8	30	30
Bronzed Grackle	20	...	....
Red-winged Blackbird	300	...	2,000
Cow-bird	300	...	....
Bobolink	200	...	....
Crow	20	15	25
Least Flycatcher	2	...	....
Wood Pewee	4	1	....
Humming Bird	20	5	....
Swift	4	...	2
Whip-poor-will	3	...	....
Flicker	80	10	3
Downy Woodpecker	1	1	....
King Fisher	2	2	1
Sharp-shinned Hawk	100	250	900
Sparrow Hawk	1	...	....
Pigeon Hawk	...	2	4

Marsh Hawk	8	10	50
Duck Hawk	...	1	3
Fish Hawk	...	1	...
Red-tailed Hawk	1	...	....
Cooper's Hawk	8	10	10
Dove	...	1	1
Bald Eagle	...	...	1
Semipalmated Plover	1	1	1
Spotted Sandpiper	1	...	....
Sanderling	2	1	....
Semipalmated Sandpiper	1	...	....
Least Sandpiper	1	...	....
Snipe	1	...	....
King Rail	1	1	....
Bittern	...	...	1
Least Bittern	1	...	....
Great Blue Heron	2	2	3
Wood Duck	30	.	....
Blue-winged Teal	35	..	....
Green-winged Teal	5	...	....
Black Duck	...	15	....
Herring Gull	100	100	50
Ring-billed Gull	400	100	50
Bonaparte's Gull	1	...	....
Coot	1	...	....
Florida Gallinule	8	...	....

RARE BIRDS AT POINT PELEE.

By W. E. SAUNDERS, LONDON, ONT.

The visit of the enthusiasts to Point Pelee, beginning October 1st, proved no exception to the rule that the Point always has something of extraordinary interest for the bird man.

This time we discovered Henslow's Sparrow in migration and it certainly gave one a feeling of satisfaction to go to a certain field selected because of its fitness, for this sparrow at this time, and then after a short time, to find and secure it. We got altogether three, and those who are acquainted with this bird in its autumn plumage, will realize its beauty. The species of the genus Ammodramus, perhaps without exception make it a rule to spend the winter in their highest plumage, and when they reach the breeding grounds in spring, not having molted since the previous autumn, they are in worn plumage, so that the autumn and mid-winter specimens which I have taken of

Henslow's, Sharp-tailed and Grasshopper, are the highest plumaged specimens that I have.

I would not like to injure the reputation of the members of the camp as wing shots by stating that we fired many times to get these three Henslow's, but certainly we used more than three cartridges. I think they are the most difficult shooting that I know. Getting up at one's feet with an exceptionally jerky flight, they travel, perhaps 20, perhaps 100 yards, before dropping into the grass, but there is no moment of that exposure that they are not difficult to hit. The novice in wing shooting got two in two shots, the rest of us got one in all the rest of the shots, which were a good many.

One of the rarest hawks in our collections is the Duck Hawk. Sometimes at the Point we have the pleasure of seeing one of these perhaps the best flyers of all the North American Falconidæ, but we have never taken one at the Point. On Sunday morning I was early at the observatory tower and was delighted to see within 100 yards, on top of the life saving building, a Duck Hawk in young plumage. There he sat and waited. Within 30 yards of me came a bright plumaged Cape May Warbler, into a red cedar, so when the next man arrived I had the pleasure of offering him, for choice of seeing, first the Cape May Warbler and then the Duck Hawk; he naturally chose the Hawk, and I promptly produced it and then followed the Warbler. When Taverner arrived, he announced that he was going to photograph the Hawk, and left for that purpose. We arranged a code of signals by which we could inform him if the Hawk was becoming nervous and likely to fly, but we had no opportunity of using them, and on the photographer's return, his remark was, "Well, some hawks are the limit." It turned out that he had been able to walk in full view, as close to the hawk as the slope of the roof would allow, perhaps 20 yards, and there set up his camera, but in order to get a good photograph he wanted the hawk to look at him and it was necessary to throw his handkerchief in the air to attract its attention. Later on we were informed that one of the boys nearby had been throwing stones at a hawk on top of this same building and had not been able to scare it away. Duck Hawks are certainly not given to this kind of behaviour.

The Cardinals had not recovered from their hawk scare, and only two were heard and none seen by the members of the party. Bird feathers were numerous and varied. At one place we found the fresh remains of two Thrashers, and besides numerous Thrushes we saw feathers of the Phœbe, Whip-poor-will, White-throated Sparrow, Sora Rail and others

For a long time we had been observing flocks of Bonaparte's

Gulls. Occasionally these would fly past us, within close range, but it remained for this trip to disclose to us, that, sometimes at least, these flocks consist in quite large proportions of Caspian Tern, and I selected one from the flock in which this was first noted, but it dropped too far out in the cold water and the wind drifted it beyond my swimming powers. These birds will be looked for later on, as they have been observed in only small numbers before. On this trip there was only the one occasion when they came near shore and at all other times the beautiful evolutions of the gulls were carried on at considerable distances. Nearly every person has seen flocks of Blackbirds and perhaps Waders, which when passing within view, are apt to dart down at an abrupt angle and then shoot up again, but the Bonaparte's Gull not only does this, but reverses the process as well. While watching a flock skimming over the surface of the water, there could be seen, one, at a time, of these beautiful birds, leaving the flock and shooting upwards for perhaps 20 yards, at an incredibly rapid rate and then dropping down to join the others. The effect of these gyrations is very beautiful indeed; and only a few times have I seen anything resembling the beautiful curving flight which this bird used when a high flying flock desires to come to the surface of the water. They always make me think of falling leaves. Swallows are the only other birds that I have often seen performing in this way.

The Carolina Wrens which were observed on only one day on our last trip, were again in evidence, and several were heard singing each day. Tree Swallows were seen in considerable numbers on the 1st and 2nd of October. They were living out over the marsh where probably they roosted as well. A very few Barn Swallows were also noted, but the date was very late for them.

The nights were warm until that of the 5th, when the thermometer dropped to 42. The effect was instantaneous, and the next morning a large number of Blackbirds were added to the daily bill, but their flight finished early in the morning and it happened that this particular morning was the only one, on which we made a late arrival at the end of the Point, owing to dissipation on the previous evening. The said dissipation consisting of cartridge loading and bird skinning, which are perhaps different from the ordinary method of burning midnight oil.

Short-eared Owls were a feature of the trip, and were seen in moderate numbers almost every day near the end of the Point. Two notable Waders were seen, 3 Golden Plovers and one White-rumped Sandpiper. A single Connecticut Warbler was taken on October 2nd, but warblers in general were in small numbers and their flight had evidently passed.

BOTANICAL EXCURSIONS.

GERMAN FIELD METHODS.

BY JOHN CRAIG, CORNELL UNIVERSITY, ITHACA, N.Y.

There are few places in central Europe where the student can spend a more agreeable summer than in the pleasant city of Freibourg, in the famous Black Forest region of southwestern Germany. In this city is located the University of Freibourg, noted for its strong medical staff, and to the average American naturalist remembered as the institution with which Weismann, the eminent zoologist and student of evolution, has long been connected.

It was my privilege a year ago to attend several of Dr. Weismann's lectures, and it may interest readers of THE NATURALIST to hear some of the personal features of these events. It is quite the custom in Germany for the chief or head of a department to give an elementary course, and this is the case with Professor Weismann. The number of advanced students seemed to be comparatively small. The course which attracted the mass of students was an elementary and general course in zoology, differing in no special respect from such outlines as are available in the best text books of the present day; but it was exceedingly popular and the great attraction was the man, the lecturer, and many students with whom I talked told me that their main reason for coming to Freibourg was the fact that they would have the privilege of studying under Weismann. Another reason possibly for the head of a department giving elementary courses may be due to the fact that the German professor's salary derived from the university itself is not large, but each full professor has the privilege of charging a fee to all students taking his lectures and these fees constitute the large share of his revenue, therefore it is not surprising that the elementary courses should be elected by the full professor who is permitted to charge a fee.

It is interesting to note the manner in which the work is given and lectures conducted. Weismann is now well advanced in years a man between seventy-five and eighty, tall, of dignified, cultured presence white hair and beard. He wears very heavy lens glasses, owing to weakened and waning vision. The lecture period is forty-five minutes in length and begins fifteen minutes after the hour, at which time the professor enters the class, and in the case of Weismann was always greeted with applause by his waiting students who had previously secured seats in the large auditorium The lecturer immediately advanced to a

comfortable arm chair in front of a small desk, seated himself, and began a hasty review of the ground covered by the previous lecture. The review occupied about five minutes, when he plunged into new matter and continued talking with a fair degree of rapidity to the close of the hour. Professor Weismann is always accompanied by an intelligent attendant, who brought forward such charts and models as were necessary to illustrate the lecture. Many of these are employed. In fact the wall behind the lecturer was always covered with charts which could be drawn down or rolled up at will, in addition to coloured diagrams on the blackboard. One of the features of Weismann's lectures was the facility with which he could use coloured chalks in sketching organs and special features to be illustrated. He in common with other lecturers in this school always employed chalk of a definite colour to illustrate given tissues or organs. A system of this kind adds very considerably to the clarity of the lecture. Dr. Weismann used no notes in lecturing. At the close of the hour he immediately retired to his private room. It is considered a very special privilege on the part of the student to be able to approach the professor and discuss any point covered in the hour's lecture. Although long past the seventy-year mile post Weismann is still lecturing daily at twelve, including Saturday.

Among the pleasant experiences during my stay at Freibourg were attendance and participation in several botanical excursions, of which there are a number every week, there being one every Saturday and usually one on Sunday. The number of students attending these excursions varied from twenty-five to forty. Usually several women were members of the party A fee is charged for the privilege of attending them, in the same way that a fee is charged for laboratory facilities.

The ordinary plan was to take a certain train out of town for a given distance into the country, the details and a map of the route having been previously posted in the laboratory and lecture rooms of the botanical department. One of the assistants usually acted as business manager of the party, purchasing tickets and apportioning the expenses among those attending. On arriving at the starting point for field work the party immediately struck out into the country at a smart pace. It must be borne in mind that botanical students (or field-naturalists) are not given the freedom of the countryside in the same generous way in Germany that obtains in Canada and the United States. Parties are not allowed to tramp at will over meadow or even through pasture lands. If such liberties are attempted they are likely to come into sharp conflict with the owner of the land. There are certain crown properties, however, in which

they may roam for purposes of study. The line of march then is usually confined to the country roads, choosing the byways more than the highways. The party tramps along, looking here and there for interesting plants in bloom, when suddenly a whistle is blown which is the signal for a halt. The professor is seen standing a little in advance of the party, holding up a plant for general inspection. The students cluster around and the professor asks questions. First, what is the plant; second, where does it belong, what are its peculiarities of structure, what are its uses, adaptations, etc. Sometimes the answers come in chorus, and again there is silence or a solo! Usually at the close of the study of the individual plant some additional remarks are offered by the professor and the march is then resumed. These stops occur at frequent intervals. At each time students are expected to note the names of plants discovered and supplement the information given by other information to be secured from the manuals. Frequently plants are brought in from the side lines by students themselves.

The situation of Freibourg, lying as it does near the Rhine Valley on the one hand and at the gateway of the most attractive and interesting part of the Black Forest Mountains on the other, makes it possible to vary the character of the flora to be studied from day to day by simply changing the route. Thus the mountain flora may be studied on one excursion and the lowland area with a different flora explored the next time, or it is even possible in an extended walk to include both upland and lowland.

Germans, like Englishmen, are good walkers. The "week end" tramps with rucksack on back are very much in vogue in Germany, and the mountain paths in this particular region are freely patronized during the summer by cheerful pedestrians. This kind of exercise makes for the development of an essential quality in a naturalist, namely the ability to walk. In these field excursions I discovered that the leader usually set a lively pace. One of the last excursions I had the privilege of attending occurred on the 12th of July, 1908, and I found on returning home and comparing the route with the map that we covered about ten miles in a little over three hours. I found also the following list of plants were collected and many of them discussed. The list is uninteresting in itself, but simply shows the flowering plants which happened to attract our attention in this short ramble among the hills of the Schwarzwald in the first half of July.

Achillea multiflorum, Alnus glutinosa, Asplenium rigida, Andromeda polifolia, Betula verrucosa, Blitum capitatum, Calluna vulgaris, Campanula lata, Campanula patula, Cardamine

sylvatica, Carex pauciflora, Centaurea nigra, Centaurea Jacea, Chaerophyllum hirsutum, Chrysanthemum Leucanthemum, Comarum palustre, Cynosurus crispus, Dactylis glomerata, Digitalis ambigua, Drosera rotundifolia, Epilobium angustifolium, Epilobium montana, Equisetum arvense, Galium Mollugo, Genista sagittalis, Geranium columbinum, Geum rivale, Heracleum sp-?, Hieracium murorum, Hieracium viticella, Holcus lanatus, Lathyrus pratensis Lycopodium Stelago, Lysimachia vulgaris, Mimulus sp-?, Pinus montana, Pinus uncinata, Polygonum pertola, Prenanthes purpurea, Ranunculus Flammula, Ranunculus repens, Sambucus racemosa, Scabiosa arvensis, Scrophularia ambrosia, Senecio Fuchsii, Silene ruprestris, Spiraea Aruncus, Spiraea Ulmaria, Stachys sylvatica, Stellaria graminea, Stellaria nemorum, Trifolium aureum, Trifolium sp-?, Valeriana officinalis, Veronica officinalis, Vicia Cracca, Vicia sepium, Viola tricolor.

To many people an agreeable feature of travel in the country places in Europe lies in the fact that the pedestrian is never far away from a source of good beer and rarely distant from an eating house! It is unnecessary to descant upon the quality of the beer which is available in that region, nor would I say anything which would have a tendency to generate a thirst on the part of my readers by extolling the merits of this native beer. The beer is good, it is readily available, and it is drunk in a civilized manner, sitting at tables, and accompanied with pretzels or good rye bread and cheese. In the little German *gasthaus* one does not need to invade a stifling, heavily curtained bar room and range along side the counter as certain of the lower animals place themselves in front of a trough, but one may sit under the shade of a tree in the garden or on the veranda while partaking of refreshment.

This merely leads me to say that the botanical excursion invariably includes a *gasthaus* in its tour. In fact it usually closes the afternoon's program at such a place, with the Herr professor presiding at an impromptu supper surrounded by his group of students, all in excellent good humor. I am not commending this as a desirable innovation, but merely commenting on the eating and drinking habits in Germany as contrasted with our habits in this country. No doubt too much beer is drunk; but it is probable that beer is safer than whiskey. Besides this, there is no treating. Everyone pays for his own drinks.

In general this type of excursion and the stimulation which it brings tends to develop naturalists. It is fair I think to say that our training in this country aims on the other hand to develop a much narrower man, the specialist. We are in need at the present time of a larger number of men who are not narrow specialists, rather naturalists of the so-called older school,

men whose sympathies in the field of natural history are not restricted or confined to a single branch, but who have an interest in the entire range of plant and animal life and who, for this reason, are able to see correlations in a much broader way than the person whose vision is limited to and focused upon a comparatively small group.

I ought to testify to the earnestness of the students who participate in these excursions, and also to the courtesy of the instructing staff. I observed no suggestion of exclusiveness, nothing but generous cordiality. The memory is very pleasant.

THE FLETCHER MEMORIAL FUND.

At the meeting of the Ottawa Field-Naturalists' Club held in the Assembly Hall of the Normal School on November 9th, the Fletcher Memorial Committee reported that they had met with a warm response from members of the Club and friends of the late Dr. Fletcher, when the matter of the proposed memorial had been brought before them. Already between $1,400 and $1,500 had been subscribed but the Committee required about $1,800 for the project in view and asked that those who had not yet subscribed to the fund, but who intended to do so, would immediately communicate with the Treasurer (Mr. Arthur Gibson) or other member of the Committee. There had not been, nor would there be, any personal canvass; it was the desire of the Club that spontaneity should characterize every donation to the fund

The Committee reported that by far the larger number of subscribers had favored the suggestion put forward at the meeting of the Club in December last, that the memorial should take the form of a fountain erected on the grounds of the Experimental Farm, Ottawa, the scene of Dr. Fletcher's labors during the last twenty years of his life and where he had done so much, officially and unofficially, in assisting the farmer and fruit grower in their efforts to resist the attack of insect and fungous enemies, and in encouraging the study of Natural History throughout the Dominion.

At the conclusion of the report it was moved by Mr. Frank T. Shutt and seconded by Dr. William Saunders, and unanimously carried, "that the tribute about to be made to the memory of the late Dr. Fletcher, take the form of a drinking fountain consisting of a granite shaft with bronze medallion,) inscription, etc., to be erected at the Experimental Farm, Ottawa, and that the Committee are hereby empowered to make all necessary arrangements for carrying out the work."

F. T. S.

TENT-BUILDING HABITS OF ANTS.

BY C. GORDON HEWITT, D.Sc.
(Dominion Entomologist, Ottawa).

The short and interesting article in the November number of THE OTTAWA NATURALIST on "Ant Roads," by Mr. Charles Macnamara, induced me to believe that an account of some further habits of ants might be of interest, and this is my apology for giving a *résumé* of some observations which my friend, Dr. Marie Stopes made during a recent sojourn in Japan, and an account of which she published with my collaboration in the "*Memoirs of the Manchester Library and Philosophical Society*," *Vol.* 53, (*Memoir No.* 20, 1909), under the title "On the Tent-building Habits of the Ant, *Lasius niger*, Linn., in Japan."

Lasius niger is the common brown or black garden ant and has a world-wide distribution. It usually constructs underground galleries and passages, and frequently keeps or cultivates aphides for the sake of the "honey-dew" which is an excretory product of the alimentary canal and is much sought after by the ants for food. It is not, as is frequently supposed, secreted by the small horn-like posterior appendages of the ants known as the syphons. The ants, as it has been stated, sometimes take the aphid eggs into their nests to protect them from the frost. *L. niger*, to my mind, is rather like man in the development of its agricultural methods. In some regions they are in these respects less advanced than in other places. Some are mere savages and leave their "cows," the aphides, out in the open to take care of themselves, others take great pains to keep their live-stock under such conditions as to be free from all danger and to ensure a maximum amount of "honey dew" production—they are the up-to-date farmers, so to speak. I do not intend to enter the arena of the vexed question of whether these actions are due to intelligence or instinct on the part of the ants: that is not my object. I am simply giving facts; let those who will analyse the motive power of these activities.

So that we find that whereas certain ants are content to wander along their well-worn paths to the pasture fields where their aphid stock is herded, others more advanced in their agricultural development make shelters or "tents," as they have been called, for their insect herds; we have called them "cow-sheds."

As early as 1810 Huber described these structures which *L. niger* was accustomed to make. He found small spherical

tents on the Spurge. They were of the "carton" type, constructed of finely triturated wood and in these shelters the ants kept the plant-lice; they were thus protected from their enemies and also from the rain and strong sunlight. Forel, who has added so much to our knowledge of the lives of these insects, has described a number of different kinds of "cow-sheds" which several European species of *Lasius* constructed. A certain species, *L. brunneus*, constructs shelters made of detritus, that is, minute inorganic or mineral particles such as sand, etc., over large bark aphides. Certain species of *Myrmica* make earthen cells to enclose the aphides and these chambers communicate with the rest by means of covered galleries. Our greatest American authority on ants, Prof. W. M. Wheeler, informed me, when I was studying these interesting habits, that *Lasius niger* and its American varieties are in the habit of constructing shelters over plant-lice and mealy bugs, and he refers to this habit in his interesting paper on the habits of the tent-building ant, *Crematogaster lineolata*, Say. (in *Bull. Amer. Mus. Nat. Hist.*, *Vol.* 22, 1906). The common American variety, *L. niger* var. *americana*, occasionally builds detritus tents around the stems of plants.

The Japanese colonies of *Lasius niger* which Dr. Stopes discovered seemed to have reached the highest stage of agricultural development; even the ants seemed to be imbued with the Japanese spirit of progress! She discovered tents on the evergreen oak, *Ilex integra*, of a cylindrical shape, encircling the terminal portions of shoots arising from the stumps of a stem that had been cut down. These tents were of the detritus type and made of minute grains of black sand mixed with white fragments of broken shell—the trees were growing near the sea at Hayama. The whole twig, with the exceptions of the tips of the leaves, was enclosed in the detritus tent through which ran galleries swarming with ants. But these particular ants were not content to construct "cow-sheds" merely, but for their own comfort had built of the same detritus covered galleries which wound round the trunk of the tree and communicated with the nests which were underground, so that they could reach the "cow-sheds" in all weather. Other shelters which may have been the initial stages of the larger tents, were made by the ants by biting the undersides of the midribs of the leaves. This caused the leaves to become inrolled with their uppersides outwards and the spaces thus formed by the inrolling was filled with detritus to form chambers.

Ants appear to construct the two types of tents—the carton type made of fibrous material of a vegetable nature, and the detritus type made of inorganic material; both kinds of

material may be used by the same species to construct their "cow-sheds" or tents.

As we concluded in our memoir, "There is no doubt that this habit of building detritus and carton tents has developed for no other purpose than that of protecting the various species of aphides which are kept by the ants for the sake of their honey-like secretions. By the construction of such "cow-sheds" the aphides are able to continue sucking the juices of the plant and at the same time they are not only protected from their enemies, but also from alien ants. The protection from cold is also important, as Brandes (in 'Die Blattlaus und der Honigbau,' *Zeitschrift f. Natur wiss, vol.* 66, 1894), has found that aphides are most active during the warmer part of the day, so that in keeping these warm the ants would also be obtaining a large supply of the secretion from them. In addition to these explanations of the tent-building habits of ants, Wheeler also suggests that the tents may be to prevent the escape of the aphides to other plants or other parts of the same plant.

"The evolution of the forms of the tents which are found in the different genera of tent-building ants may have started with the small earthen cell covering a few aphides; this may have been constructed either on the stem or by filling the space formed by the inrolling of certain of the leaves. Further enlargement and elaboration would lead to the formation of a spherical or cylindrical tent having the stem as axis, and finally, to secure for themselves the greatest comfort and convenience, the ants would connect these tents either with the earth or with their subterranean nests by means of covered passages."

This great adaptability to its environment, the usage of the means at hand and variability of constructive power in a single species of insect such as *Lasius niger*, is of very great interest to the entomologist who becomes so accustomed to the fact of a certain species of insect making nests or structures of a particular and more or less fixed type, such as we find in the other social and solitary hymenoptera as the bees and wasps, and also in other orders of insects.

BOOK REVIEW.

FARM WEEDS OF CANADA.—By George H. Clark, B.S.A., and James Fletcher, LL.D., F.R.S.C., F.L.S., with illustrations by Norman Criddle: Second Edition. Revised and En-

larged by George H. Clark. For sale, by single copies only, at the office of the Superintendent of Stationery Government Printing Bureau, Ottawa. Price $1.00.

We were particularly pleased to receive recently the second edition of this most useful publication. There are a number of splendid new features which are at once seen in a hasty glance through the book. In the first place it is of a more convenient size and the Table of Contents at the beginning is a useful addition. The general make up of the work is an improvement on the first edition, the type is better and the arrangement of the subject matter all that could be desired. Twenty full page additional coloured plates are included, the work of Mr. Criddle. As Mr. Clark says, considerable re-arrangement of the matter was made necessary in this second edition in order that the various plant families, genera and species might be adjusted to conform with the recommendations of the International Botanical Congress at Vienna and now generally adopted by botanists. In revising the descriptions of plants and seeds technical terms have been avoided wherever possible. Many most interesting quotations apropos of the subject are used throughout the book to complete pages. In the Preface it is stated that "Farm Weeds of Canada was one of the last of the many contributions to agriculture from the late Dr. James Fletcher. It is desired that this second edition of the book will further perpetuate to his memory that large measure of appreciation of his unselfish personality and zeal for useful service which he so richly deserved." This new edition of Farm Weeds is a particularly valuable work and is without doubt one of the best, if not the best, Government publication which has yet appeared in any country. The Dominion Department of Agriculture is fully alive to the enormous annual losses caused in Canada by Weeds. The first edition of Farm Weeds was eagerly sought after by farmers and others throughout Canada, and has already been of inestimable value to the country. The second edition revised and enlarged will doubtless too soon be exhausted. The nominal price fixed for its sale will restrict its distribution to those who will preserve and make good use of it. The Ottawa Field-Naturalists' Club is specially interested in this book, in that Mr. George H. Clark, Seed Commissioner of the federal Department of Agriculture, and Mr. Norman Criddle who made the drawings, are both members. Other members of the Club too, who assisted and whose names we notice in the Preface are Mr. George Michaud, Prof. John Macoun, Mr. T. G. Raynor, Mr. J. H. Grisdale, Mr. T. N. Willing, and Mr James Murray.

A. G.

THE OTTAWA FIELD-NATURALISTS' CLUB.

LECTURE PROGRAMME

1909 - 1910.

(All lectures will commence at 8 o'clock sharp.)

November 9th, 1909, (Tuesday)—"HOME BIRDS AND WANDERERS," Mr. W. E. Saunders London, Ont. (Normal School).

December 14th, 1909, (Tuesday)—8 p.m.—EXHIBITION OF BIOLOGICAL AND GEOLOGICAL SPECIMENS. Microscopes will be supplied for the examination of microscopic specimens.
9 p.m.—SHORT ADDRESSES by Dr. J. F. White, Mr. J. W. Gibson, Mr. A. Halkett and others. (Normal School).

January 4th, 1910, (Tuesday)—"INSTINCT AND EDUCATION," The President. (Carnegie Library).

January 18th, 1910, (Tuesday)—"LIFE," Mr. A. H. W. Cleave, F.R.M.S., Ottawa. (Normal School).

February 1st, 1910, (Tuesday)—"HOUSE FLIES AND THEIR RELATION TO PUBLIC HEALTH," Dr. C. Gordon Hewitt, Entomologist, C. E. Farm, Ottawa. (Normal School).

February 15th, 1910, (Tuesday)—"THE FLORA AND FAUNA OF THE WEST COAST OF VANCOUVER ISLAND," Prof. John Macoun, Ottawa. (Carnegie Library).

February 25th, 1910, (Friday)—(*Joint Lecture series*)—"BACTERIA IN RELATION TO PLANT LIFE," Prof. F. C. Harrison, Macdonald College, Que. (Normal School).

March 8th, 1910, (Tuesday)—"A PLANT DOCTOR AND HIS WORK," Mr. H. T. Gussow, F.R.M.S., Botanist, C.E. Farm, Ottawa. (Normal School).

March 15th—ANNUAL MEETING. Including Receipt of Annual Report, Election of Officers, Presentation of Revised Constitution and By-laws. *A full attendance of members is requested.* (Carnegie Library).

President: A. E. Attwood, M.A.
Treasurer: Arthur Gibson. Secretary: T. E. Clarke, B.A.

THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, JANUARY, 1910 No. 10

SOME OF THE BEST NATIVE PLANTS FOR CULTIVATION.

By W. T. Macoun,

Horticulturist and Curator of the Arboretum and Botanic Garden, Central Experimental Farm, Ottawa.

There are in Canada about 4,000 species of flowering plants, and 76 species of ferns. In the Province of Ontario alone there are nearly 2,000 species of flowering plants, and 46 species of ferns. This flora stretches from the Atlantic to the Pacific and from latitude 49° to as far north in the Arctic regions as the Canadian territory extends. Over this wide area there are many variations in climate, each great climatic region being again subdivided into habitats, where the different species are found. Some species have a very wide range, extending from the Atlantic to the Pacific and from the 49th parallel to the Arctic circle, while others, such as the Tulip Tree, *Liriodendron tulipifera*, American Crab Apple, *Pyrus coronaria*, Common Papaw, *Asimina triloba*, Flowering Dogwood, *Cornus florida*, Virginian Cowslip, *Mertensia pulmonariodes*, and other plants I might mention are confined to very limited districts in south-western Ontario, though having considerable range south in the United States.

There is no difference of opinion among lovers of plants as to the beauty of the Canadian flora. The great variety, the charming forms, the lovely colours, and the blending of the whole when under natural conditions give us innumerable and varied pictures of which we may well feel proud.

There is a growing sentiment in Canada in favour of Canadian things. We are becoming more proud of our country every year. We are looking for an individuality which will stand for Canada, and one of the best ways we can impress our individuality on the people of other countries and our own is to make Canadian trees, shrubs, and herbaceous plants a prominent feature of our landscapes. We have too often in the

past planted our parks and public grounds with plants which were native of other countries when we might have made them beautiful with our own.

Every city should have a by-law regulating the planting of avenue and shade trees along the streets of the city, and while, in all cases, it might not be desirable to confine the planting to native species, yet everything possible should be done to encourage the planting of them. The merits of the different species should be brought prominently before our people. A proposed by-law of this kind is before the Ottawa City Council now.

Let us now look at the material there is to draw upon, beginning with the trees, shrubs and vines which are, perhaps, our most effective plants.

The Norway Maple, *Acer platanoides*, is a good shade tree, but it is not as desirable for street planting as the Hard Maple, *Acer saccharum*. The chief drawbacks to the Norway Maple, as I have observed it, are that it forms too low a head and if pruned up does not look well. This tree is being planted in greater numbers every year, chiefly due, in my judgment, to the fact that it grows rapidly in the nursery, and hence is a more profitable tree to grow. But let us stick to our Hard Maple, the best maple by all odds. It grows to a great height and size and its brilliant colouring in autumn gives Canadian cities an individuality.

As the Hard Maple is the best maple to plant, so is our American Elm, *Ulmus americana*, the best elm. The rapid growth of this tree in most soils, the great height to which it grows, and its graceful form, make it one of the most desirable trees for street planting. Moreover, it lends itself to high pruning, which is so necessary in our cities, where there is such a mass of wires. The higher the American Elm is pruned the better it looks when the tree is large, and this is a very important matter. In some places two species of European elms have been planted instead of the American. This is a great mistake as they are inferior trees to our own and everything possible should be done to confine the planting to the American Elm.

With the Hard Maple and American Elm conceded to be the two best trees for street planting, there are few other trees which need to be considered, as they should constitute by far the greater part of the planting. But for variety, a few other desirable species may be used. Why the Red Oak, *Quercus rubra*, has not been more planted as a street tree is a mystery to me. It is a most beautiful tree, the fastest growing of the oaks, and as rapid a grower, I believe, as the Hard Maple. Its leaves, which are usually highly coloured, remain on the tree until winter and give a colour to the streets long after the leaves of

most other trees have fallen. Pin Oak, *Quercus palustris*, is also another fine species, but a slower grower, but its finely cut leaves give quite a characteristic feature to an avenue of this species. It is, however, much tenderer than the Red Oak and should only be planted in the milder parts of Ontario.

Other good native trees for street planting for some sections of the country are the Silver and Red Maples for wet ground, the Sycamore or Buttonwood for south-western Ontario.

For park purposes there are so many good native trees that one would have to name almost all of them, but a few of the best deciduous trees are those previously mentioned for streets and the Basswood, Beech, Yellow Birch, Canoe Birch, Mountain Ash, White Ash, Kentucky Coffee Tree, Cork Elm, Hickory, Scarlet Haw, Cockspur Haw, Honey Locust, and Tulip Tree and Sassafras (for western Ontario).

Canada is rich in evergreens and why the Scotch Pine, Austrian Pine, and Norway Spruce are used to the almost exclusion of our native pines and spruces can only be explained by the apparent preference for something exotic.

The Scotch Pine, *Pinus sylvestris*, cannot be compared in beauty with our White Pine, *Pinus Strobus*, which is the most beautiful pine that grows. The Scotch Pine is stiffer in habit to begin with and soon becomes scraggy and unsightly, while the beauty of the White Pine increases as it grows older if given plenty of room so that it may hold its branches to the ground.

The Austrian Pine, *Pinus Laricio nigricans*, is a fine tree, but it also has a stiffer outline than our Red Pine, with which it may be fairly compared. We usually think of Red Pine, *Pinus resinosa*, as it is seen in the woods, a tall tree with a clean trunk and apparently a few leaves at the top, but well grown specimens of Red Pine branching to the ground are most attractive.

The Norway Spruce, *Picea excelsa*, is a beautiful tree when young; being a rapid grower and very graceful, but for permanent effect it cannot be compared with our native White Spruce, *Picea alba*, particularly those with a bluish tinge, as anyone who has seen a well-grown specimen of White Spruce sixty or seventy feet high will bear me out. The Colorado or Rocky Mountain Blue Spruce, *Picea pungens*, is a close competitor of the White Spruce and the best specimens are bluer in colour and it is undoubtedly one of the best spruces to plant, but it is a very stiff tree and it is not a favourite with many people on that account. Moreover, it is expensive, which makes it more or less prohibitive.

The Hemlock, *Tsuga canadensis*, is a very graceful tree, and while a rather slow grower there is no other tree which does well in eastern Canada that looks anything like it. For

park effect and for blending with other trees it is one of the most desirable. From British Columbia we have the Douglas Fir, Bull Pine, and Englemann's Spruce, all fine trees and doing well in eastern Canada. The best Englemann Spruce resembles very much the Colorado Blue Spruce, but is more graceful.

Among the most ornamental Canadian shrubs I mention the Viburnums, of which there are eight good species which succeed under cultivation. Perhaps the best of these is the High-bush Cranberry, *Viburnum Opulus*, which is ornamental both in summer and winter, the brightly coloured fruit being very attractive. Our wild roses are very useful, among the best being *Rosa lucida*, the glossy leaves of which make this very ornamental even when out of flower. Two of the best species of Mock Orange are natives of British Columbia, namely, *Philadelphus Gordonianus* and *Philadelphus Lewisii*. Flowering Dogwood is a very effective shrub in spring in Western Ontario, while the Amelanchiers make masses of white in the early spring. For autumn effects the Aromatic and Stag-horn Sumachs cannot be beaten.

Among the hedge plants there is no evergreen so satisfactory as the native American Arbor Vitæ or Cedar. Rarely injured by insects or diseases, standing pruning well and needing comparatively little pruning, it is undoubtedly the best. It is not so rapid a grower as the Norway Spruce, which is sometimes used for hedge purposes, but is more permanent and takes up less room. The White Pine is also proving an excellent hedge plant at the Experimental Farm. The Hemlock makes a very fine hedge if rapid growth is not desired, being compact and of a pleasing shade of green.

While few of our deciduous plants are used for hedge purposes we see no reason why some of them should not be used with good effect. The native beech is doing well as a hedge plant at Ottawa and there is no good reason why it should not become as popular in this country as the European Beech is in England. The Moosewood, *Dirca palustris*, should make a splendid hedge plant with its soft, light green leaves. The Scarlet Hawthorn should make a desirable one, and where a hedge for holding back stock is required the Honey Locust is one of the best plants to use in the warmer parts of Ontario. This is taking the place of the Osage Orange in those districts where the latter succeeds. There are other shrubs with attractive foliage, such as the Viburnums and Hamamelis which should do well as hedges.

Among the climbing hardy plants we have three native woody species which can scarcely be excelled. These are the Virginian Creeper, the Wild Clematis or Virgin's Bower, and the

Climbing Bitter Sweet, and to these might be added for some purposes the Wild Frost Grape.

For beauty of autumn colouring the Virginian Creeper stands alone among climbing plants. Where leaf-hoppers are troublesome its attractiveness is marred during the latter part of summer by the withering of the leaves. There is, however, a self-fastening variety brought into notice by the Experimental Farm, which is now becoming quite common about Ottawa. This does not need support but climbs walls by means of its discs and tendrils almost as well as the *Ampelopsis Veitchii*. The foliage of this variety is somewhat downy and the insects seem to be repelled by the hairs, at any rate they trouble it very little.

The Virgin's Bower or Wild Clematis is a very rapid grower, has clean foliage which is very seldom affected by insects, and bears a profusion of small white flowers in summer. This, and the European Traveller's Joy, *Clematis Vitalba*, which is much like ours, if planted alternately will give a continuity of bloom from early summer almost until *Clematis paniculata* is in bloom.

The Climbing Bittersweet, *Celastrus scandens*, should be more planted than it is as it has a very clean, attractive foliage and the orange and scarlet fruit in autumn and early winter lengthens its season of usefulness very much. In parks or large grounds this can be used very effectively.

One might write much more about the beauties and advantages of our trees and shrubs. Something must, however, be said about the best native herbaceous plants.

It has often been remarked, especially by those coming from other countries, how few species of Canadian wild flowers are found growing along the roadsides or borders of cultivated fields in eastern Ontario. If we take out the Golden-rods and Asters there are few prominent plants left. But one might say: "There is the Canada Thistle; that surely is common enough!" But the Canada Thistle is a European plant and we should protest against its being called under that name. Furthermore, practically all our bad weeds are European plants. The reason why so few attractive Canadian wild flowers are found along our roadsides and in our uncultivated ground is that most of our best wild flowers are woodland species and when the woods disappear they disappear with them. To retain and make use of the many beautiful woodland species we must preserve the woods or make for them in our parks and gardens conditions approaching those they get in their native wilds. But fortunately, there are a number of beautiful flowers, among the best in fact that are available anywhere, which will succeed under cultivation without any very special selection of situation or soil, and first among these I mention *Trillium grandiflorum*

There is no other white flowered perennial of its season of bloom which approaches it for beauty. It has a comparatively long season of bloom for a spring flower, quickly becomes established and multiplies rapidly. A clump of about three roots planted ten years ago, now produces more than fifty flowers annually, most of very large size. These could be used with splendid effect in parks or private grounds if massed.

The Virginian Cowslip, *Mertensia pulmonariodes*, or, as it used to be called, *Mertensia virginica*, is another spring flowering herbaceous perennial which should have a place in every garden. The flowers which open at Ottawa during the second week of May are of a lovely shade of pale blue and when in bud are pink at the base. This plant soon withers after blooming and by early summer is not seen above ground.

Another charming wild plant which does well under cultivation is the Wild Sweet William or Blue Phlox, *Phlox divaricata*. This blooms at Ottawa from the middle of May to June 10th, and is one of the most admired plants at that time. The flowers vary from soft tints of lilac to mauve, and a white variety is found in western Ontario which is very beautiful.

A dwarf phlox native of south-western Ontario is the Moss Pink, *Phlox subulata*, blooming early in spring and particularly useful for rockeries. It can be had now in many varieties.

Although some of the best of the later blooming Columbines are not natives of Canada, yet two of the best early species are *Aquilegia canadensis*, and *A. coccinea*, which, if not so common, would be more appreciated.

Among the first flowers to open after the snow goes is the Prairie Anemone or Prairie Crocus, *Anemone patens*, var. *Nuttalliana*. This is common in the prairie provinces. It is very showy, even in small clumps, but if massed would be very effective in early spring and be a contrast to the early flowering bulbs, which are in bloom at the same time.

One of the showiest native plants we have and particularly attractive on account of its odd but pleasing colour, is the Butterfly Weed or Pleurisy Root, *Asclepias tuberosa*. The flowers are a bright orange and the plant remains in bloom from early in July to early in August.

The Oswego Tea or Bee Balm, *Monarda didyma*, is a native which is considerably used in planting in the United States and could be used much more in Canada with good effect. The plant being from three to four feet high and the flowers being bright crimson or scarlet, it is a striking object wherever planted. It blooms from early in July to September. While mentioning scarlet flowers one must not forget the Cardinal Flower, *Lobelia*

cardinalis, which does very well in a moist place in the herbaceous border.

There are many species of herbaceous Spiræas growing at the Central Experimental Farm, but there are none of them as handsome or as effective as the Goat's Beard, *Spiræa Aruncus*, a native of British Columbia. It grows 4½ feet high and from early in June to early in July it is a mass of large, plume-like panicles of creamy white flowers.

Among lilies, what is more effective than our native *Lilium superbum*, attaining a height of 4½ to 7 feet at Ottawa?

Of hardy native orchids of great beauty which do well under cultivation with special preparation of soil and partial shade, may be mentioned *Cypripedium spectabile*, *Cypripedium pubescens*, and *C. parviflorum*. One of our lovers of wild plants at Ottawa has also been very successful with *C. acaule*. *Orchis spectabilis* and *Habenaria psycodes* can also be cultivated.

Other well known native wild flowers which are very desirable and do well under cultivation are *Coreopsis lanceolata*, *Gaillardia aristata*, *Polemoniums* of several species, Violets of several species, *Anemone canadensis*, *Papaver nudicaule*, *Cimicifuga racemosa*, *Thalictrum purpurascens*, *Dicentra eximia*, *Echinacea purpurea*, *Hepatica acutiloba* and *triloba*, *Sanguinaria canadensis*, *Eupatorium ageratoides*, *Aster novæ-angliæ*, and other species, *Solidago canadensis*, and many other beautiful plants from the western provinces.

Nor must we close without reference to the ferns, of which we have so many beautiful species that may be readily cultivated. Among the best are:—

1. Maidenhair Fern, *Adiantum pedatum*.
2. Male Shield Fern, *Aspidium Filix-mas*.
3. Marginal Shield or Evergreen Wood Fern, *Aspidium marginale*.
4. Spinulose Wood Fern, *Aspidium spinulosum*.
5. Narrow-leaved Spleenwort, *Asplenium angustifolium*.
6. Ostrich Feather Fern, *Onoclea Struthiopteris*.
7. Sensitive Fern, *Onoclea sensibilis*.
8. Cinnamon Fern, *Osmunda cinnamomea*.
9. Royal Fern, *Osmunda regalis*.
10. Fragile Bladder Fern, *Cystopteris fragilis*.
11. Bulblet Bladder Fern, *Cystopteris bulbifera*.
12. Lady Fern, *Asplenium Filix-femina*.

NEW CONTRIBUTIONS TO CANADIAN BRYOLOGY.

By N. Conr. Kindberg, Ph.D., Upsala, Sweden.

(Continued from page 143).

36. Grimmia (Schistidium) diversifolia.

Leaves large, channelled or concave, diversiform; the lower broader, subovate obtuse and muticous; the upper broadly ovate-lanceolate, obtusate or short-acuminate, recurved all around, muticous or rarely with a short and broad hairpoint; cells not sinuous. Perichetial leaves larger. Capsule immersed; peristome orange, brittle. Stem 2-3 cm. high. Tufts blackish-brown.

On rocks in Pipestone Pass, eastern slope of Rocky Mountains, Alta., altitude 7,300 feet, July 5th, 1904. No. 119a.

37. Grimmia Hartmani Sch.

Gaspe, 1907.

38. Grimmia papillinervis.

Capsule smooth oval; teeth nearly entire, reddish-yellow or yellowish; stomata not distinct; pedicel exserted, *curved* when moist. Leaves ovate-lanceolate, broadly acuminate subacute, carinate, slightly or not recurved, sometimes papillose at borders, not large, faintly appressed when dry; cells quadrate, not sinuous; the upper somewhat small and chlorophyllose, the lower larger, nearly uniform and hyaline; hairpoint long, denticulate or nearly smooth; costa papillose. Monoecious (subparoecious). Tufts pulvinate, densely cohering, about 1 c.m. high dark or glaucous green when dry. Lid and calyptra not seen.

British Columbia, Skagit summit. J. M. Macoun, 1905.

39. Grimmia hamulosa, Lesq.

Vancouver Island, Nanaimo Biological Station, June, 1908. New to Canada.

40. Grimmia cognata, Card. et Ther.

Alberta, Lake Louise, alt. 6,000 ft. 13th Sept., 1904. New to Canada.

41. Grimmia subpapillinervis.

Agrees with *G. papillinervis*. Leaves with not sinuous cells, the upper cells subquadrate; costa papillose. Differs from it. Leaves longer, long-subulate; lower cells rectangular, the alar more distinct; hair-point smooth. Capsule oblong-cylindric.

Differs also from *G. alpestris* in the longer leaves and the curved pedicel of capsule, etc.; from *G. subsulcata* in the longer, not striate leaves.

British Columbia 1908. A. Brinkman.

42. GRIMMIA STIRTONI, SCHIMPER; BRAITHWAITE.

Capsule oval, smooth; pedicel straight, slightly exserted above the (with very long and rough hair-point furnished) perichetial leaves. Hitherto found only in sterile state.

Vancouver Island, Mount Benson, 1893.

43. GRIMMIA SERRATA.

Differs from the resembling *G. robustifolia*. Capsule oblong, distinctly costate. Leaves serrate above; upper cells not sinuous. Tufts green.

British Columbia, Rossland, 15th Aug., 1902. J. M. Macoun.

44. RACOMITRIUM DEPRESSUM, LESQ., VAR. NIGRICANS

Tufts blackish when dry; leaves sometimes furnished with a hairpoint.

The sterile specimens agree with the description in Manual of Mosses of North America by Lesquereux and James; the true *R. depressum* is found in Yosemite Valley, but I have not seen authentic specimens. Perhaps the capsule is different

Collected on Southampton Island, near Fullerton, northwest of Hudson Bay, by Commander A. P. Low in 1904, also at Whale River, Labrador, in 1896.

45. SCOULERIA MUELLERI, KINDB.

Differs from *S. aquatica* in its leaves being broader at the middle; inner basal cells very numerous. These characters are sufficient to make a proper species when they are constant and easily observed.

Collected on a rock in the Klondike River near Dawson, Yukon, August 8th, 1902. No. 295.

46. BARBULA SUBCYLINDRICA, BROTH.

Vancouver Island 1908 and 1909, also fruiting. New to Canada. Pedicel twice longer and neither curved nor exserted.

47. BARBULA ANDREÆOIDES.

Leaves small and short, broadly ovate and subcochleariform, obtusate, mostly obtuse, more or less reflexed, distinctly papillose, appressed when dry, straight suberect and rufescent when moist; cells small subquadrate; costa percurrent redbrown. Perichetial leaves broadly ovate-lanceolate acuminate

acute; costa long-excurrent. Tufts blackish-brown when dry, dense, 2-3 cm. high. Stem capillary. Dioecious. Capsules not seen.

On rocks, summit of McArthur Pass, western slope of Rocky Mountains, B.C., altitude 7,500 feet, August 10th, 1904. No. 241.

48. BARBULA SUBANDREÆOIDES.

Resembles *B. andreæoides* in the stem being often proliferous with long shoots, also in perichetial leaves and in habit.

Differs from it: Leaves longer, generally subovate-oblong short-acuminate and not reflexed. Tufts pulvinate, about 1 cm. high.

On rocks, near Twin Falls, Yoho Valley, western slope of Rocky Mountains, B.C., altitude 6,800 feet, September 6th, 1904.

49. BARBULA INCLINATA (HEDW. FIL.) SCHWAEGR.

On damp rocks at Laggan, eastern slope of Rocky Mountains, altitude 5,200 ft., June 26th, 1904. No. 113. New to Canada.

50. DIDYMODON BRACHYDONTIUS (BRUCH) WILS.

(*Trichostomum mutabile* Notaris).

British Columbia, fruiting: A. Brinkman, 1908.

51. ENCALYPTA ALASKANA, KINDB.

"*E. flaviseta*," Kindb. in letter to Macoun, 1890.

Leaves recurved, not limbate obtuse or subobtuse. Capsule faintly sulcate when dry; pedicel soon red; calyptra not fringed.

Collected on rocks at Sicamous, B.C., July 3rd, 1889, on the Yoho Pass, B.C., September 2nd, 1904; also at Laggan, Alta., June 27th, 1904.

52. MEESEA MACOUNII.

Synœcious. Leaves decurrent, from a dilated base tapering to a gradually attenuate, acute, entire or near the apex sparingly dentate acumen; the upper reflexed at the borders and with an excurrent costa; basal cells larger than the upper ones. Pedicel of capsule to 7 cm. long.

M. longiseta differs in the leaves not being reflexed and with an abbreviate costa. In *M. Albertinii* the leaves are entire, their basal cells small; the pedicel of the capsule is not so long.

In a small log at Laggan, eastern slope of Rocky Mountains, Alta., altitude 5,500 feet, July 25th, 1904. No. 37.

53. MIELICHHOFERIA RECURVIFOLIA.

Leaves small and smooth, broadly ovate, obtusate or very shortly acuminate, slightly denticulate above, often recurved

on the borders, appressed when dry; nearly all cells quadrate; costa percurrent. Tufts compact, decolorate with green branch-tips, about 3 cm. high, in the lower part filled by earth. Capsules and flowers not seen.

On earth by Lake Agnes above Lake Louise, eastern slope of Rocky Mountains, altitude 7,500 feet, September 14th, 1904. No. 34.

54. PHILONOTIS MICROCARPA.

Allied to *Philonotis marchica*, agreeing in the leaves being uniform, small and serrate, also in the stem being high and not thick; differs in the leaves being sometimes reflexed at the borders, the inner perichetial long, reaching far above the vaginula, broad and acute with a not percurrent costa; capsule very small.

The tufts are tomentose, about 6 cm. high; lid of capsule conic; pedicel capillary, 2, 2.5 cm. long. Male plants not seen.

In other allied species (*Ph. Macounii et al*) tufts are very much lower, the stems thinner and subcapillary.

Bogs along Pipestone Creek, eastern slope of Rocky Mountians, altitude 6,000 feet, July 8th, 1904. No. 75.

55. PHILONOTIS FONTANA (L.) BRID., VAR. MICROTHAMNIA, KINDB. New variety.

Tufts dense, nearly wholly tomentose. Shoots of male plants very slender, 1-1.5 cm. long; barren branches shorter; stem capillary. Leaves small recurved acuminate acute, spreading or falcate with double mamillæ; the upper longish with long-excurrent costa; the lower shorter with shorter costa. All perigonial leaves obtuse; costa faint or obsolete.

Collected in a peat bog along Hunker Creek, Yukon, July, 1902. No. 152.

56. FUNARIA MICROSTOMA BRYOL. EUR.

Vancouver Island, 1908. New to Canada.

57. PHYSCOMITRIUM MICROCARPUM.

Leaves *entire*, limbate by one yellow cell-row, ovate-oblong short-acuminate, not recurved; the upper with short-excurrent costa. Capsule small; lid convex; spores rough; pedicel pale, finally pale-reddish.

Brit. Columbia. A. Brinkman, 1908. New to Canada.

58. MNIUM SELIGERI, JURATZKA & MILDE.

On rocks near Fort Albany, west coast of James Bay, Hudson Bay, August 9th, 1904. Coll. Mr. W. Spreadborough.

No. 369. On rocks and earth at Ottawa, October 10th, 1905. New to Canada.

59. MNIUM MEDIUM BR. EUR. * BOREALE, KINDB.

Near Fort Albany, James Bay, Hudson Bay, August 9th, 1904. Coll. W. Spreadborough.

New to Canada. Also found in Illinois by C. F. Baker.

60. MNIUM BLYTTII BR. EUR., VAR. MICROPHYLLUM, KINDB: new variety.

Leaves smaller, obtusate (not acuminate), generally obtuse and elliptic, rarely with a very short point; only shoot-leaves green, the others purplish-red.

In bogs along Hunker Creek, Yukon. Not uncommon. Collected in July, 1902. Nos. 218, 219, 213 in part.

61. MNIUM MACOUNII.

Agrees with *M. riparium*, Mitt., in the leaves of the barren stems being loosely disposed and crisped when dry.

Differs in leaves being very much smaller, nearly always *simply* dentate (or entire at least below the middle), very rarely doubly dentate; nearly all cells of the same size (not smaller towards the margins), also (and principally) in the *short* costa.

Leaves generally obtusate (short-pointed or acute), more or less (or not) decurrent; the lower leaves smaller and broadly oval often reddish; the upper generally oval (or rarely oblong); all with a border of 2-3 rows of narrow and often finally red cells; costa finally red, not dentate, abbreviate, generally ceasing far below the apex. Stem purplish. Tufts large, very radiculose at the base, dense, 1 cm. high or lower. Dioecious. Capsules not seen.

In peat bogs along Bonanza and Hunker Creeks, Yukon, July, 1902. Nos. 212, 233b.

62. BRYUM CYCLOPHYLLOIDES.

Differs from *B. cyclophyllum* (Schw.) Br. eur.

Upper leaves more concave, crowded (and green), the lower rufescent; cells somewhat larger, the alar rufous; costa percurrent, often red. Capsules not seen

In a small pool by Pipestone Creek, eastern slope of Rocky Mountains, altitude 6,500 feet July 6th, 1904. No. 84.

63. BRYUM PENDULUM (HORNSCH.) SCHIMPER., * NANUM.

Differs in capsule being minute, pedicel less than 1 cm. long, stem very short with gemmiform shoots.

On Cape Henrietta Maria, west side of James Bay, Hudson Bay, August 9th, 1904. Coll. Wm. Spreadborough. No. 364.

64. BRYUM PENDULUM * LONGIPES.

Differs in its narrow capsule with a mamillate lid, costa of leaves short-excurrent.

On earth at Laggan, eastern slope of Rocky Mountains, altitude 5,200 feet, June 26th, 1904. No. 132.

65. BRYUM SUBPERCURRENTINERVE.

Leaves crowded, concave, not decurrent, diversiform, entire, not large, twisted when dry; cells dilated subrhombic; costa red. Older leaves with red insertion. Upper stem-leaves oval-oblong subacute, mostly limbate and reflexed; costa percurrent or rarely short-excurrent. Shoot-leaves and lower stem-leaves oval, not distinctly limbate, slightly or not reflexed, very obtuse, arrounded at the apex; costa not percurrent. Capsules not seen; pedicel capillary, 1.5 to 2 cm. long. Dicœcious. Tufts dense, green above, 2-3 cm. high.

Very peculiar in the round-obtuse shoot-leaves with their abbreviate costa.

Bogs along Pipestone Creek, eastern slope of Rocky Mountains, altitude 6,000 feet, July 8th, 1904. No. 89.

66. BRYUM (B. PARVULUM Kindb in Revue Bryolgique) MACOUNII (New name).

Capsule suboval, not constricted,brown and pendent, small, neck longish; lid large convex mamillate, red and nitid; teeth brown; endostomial segments entire, pale; cilia wanting; pedicel 1 cm. long; spores about 0.03 mm. Leaves small and short, ovate-oblong, short-acuminate acute, recurved and entire, more or less limbate; insertion red; cells rhombic; costa red, percurrent. Tufts low and compact; stems subgemmiform. Synœcious. Habit of *Bryum archangelicum*; it differs in monœcious inflorescence, costa of leaves excurrent, etc. *B. lacustre* differs in the small lid of the capsule, endostomial segments fenestrate, narrower leaf-cells, loose tufts, etc.

On wet earth and rocks at Gaspe Basin, Gaspe County, Que., August, 1907. Coll. John Macoun.

67. BRYUM (WEBERA VEL POHLIA) OBTUSATUM.

Leaves small and distant but neither decurrent nor reflexed, ovate-oblong or ovate, obtusate, generally obtuse; distinctly denticulate to the middle; cells somewhat wide; costa abbreviate. Lower leaves shorter, round-obtuse, sometimes faintly rose-red. Perichetial leaves suboblong shortish, not acuminate, generally obtuse, rarely subacute. Stem red. Shoots long with capillary stem and short, much distant and patent leaves. Tufts 7 cm. high. Dicœcious. Capsule not seen.

In the railway ditch at Hector, western slope of Rocky Mountains, B.C., altitude 5,200 feet, August 4th, 1904. No. 265a.

68. BRYUM ALPINIFORME, KINDB.

Cat. Can. Plants, p.271.

Hitherto found only in a sterile state. Capsule sometimes asymmetric; cilia appendiculate; spores 0.01 mm. Stem 4-5 cm. high.

In the railway ditch at Hector, with the preceding species, on same date. No. 274 in part.

69. BRYUM SUBOBTUSIFOLIUM, C. MUELLER, MUSCI TSCHUCHTSCHICI.

Differs from *B. obtusifolium*, Lindb, leaves less loosely disposed, shorter-decurrent and often limbate. Sterile. The tufts are 7 cm. high.

On Southampton Island, Hudson Bay, August 9th, 1904 Coll. Commander A. P. Low. No. 337. New to America.

70. BRYUM (WEBERA) SUBCUCULLATUM, C. M. & KINDB.

Cat. Can. Plants, p.113.

It seems to be a good species, when the inflorescence is parœcious. It was regarded by me (in Eur. and N. Amer. Bryineæ) as a subspecies of *B. commutatum*.

Collected on the "Saddle" above Lake Louise, eastern slope of Rocky Mountains, altitude 7,300 feet, July 20th, 1904. No. 77.

71. BRYUM AURIMONTANUM.

Nearly allied to *Bryum arcticum* in peristome, spores and synoecious inflorescence.

Differs from it: Leaves shorter, subovate, dentate near apex, yellowish (not red-) limbate; capsule less narrowed to the mouth.

On earth at Dawson City, Yukon, July 14th, 1902. No. 163.

72. BRYUM SUBMICANS.

Allied to *Bryum arcticum*; but capsules are less narrowed to the mouth; leaves yellowish-limbate.

Differs from *Bryum micans*, Limpr. Capsule longer, oval-oblong (not subglobose). Leaves longer, broadly (not narrowly) limbate, the upper with long-excurrent costa. Pedicel of capsule longer, 3-4 cm.

Inflorescence and spores as in *B. micans* and not *B. arcticum*.

In peat bogs along Bonanza Creek, Yukon, July 18th, 1902. Coll. John Macoun. No. 173 in part.

73. BRYUM SUBNEODAMENSE.

Differs from *Bryum neodamense Itz.* Leaves very much smaller and broader, suborbicular, not or slightly decurrent; limb of only 2-3 cell-rows. Capsule not seen. Habit of *Mnium hymenophylloides*. "It is not identical with *Bryum suborbiculare*. Philib." Brotherus has written so to me.

Borders of Bonanza Creek, Yukon, July 18th, 1902. No. 211a. Coll. John Macoun.

74. BRYUM PALLESCENS, VAR. GRANDE.

Leaves narrowly lanceolate long-acuminate entire. Pedicel of capsule 5-6 cm. long. Spores very small, 0.01 mm. Synœcious.

On rocks at Goldstream, Vancouver Island, June 8th, 1908.

75. BRYUM LOWII.

Synœcious. Leaves small, red, round-oval obtuse (or the uppermost subacute), entire and not limbate, not (or only the uppermost) reflexed at borders, somewhat loosely disposed, slightly or not decurrent; insertion pale; cells subrhombic; costa red abbreviate. Ripe capsules not seen, pedicel capillary, 1 c.m. long. Tufts dense, 1-2 c.m. high. Probably allied to *B. erythrophyllum* Kindb.

Hudson Bay, Southampton Island; Commander A. P. Low, 1904.

76. BRYUM JULACEUM.

Fruiting stem gemmiform; shoots julaceous or gemmiform. Capsule brown, oblong, not large; neck short; lid large convex mamillate; cilia appendiculate; spores about 0, 01 m.m.; pedicel 2-3 c.m. long. Leaves reflexed but not limbate, ovate-oblong entire, more or less acuminate; insertion red; cells small rhomboidal; costa long-excurrent, denticulate above, finally red. Tufts low and dense. Dicœcious. Allied to *Bryum Kunzei*, Hornsch.

British Columbia, Pipestone Pass, 7,400 ft. Alt. 1904.

77. BRYUM NEODAMENSE, ITZIGS.

Ottawa, 1907. New to Canada.

78. BRYUM GLACIALE.

Polygamous or monœcious. Capsule small brown, oblong strangulate; neck short; lid conic mamillate; teeth yellowish; cilia appendiculate; spores about 0, 01 m.m.; pedicel 1 c.m. long. Leaves small and generally flat (rarely recurved) at borders, crowded and not decurrent, ovate or ovate-oblong acute, entire and not distinctly limbate; insertion red; cells

short, somewhat wide; costa of stem-leaves long-excurrent but of shoot-leaves mostly short-excurrent. Tufts dense, green above, 2-3 c.m. high. Stem radiculose, neither julaceous nor gemmiform. Allied to *B. cæspiticium*, L.

British Columbia, Skagit Summit, about 6,000 ft. Alt. J. M. Macoun, 1905.

79. BRYUM INTERMEDIUM (LUDW.) BRID. SUBSP. OVATIFOLIUM.

Capsule not curved; cilia long-appendiculate; spores 0, 025 m.m. Leaves generally ovate or ovate-oblong, those of the shoots decurrent; costa of lower leaves not excurrent.

British Columbia, Pipestone Creek, 6,500 f. a. s., 1904.

80. BRYUM NANO-CÆSPITICIUM.

Synœcious. Stem very short with gemmiform shoots. Leaves subovate acute, neither decurrent nor recurved, narrowly limbate, red at base; costa short-excurrent. Capsule brownish; teeth yellow with red base; cilia appendiculate; spores about 0, 01 m.m.; pedicel 3 c.m. long.

Yukon district, Hunker Creek, 1902.

81. BRYUM BRACHYNEURON, KINDB.

British Columbia, Ucluelet, 1909. New to Canada.

82. BRYUM DREPANOCARPUM, PHILIB.

Scarcely distinct from *B. meeseoides*. New to Canada.
British Columbia, Ucluelet, 1909.

83. BRYUM CAMPTOCARPUM, CARDOT ET THERIOT.

Differs from *B. meeseoides* in monœcious inflorescence.
Newfoundland. A. C. Waghorne.

ADDENDUM.

84. ANACOLIA BAUERI (HAMPE), PARIS.

(Philonotis leiophylla, Kindb., in Canadian Musci).

(Bartramia Menziesii Turn.; Sullivants Icones), found only in California, differs principally in the not-excurrent costa of the leaves. All specimens, related to it in Catal. of Canad. Musci, are belonging to *A. Baueri*.

85. CAMPTOTHECIUM MEGAPTILUM SULLIV.

Vancouver Island, 1908. New to Canada.

86. ISOTHECIUM HOWEI, KINDB.

Vancouver Island, 1908. New to Canada.

87. OLIGOTRICHUM HERCYNICUM (EHRH.) LAM.

British Columbia, 1908: Brinkman.

88. BRACHYTHECIUM VELUTINUM, BR. EUR. SUBSP. CURVIRAMEUM.

Leaves smaller, sometimes recurved below; cells generally wider, lanceolate, the alar well-distinct; costa longer, ceasing in the acumen. Perichetial leaves faintly denticulate. Branches subjulaceous, often curved. Capsule smaller than in the common form.

Quebec, 1905.

89. BRACHYTHECIUM (SECT. RUTABULA) LAXIRETE.

Leaves ovate-lanceolate acuminate, not plicate, long-decurrent, not or only at the base recurved, nearly appressed when dry; alar cells quadrate numerous, not large; other cells lanceolate; costa mostly short, rarely percurrent. Stem-leaves short-acuminate, nearly entire; branch-leaves long-acuminate with subulate or filiform point, nearly entire below, serrate above. Tufts not glossy. Stem irregularly divided. Monœcious. Capsule unknown.

Differs from *B. rutabulum* in smaller, nearly appressed leaves, those of the branches longer-acuminate, wider leaf-cells, etc. Approved by Dr. Brotherus.

British Columbia: Brinkman, 1908.

90. BRACHYTHECIUM PAPILLIPES.

Monœcious. Capsule small, cilia appendiculate; annulus not seen; pedicel minutely papillose nearly in its whole length, 2 c.m. long. Leaves somewhat large, ovate-lanceolate acuminate, often with long filiform point, long-decurrent, not auricled, recurved below at one side, not plicate, entire below, slightly denticulate above; alar cells rectangular, not large, other cells linear; costa vanishing below the acumen, generally reaching to $\frac{2}{3}$.

B. mirabundum differs: Leaves longer, longer-acuminate, short-decurrent, distinctly denticulate at the acumen; alar cells not well-defined; costa vanishing in acumen.

British Columbia, 1908; Mr. A. Brinkman

91. HYPNUM (DREPANOCLADUS) JAMESII-MACOUNII.

("Hypnum conflatum subenerve" Kindb. in letter to Prof. J. Macoun).

Leaves small ovate-oblong, more or less abruptly tapering to a subfiliform, often curved point, entire and decurrent, neither striate nor recurved; insertion pale; alar cells large hyaline

and well-defined; other cells narrow, very small; costa thin, mostly indistinct, sometimes ceasing below or near the middle.

Dicœcious. Stem irregularly divided, not creeping; paraphyllia none. Capsules unknown.

Differs from the resembling *H. Kneiffii* in small leaf-cells and indistinct or short and faint costa. Now approved by Mr. Renauld.

Alaska, St. Paul's Island. J. M. Macoun, 1892, No. 113; Ottawa, 28th September, 1907, No. 268. New to Canada.

92. ORTHOTRICHUM AFFINE, SCHRAD., SUBSP. SUBRIVALE.

Capsule and pedicel exserted. Leaves short-acuminate acute (not subulate).

Quebec, 1905, No. 69.

93. BARTRAMIA CIRCINNULATA, C. M. ET KINDB.

Capsule long-pedicellate, as in *B. pomiformis*.

Vancouver Island, 1908.

94. BRYUM HYDROPHILUM, KINDB.

Leaves of fruiting stem narrowly recurved in the lower part. Cilia of the endostome appendiculate. Spores small, about 0.01 m.m. Dicœcious. Allied to *B. ventricosum*.

Vancouver Island, fruiting, 1908.

95. EURHYNCHIUM RUSCIFORME (WEIS) MILDE, VAR. OBTUSUM.

Leaves generally obtuse, often arrounded at the apex. Capsules not seen.

Vancouver Island, 1908.

96. CALLIERGON TRIFARIUM (WEB. ET MOHR), SUBSP. APICULATUM.

Stem much divided; branches curved; leaves short-apiculate, not arrounded at apex, less strongly appressed. Capsules unknown.

Vancouver Island 1908.

97. ISOTHECIUM MYUROIDES, KINDB.

("Isothecium aplocladum, Mitt." Kindb., Eur. and N. Amer. Bryineo).

Leaves shorter than in *I. myosuroides*; cells often oblong.

It is several times found, also 1908, in Vancouver Island.

98. WEISIA WOLFII, LESQ. ET JAMES.

("W. mucronata Br. eur." C. Mueller).

Peculiar in the large spores.

British Columbia, Ucluelet, 4th June, 1909, No. 143; Quebec, Hull, September 26th, 1907, No. 214; Ottawa, October 27th, 1900, No. 890.

99. HYPOPTERYGIUM CANADENSE, KINDB.

British Columbia, Ucluelet, 1909.

100. HYPNUM CALLICHROUM, BRID.

Labrador, 1892 and 1894; Rev. A. C. Waghorne. New to Canada.

101. BRYUM HAMICUSPIS, KINDB., HEDWIGIA, 1903.

Agrees with *B. pallescens:* Leaves ovate-lanceolate, long-attenuate, broadly limbate, recurved all around, not decurrent; insertion deep-red. Capsule somewhat narrow, strangulate, not pendent; lid large convex; teeth pale; cilia appendiculate. Tuft dense.

Differs from it: Leaves more distinctly denticulate; costa short-excurrent to a curved, not long point. Capsule brown with a short neck. Spores 0, 01 m.m. Dicœcious.

Ontario, Cape Vincent, Kingston: Prof. Fowler, 1881.

102. BRYUM COLUMBICO-CÆSPITICIUM, KINDB., HEDWIGIA, l.c.

Differs from *B. cæspiticium*: Capsule longer, subcylindric; pedicel often very (5-8 c.m.) long and geniculate. Synœcious. Costa of leaves mostly short-excurrent.

British Columbia, Revelstoke, 1890, Vancouver Island, Comox, 1887, No. 92.

103. DIDYMODON DIECKII, BROTH.

Vancouver Island, 1909.

104. THAMNIUM PSEUDO-NECKEROIDES, KINDB., HEDWIGIA, 1902, p. 219.

(Hypnum alleghaniense, Canad. Musci, No. 102).

It is more allied to *T. Leibergii*, Britton, than to *T. alleghaniense*, Bryol. eur.; but is perhaps only a subspecies. It differs indeed: nearly all leaves ovate-oblong with a subulate acumen. Stem sometimes with paraphyllia; branches after complamte. Dicœcious.

Ottawa, Owen Sound and Cape Breton, British Columbia, Ucluelet, 1909.

Obs. The species, subspecies and varieties, not marked with the name of the author, are already by myself described *as new* in the Journal "Revue Bryologique," the years 1904-1909.

A GANNET NEAR OTTAWA.

A very beautiful specimen of a juvenal of the Gannet, or Solan Goose (*Sula bassana*, Boie.) was shot, October 14th, at Shirley's Bay, seven miles above Britannia by Mr. J. H. Slack, 90 Elm St., Ottawa. When Mr. Slack first saw the bird it was apparently feeding about 300 yards from the shore and while he was endeavoring to decide how best to reach it with a rifle shot the bird rose and flew straight towards him. Fortunately Mr. Slack had a shot-gun with him and with that the bird was killed. It was secured for the Geological Survey Museum and is a valuable addition to the bird collection. The Solan Goose breeds abundantly in the Gulf of St. Lawrence and has been taken a few times on Lake Ontario, but this is the first record of its occurrence near Ottawa.

J. M. M.

CONTRIBUTIONS FROM THE HERBARIUM OF THE GEOLOGICAL SURVEY.

By JAMES M. MACOUN.

PHEGOPTERIS ROBERTIANUM, (Hoffm.) A. Br.

P. Dryopteris var. *Robertianum* (Hoffm.), Macoun Cat. Can. Pl. II.: 270.

On rocks, Hunker Creek, Yukon, No. 78, 293; four miles up Klondike River, Yukon, No. 78, 292. (*John Macoun*).

SOROBOLUS UNIFLORUS, (Muhl.) Scribn. and Merr.

On rocks at Petawawa Falls, Algonquin Park, Ont., July 23rd, 1900, Herb. No. 21,915. (*John Macoun*). Not before recorded from Canada.

ELEOCHARIS NITIDA, Fernald.

In a swamp at Parker's, nine miles from Quyon, Que. No. 61,199. Only known station. This species and *E. Macounii*, collected by Mr. J. M. Macoun near North Wakefield, Que., are both described in the new edition of Gray's Manual and should be looked for in other localities by Ottawa collectors.

CAREX CEPHALOIDEA, Boott.

The only Canadian locality from which we have recorded this species is London, Ont. Later records are: Galt, Ont., No. 78,035 (*W. Herriot*); Hull, Que., No. 61,146; near Wakefield, Que., No. 78,179, and Tilsonburg, Ont., No. 33,732. (*John Macoun*).

SALIX TENERA, Anders.

This species was described from specimens collected by Lyall at 7,000 feet altitude on the International boundary in 1860 and was not collected in Canada again until found by the writer in 1905, probably on the same mountain on which Lyall first saw it. Second summit west of Skagit River, altitude 6,500 feet. No. 73,674.

ABRONIA UMBELLATA, Lane.

The record made for this species on page 148 of THE OTTAWA NATURALIST should have been credited to Mr. James Fraser instead of Mr. George Fraser.

RANUNCULUS LOBBII, A. Gray.

Abundant in Lost Lake near Victoria, Vancouver Island, Herb. No. 77,391, May 11th, 1908, in fine fruit. (*John Macoun*). Not before recorded north of Oregon.

CAKILE EDENTULA, (Bigel.) Hook.

C. Americana, Nutt.; Macoun, Cat. Can. Pl. I: 58.

Abundant at Long Beach, 20 miles north of Ucleulet, west coast of Vancouver Island, B.C., August 7th, 1909. Herb. No. 78,288. (*John Macoun*). Not recorded in Canada west of Lake Superior nor on the Pacific Coast north of California.

ALTHÆA OFFICINALIS, L.

Brother Victorin of Longueuil College reports this species to be very common in pastures at Oka, Que. We have no other record of its occurrence in Canada.

BARTONIA VIRGINICA, (L.) B S P.

The only specimens we have of this beautiful species were collected by Dr. Chas. A. Hamilton in pastures on both sides of the Feauxbourg Road just south of Mahone Bay, N.S. Dr. Hamilton reports it as growing quite plentifully over 30 or 40 acres of pasture. The soil was thin and peaty but not swampy. The plants associated with it were *Pteris aquilina*, *Myrica asplenfolia*, *Gaultheria procumbens*, etc. Herb. No. 78,291.

AMSINCKIA LYCOPSOIDES, Lehm.

Douglas, B.C. No. 76,744. (*Wm. Spreadborough*). Common in suitable localities on Vancouver Island but not before recorded from mainland of British Columbia.

COLEOSANTHUS OBLONGIFOLIUS, (Nutt.)

Brickellia oblongifolia, Macoun, Cat. Can. Pl. I: 207.

This plant, which is hardly distinguishable from *C. linifolius*, was collected by Lyall "on mountain slopes along the southern boundary of British Columbia" but not again until it was found by the writer in the Skagit Valley, B.C., in 1908, Herb. No.

76,863, probably near where Lyall found it, as he travelled along the same trail.

ANTENNARIA NEODIOICA, Greene var. GASPENSIS, Fernald.
Ottawa Naturalist XIX: p. 156.

When this plant was described by Mr. Fernald it was known from the Bay of Chaleurs and the upper part of the Gulf of St. Lawrence. Specimens collected by Prof. Macoun at Jupiter River, Anticosti, August 20th, 1883, No. 70,448, have recently been determined as this variety by Mr. Fernald.

BIRDS OBSERVED AT COBOCONK, ONT.

BY J. A. MUNRO, TORONTO.

May 22nd, 23rd and 24th of 1909 were spent by the writer in the vicinity of Coboconk, Victoria County, and the following notes were made on the birds of the district:—

Observations were confined to a tract of about 400 acres, the greater part of which is covered with original forest, maple, elm, butternut, birch and a few hemlock, spruce and balsam. The second growth is chiefly oak, black ash, ironwood, birch and poplar. Between the wooded portion of the farm and the lake there are 60 acres of cleared ground, on which the stumps of the old pine forest, cut 40 years ago, are still standing. Some of these fire blackened stubs are ten to fifteen feet high and afford excellent nesting places for Robins, Bluebirds and Bronzed Grackles. Within the last few years a number of the stumps have been removed and piled at the edge of the clearing. The deep cavities between the roots were used as nesting sites by Robins and Song Sparrows.

Spotted Sandpiper—Two seen.

Ruffed Grouse—Slightly on the increase; one nest containing ten eggs was found within 500 yards of the farm house.

Sparrow Hawk—One seen.

Arctic Three-toed Woodpecker—One seen.

Red-headed Woodpecker—One seen.

Northern Flicker—Common; one pair nesting in a hemlock stub.

Whip-poor-will—Common.

Nighthawk—Common.

Kingbird—Common; they frequently build on top of the pine stumps near the water.

Crested Flycatcher—Common.

Phœbe—Common.

Olive-sided Flycatcher—Two seen, one of which was collected.
Wood Peewee—Two seen.
Least Flycatcher—Very common.
Blue Jay—Common.
American Crow—Five seen.
Cowbird—Common.
Meadowlark—Common.
Bronzed Grackle—Very common; two nests each containing five eggs were found. The first was a bulky nest, made of roots, weed stalks, cedar bark and dry grass, lined with fine roots and wiry grass. The bottom was reinforced with clay. It was placed in a depression at the top of a fifteen foot pine stub. The second nest consisted of a few pieces of dry grass and twigs, lining the bottom of a deserted woodpecker's hole, twelve feet from the ground in a pine stub.
American Crossbill—One pair seen.
American Goldfinch—Common.
Vesper Sparrow—Common.
White-throated Sparrow—Common.
Chipping Sparrow—Common; one empty nest found.
Slate-colored Junco—Six seen; one nest containing 3 eggs was found.
Song Sparrow—Common; one nest, built between the roots of an overturned pine stump and containing four eggs. One nest, five feet from the ground in a birch and containing 4 eggs.
Rose-breasted Grosbeak—Common.
Cliff Swallow—Common.
Barn Swallow—Common.
Tree Swallow—Common; in this locality they invariably select for nesting sites the cavities in the many stumps which stand in the water close to shore.
Cedar Waxwing—Common.
Red-eyed Vireo—Common.
Black and White Warbler—Three seen.
Black-throated Blue Warbler—Five seen.
Myrtle Warbler—Four seen.
Magnolia Warbler—Common.
Chestnut-sided Warbler—Very common.
Blackburnian Warbler—Two seen.
Black-throated Green Warbler—One seen.
American Redstart—Two seen.
Catbird—Common.
Brown Thrasher—Common; one nest containing 4 eggs was found.

House Wren—Common; a pair were nesting in a cavity in the top rail of a snake fence.
Chickadee—Common.
Wilson's Thrush—Common.
Olive-backed Thrush—One seen.
Hermit Thrush—Common.
American Robin—Seven nests were found within the radius of 400 yards: one in a small spruce, one in a white pine, two on the tops of pine stumps and three between the roots of upturned pine stumps.
Bluebird—Common; one nest containing 6 eggs, in a woodpecker's hole, 20 feet from the ground in a hemlock stub.

FLETCHER MEMORIAL FUND.

The Committee in charge of this Fund recently met in the Carnegie Library, and a further circular was drafted to be sent to members of the Club and friends of the late Dr. Fletcher who had subscribed to the Fund but had not remitted to the Secretary-Treasurer, (Mr. Arthur Gibson, Central Experimental Farm) the amount of their subscription. Another circular was also prepared, to be mailed to those who had received the first circular, but who had not responded. Both of these circulars were sent out in December, and the Committee are so far much gratified at the results. There still, however, are many members of the Club, whom the Committee feel sure desire to contribute, and these and others who have not as yet sent in their subscription to the Secretary-Treasurer, are requested to attend to this matter as soon as possible, in order that the Committee may make final arrangements for the work in connection with the Memorial, which, as our readers are aware, is to take the form of a drinking fountain at the Central Experimental Farm.

SOIREES.

The first lecture of the winter series was held on Tuesday, November the 9th, 1909, the lecturer of the evening being our esteemed member, Mr. W. E. Saunders of London, Ont. "Home Birds and Wanderers" was the subject chosen by the speaker, and it proved a most interesting one to the large audience which filled the Assembly Hall of the Normal School. Mr. Saunders spoke in a delightfully interesting manner, and illustrated many of his remarks with the calls and songs of the birds he loved and described. Preserved specimens of many of the birds referred to were exhibited.

THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, FEBRUARY, 1910 No. 11

EVERYDAY ORNITHOLOGY.

By Norman Criddle, Treesbank, Man.

The following notes are made up simply of observations recorded in my note book at Aweme, Man., supplemented with additional remarks to make the whole appear less disjointed and more complete in detail. They are mere extracts from a mass of material covering a period of four years, commencing in 1906. They are given in the original form, not only because that saves labor, but chiefly because it gives them the appearance of having been made in the field, which is indeed the case.

1906.

January 10.—It seems remarkable that partridges (Ruffed Grouse) should have a preference for certain clumps of trees upon which they make their evening meal by eating the buds, but such is the case. Not only do they return to the same locality week after week throughout the winter months, but the same clumps seem to be selected year after year.

About one hundred yards from the farm buildings there is a bluff which contains a few hundred trees, all aspens of medium size, with smaller ones and hazel brush beneath. The larger trees are those selected, and every evening shortly after sunset five or six partridges appear, sometimes flying from a considerable distance. About the same number turned up last year, and also the previous winter. That they are gradually stripping the trees of their buds and consequently preventing the growth of leaves there is no doubt, but fortunately they confine themselves largely to those buds that in the course of time would produce catkins, so that the injury is not as great as might be suspected, though it is very evident when the leaves appear. During the day these birds content themselves with eating hazel catkins, rose-berries and such other fruits as appear above the snow. Consequently aspens and other poplars only suffer once in 24 hours.

FEBRUARY 19.—About a week ago we found a Redpoll unable to fly though in apparently excellent condition. It was taken into the house and ate well for two days, at the end of which period it died. I found another to-day that went off in the same way. Both of these were in dull plumage.

MARCH 4.—Another Redpoll was discovered dead this morning, a male, in perfect plumage. This had been observed to be weakening for some days past, though like the others it fed to within a short time of its death. An examination showed it to be rather thin, but the cause of death appeared to have been due to a large clot of blood on the back portion of its skull. These birds all died slowly, and when found were in a sitting position, as if they had gone to sleep and so died.

Redpolls have been very plentiful throughout the winter, and as the snow was deep were attracted in large numbers to seeds placed for their use, and consisting chiefly of lambs-quarters, with a small quantity of wild buckwheat mixed in. Is it this abundance of food without the customary exercise in procuring it that has been responsible for this mortality by a form of apoplexy?

MARCH 17. -Watched a full plumaged Redpoll courting a female. She sat quietly on a bough some 20 feet from the ground while he displaying his bright colours to full advantage remained almost stationary before her by means of a rapid movement of his wings. While thus occupied he indulged in incessant song of a decidedly more variable nature than is usually heard at this time of the year. After continuing this arduous love-making for some twenty seconds he flew to a neighbouring tree where he was quickly joined by his lady love, and eventually they flew off in company apparently mutually satisfied.

These birds are supposed to leave us in summer time to breed farther north, and according to Macoun's Catalogue their nests have been found in some numbers both in Labrador and Hudson's Bay during May and June. Now, as they seldom all leave us before the middle of May, and as both males and females were observed in the hills among spruce woods on June 11th, 1909, there seems to be reasonable grounds for suspecting them of breeding in the province.

MAY 10. On a newly ploughed field that had not been under cultivation for two years, White Grubs (*Lachnosterna* sp.) were very plentiful, but everyone exposed by the plough was eagerly picked up by crows, a large number of which were breeding close at hand. A rough estimate places the number of larvæ eaten at fully 2,000 to the acre, but the full number consumed probably far exceeds that amount.

MAY 11.—Among the male birds that habitually feed the females while they are nesting, Crows and Chickadees are notable examples. The former does so throughout the brooding period, and it is a strange fact that the hen bird reverts to that method of calling for food so characteristic of the young, with the same excitement and fluttering of wings when food is brought within view. The Chickadee goes still further and feeds his mate with nice juicy caterpillars weeks before she commences to lay. He, also, like the Crow, takes an active share in nest building. Blue Jays likewise become very polite to the females by procuring food before and when she is brooding. They make an extremely affectionate couple at this time of year and can constantly be heard talking softly together. I believe there are few, if any, Canadian birds that have such a complete code of signals.

MAY 30.—The Redbacked Cutworm is doing an immense amount of damage to growing grain, and our friends the Crows are once more at work for their own benefit and incidentally ours. From 18 to 32 were counted together at different times to-day on an infested field, and close inspection shows where they have dug the Cutworms out, while watching detects many a beak full being taken to the nests.

Crows have by no means a good reputation, especially in corn belts, or among sportsmen, who accuse them of much damage to winged game through eating eggs and young, but the injury is much exaggerated. We are apt to overlook the good deeds, as the picking up of small objects, such as noxious insects; whereas, to see a Crow fly off with a young bird is much more likely to attract attention, especially if the parents are attempting some sort of defence. As to the destruction of eggs of Grouse by Crows, these birds are so admirably suited in colour for concealment that it is only on very rare occasions, provided the birds are not otherwise disturbed, that their nests are discovered.

JULY 14.—Found the nest of an Ovenbird in woods near some large aspens. It was of a dome shape, rather elliptical in outline, and so remarkably well constructed outside with dead leaves and grass, that it would almost surely have passed for a slight rise in the ground had I not flushed the bird. Inside the nest were four young, surrounded by a lining of fine grass and horsehair.

JULY 15.—Several Crows have been found dead recently, apparently in good condition. They seem to have died suddenly, sometimes while flying, but I could discover no cause for this. If the death role has been as high in other parts, many thousands must have perished.

JULY 27.—Three more Crows found dead, two full grown

young and an adult. A young bird fully fledged was also discovered in a weak condition, though nothing could be found to account for its sluggishness.

1907.

FEBRUARY 6.—A small band of Chickadees have been with us since the winter commenced, feeding upon pieces of suet placed for their convenience. Recently this has become scarce and the Chickadees are now subsisting to quite a large extent on waste oats. These they carry to the sunny side of a log building and holding the oat with one foot extract the kernel from the husk with their beak. This is quite a new departure for Chickadees.

APRIL 28.—Found two Western-horned Owls in possession of a nest built by a pair of Goshawks last year. There were two or three young of different ages in the nest and an old bird made several queer noises at me, one of which resembled the barking of a dog. There was a recently killed field mouse at the bottom of the tree.

MAY 26.—Examined around the Owl's nest mentioned above and found several pellets, which were made up chiefly of the hair of mice and rabbits, with the broken bones of those mammals and one bird bone.

JULY 26.—There are two Ravens a few miles northwest of here which have discovered a young calf and dog recently deceased. This is the first occasion that Ravens have been observed at Aweme in summer time and might lead one to suspect them of breeding in the neighbourhood.

AUGUST 11.—Visited the nest of a Vesper Sparrow to see what effect the heavy rain had had upon the young. Found one stretched out very much overcome, but later in the morning both were perfectly well. They are almost fully fledged.

NOVEMBER 16.—I have for the last week been cutting down trees close to a Chickadee's sleeping place, a hole some 18 feet from the ground in an old tree, evidently the work of a Woodpecker. The Chickadee appears regularly and enters its home at about ten minutes after sunset, there being a slight variation, according to the brightness of the evening. At first the stump was surrounded by trees, but though these have now all been cut away and the only branch upon which the bird perched before entering its nest broken, it entered its hole as usual after showing but momentary surprise at the change. This Chickadee is often accompanied by others, but they have separate homes and soon vanish to meet together again next morning.

1908.

MARCH 10.—Two White-throated Sparrows have managed to survive the winter and are now quite active. The only shelter they had was a wood pile at night and round about the farm yard during the day. They suffered but little, excepting during the most severe weather, showing that it is more a question of food than cold that is responsible for the southward migration. Doves, Blackbirds, Juncoes and Robins have also been known to come through the winter when provided with sufficient food.

NOVEMBER 6.—There are an exceptional number of Canada Jays about this autumn, and farmers south of here, who have been killing cattle for beef, say that these birds at once attack the carcasses, damaging them for the market. They are also at times a perfect nuisance to trappers by stealing the bait from traps. Meat, skins, bread, potato peelings, grain and indeed anything else that can be eaten, is carried off. In fact, when these birds once discover something palatable, it is practically impossible to make them leave the vicinity.

1909.

JANUARY 12.—During an exceptionally cold spell, a Northern Shrike has made its headquarters here, and subsists very largely upon House Sparrows rendered sluggish by the cold. At least a dozen of these birds have been taken, and also some Chickadees, that habitually come up to partake of suet. The Shrike seems to withstand the cold easily and has been seen to carry off Sparrows without much difficulty.

JANUARY 24.—The little group of birds that come up daily to eat of the fat, now consists of Northern Hairy Woodpeckers, Blue and Canada Jays and Chickadees. The Canada Jays have also been seen to eat a few asparagus berries, but not with particular relish.

FEBRUARY 9.—Discoverd a Goshawk with a Ruffed Grouse which he had just captured and eaten a small hole in its side. The unfortunate bird was still living, though mortally wounded, and seemed to have lost much blood. From the fact that there was no sign of this on the snow, I am strongly of the opinion that the hawk drank it from the hole in the partridge's side. As there was no hope for its recovery I ended its further suffering. This Goshawk has been about for some weeks past and during that time has caused the death of numerous grouse and some rabbits.

These hawks are undoubtedly the most destructive to grouse of all the hawks found in Manitoba. They are not only more numerous than other injurious species, but they seem to have a decided preference for feathered game. On the other

hand it should not be forgotten that they compensate to some extent, at least, by destroying bush rabbits, and therefore, while the sportsman would assuredly look upon them as an enemy, the fruit grower, and those having an interest in forestry, might well class them equally as a useful ally.

FEBRUARY 12.—There was a Richardson's Owl in the straw-shed this morning. Later in the day we tried to feed it with raw meat, but our efforts were unavailable, though it allowed a very close approach, and in fact sat among the meat.

FEBRUARY 19.—Several Eagles, both Golden and Bald, are living upon rabbits along the Souris River. They are seen almost daily and undoubtedly do much good by destroying a pest which has no competitor among mammals injurious to trees. Further up the river both species breed, according to Mr. W. D. Black, of Margaret, Man., who says they are not uncommon in that neighbourhood.

It is indeed unfortunate that these fine birds, together with several large hawks and owls, should be continually shot. Many people seem to think they have done something exceptionally meritorious when they relate the destruction of one of these useful birds. But, it is time such deeds were painted in their true colour, otherwise extermination will follow ignorance and the country will suffer from the increase of numerous rodents such as mice, rats, rabbits, etc., which in the past have been kept within reasonable bounds.

FEBRUARY 20.—The Richardson's Owl mentioned above has twice been up since that date. This morning it was found, as usual, in the straw shed, and, as is customary with these birds, allowed me to approach within a few feet. Later on I discovered it with a house mouse in its claws, which it ate and then disappeared into the woods to sleep.

MARCH 18.—The Canada Jays are now very much together. They are apparently in search of a nesting site and go about very quietly. Sometimes one, presumably the male, sings softly from some low bush, and when they become separated both utter loud cries.

MARCH 30.—The Northern Shrike that has been about here throughout the winter was shot to-day. It has on more than one occasion made itself obnoxious by killing Chickadees, Redpolls, and other small birds. As these had been specially attracted by food, it was impossible to stand by and watch their destruction; and so, after much threatening, the shrike has met the fate he meted out for so many others.

The economic value of these birds is questionable, for though they destroy many mice and House Sparrows, they are most

plentiful during the migration of small birds, particularly Tree Sparrows and Juncoes, upon which they prey with much persistency. They should not be confused, however, with the White-rumped Shrike, which takes their place during the summer months. These latter birds are probably much more useful, as their food is made up largely of grasshoppers.

APRIL 18.—Examined pellets of a Western-horned Owl of last summer and found them to contain fur of a striped gopher (unusual food), rabbit and mouse hair, and also broken bones of several small mammals.

JUNE 10.—Saw a male Marsh Hawk capture a Cowbird. He appeared suddenly over some bushes and made his capture almost before the small bird was aware of his presence.

Only a farmer can fully appreciate Cowbirds. You must be following the plough or tending cattle to note the habits which can be observed nowhere else. They will be seen at one time running about on the back of a cow, catching flies; at another, being shoved out of the way by the nozzel of a feeding horse. A small band are nearly always in attendance of the ploughman picking up noxious larvæ, such as White Grubs, etc., and when they become less hungry they content themselves with pinching the heads of large grubs, only eating the smaller. It is interesting to watch them running along with their beaks pointing upwards making a careful scrutiny above for a possible hawk. To see the males, which greatly predominate, showing off and being chased by the females; to sit still and have full grown young walk over one and fearlessly take food offered, besides many other little acts, tends to make us forget the habits of parasitism for which they are condemned, for with all their faults they still do much good; and, for the old-fashioned naturalist, who cares less for the dollars and cents, and more for Nature, because it is Nature, the Cowbird, when properly known, will always be looked upon with warm regard.

JUNE 11.—Noticed several Red Crossbills in the spruce woods feeding on old cones on the tops of the trees, which indicates that perhaps they breed here.

JUNE 18.—A nest of a Red-tailed Hawk examined to-day, contained three young that could almost fly, and a striped gopher.

JUNE 24.—Found the nest of a Swainson's Hawk in an aspen tree. There were three young in it about two weeks old, also three striped gophers and a Meadow Lark.

I have examined numerous nests of these hawks at different times, and when there were young present, have never failed to find gophers also, showing that the nestlings are supplied with

all they require. To find dead birds in the nest is quite an exception.

Owls also keep their larders well stocked with fresh meat, and it is by no means an uncommon thing to find several untouched mice in nests containing young of Long-eared Owls. I have twice found those rodents present a day previous to the first egg-hatching, but whether these were for the expected young, or had merely been supplied by the male for his mate's use, I am unable to tell.

AUGUST 5.—I have been taking special observation of House Sparrows feeding their young within the last two weeks, and find that the food consists largely of grasshoppers, which at present are more plentiful than usual. Both parents go out in search of these insects, sometimes as far as half a mile away.

NOVEMBER 12.—About thirty House Sparrows arrived from the north this morning and left in a southerly direction before evening.

NOVEMBER 20.—A Northern Shrike has been up several times recently and at present is devoting its attention to capturing Juncoes. The House Sparrows have grown wise and as a rule are much too quick having learned that safety lies in rapid entrance into a building. The smaller birds are not so sagacious and attempt to escape by flying upwards, which almost invariably proves fatal, as the shrike follows like a bloodhound, and by sheer persistency more than rapidity of flight, accomplishes its object.

MEETINGS OF THE BOTANICAL BRANCH.

On the evening of November 13th, the first meeting of the Botanical Branch for the season was held at the residence of Mr. G. H. Clark. The following members were in attendance: Messrs. J. Macoun, R. B. Whyte, W. T. Macoun, T. E. Clarke, D. A. Campbell, G. H. Clark, L. H. Newman, A. E. Attwood, H. Groh, Geo. Michaud, Dr. Blackader, T. H. Binnie, W. H. Harrington and E. D. Eddy.

Mr. J. W. Gibson was the leader for the evening and chose as the topic for discussion "The adaptation of plants to their environment as shown by their internal structure." The different evidences of adaptation in the plant tissues were demonstrated by means of microscopes and a carefully selected collection of microscopic slides, some of which had been loaned for the occasion by Prof. W. T. McClement and his assistant, Mr. A. B. Klugh, of Queen's University.

The leader introduced the subject by first pointing out the

main problems that confront the student of plant ecology and also the practical value of the study over and above its mere scientific interest. He then proceeded to demonstrate the fact that the minute structure of the internal parts of plants may reveal an adaptation to their environment no less marked than does their external form or habit of growth. The ability of plants to meet the exigencies of a new environment by a modification of their internal structure was clearly shown as in the case of *Ranunculus aquatilis* and *Proserpinaca palustris* (Mermaid Weed) which were grown in air, although habitually they are aquatic. The difference in internal structure of leaves grown in bright sunlight and in shade was also demonstrated.

The question as to whether or not living plants absorb moisture otherwise than by their roots gave rise to some discussion on account of a divergence of views held by the different members of the Club. The discussion will probably be resumed at some future date when more experimental evidence will be presented. The value of dew to growing plants and the effect on transpiration of relative humidity of atmosphere were also discussed at some length. The view presented by the leader that excepting in the case of a few epiphytic plants which have specialized organs for the absorption of water, dew is only indirectly beneficial to plants i.e. in so far as it depresses transpiration, was challenged and rather discredited.

It was also pointed out that the main causes of internal modification of plant tissues were variations in the intensity of light and heat and also in available water supply. Of these three important ecological factors the last mentioned was considered most important, although a few of the members held the view that variations in heat are of even greater importance in modifying plant structures. The main characteristics of three great classes of plants were pointed out and discussed, viz.: Mesophytes, or the normal plants of a locality not given to extremes or excesses; Hydrophytes, or those plants that are surrounded by excess of moisture and have to provide against "drowning" by the development of an abundance of aeration tissue; Xerophytes, which endure great privation from lack of moisture and excess of heat, and which therefore must adapt themselves to such conditions by developing an abundance of cells for storing up water, by throwing out protective coverings and by lessening transpiration through sunken and protected stomata.

Several miscellaneous slides were also exhibited illustrating Halophytes (plants belonging to saline or alkali lands), Isophytes (plants whose leaves are the same on both sides), Carnivorous and parasitic plants. J. W. G.

The second meeting of the Botanical Branch was held at the home of Mr. R. B. Whyte on Saturday evening, November 27th, 1909 There were present, in addition to the Chairman, Messrs. Geo. H. Clark, Groh, Michaud, Blackader, Attwood, Newman, Campbell, Prof. J. Macoun, W. T. Macoun.

There was no special subject for discussion, the arrangement being that each person present was to say something about what he had been doing during the summer. The discussion, however, proved so interesting that few men had an opportunity of telling of their work. Mr. Whyte told of what he was doing in raising seedling gooseberries. His object was to obtain a variety that would be as good, or better in quality, than any other, and which would be hardy and free from mildew. He showed specimens of a fine large seedling of the English gooseberry which he said was of very good quality. A discussion arose as to Mr. Whyte's methods, some claiming that there would be no marked increase in hardiness without the introduction of blood of a hardier gooseberry. The reason why the English gooseberries are susceptible to mildew in this country was thought by some of those present to be due to the fact that the English gooseberry was a native of a moist climate and when grown where the conditions were drier the leaves and fruit were affected by the mildew, as occasionally occurs in the drier parts of England. This brought out the interesting fact that some species of mildew thrive best in dry air, while some do best under moist conditions, as do the higher plants.

Mr. Michaud gave an interesting account of his work in the testing of vegetable seeds during the past summer. He found that, on the whole, seeds germinated better in diffused light than in total darkness. For instance, lettuce seed germinated better on the surface of blotting paper than between folds of this paper. The fact was brought out that in Nature most seeds germinate on the surface of the ground. As, however, it is impossible to control the conditions of moisture in the growing of crops outside it is necessary to plant the seeds in order to ensure their receiving sufficient moisture to germinate.

After Mr. Michaud had told of his germinating tests there was considerable discussion on the growth of plants and as to what proportion of the growth took place at night. One member claimed that there was more growth at night than in the daytime, but the general opinion was that this was not so. Growth takes place in darkness as well as in light, but elaboration of plant food takes place only in light. For instance, a potato may grow in a dark cellar by using up the food in the tubers which has been previously elaborated in the light.

Mr. Groh told of his study of the local hawthorns during the past summer. He examined fifty trees in different localities and collected flowering specimens of them, and later in the season obtained fruit as well. He found a marked difference in the number of stamens, styles and colour of the anthers of the flowers, and the number of flowers to a corymb, on different trees. The specimens, together with those collected by Prof. Macoun, have been sent to a specialist on *Crataegus*. Prof. Macoun stated that when collecting in western Ontario some years ago he had found that there was a month's difference between the time when the earliest blooming species of *Crataegus* flowered, and the latest. At Ottawa he had found in 1903 that the earliest bloomed on May 21st and the latest on June 3rd. He reported that he had completed the List of the Ottawa Flora from the lower forms up to the Caryophyllaceae.—W. T. M.

SOIREES.

The opening soiree of the Club for the season of 1909-10 held on the 14th of December, was of the nature of a conversazione. The first hour was devoted to a display of objects under the microscope and of natural history specimens. Afterwards short addresses were delivered by the President, Mr. A. E. Attwood, Mr. G. H. Clark and Mr. A. Halkett. Besides these a short talk, illustrated with lantern slides, showing the development and structure of the cell, was given by Mr. A. H. W. Cleave.

Several microscopes were very kindly loaned for the evening by Mr. J. W. Gibson, of the Normal School. Besides these Messrs. Cleave and Odell each had their own microscopes present and showed interesting objects to those attending the meeting. Mr. W. J. Wilson also took charge of one of the microscopes and entertained many.

The following exhibits were of much interest:—

Mr. Geo. Michaud, of the Seed Branch of the Department of Agriculture, showed

1. A set of old coloured plates of plants, taken from a botanical magazine published in London in the year 1790. These plates are remarkable from the point of view of the colour, which is all made by hand. Each plate is accompanied by a botanical description of the plant. The sets contain three or four plates with the text and were sold for one shilling each.

2. A set of the lithographic plates of "Farm Weeds," published by the Seed Branch of the Department of Agriculture, 1906 and 1909. These plates, which were painted by Mr. Norman

Criddle, both from the artistic and botanical point of view, deserve much praise.

3. One collection of economic seeds and weed seeds, put up by the Seed Branch, Department of Agriculture, containing the seeds of the most common forage plants and weeds.

4. One pocket collection, containing seeds of the worst weeds of the country, all mentioned in the Seed Control Act, 1905.

Several cases containing insects of many kinds were exhibited by Mr. Arthur Gibson, Mr. C. H. Young, and Mr. J. W. Baldwin. Those brought by Mr. Gibson were from the collection of the Division of Entomology at the Central Experimental Farm. They represented a collection mostly of local butterflies and hymenopterous insects. Mr. Young's cases contained chiefly a collection of microlepidoptera taken in the Ottawa District. These were beautifully mounted and were much admired. Mr. Baldwin's specimens were in two oases, one of which contained 92 specimens, representing 60 species of moths collected at Ottawa. In this case were some rare forms. In the other case an interesting series of the genus *Catocala* was shown. Dr. C. Gordon Hewitt sent in a small but interesting exhibit of coleoptera and diptera fossilized in gum animé, obtained for commercial purposes from Zanzibar, from areas where no trees are now visible. The gum is the product of *Trachylobium hornemannianum*.

Mr. Young also showed some cases containing a valuable collection of specially well prepared star fishes and crabs, all of which had been collected by him in British Columbia during the past year.

Mr. H. Groh, Assistant Botanist, Experimental Farm, exhibited a number of botanical sheets of native parasitic flowering plants which are destitute of green foliage. The following are some of those which were noticed.—

Cuscuta Epithymum, Clover dodder; *Cuscuta Gronovii*, Love-vine; *Monotropa uniflora*, Indian Pipe; *Monotropa Hypopitys*, Pine-sap; *Pterospora andromedea*, Pine-drops; *Epifagus virginiana*, Beech-drops; *Conopholis americana*, Squaw-root; *Orobanche uniflora*, One-flowered Cancer-root; *Orobanche fasciculata*, Broom-rape.

Mr. Groh also showed a stem of Juneberry (*Amelanchier*), which, according to him, "had been virtually choked to death by a vine of Climbing Bitter-sweet (*Celastrus scandens*). The stem had continued to increase in diameter until the coils of the vine were almost buried in the wood, but finally last June the obstruction of the passage of food had become so serious that the leaves turned yellow and dropped."

A very interesting feature was an exhibit, by Mr. Ernest LeSueur, of living turtles (some of which were exotic), salamanders and tree-toads. There were four of the last mentioned, and two of them (probably females) took on, early in the evening, the green colour of the electric-light shade.

Mr. Halkett showed a number of specimens of various fishes preserved in museum jars.—A. H.

INSTINCT AND EDUCATION.

An abstract of an Address read before the Ottawa Field Naturalists' Club, January 4th, 1910, by Mr. A. E. Attwood, M.A.

Foreshadowings of Instinct in its mechanical manifestations are observable in inorganic nature in the phenomena of gravitation, magnetism and crystallization. The movements and behavior of plants resemble the instinctive actions of animals. Plants are animate objects, *i.e.* objects with mind. Heredity, a distinctive characteristic of instinct, is also a characteristic of plants Vitality implies mentality.

Reflex action so closely resembles instinctive action that Herbert Spencer defines instinct as complex reflex action. Instinct is, however, a broader term as it is observable in the lowest of animals, whereas reflex action implies a more or less developed nervous system.

Instinct is racial memory; it is inherited habit; it is complex reflex action; it is capitalized experience. A series: an action, a repeated action, a habit, an inherited habit or an instinct, an intuition. Instincts are faculties which are innate, hereditary, semi-automatic and semi-conscious. They attain results without the necessity of previous individual instruction, reason, or experience.

There are two classes of instincts: primary or congenital instincts, and secondary or acquired instincts. The latter are evolved from the exercise of a rational intelligence. The brain is the organ of reason. The evolution of instincts was promoted by the development of a brain in the animal kingdom. The brain is the school-master in the work of evolving instincts, it is a short-cutting device for the development of the race.

The progress of the race depends upon the constant accretion of secondary instincts. The work of education should be to develop desirable habits which shall be transmitted as instincts to subsequent generations. We should begin the training of a child many generations before he is born.

Just as there are vibrations in the solar spectrum below the visible red rays and above the visible violet rays, there are evidences of the working of mind outside of the range of consciousness. These extensions of the mental spectrum have been called the subliminal mind. Is not this subconscious mind identical with the instinctive mind?

The brain is the organ of the conscious or objective mind. The instinctive mind has no special organ, but is the federal head of the aggregated minds of the cells which constitute the whole organism. The brain, or imperial mind, exerts its influence on the instinctive or colonial mind by the power of suggestion. "Every suggestion is a nascent instinct. Original sin is a kind of suggestion instilled from childhood and producing real hereditary sin."--(Guyau).

Conscience is a peculiarly human emotion. It is certain of action only when it has become instinctive. A good conscience is the fruit of good seed sown by the rational intelligence in the soil of the instinctive mind. The voice of conscience is the voice of our distant progenitors transmitted along the lines of heredity.

Patriotism is an altruistic instinct. Kipling's "Absent-Minded Beggar" acts, not rationally, but instinctively when he enlists in defence of the Empire. When a nation finds it necessary to assert its patriotism by noisy and dangerous demonstrations, it may be assumed that such patriotism has not yet developed into an instinct.

The sting of death is withdrawn when it is recognized that like sleep, it is instinctive. The great majority of deaths are peaceful because they are instinctive.

What has been called an instinctive aversion to snakes, seems to be disappearing in the civilized human race in the light of the fact that most of our snakes are harmless. The rivalry of the rat for the possession of the earth may in time develop a similarly strong instinct in the human mind against that animal.

Instinct, Intuition, Omniscience, are words embodying ideas of the same category. Intuition is a high grade of instinctive human intelligence, the faculty of knowing without the labor of inductive reasoning. Genius is habitual intuition. The genius is "in tune with the Infinite;" his instinctive mind vibrates in unison with the mind of the Omniscient.

Extend instinct, intuition, genius to infinity and we attain omniscience. Divine omniscience and human intuition are the same in kind, differing only in degree, differing as the Father differs from the son.

THE FLETCHER MEMORIAL FUND.

At a meeting of the Fletcher Memorial Committee held on the 7th February, it was decided to close the subscription list to the above fund on the 20th day of March next. The expectations of the Committee have almost been realized, but before the list is finally closed, it is hoped that at least another hundred dollars will be subscribed, so as to bring the total up to $1,800. This is the last appeal which the Committee intends to make, and, therefore, if there are still any members of the Club, or others, who wish to contribute to the Memorial to be erected at the Central Experimental Farm, it is important that they should attend to this matter at once. This will be the first memorial of its kind in Canada, and the Committee is particularly anxious that it shall be worthy of him to whose memory it is to be erected. This, of course, can best be accomplished with the help of as many members of the Club, and friends, as can conveniently subscribe towards the cost of the undertaking. ARTHUR GIBSON, Secretary-Treasurer of Committee, (Experimental Farm, Ottawa).

NOTES.

BARTONIA VIRGINICA IN QUEBEC. In Mr. James M. Macoun's "Contributions" in the January number of The Naturalist, *Bartonia virginica* (L) BSP. is recorded from one Canadian locality, near Mahone Bay N.S. I am glad to be able to add to this record another from St. Hubert, near Montreal. In 1908, shortly before his death, Dr. Fletcher received specimens of this plant collected by Father Marie-Victorin, in June, July and August of that year, at the above locality. They were stated to be growing in the peat bogs of that place. HERBERT GROH.

BONAPARTE'S GULL. The stomach of a Bonaparte's Gull taken at Point Pelee about November 25th, 1909, was sent to Mr. Arthur Gibson, at the Experimental Farm, for the purpose of having the contents determined. Over fifty noctuid larvæ were found, which Mr. Gibson reports to be of a species of *Agrotis*, or *Hadena*.

The use of insects as food for gulls, was referred to by Mr. Arthur H. Norton, in the October "Auk" when he mentioned the maggots living in seaweed, used for this purpose, but the caterpillars eaten by the Bonaparte's Gull are terrestrial, and were probably found in some such situation as a Muskrat house, which consists of decayed vegetable matter, such as rush stems and grasses. They must have been in considerable abundance to have enabled the gull to find so many of them at one time. W. E. SAUNDERS. London, Ont.

A RARE WEASEL AT OTTAWA.

By W. E. SAUNDERS, London, Ont.

Exact knowledge regarding weasels is not a part of the mental equipment of most nature lovers, and the capture of what was to me a rare specimen, may afford an opportunity for hanging thereon a few remarks.

It is, of course, well known that the weasel, which in summer is brown above and yellowish white below, turns pure white in winter, with the exception of the tip of the tail, which is black at all seasons. I had long realized that there were two sizes of weasels which (naturally!) were of two species, but some years ago when I happened to study them a little I found that all the large ones were males, and all the small ones were females, and the authorities state this is the normal condition of affairs in the common *Putorius noveboracensis*. There is, however, a small weasel in old Ontario, and I have been on the lookout to find it for a long time, but vainly, until November 11th at Ottawa, when I shot one on the stone ridge thrown out of the pipe excavation leading to the Tuberculosis Hospital. I saw before shooting that this specimen was a small one, and when I found I had a male, I was delighted, as it could be nothing else than the long sought Bonaparte's Weasel, *Putorius cigonani*. When I fired I was delighted to see him fall right over, apparently dead, but to make sure I ran the intervening distance and was disgusted to see a flicker of white disappearing down through the stone pile, just as I reached him. That, of course, made it necessary that the stone pile should be removed, which was promptly done, and, encouraged by an occasional drop of blood, operations proceeded as far as the ground and then along the pile in the direction indicated, when he was soon found stone dead.

Doubtless this animal covers the coniferous parts of Ontario fairly well, but in my district around London, where the vegetation is largely deciduous and where balsams are entirely absent, it is doubtful if there are any of these remaining; certainly I have never been able to learn of the capture of one of them.

The normal measurement in millimeters of male and female *noveboracensis* and the measurement of this specimen of *cicognani*, which seems to be normal, are given below:

		Length	Tail	Hind foot
Noveboracensis—	Male	418	150	50
	Female	298	92	26
Cicognani		290	80	35

THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, MARCH, 1910 No. 12

SOME WESTERN SPECIES OF ARNICA.

By Edward L. Greene.

The names and descriptions subjoined are of species of Arnica, apparently undescribed hitherto. Those placed first in the series, it will be seen, are from within the Canadian boundary, while others are from those parts of the Pacific United States which lie contiguous to Canada. It would not be remarkable if any of these should by and by be found also in some one part or another of the extensive and varied Province of British Columbia.

A. sororia. Stem solitary, a foot high or more, erect, slender, firm, scarcely leafy, the whole plant with a velvety appearance, but the close pubescence somewhat harsh rather than soft: even the basal leaves not forming a rosette, but opposite, or in threes, narrowly elliptic-lanceolate, 2½ to 3 inches long, including the petiole, this long or short, both faces somewhat plushy-pubescent, margins obscurely and remotely serrate-toothed; proper stem-leaves in 2 remote pairs and much reduced, entire, sessile; heads mostly 2 or 3 on peduncles 3 to 5 inches long; involucre broad-campanulate, of 16 to 20 linear-lanceolate glandular-hirsutulous bracts; ray-corollas deep-yellow, not short, abruptly 3-toothed at the rounded apex; disk-corollas with slender glandular-hirtellous tube twice as long as the somewhat clavellate throat; achenes remarkably short, strigose-hispid; pappus dull-white, scarcely barbellate.

Cascade, British Columbia, 30th June, 1902, J. M. Macoun, No. 64987 of Canad. Geol. Surv. Related to *A. lonchophylla*, Greene, which Mr. Macoun sent from the Athabasca River country, as collected by Mr. Spreadborough in 1898; but this present species has also certain points of seeming contact with *A. pedunculata*, Rydb. of Montana; but this last is a stout comparatively coarse plant, always monocephalous.

A. rubricaulis. Base of stem and its foliage not seen, but plant large, the stem copiously leafy with an ample and thin spreading foliage, the internodes dark red-purple and slightly

clothed with whitish hirsute hairs mostly deflexed; leaves lance-oblong, 5 to 7 inches long, including the winged petiole, but the uppermost pairs quite sessile, all very thin, triple-nerved, remotely and not prominently dentate, nearly glabrous on both faces; heads small, many, somewhat panicled and the panicle leafy-bracted; involucre broadly campanulate, the 16 to 20 bracts lanceolate, obtusish, thin, sparsely hirsute below the middle; rays many, narrow and not long; disk-corollas with soft-villous tube longer than the subcylindric throat; achenes hirtellous with short bristly hairs; pappus brownish, delicate, scaberulous.

Trail, British Columbia, J. M. Macoun, 22nd June, 1902; Geol. Surv. No. 64985. A member of the *A. foliosa* group; evidently very large.

A. STRICTA. Erect from a horizontal rootstock, nearly 2 feet high, sparingly leafy, with a pair of branches from each pair of cauline leaves, these very erect, pedunculiform, nearly parallel with the main stem, all glandular-puberulent; basal leaves few, cuneate-oblong, obtuse, 4 inches long or more, including the indistinctly petiolar base, 3-nerved, very remotely or not at all dentate, the veins and margins scaberulous, otherwise glabrous; heads 9 to 11 each at the end of a long peduncle, those of the branches surpassing the terminal one; involucre campanulate, ¾ inch high, of about 12 lanceolate thin glandular, but scarcely hairy bracts; rays 8 or 10, long, deep-yellow; disk-corollas with long slender tube hirtellous with strongly gland-tipped short hairs, the throat rather more than half as long and turbinate; achenes strigose-hispid; pappus fine, whitish, barbellulate.

British Columbia, along the International boundary, between the Columbia and Kettle Rivers, J. M. Macoun, 30th June, 1902. A fine species of that section in which Pursh's *A. fulgens* is typical, all the others of which section are monocephalous, while this new one produces a flowering peduncle from each leaf-axil, yet in habit the plant is as upright and strict as a plant can well be that is not simple. The label of my specimen bears No. 64979 of Canad. Geol. Surv.

A. LACTUCINA. Slender, a foot high or less, the herbage of a vivid green and almost wholly glabrous; basal leaves not seen, the cauline is about 2 pairs, sessile and divaricately spreading, the lower pair either panduriform or else contracted very near the base to a broad and short winged petiole, the upper pair often broadest at base and there subhastately dilated; all very acute at apex, below the middle more or less prominently and even spinosely toothed; heads small and subcorymbose, the involucres campanulate, of about 10 narrow bracts slenderly acuminate, not pubescent, but granular-glandular; rays 10 or 12,

long and showy, deep yellow; disk-corollas with short villous tube and much larger subclavate throat; achenes small, black, glabrous, but with a line of shortly stipitate glands besetting the 4 or 5 prominent angles; pappus short, firm, white, barbellate-scabrous.

Plant of the Rocky Mountains northward, in Alberta, the type in U. S. Herb. from Vermillion Mountain, near Banff, 24th July, 1899, W. C. McCalla, the specimens in flower only; but the account of the achenes and pappus is drawn from specimens in my own herbarium, also from the vicinity of Banff, by Miss Edith M. Farr, who gathered them at Mt. Fairview, 18th August, 1905.

A. FALCONARIA. Upright, stout and simple, 10 to 16 inches high, rather pale with a minute but sparse viscidulous pubescence, the stems and petioles somewhat villous; leaves mainly subcordate-oval, obtusish, irregularly and coarsely dentate, 1½ to 2½ inches long, tapering very abruptly to a petiole as long, the reduced upper cauline pair either spatulate and sessile, or with short broadly-winged petiole; heads 1 to 3, large, on moderately long peduncles; involucre campanulate, of about 10 rather broad elliptic-lanceolate thin sparsely villous bracts; rays, none; disk-corollas with short villous-hirtellous tube and much longer narrow funnelform throat, the segments all villous at tip; achenes slender, sparsely short-setulose and as sparsely beset with minute sessile glands; pappus white, barbellate.

Falcon Valley, Washington, 27th June, 1892, W. N. Suksdorf; type in U. S. Herb. under No. 1617, labelled *A. cordifolia*, var. *eradiata*, Gray; but the plant bears no intimate relation to that particular species.

A. EVERMANNII. Low, leafy at base, the peduncles several, mostly subscapiform, the whole plant 5 to 7 inches high; leaves deep green, not thin, ovate-subcordate to ovate-lanceolate with subtruncate base, about 2 inches long, the petioles about as long, the single cauline pair as large but spatulate, all acutish, remotely and saliently dentate, the pubescence very scanty; involucres turbinate-campanulate, nearly ¾ inch high, bracts 9 to 11, thin, subbiserial, linear-lanceolate, acuminate, viscidly villous; rays of medium length but very narrow; disk-corollas with short thinly setulose tube and longer narrow-funnelform throat; achenes linear, stirate, minutely short-setulose; pappus white, barbellate.

Subalpine species of Northern Idaho and adjacent Washington, found at altitudes of 7,000 to 10,000 feet; the type by B. W. Evermann, from shores of Pettit Lake, 13th August, 1895.

MEETING OF THE ENTOMOLOGICAL BRANCH.

The first of the winter's series of meetings of the Entomological Branch was held at the residence of Mr. Arthur Gibson, on the evening of the 10th February. There were present: Messrs. Harrington, Wilson, Criddle, Baldwin, Young, Halkett and Nicholls, in addition to the Chairman.

Mr. Gibson had on exhibition his collection of arctiid moths of the genus *Apantesis*. He spoke at some length on the different species and varieties represented in the cases and told of his work in studying their life-histories. Specimens of the inflated larvæ and pupæ of many of the species were also shown. The range of variation in the genus is remarkable, and has been the cause of much confusion by some of the earlier writers who had but few specimens to study. The larger number of the specimens in the cases exhibited had been reared from eggs. At Ottawa the following species of this genus have been found: *virgo*, *parthenice*, *virguncula*, *figurata*, *celia*, *arge* and *vittata*.

Mr. Norman Criddle showed a collection of Tiger Beetles from Manitoba. Thirteen species were represented in the case, most of which had been found at Aweme, Man. Mr. Criddle spoke particularly of the burrowing habits of the larvæ and on the life-histories of the insects in general. He has found that in Manitoba some of the species take at least three years to complete their life-cycle, whereas at Chicago, it has been found by Prof. Shelford, that the same species only required two years to complete their growth. The habits of cicindelid larvæ are exceedingly interesting. In Manitoba there is much difference in the depth to which the larvæ burrow for hibernation. Some species such as *limbata* and *repanda* only go down to a depth of six or eight inches, while others, as *manitoba* and *lepida* go much deeper; the former sometimes being found six and a half feet below the surface, and the latter six feet.

Mr. A. Nicholls brought two specimens for determination. These were *Thalessa lunator* and *Corydalis cornuta*. Mr. Harrington spoke of the habits of both of these insects. Referring to the latter species Mr. Gibson mentioned that both he and the late Dr. Fletcher had found it "at sugar" commonly, some years ago. It is unusual for a neuropterous insect to be attracted at night to trees on which "sugar" is put to allure noctuid moths. Speaking of attracting moths, Mr. Criddle mentioned that at Aweme the males of the Buck Moth, *Hemileuca maia*, var. *lucina*, can easily be attracted by smoke. In the sand hills near Aweme, where the moth is usually abundant, both he and his brothers had frequently made smudges of leaves and grass

to attract the moths. Almost immediately the males would appear, some being seen to come from quite a long distance.

Mr. Halkett exhibited a small miscellaneous collection of insects which he had gathered at random in Nova Scotia during the past summer. The most interesting species was *Hydroecia micacea* of which two specimens had been collected. This is an European insect recently introduced into America, and an account of which appears in the annual report of the Entomological Society of Ontario for 1908.

Mr. Baldwin showed a box of noctuid moths which he had collected in 1909, mostly at the Electric Railway power house near Britannia. Some rare species were represented, viz.: *Tapinostola variana*, *Baileya doubledayi*, *Mamestra nimbosa* and a species of *Syneda*, the first taken in the Ottawa district.

Sir George Hampson's two latest volumes on Lepidoptera which appeared in 1909, and Dr. J. B. Smith's new book "Our Insect Friends and Enemies" were shown by Mr. Gibson, who also spoke of a paper he was preparing on the Butterflies of the Toronto District. In this article eighty one species are listed.

A. G.

A SHREW NEW TO NEW BRUNSWICK.

By Wm. H. Moore, Scotch Lake, N.B.

Last autumn a shrew, different from anything hitherto observed by the writer in this locality, was secured. The specimen was in a badly damaged condition, having been killed and mutilated by some farm poultry, but enough of it was left intact to serve for the identification of the animal, which was kindly made by Mr. E. A. Preble, of the Biological Survey, Washington, D.C., who after an examination was assured that it was *Neosorex albibarbis* (Cope). The upper parts are blackish; underparts grayish, with a brownish band across neck and chest. Tail blackish above and all around near tip; lighter on balance of under side. Length of body 84 mm.; tail 75 mm.

In bulletin No. 10 of North America Fauna the range of this species is given by Dr. C. Hart Merriam "from mountains of Pennsylvania and New York northward to Labrador." In the same bulletin Mr. G. S. Miller, Jr., mentions having examined specimens from Nova Scotia, Quebec, Maine and other states.

Dr. Philip Cox, of the University of New Brunswick tells me that it is a new mammal to record for the province. In other parts of New Brunswick this species may be tolerably common or even plentiful, but I cannot think that it is anything but rare

here, for no such animal has been noticed, either dead or alive, resembling this in the last twenty years. Why I say dead or alive is because dead specimens of our shrews and moles are often found on our highways.

Other shrews and their relatives that I have taken here are as follows:—

Common mole, *Condylura cristata*. Generally distributed, its habitat being chiefly wettish places where it burrows in search of worms, grubs, etc. Its colour ranges from sooty to black, according to season. It is larger, being much more stoutly proportioned, than the shrews. Measurements are about as follows: body 130 mm.; tail 60 mm.; hind foot 23 mm.

Short-tailed shrew, *Blarina brevicauda*. Generally distributed about damp woods and fields; have secured some in open fields and in the same runways as used by the common meadow mouse, or vole. Its colour is ashy, slightly paler below, varies with the seasons. Measurements are about as follows: body 90 mm.; tail 23 mm.; hind foot 14 mm.

Smoky shrew, *Sorex fumeus*. This species is without doubt the most common of the shrews in this locality. It seems to be found mostly about moist woods and thickets. The general size here is, body 68 mm.; tail 44 mm.; hind foot 13 mm. Colour grayish, slightly paler below, lightest on throat; feet and tail lighter than body, tip of tail darkest.

Little shrew, *Sorex personatus*. Found about moist woods and swampy grassy areas. This species very much resembles *S. fumeus* but is much smaller; body 50 mm.; tail 43 mm.; hind foot 13 mm.

These constitute the species found at Scotch Lake. There are two other species found elsewhere in the province, viz.: *S. hoyi* taken in northern New Brunswick; (I think I secured a specimen near Nictor Lake in Restigouche County, but the skin was destroyed), and *S. richardsoni* reported from along the St. John River by Dr. Cox.

As mentioned above specimens of moles and shrews are frequently found dead along roadways. Upon examination I have always found them to have been killed by some preying mammal, probably the work of a weasel. The skulls have all been more or less broken, and at times the skin about the fore parts punctured or badly mutilated. Cats will kill shrews, probably in mistake for mice, but they do not eat them as the shrews have a pungent musky odor obnoxious to carnivorous mammals.

MEETING OF THE BOTANICAL BRANCH.

The third meeting of the Botanical Branch was held on December 11th, at the residence of Mr. George Michaud. There were present: Messrs. G. H. Clark, James M. Macoun, Wm. T. Macoun, A. E. Attwood, H. Groh, R. MacMillan, Norman Criddle, R. B. White and the Chairman.

The subject for the evening was "The value of the seeds as a means of identifying plants." The seeds were shown by Mr. Michaud to be very important in identifying plants on account of their more constant characters, being less affected by environment than are other organs such as leaves, flowers, etc. A collection of specimens mounted on slides was exhibited showing the generic characteristics of the most important families of our wild and cultivated plants in their normal and different conditions, as found in commercial samples of seed grain. Special slides showing the following interesting points were also shown:—

1. Similarity of the external appearance of seeds of quite different botanical groups; e.g., *Stipa spartea* vrs. *Erodium cicutarium*, *Saponaria officinalis* vrs. *Astragalus caryocarpus*, *Saponaria Vaccaria* vrs. *Brassica Rapa*, *Cynoglossum officinale* vrs. *Ranunculus tuberculatus*, *Euphorbia Helioscopia* vrs. *Neslia paniculata*, *Glycyrrhiza lepidota* vrs. *Xanthium canadense*, and others.

2. Apparent dissimilarity of external characters of seeds belonging to the same botanical groups; e.g., *Corispermum hyssopifolium* vrs. *Atriplex patula*, *Potentilla monspeliensis* vrs. *Rosa acicularis*, *Agrimonia gryposepala* vrs. *Geum album*, *Trifolium repens* vrs. *Glycyrrhiza lepidota*, *Geranium Bicknellii* vrs. *Erodium cicutarium*, *Apium graveolens* vrs. *Washingtonia longistylis* vrs. *Heracleum lanatum*, *Lithospermum arvense* vrs. *L. officinale*, *Cynoglossum officinale* vrs. *Myosotis palustris*, *Mimulus ringens* vrs. *Linaria vulgaris*, *Achillea Millefolium* vrs. *Bidens frondosa*, and others.

Specimens of dead leafless plants, collected under the snow at the end of November, which had been identified through single seeds still found on them, were also shown,

The purity work of the Seed Laboratory was also discussed and shown to be simply an identification of plants by the seeds only.

Those who were present at this meeting were much interested in seeing the specimens of seeds of certain species which, without a magnifying glass or microscope, appeared identical with seeds of other species, even of other genera, but which on being put under the glass showed striking differences in the marking of

the seed coat in the relative roughness or smoothness of it, and in other characteristics. Those who had previously been sceptical as to the possibility of identifying species of plants with certainty from their seeds alone, were convinced before the meeting was over that this could be done, and that in many cases when the specimens of dried plants were so bad that it was impossible to identify them, a single seed would settle the whole matter. G. M.

THE CORRELATION OF CHARACTERS IN PLANTS AND ITS ECONOMIC IMPORTANCE TO THE PLANT BREEDERS.

(SYNOPSIS OF A TALK GIVEN AT A MEETING OF THE BOTANICAL BRANCH ON THE EVENING OF JANUARY 8TH BY MR. L. H. NEWMAN.)

It is a well known fact that certain characters in plants are more or less closely related and that any modification of the one is simultaneously followed by a modification of the other. Darwin considered the correlation of different parts of the individual to be an important factor in explaining some of the laws of variation. This tendency for the development of certain parts to follow the developement of certain other parts is of considerable value to the practical plant breeder since his efforts to effect improvement along certain lines may be either offset or assisted by the development of other characters elsewhere in response to the disturbance within the organism. The nature of this bond of correlation is not understood although several have attempted to explain it.

Webber has classified the various forms of correlations under four heads, viz.: (1) Environmental, (2) Physiological, (3) Coherital and (4) Morphological.

Environmental correlation implies merely the response of a plant to its environment. In other words, if the soil be poor there will be a correspondingly poor growth; increase the fertility and the plant immediately responds.

De Vreis describes this class of variation as one in which two characters react similarly to external conditions. Liebenberg claims that increase in length of stem is correlated with increase in strength of stem, length of head, number of spikelets and total weight of kernel produced.

Grains grown under conditions characterized by a superabundance of light, heat, food or moisture produce extra long heads. In wheat these heads seldom produce more than an

extra spikelet and sometimes even less, but the distance between the spikelets is greatly increased while the kernel is likely to be starchy, hence *environment* vrs. *quality of grain*. Selecting these heads is therefore a useless practice and is always discouraged.

Physiological Correlations:—Under this class of correlations belong those variations which occur in the functional organs of the plant. An example of this class is given by certain breeders who have noticed that excessive leaf development is followed by a corresponding reduction in the production of seeds. Potatoes, pease and other crops have also demonstrated that an excessive growth of vine or stalk is usually associated with a decreased yield of tubers or seed as the case may be. East discusses this under the heading of "The interrelation of parts not homologous," or "The compensation in growth of plants." This latter law was propounded almost simultaneously many years ago by G. St. Hilaire and Goethe.

Coherital Correlations:—Under this heading are included those characters which seem to be inherited as a single unite character. They are related in such a way that they are "inherited together," although there is little or no evidence to show that this relationship is of any functional importance.

Webber cites an interesting case of coherital correlation which came to his notice in connection with an attempt to cross Black Mexican and Stowell's Evergreen Sweet corn with a view to producing a hybrid having the tenderness and sweetness of the Mexican but with the larger and more suitable ear for canning purposes peculiar to the Stowells. It was also desired to produce a hybrid having the light colored kernel of the Stowells when in the milk stage with a light blue color indicating "something new" when ripe. In the fourth generation an examination was made and careful notes taken on the color of the silks, stamens and glumes of the tassels. In the pure Mexican these parts are light in color while in the Stowells which produces a white kernel, these organs vary from dark reddish-purple to a lighter pink. It will be noted here that, contrary to what would naturally be expected, the black kernel produces light colored reproductive organs while the white kernelled variety bears organs which are dark in color. We often find the same peculiarity in wheat.

An examination of the ears produced in the fourth and fifth generations showed that these related characters still cling together despite the claims of some authorities, notably, Johannsen, that hybridization breaks correlations—Webber found that only in about one case out of 50 or 100 was the correlation broken through hybridization.

This correlation of colors is of value to the breeder as it enables him to make an examination of organs which are exposed and still growing or in operation and thus to tell what the color of the kernel will be. If it be desired to produce a hybrid of a uniform color, say a light blue, the tassels or male organs might be removed from those plants bearing light green glumes, stamens and silks before the pollen is shed so that a race of a pure color might be developed much more quickly.

Norton cites an interesting case of coherital correlation in oats. In hulled oats the spikelet produces from 1 to 3 flowers while naked types produce from 3 to 7 flowers. Hybrids of these two have been effected with a view to increasing the number of flowers to a spikelet and still retain the hulled character, but it was found that where as many as four flowers were produced to a spikelet the kernel was invariably found to be naked. The difficulty of breaking this correlation has here worked to the disadvantage of the breeder so it will be seen that these correlations are not always advantageous. The existence of these coherital correlations seems to strengthen the theory of the existence of unit characters in plants which theory is being accepted by many of our leading biologists and breeders of the present day. East has recently extended Webber's classification and has discussed several groups not included in the above arrangement. His dissertation on "The interrelation of parts not homologous" is especially interesting.

Morphological Correlations:—Under this class belong those cases "where a variation in one character is the *primary cause* for the variation in another character." An example of this class is illustrated in work done by Dr. Hopkins, of Illinois, in improving certain characters in the corn kernel, notably the oil and protein content.

The germ of the corn kernel is richest in oil, therefore, the larger the germ in relation to the rest of the kernel the higher the oil content; the hard corneous substance of the kernel is richest in protein, hence the larger the proportion of this substance to the rest of the kernel the higher the protein content.

At the Nebraska Station, Lyon conducted some tests with a large number of samples of wheat with a view to determining the relationship between the per cent. protein and the weight of kernel. His results indicate that high protein kernels are smaller and lighter and that plants producing kernels of high protein content do not produce such high yields as do those producing kernels lower in protein. This suggests to the breeder the futility of breeding for high protein and high yields at the same time. Medium yielding heads are also found to come from highest yielding plants.

There is said to be a relationship between the per cent. hull in oats and the strength of straw. Very thick or very thin hulled varieties produce weak straw. For an example we have the Tartar King and Joanette varieties respectively. Tartar King variety seems to vary considerably as regards the manner in which the kernels are developed.

At the Svalöf Station, Sweden, some interesting morphological correlations have been discovered in barley. Barley is normally classified under two main types, viz., the hexastrichum or six-rowed (including the four-rowed) and the districhum or two-rowed nodding (nutans) and the two-rowed erect (erectum). An examination of grains of barley will show that some have smooth backs while some have indentations on the edges. Again at the base of the ventral portion of the grain we will find the plumule, in some cases, made up of comparatively long stiff hairs, while in other cases it consists of a mass of short curled hairs. These characters have been found to have a great permanency and to correspond to certain physiological characters such as rate of maturing and brewing qualities. Types of barley which ripen evenly and have a thick husk with short woolly hairs at the base of the scales are better brewers than are those not possessing these characters. These peculiarities of form or structure are considered very useful by the breeder in enabling him to isolate superior types much more quickly and with much less work.

In our own corn improvement work we find many interesting correlations, some of which are of considerable value to the breeder. During the past summer the writer had occasion to examine with special care seventy-three special corn plots and succeeded in gathering considerable important data. Among our breeders of Dent corn were found some who, in their desire to develop highly productive types, were selecting large deep kernelled ears having at least 20 rows of kernels. Such ears, however, are universally later since depth of kernel and length of time it requires for an ear of corn to mature are very closely related. We find another correlation between the size of the ear and the height at which it is borne on the stalk, the large late ears being borne higher from the ground than are those which mature earlier. One breeder planted ears averaging 9½—10 inches long by 9 inches in circumference with the result that ears averaging 20-22 rows of kernels were produced and these were borne at about 5′ from the ground. Still another correlation is found between the character of the dent of corn and the depth of kernel—the smoother the dent the shallower the kernel and vice versa. This fact is useful to the breeder in

that he can be guided in making his selections by observing the character of the dent of the kernel.

An examination of the plots just referred to showed that where the average size of the ear did not exceed 9 inches in length by 7 inches in circumference the largest proportion of good mature ears were found, and therefore the largest yield was realized. This proves the importance of selecting medium sized ears of good type which will thoroughly mature before frost. In ordinary fields of corn it is very common to find a mixture of many different types, some of which are deep kernelled while others are shallower. In such cases there is a very conspicuous lack in the uniformity of maturity of the crop, and as a consequence its value is greatly decreased not only for feeding purposes but more especially for seed. A sufficient number of cases have been given to indicate that the correlation of different characters in plants is not only of scientific interest but is of considerable practical value in revealing to the breeder certain hidden qualities. Care should be taken, however, to avoid concluding too hastily that any two characters are correlated sufficiently to warrant a selection being made because of its existence. On the other hand, the general ratio in which each is found in the general population should decide the issue.

THE PASSENGER PIGEON.

BY W. LOCHHEAD.

Not many years ago the passenger pigeon was a very common bird, and great flocks, comprising hundreds of thousands, were often observed during their periods of flight. Its range extended along eastern North America, as far west as the Mississippi valley and northward to Hudson Bay. It nested in the northern portions of its range. Now, however, it is so rare that there are doubts as to its very existence in America.

The cause of the disappearance of such useful, beautiful, tender-voiced birds in the course of a single generation is not far to seek. They were thoughtlessly slaughtered by the thousands, in order to provide sport and food for a few days. It is stated by a trustworthy eye-witness that "people would come from all parts of the country with wagons, axes, beds and cooking utensils, camping on the ground with their families for days, where they could plunder the nests of the roosts, of the vast army of passenger pigeons." Accordingly, the passenger pigeon has gone the way of the buffalo which existed once in countless numbers on the prairies of the West—awful examples

of the work of destruction of people who had no thought of to-morrow.

An effort is now being made by persons interested in the preservation of such a fine bird to save it from utter extinction if there be any alive. At a recent meeting of the American Ornithologists' Union the matter was brought up by Prof. C. F. Hodge, of Clark University, Worcester, Mass., and as a result of the discussion that followed Colonel Kuser offered an award of $300 for the first information of a nesting pair of wild passenger pigeons *undisturbed*. Before this award will be paid, such information exclusive and confidential, must be furnished as will enable a committee of expert ornithologists to visit the nest and confirm the finding. If the nest and parent birds are found *undisturbed* the award will be promptly paid, through Prof. Hodge. The object of this generous award is to induce a search for nesting passenger pigeons throughout the length and breadth of Canada and the United States; and when they are found to organize adequate protective work through legislation and warden service, so that the birds may be permitted to feed in absolute safety and be accorded the freedom of the American continent.

All lovers of birds, it is felt, will join heartily in the plan proposed for the preservation of this ill-fated pigeon. In order, however, that a wide-spread interest may be aroused in the effort to locate nesting pairs, there should also be local volunteer awards for the first undisturbed nest in each province; and a call is here made to our liberal-minded citizens for such local awards. Teachers throughout Canada should call the attention of the boys and girls to the plan and ask them to join in the search. The first nest discovered will draw Colonel Kuser's award of $300 and the local award as well. That first nest is likely to be found in Canada.

BOOK REVIEW.

CATALOGUE OF CANADIAN BIRDS. By John Macoun, Naturalist to the Geological Survey, Canada, and James M. Macoun, Assistant Naturalist to the Geological Survey, Canada. Department of Mines, Geological Survey Branch, Ottawa. 1909.

Bird lovers and Canadians generally will join in felicitations to Prof. John Macoun and Mr. J. M. Macoun on the successful completion of their revision of the Catalogue of Canadian Birds, which is just out, bringing Canadian ornithological records as nearly as possible up to date.

Prof. Macoun has been fortunate in having the assistance of Mr. J. M. Macoun in these labors, which have produced a volumn of 761 pages, exceeding its predecessor by 28 pages, and appearing in one volume instead of three parts as before.

Five additional species appear in the list, four of them by the taking of specimens, namely:—

The Fulvous Tree Duck, an old record of which has been turned up, and in addition, a specimen taken from a flock of eleven of the same species near New Alberni, Vancouver Island, September, 1905.

The Dotterel, taken at King Island, Alaska, July 23, 1897.

The Chuck-Will's-Widow, taken at Point Pelee, May 19, 1906, and one near Picton, N.S., date not given.

The European Linnet, taken at Toronto, January, 1890, by Mr. Wm. Loan.

In addition to these, the Green Crested Flycatcher has been added to the list on a surmise by Mr. J. H. Fleming that a specimen which he took years ago at Toronto was of this species; while the surmise is probably correct, the specimen was never preserved. Since the list was in type, however, there have been two satisfactory records of the occurrence of this species in Ontario.

The activities of the closet naturalist are well illustrated by the addition of twenty, and the elimination of five varieties, which make a net addition of twenty titles to the present edition, the contents of the book being enlarged at the same time from 738 to 761 pages. The elimination of the lists of specimens in the Government Museum also left space for the inclusion of much new matter. The arrangement of the matter and the type used, and the proof-reading, are eminently satisfactory, so also is the index. In these respects there was no fault to find with the previous editions, but other publications have sometimes been sadly lacking in this regard. The index is so printed that one's eye passes very rapidly over the titles until the item desired is reached.

In the reception and arrangement of such a vast amount of material as is here published, it is inevitable that errors should creep in; but the authors have characteristically preferred to err on the side of generosity, rather than to exclude entries which may probably be incorrect. There are, however, items to which perhaps exception may reasonably be taken, and which it would appear, ought to be noticed in greater detail, as for instance the Yellow-green Vireo, which is reported as taken at Godbout in May, 1883. This species is of only casual occurrence in North America and the validity of this record when published

without circumstantial detail is open to question. So rare a specimen should be located and verified by the highest authorities.

The record of the Wilson's Plover is open to similar criticism, and for a Canadian list it would seem as though the basis of the published habitat should be stated.

Again with regard to the Black Rail, the three records given are none of them thoroughly reliable; one was a bird seen in flight; another refers to the taking of a number of specimens in the Dundas Marsh, which have since proved to be the Virginia Rail; and the third depends upon the ability of a gentleman, the honesty of whose intentions is not open to question, but who may have fallen into the same error as did Mr. Nash regarding the Virginia Rail.

The record of the White-winged Black Tern, which is also a sight record of birds seen on the wing, is another fair mark for criticism. The fact that Black Terns, as well as other species of the family, are known to carry over into the second year parts of the juvenal plumage, and that the bend of the wing appears white in flight renders sight records of these species more liable to error than would otherwise be the case.

The authors are to be congratulated on having preferred the long used English names, instead of following the changes which the A.O.U. Committee of Revision are attempting to foist upon the ornithological world. Alterations in scientific names have been so frequent and widespread that there is a tendency to cease referring to them, and to use only the English names which have been so far perfectly stable, but when the Committee endeavors to attach to the English names that changeableness which has so long been characteristic of the scientific names, it is time for the rank and file of ornithologists to refuse to follow their lead. The laws which have been made to govern the application of scientific names, have doubtless required the making of the changes that have occurred, but these laws do not govern the English names, nor is it likely that they will be followed by the bulk of students. Furthermore many students will prefer, and will use, the old style of possessive names for such birds, as Wilson's Thrush. The present catalogue follows the newly suggested method of omitting the possessive which would sometimes lead us into serious trouble; for instance, if a thrush were named for James Brown and the name were spelt after the newly suggested manner, it would be the "Brown Thrush," which would certainly lead to confusion.

It would appear that in publishing the present edition, current literature has not been scanned as closely as it might

have been in the scrutinizing and addition of records. For instance, the Prairie Warbler, Carolina Wren and others have had notable additions to their Canadian status since the last edition; the Blue-wing Warbler and the Worm-eating Warbler have been added to the Canadian list, by the taking of specimens, and were recorded in the Auk for July, 1908; but when such criticism is offered, one must bear in mind that the list has been in type for a long time, and it may not have been possible to make these additions since it passed out of the authors' hands. Certainly it is a fact that there is less elasticity in the issuance of Government publications than is usual in the commercial world.

It is understood that the authors intend to issue an addendum to this list in the present year with the idea of making any corrections and additions that may be necessary to bring the matter thoroughly up to date. If all bird students will keep this matter in view while reading the work, and will make notes on such matters as deserve remarks and later on report these notes to the authors, they will materially assist the work of these gentlemen who have done so much for this branch of natural history.

W. E. S.

THE SMOKY SHREW. *Sorex fumeus*, the Smoky Shrew, is a small animal that is practically unknown from Ontario. Skilled collectors have taken and recorded a few specimens to the north and west of Muskoka, and now I wish to record the only two specimens that have been taken in the older part of the province. These were both taken by Mr. John A. Morden, near Hyde Park. One, a female, was trapped on December 9th, 1907, in a sphagnum and spruce swamp, 4 miles west of London. Mr. Morden recognized the tracks on the snow as being made by an animal new to him.

The second one was caught by Mr. Morden's cat and discarded by that animal, as being useless for her purpose. The date was April 7th, 1909, and the specimen is a male.

Both individuals are now in the collection of Mr. J. E. Keays, of this city. He and I have trapped considerably on the very ground on which Mr. Morden's first specimen was taken. This locality is the only place where we have been able to find *Synaptomys* near London, but we have never succeeded in taking *fumeus* there, although *Sorex personatus* is usually found in fair numbers, and sometimes appears to be quite common, whereas, through the country generally, it is rare. W. E. SAUNDERS, London, Ont.

INDEX

TO THE

OTTAWA NATURALIST, VOL XXIII, 1909-10.

The Canadian field-naturalist

1909-10