



C. Jordan Hunt,

The Canadian Entomologist

VOL. LII.

LONDON, MAY, 1920.

No. 5

CHARLES GORDON HEWITT.

In the death of Charles Gordon Hewitt, Dominion Entomologist and Consulting Zoologist, the biological sciences have lost a leader of exceptional ability. Not only was he held in the highest esteem by his colleagues of the Dominion Entomological Service, but entomologists generally the world over appreciated his brilliant attainments and marked executive ability. Although eminent in entomology his studies were by no means confined to this science. A broad study of economic zoology from the national standpoint occupied a large share of his thoughts particularly during the last four or five years of his life.

During his eleven years of office he developed the Dominion Entomological Service from a very small division, with one assistant and a stenographer, attached to the Experimental Farms Branch, to an important separate Branch of the Department of Agriculture. This development of the Entomological Branch was his most important achievement and the organization he perfected will remain a tribute to his great ability and zeal. The broad development of the Entomological Branch is instanced in the establishment of important Divisions at Ottawa, such as the Division of Field Crop and Garden Insects, the Division of Forest Insects, the Division of Foreign Pests Suppression, and the Division of Systematic Entomology, all under the immediate direction of highly-qualified Chiefs. In addition to these divisions of the work special officers have been given charge of such lines of study as Natural Control Investigations, Insecticide Investigations, and Stored Product Insect Investigations. In the various provinces too, field or regional laboratories have been established with trained entomologists in charge, who study local problems and disseminate information of value to agriculturists, horticulturists, lumbermen and others.

In 1909, Dr. Hewitt recognized the importance of legislation to prevent the introduction or spreading of insects, pests and diseases destructive to vegetation, and as a result Parliament passed the Destructive Insect and Pest Act in May, 1910. Under the regulations of this Act inspectors were appointed to deal with the threatened spread of the brown tail moth in the Maritime provinces, and provisions were made for the prohibition, fumigation or inspection of nursery stock at definite ports of entry. In addition to the brown tail scouting work, which he developed in co-operation with the provinces of Nova Scotia and New Brunswick, he also arranged for the collection in Massachusetts and establishment in eastern Canada of thousands of parasitic and predaceous enemies of the brown tail and gipsy moths. Dr. Hewitt was keenly interested in medical entomology and accomplished much useful work on problems related to the house-fly, mosquitoes, ticks and other animals which spread disease.

He was the author of important books and memoirs. His chief published work is the well-known book on the house-fly of which there were two editions. A smaller book on the same subject appeared later as one of the Cambridge

Manuals of Science and Literature. His departmental publications consist of a series of annual reports (1910-1916), bulletins, and circulars, chief among the latter of which are those dealing with the Honey Bee and the Large Larch Sawfly. Very recently he completed an important work on the conservation of the wild life of Canada, the manuscript for which is now ready for the press. The publication in 1919 of the various parts of an important volume on the insects collected by the Canadian Arctic Expedition, 1913-1918, was brought about under his direction.

Dr. Hewitt's reputation was by no means confined to Canada. In addition to a wide connection among scientific workers in England his outstanding abilities were soon recognized by entomologists in the United States, where economic entomology particularly has reached such a high development. In the year 1913 he was honoured by being elected a Fellow of the Entomological Society of America. In 1915 he was elected President of the American Association of Economic Entomologists. In Canada, in 1913, he accepted the Presidency of the Entomological Society of Ontario and in the same year was elected a Fellow of the Royal Society of Canada. In the following year he was appointed Honorary treasurer of the latter society, which office he held at the time of his death. He was a Fellow of the Entomological Society of London, England; a corresponding member of the Zoological Society of London and Honorary Fellow of the Royal Society for the Protection of Birds, London, England. He was a recognized student of wild life preservation and rendered valued service in the capacity of Secretary of the Advisory Board on Wild Life Protection. In March, 1918, he was elected President of the Ottawa Field-Naturalists' Club for the year 1918-19.

The gold medal of the Royal Society for the Protection of Birds was presented to Dr. Hewitt on March 12th, 1918, in grateful recognition of successful efforts in furthering the treaty between Canada and the United States for the protection of migratory birds.

A short time before his death he was chosen as the first President of the recently organized Institute of Professional Civil Servants. In addition he was President of the Ottawa Boys Home, an ardent supporter of the Boy Scout movement and a Councillor of the Ottawa Humane Society.

Dr. Hewitt was born near Macclesfield, England, on February 23rd, 1885. He was the son of Thomas Henry Hewitt and of his wife Rachel Frost. He received his early education at the King Edward VI Grammar School, Macclesfield, afterwards entering Manchester University, from which institution he received the following degrees: B. Sc. in 1902; M. Sc. in 1903, D. Sc. in 1909. He obtained first-class honours in Zoology at Manchester University, and was university prize man and scholar. In 1902 he was appointed by his alma mater Assistant Lecturer in Zoology, and in 1904-9 occupied the position of Lecturer in Economic Zoology. In 1909 he left England for Canada, having received the appointment of Dominion Entomologist. In 1916, his title was changed to that of Dominion Entomologist and Consulting Zoologist.

On October 11, 1911, Dr. Hewitt was married at Canning, N. S., to Elizabeth Borden, daughter of Surgeon General Sir Frederick Borden, K. C. M. G., Minister of Militia and Defence from 1896 to 1911.

Dr. Hewitt's eminence as a scientist and administrator was widely recognized. As an ardent student of wild life he was deeply interested in the development of game reserves, bird sanctuaries and all plans for the protection of wild life. The versatility of his interests in science, literature, art, music, and social welfare, combined with the charm of his fine character, had endeared him to many personal friends. His remarkable ability and well directed ambitions enabled him to accomplish more in the thirty-five years he lived than is compassed by most men in a long lifetime.

Dr. Hewitt had attended the meetings of the Commission of Conservation, at Montreal, on February 18th and 19th, at which he presented an important paper on "Fur Bearing Animals, their Economic Significance and Future."

Soon after his return to Ottawa on the 20th he was taken seriously ill with influenza; this soon developed into pleural pneumonia and he died about 11 p.m., on February 29, 1920.

The following resolution was passed at a recent meeting of the Council of the Entomological Society of Ontario.

"The Council of the Entomological Society of Ontario have learnt with extreme regret of the unexpected death of Dr. C. Gordon Hewitt, a former President of the Society, and Dominion Entomologist, and desire to place on record their high appreciation of his eminence in this branch of Science and of the notable work that he carried on by establishing field laboratories with capable managers in all the Provinces of the Dominion, in addition to the activities which he directed at the central office in Ottawa. They feel that the Society and Entomological Science in Canada have sustained a great loss which can hardly be over-estimated. Their sorrow in this bereavement is shared by a large number of Dr. Hewitt's friends in the United States as well as by all those who were associated with him in this country.

They wish to convey to Mrs. Hewitt their tribute of sympathy with her in the great loss that she has sustained and their high appreciation of her late husband as a leader and friend."

The senate of his alma mater passed the following resolution:

"The members of the senate desire to express their deep regret at the death of Dr. Charles Gordon Hewitt, formerly a student, graduate scholar, and lecturer in the University. He attained to great distinction by his researches in Entomology and by his great administrative abilities as chief entomologist in the Dominion of Canada.

They feel that by his early death a career of great distinction has been prematurely closed. They desire that a copy of this resolution be sent to his widow and to his father."

ARTHUR GIBSON,

J. M. SWAINE.

THE WRITINGS OF THE LATE C. GORDON HEWITT.

COMPILED BY C. B. HUTCHINGS.

Ottawa, Ont.

- 1905—Note on the Buccal Pits of *Peripatus*. Memoirs and Proceedings of the Manchester Literary and Philosophical Society. Vol. L, Part 1.
- 1906—The Cytological Aspect of the Parthenogenesis in Insects. "Memoirs and Proceedings of the Manchester Literary and Philosophical Society Vol. L, Part III.
- Some Observations on the Reproduction of the Hemiptera = Cryptocerata. The Transactions of the Entomological Society of London.
- An Abnormal Vermiform Appendix in the Rabbit. The Journal of Anatomy and Physiology, Vol. XL.
- A Preliminary Account of the Life-history of the Common House-Fly (*Musca domestica* L.). Memoirs and Proceedings of the Manchester Literary and Philosophical Society, Vol. LI, Part 1.
- 1907—Ligia. Liverpool Marine Biology Committee Memoirs on Typical British Marine Plants and Animals, XIV.
- On the Life-History of the Root Maggot, *Anthomyia radicum* Al. Journal of Economic Biology, Vol. II, Part 2.
- The Structure, Development and Bionomics of the House-Fly, *Musca domestica* L. Part I. The Anatomy of the Fly. Quarterly Journal of Microscopical Science, Vol. LI, Part 3.
- Some Arthrostraca and other Invertebrata from St. Kilda. Annals of Scottish Natural History.
- A Contribution to a Flora of St. Kilda: Being a List of Certain Lichens, Mosses, Hepaticæ and Fresh-water Algæ. Annals of Scottish Natural History.
- On the Bionomics of Certain Calyprate Muscidae and their Economic Significance, with Especial Reference to Flies Inhabiting Houses. Journal of Economic Biology. Vol II, Part 3.
- House Flies. Reprinted from the Annual Report and Transactions of the Manchester Microscopical Society, 1907.
- 1908—On a New Phytophagous Mite, *Lohmannia insignis*, Berl. var. *dis-similis* n. var., with notes on other species of economic importance. Memoirs and Proceedings of the Manchester Literary and Philosophical Society, Vol. LII, Part 1.
- On an Enchytræid Worm Injurious to the Seedlings of the Larch. Journal of Economic Biology, Vol. III, Part 2.
- The Biology of House-flies in Relation to the Public Health. The Journal of the Royal Institute of Public Health.
- The Structure, Development and Bionomics of the House-fly, *Musca domestica* L. Part II—The Breeding Habits, Development and the Anatomy of the Larva. (Reprinted from Quarterly Journal of Microscopical Science, Vol. LII, Part 4.)
- The Large Larch Saw-fly, *Nematus erichsonii*. Journal of the Board of Agriculture, Vol. XV, No. 9.
- On the Tent-building Habits of the Ant *Lasius niger* L. in Japan.

- Memoirs and Proceedings of the Manchester Literary and Philosophical Society. Vol. LIII, Part 3.
- 1909—Tent-building Habits of Ants. *Ottawa Naturalist*, XXIII, 168-170.
 The Structure, Development and Bionomics of the House-fly, *Musca domestica* Linn. Part III—The Bionomics, Allies, Parasites, and the Relation of *M. domestica* to Human Disease. *Quarterly Journal of Microscopic Science*, LIV, Part 3, pp. 347-414
- 1910—Importance of Entomology in the Development of Canada. Report of the Standing Committee on Agriculture and Colonization, 1909-1910, pp. 17-54.
 House-flies and the Public Health. *The Ottawa Naturalist*, XXIV, pp. 30-34.
 Insects Destructive to Canadian Forests. Report of the First Annual Meeting of the Commission of Conservation of Canada, pp. 142-151.
 The Brown-tail Moth in Canada. *Census and Statistics Monthly*, III, pp. 73-74.
 House-flies and their Allies. Fortieth Annual Report of the Entomological Society of Ontario, pp. 30-36.
 The Larch Sawfly, *Nematus erichsonii*. Fortieth Annual Report, Ent. Soc. Ont., pp. 20-21.
 The Teaching of Insect Life and its Practical Importance. Magazine of the West Riding County Council Vacation Course, No. 3, pp. 10-13.
 Fruit Pests. Annual Report of the Pomological and Fruit-growing Society of the Province of Quebec, 1909, pp. 100-109
 House-flies and Disease. *Nature*, LXXXIV, pp. 73-75
 The House-fly, *Musca domestica* L. 195 pp., Manchester, The University Press.
 The Spruce Budworm. *Canadian Forestry Journal*, VI, p. 93.
 Report of the Dominion Entomologist. Annual Report of the Experimental Farms, Department of Agriculture, Ottawa, Canada, pp. 223-250.
- 1911—Warbles in Cattle. *Census and Statistics Monthly*, Dept. Agric., Canada, Vol. IV, pp. 118-119.
 The More Injurious Insects of the Year 1910. Forty-First Ann. Rep. Ent. Soc. Ontario, pp. 27-29.
 The Destructive Insect and Pest Act, and Regulations Issued Thereunder. Bull. No. 7, Second Series, Exp. Farms, Dept. of Agric., Canada, 13 pp.
 Some Observations on the Practical Importance of the Study of Parasitic Insects. Forty-first Ann. Rep. Ent. Soc. Ont., pp. 62-64.
 Notes on Insect Pests. *Census and Statistics Monthly*, Dept. Agric., Canada. Vol. IV, pp. 146-148.
 The House-fly in relation to Public Health. *Public Health Journal of Canada*. Vol. II, pp. 259-261.
 The Spruce Budworm and Larch Sawfly. Report Canadian Forestry Association, pp. 107-113.

- The Preparation of a Catalogue of the Insects of Canada. Can. Ent. Vol. XLIII, pp. 273-275. Also published in Ottawa Naturalist, Vol. XXV, pp. 83-86.
- The Teaching of Insect Life and its Practical Importance. Ottawa Naturalist, Vol. XXV, pp. 63-67.
- The Hessian Fly. Census and Statistics Monthly, Dept. Agric. Canada, Vol. IV, pp. 201-203.
- The Chinch Bug. Census and Statistics Monthly, Dept. Agric., Canada. Vol. IV, pp. 231-233.
- On *Ccelopisthia nematicida* Pack., a Chalcid parasite of the Large Larch Sawfly, *Lygaeonematus erichsonii* Hartig. Can. Ent., Vol. XLIII, pp. 297-303.
- Daniel William Coquillett. A Obituary Notice. Can. Ent., Vol. XLIII, pp. 311-312.
- Report of the Dominion Entomologist. Ann. Report Experimental Farms Dept. of Agric., Canada, pp. 207-235.
- The Sheep Maggot Fly. Census and Statistics Monthly. Dept. Agric., Canada. Vol. IV, pp. 323-324.
- 1912—The Transmission of Typhus Fever by Lice. Can. Ent., Vol. XLIV, pp. 103-104.
- Investigations on Forest Insects and Forest Protection. Can. Forestry Journ., Vol. VIII, pp. 35-38.
- The Honey Bee. A Guide to Apiculture in Canada. Bull. 69, Exptl. Farms, Dept. Agric., Canada; being Bull. 2, Division of Entomology; 45 pp.
- Observations on the Range of Flight of Flies. Repts. Local Government Board on Public Health and Med. Subjects, N.S., No. 66. Further Reports on Flies as Carriers of Infection. London, pp. 1-5.
- An account of the Bionomics and the Larvæ of the Flies *Fannia canicularis* L., and *F. scalaris* Fab., and their relation to Myiasis of the Intestinal and Urinary Tracts. *Ibid.* pp. 15-22.
- Control of Grasshoppers and Locusts. Census and Statistics Monthly. Dept. Agric., Canada, pp. 157-158.
- The Division of Entomology. Can. Ent., Vol. XLIV, pp. 267-269.
- Some of the Work of the Division of Entomology in 1911. Forty-second Ann. Rept. Ent. Soc., Ont., pp. 25-27.
- Insect Scourges of Mankind. Forty-second Ann. Rept. Ent. Soc., Ont., pp. 46-50.
- Thrips Affecting Oats. Forty-second Ann. Rept. Ent. Soc., Ont., pp. 63-65.
- The Large Larch Sawfly, with an Account of its Parasites, Other Natural Enemies and Means of Control. Bull. 10, Second Ser., Entom. Bull. 5, Exptl. Farms, Dept. Agric., Canada, 42 pp.
- Fannia (Homalomyia) canicularis* Linn., and *F. scalaris* Fab. Parasitology, Vol. V, pp. 161-174.
- House-flies and how they spread disease. Cambridge Univ. Press. XII, pp. 122

- The International Congress of Entomology. Can. Ent., Vol. XLIV, pp. 343-346.
- The Control of Insect Pests in Canada. Bull. 9. Sec. Ser., Ent. Bull. 4, Exptl. Farms, Dept. Agric., Canada, 13 pp.
- Legislation in Canada to prevent the Introduction and Spread of Insects Pests and Diseases destructive to vegetation, with Regulations regarding the importation of Vegetation into Canada. Bull. 12, Sec. Ser., Entom. Bull. 6, Exptl. Farms, Dept. Agric., Canada., 36 pp.
- Annual Report of Dominion Entomologist for year ending March 31, 1912.
- 1913—Report of the Dominion Entomologist. Ann. Rept. Exptl. Farms, Dept. Agric., Canada, pp. 173-189.
- The Spring Grain Aphis or "Green Bug." Can. Ent., Vol XLV, pp. 77-80.
- The Imperial Bureau of Entomology. Can. Ent., Vol XLV, pp. 171-174. Science, n. s. Vol. XXXVII, No. 957, pp. 659-660; Journal Econ. Ent., Vol. VI, pp. 274-276.
- The Insect Food of Fresh-water Fishes; its Economic Importance in Relation to Fish Culture and the Conservation of Fresh-water Fish. Fourth Annual Report, Commission of Conservation, Ottawa, 12 pp.
- Review of Entomology Relating to Canada in 1912. 43rd Annual Report, Ent. Soc., Ont., pp. 34-37.
- Bibliography of Canadian Entomology for 1911. Trans. Royal Society of Canada. Third series, Vol. VI, Section IV, pp. 115-127.
- 1914—The Occurrence of the Warble Fly (*Hypoderma bovis* De Geer) in Canada. Can. Ent., Vol. LXVI, pp. 1-2.
- On the Predacious Habits of *Scatophaga*, a New Enemy of *Musca domestica*. Can. Ent., Vol. XLVI, pp. 2-3.
- Note on the Occurrence of the Felted Beech Coccus, (*Crytococcus fagi*, Baereus Dougl.) in Nova Scotia. Can. Ent., Vol. XLVI, pp. 15-16.
- The Protection of Birds in and around Ottawa. Ottawa Naturalist, Vol. XXVII, pp. 161-171.
- Sterility in Cats caused by Thrips. Jour. Econ. Ent., Vol VII, pp. 211-218.
- Bibliography of Canadian Entomology for 1912—Trans. Roy. Can. Soc. III. Ser. Vol. VII, Sect. IV, pp. 161-173.
- The Occurrence of a Slug in the Human Stomach. Parasitology, Vol. VII, No. 2.
- Observations on the Feeding Habits of the Stable Fly (*Stomoxys calcitrans* L.). Trans. Roy. Soc., Canada, Ser. III, Vol. VIII, Sec. IV, pp. 37-42.
- The House Fly (*Musca domestica* L.). Its Structure, Habits, Development, Relation to Disease and Control. Cambridge Univ. Press. England, 1914. A complete monograph on *M. domestica*.
- Applied Entomology in Canada. Its Rise and Progress. Forty-fifth Annual Report, Ent. Soc., Ontario, pp. 28-41.
- Birds and Insects. Agr. Gaz. of Canada, Vol. I, No. 6, p. 429.
- The Loss from Insect Pests in Canada. Agr. Gaz. of Canada, Vol. I, No. 10, p. 765.

- An Incessant War. Agr. Gaz. of Canada, Vol. I, No. 10, pp. 789-790.
- Further Observations on the Breeding Habits and Control of the House Fly, *Musca domestica*. Journal Econ. Ent., Vol. VII, pp. 281-289.
- The Canadian Entomological Service. Science, Vol. XXXIX, pp. 570-571.
- The Canadian Entomological Service. Agr. Gazette of Canada, Vol. I pp. 270-274.
- Report of the Dominion Entomologist, year ending March 31st, 1914.
- House-fly Suppression with Notes on Recent Work. Bulletin Women's Municipal League of Boston, Vol. V, No. 6, pp. 9-13.
- Instructions to Importers of Trees, Plants and other Nursery Stock into Canada. Entomological Circular No. 4. Dept. Agric. Canada, 11 pp.; also revised addition, 14 pp.
- Control of Insect Pests in Manitoba with Particular Reference to the Enemies of Horticulture and Forestry. Rept. 15th and 16th Ann. Convention Manitoba Hort. and Forestry Assn. Winnipeg, pp. 101-108.
- 1915—A Forecast of the Work for 1915. Agr. Gaz. of Canada, Vol. XI, No. 1, pp. 16, 17.
- House-fly Control. Agr. Gaz. of Canada, Vol. XI, No. 5, pp. 418-421.
- The Outbreak of the Western Army Cutworm in Southern Alberta. Agr. Gaz. of Can., Vol. II, No. 6, p. 521.
- The House Sparrow. Agr. Gaz. of Can., Vol II, No. 9, pp. 837-38.
- New Entomological Laboratories. Agr. Gaz. of Can., Vol. II, No. 12 pp. 1146-49.
- The Protection of Birds. Sixth Annual Report Com. of Conservation, pp. 117-119.
- Jean-Henri Fabre. Canadian Entomologist, Vol. XLVII, No. 12, pp. 381-83.
- A Contribution to the Knowledge of Canadian Ticks. Trans. Roy. Soc. Can. Ser. III, Vol. IX, pp. 225-239.
- Notes on the Pupation of the House-fly (*Musca domestica*) and its Mode of Over-wintering. Can. Ent., Vol. XLVII, pp. 73-78.
- Two Serious Fruit-Pests New to Canada. Agr. Gazette of Canada, Vol. II, No. 8, pp. 732-37.
- An Early Reference to the Relation of Insects to Disease. Can. Ent., Vol. XLVII, No. 12, pp. 396-99.
- Report of the Dominion Entomologist, year ending March 31, 1915.
- 1916—A Review of Applied Entomology in the British Empire. Annals Ent. Soc. Amer., Vol. IX, No. 1.
- The Suppression of Two Insects Affecting Troops. Special Circular.
- The Introduction and Establishment in Canada of the Natural Enemies of the Brown Tail and Gipsy Moths. Agr. Gaz. of Canada, Vol. III, No. 1, pp. 20-21.
- Outline of Work Projected for 1916. Agr. Gaz. of Canada, Vol III, No. 5, pp. 400-402.
- The Protection of Migratory Birds in Canada. Agr. Gaz. of Canada, Vol. III, No. 12, pp. 1032-1036.
- The Conservation of Our Northern Mammals. 7th Annual Report Com. of Conservation, pp. 32-38.

- Conservation of Birds and Mammals in Canada. Report on Conservation of Fish, Birds and Game, pp. 140-149.
- Frances Marion Webster. An Obituary Notice. Canadian Entomologist, Vol. XLVIII, No. 3, pp. 73-74.
- Geoffrey Meade Waldo. An Obituary Notice. Canadian Entomologist, Vol. XLVIII, No. 6, p. 196.
- Annual Report of Dominion Entomologist, year ending March 31, 1916.
- 1917—The Introduction into Canada of the Ichneumon Fly. *Mesoleius tenthredinis*, a Parasitic Enemy of the Larch Sawfly, *Nematus erichsonii*. Agr. Gaz. of Canada. Vol. IV, No. 5, pp. 355-357.
- Mr. Tom Wilson. An Obituary Notice. Agr. Gaz. of Can. Vol. IV, No. 6, pp. 450-51.
- The Discovery of the European Ermine Moth (*Yponomeuta*) on Nursery Stock Imported into Canada. Agr. Gaz. Canada, Vol. IV, No. 7, pp. 552-54.
- Fur Resources of Northern Canada. Eighth Annual Report Com. of Conservation, pp. 119-122.
- A Review on the Sarcophagidae of North America. Canadian Entomologist, Vol. XLIX, No. 1, pp. 34-36
- Regulations Under the Destructive Insect and Pest Act. Cir. 10, Ent. Br., Dept. Agriculture.
- Protection of Crops. Leaflet No. 1, Ent. Br., Dept. Agr.
- Prepare to Protect Your Crops Next Season. Leaflet No. 2, Ent. Br., Dept. Agr.
- Report of the Dominion Entomologist, year ending March 31, 1917.
- 1918—Some Results of Scientific Research on Insect Pests in Canada. Agr. Gaz. of Can. Vol. V, No. 2, pp. 128-131.
- The Conservation of Wild Life in Canada in 1917. Ninth Annual Report Com. of Conservation, pp. 118-139.
- Regulations Under the Destructive Insect and Pest Act. Supps. 1 and 2 to Cir. 10, Ent. Br., Dept. Agr.
- To Prevent Waste of Coarse Flour, Meals and Cereals by Insect Pests. Special Circular.
- Rats and Mice.—Leaflet No. 7, Ent. Br., Dept. Agr.
- 1919—Investigations of Mosquitoes in Lower Fraser Valley of British Columbia. Agr. Gaz. of Can., Vol. VI, No. 3, pp. 233-34.
- The Use of the Aeroplane in Entomological Work. Agr. Gaz. of Can., Vol. VI, No. 10, p. 877.
- The Need of Nation-wide Effort in Wild Life Conservation. 10th Annual Report of Com. of Conservation.
- The Coming Back of the Bison. Natural History, Vol. XIX, No. 6, pp. 553-565.
- Joint Annual Reports of Dominion Entomologist for Years Ending March 31st, 1918 and 1919. In press.
- The Conservation of Wild Life in Canada. A Memoir. Recently completed. Arrangements for publication unsettled.

POPULAR AND PRACTICAL ENTOMOLOGY.

THE IMPORTED CURRANT WORM.

BY L. CAESAR AND G. GARLICK,
Guelph, Ontario.

***Pteronus ribesii* Scop.**

As nearly everybody who is at all familiar with currants and gooseberries has seen the imported currant worm, no description of the insect referred to will be necessary other than to state that it is the common bluish-green caterpillar with black head and numerous black spots on the body, commonly found feeding upon the foliage of gooseberries and some kinds of currants.

It is not our intention in this article to give a full account of the life-history and habits of the insect, but rather to draw attention to some points of interest and value discovered in a study made by the junior author for the senior at Burlington, Ontario, in the year 1919.

Host Plants.—The first point of interest to which we would call attention is that of host plants. In reading over the literature, especially books on Economic Entomology, one finds such statements as "The imported currant worm feeds upon currants and gooseberries" without stating definitely whether there are any exceptions, or "It feeds upon all kinds of currants and gooseberries." Our experiments show that such statements are inaccurate, for in no case have we been able to see any proof that it will feed upon black currant foliage. In the field, we occasionally found eggs upon black currant leaves, but in no case was there any sign of feeding. In cages, larvæ could not be forced by any means in our power to feed upon such foliage and further, the adults could not even be induced to lay eggs upon black currant leaves, though they readily laid upon the leaves of red currants. Moreover, growers informed us that they had never seen any injury to black currants by this species. We believe, therefore, that there is practically no doubt that black currants are immune and that the host plants are red and white currants and gooseberries. Whether there are any species of gooseberries immune or not, we have not yet been able to discover.

Time of appearance of adults in spring.—Before beginning our study we supposed that adults never appeared until the leaves were fairly well expanded, hence it was a surprise to find females present in large numbers in April and laying eggs before the largest leaves were the size of a ten-cent piece, and when the majority of the buds had just burst.

Parthenogenesis.—By cage experiments it was discovered that eggs were often laid by unmated females, and that these hatched just as well as fertilized eggs; in fact, in the later broods the females avoided the males as far as possible and appeared to lay more eggs when unmated. The adults derived from these unfertilized eggs were, in every case, males. This shows, therefore, that though mating is not necessary for the hatching of eggs, it is necessary for the perpetuation of the race.

Length of pre-oviposition period.—In the case of most of our common insects, a period of several days elapses from the time the adults appear until eggs are laid. The imported currant worm and several other allied saw-flies are exceptions to this. In the case of the former insect, oviposition begins in a

few hours after the emergence of the adults. In one instance where careful record was made of the time, the period was only one hour and five minutes.

Where eggs are laid.—The spring adults with very few exceptions lay their eggs in a chain-like arrangement along the main ribs or veins on the under surface of the leaves, the leaves chosen being almost always situated in the central, and lower part of the bush. Females of later generations are not so particular where they lay their eggs and sometimes place them almost indiscriminately over the leaves. This choosing in spring of the central part of the plant for oviposition is from the standpoint of control an important matter; because, when the eggs are hatched the young larvæ feed on the leaves nearby, eating at first little round holes in them and later devouring the whole leaf. They continue to feed gregariously in the central part of the bush until they are half grown, or even more. When the foliage is dense they have often eaten most of the leaves in this part of the bush before any but a close observer would notice that they are present. Accordingly, when they desert the central area and disperse over the outer leaves, they quickly do a very great deal of damage to the plant, especially as they feed ravenously and continue to eat all day long. Hence the fruit grower who delays spraying until he sees the insects at work on the outer leaves is likely to be late to kill them before they completely strip his plants.

Number of broods a year.—It is usually stated that there are only two broods. Our experiments however, show that in 1919 there was a regular spring brood followed by a partial second and a partial third brood, the latter two over-lapping greatly. The second brood of larvæ began to hatch from the eggs about a week before red currants were ripe, and hatching continued for fully a month. The third brood began to hatch a little more than two weeks after the fruit ripened. Adults which produced this brood continued to emerge in cages up into September. Fully half of the larvæ from the first brood remained in their cocoons throughout the year and did not transform into pupæ and adults to produce a second brood. The same thing was true of larvæ of the second brood.

Fortunately the second and third broods appear to be of little importance, for from some not clearly demonstrated reason, the great majority of the larvæ of these two broods died soon after hatching. Therefore, by destroying the first brood but little fear may be felt from the second and third.

Natural methods of control.—Two kinds of parasites were discovered, one a Braconid and the other a Cynipid. In addition to this numerous larvæ and eggs were destroyed by Aphis lions and ladybird larvæ. Another factor in control is the heat of the soil, which destroys many larvæ that fall upon it accidentally or when seeking pupation quarters; and as mentioned above, large numbers of larvæ of the second brood for some unknown reason died soon after hatching. In addition to this may be mentioned the fact that unfertilized eggs produced only males.

Artificial methods of control.—There is scarcely any insect easier to poison than this. We discovered that as small a quantity as one-half pound of arsenate of lead paste in 40 gallons of water would kill small larvæ. Our recommendations are, however, to spray the bushes thoroughly with from one to two pounds of arsenate of lead paste, or from one-half to one pound of arsenate

of lead powder in 40 gallons of water. Apply the liquid as soon as the leaves are well developed on currants or just before the red currants come into bloom, and take special precautions to spray thoroughly the central and lower part of the bush; because this is where the young larvæ feed for a week or more after hatching. If Bordeaux mixture is used, arsenate of lime, a little weaker than either of the above strengths of arsenate of lead, may be used, or Paris green may be substituted at the strength of not more than one-quarter of an ounce to 40 gallons of the Bordeaux. Usually one good spraying is quite sufficient. If a second one is given, it should be about eight or ten days after the first, or soon after the red currants are well set.

It may be worth mentioning in closing that Bordeaux mixture is a most valuable fungicide for currants, both red and black, and has the effect of preventing the foliage from dropping prematurely. In this respect it is much superior to lime-sulphur or the soda-sulphur compounds, and also to any of the sulphur or Bordeaux dusts that the writers are familiar with.

EAST KOOTENAY DIPTERA. TIPULIDÆ—I.

BY C. B. D. GARRETT,
Cranbrook, B.C.

Under the admirable leadership of Dr. C. P. Alexander I have been doing some work on the Kootenay Tipulidæ. The work has but started, but small as it is, the list of specimens is of some interest, for it contains three forms hitherto unknown from Canada. These are *Dicranoptycha sobrina* Will., *Tipula dorsolineata* Doane and *Rhaphidolabis neomexicana* Al. The last is interesting, having been previously taken only at two localities in Colorado and one in New Mexico. The capture of *Stygeropsis fuscipennis* Lw. also upsets the view that it is only a late season flyer, since in the Kootenays it is on the wing from May 7th until July 14th.

It is unfortunate that most of the captures have been females only, as these are, in many cases, difficult to determine, but later males will probably be taken, and doubtful names verified or corrected.

The list as it stands is as follows:—

<i>Dicranomyia concinna</i> Will. possibly <i>D. venusta</i> Bergroth, April 28.....	3,500 feet
“ sp. near <i>halterata</i> O.S. ♀ only. Sept. 26.....	3,500 “
<i>Dicranoptycha sobrina</i> O.S. ♀ only. June 23, '19. July 3 to Aug.	
20, '18.....	3,500 “
<i>Geranomyia canadensis</i> Western. Dead.....	6,000 “
<i>Helobia hybrida</i> Mg. May 2.....	3,500 “
<i>Limnophila ultima</i> O.S. Oct. 20.....	3,500 “
<i>Nephrotoma erythrophrys</i> Will. June 26.....	3,500 “
<i>Rhaphidolabis neomexicana</i> Al. July 21.....	3,500 “
<i>Stygeropsis fuscipennis</i> Lw. May 7 to 20, July 14.....	4,000 “
<i>Tipula angustipennis</i> Lw. May 8 to June 16.....	3,500 “
“ <i>dorsolineata</i> Doane. Aug. 5 to Sept. 4.....	4,000 “
“ sp. probably <i>fragilina</i> Al. ♀ only. 29 Sept. to Oct. 29.....	3,500 “
“ sp. close to <i>subtenuicornis</i> Doane. July 20.....	3,500 “
“ sp. probably <i>tenaria</i> Lw. May 22.....	3,200 “
“ sp. females only. Aug. 25.....	3,500 “
“ sp. females only. May 29.....	3,500 “

NEW NEARCTIC CRANE-FLIES (TIPULIDÆ, DIPTERA). PART IX.

BY CHARLES P. ALEXANDER,

Urbana, Illinois.

The majority of the species considered in this part were secured by Dr. P. W. Claassen in Estes Park, Colorado. Others were taken by Messrs. Frison, Lindley and McAtee. The writer is indebted to all the above gentlemen for the privilege of studying this material. Unless stated otherwise, the types of the species are preserved in the writer's collection.

Elliptera coloradensis, new species.

General coloration dark brown, the mesonotal praescutum brownish black; wings grayish subhyaline, the cord and outer end of cell $1st M^2$ indistinctly seamed with brownish gray; cell $1st M^2$ closed; Sc^2 located before the origin of R_s .

Female.—Length 8 mm.; wing 10 mm.

Rostrum and palpi dark brown. Antennæ dark brown, the flagellar segments oval. Head dark brown.

Pronotum obscure brownish yellow. Mesonotal praescutum obscure yellow with three broad, brownish black stripes that are practically confluent, restricting the ground-colour to the humeral region and the lateral margins; scutum yellow, each lobe with two confluent brownish black areas; scutellum obscure yellow; postnotum dark brown. Pleura brownish yellow, the mesepisternum darker; mesosternum between the fore and middle coxæ brownish black. Halteres pale, the knobs a little darkened. Legs with the coxæ and trochanters yellow; remainder of the legs dark brown, the femora paler basally. Wings grayish subhyaline, the costal region indistinctly more yellowish; cord and outer end of cell $1st M^2$ narrowly seamed with brownish gray; veins dark brown; stigma lacking. Venation: Sc rather short, Sc^1 ending about opposite two-thirds the length of R_s , Sc^2 located before the origin of R_s ; R pale at the apex; R^1 bent suddenly cephalad at the tip so that cell R^1 is widened at its outer end; deflection of R^{4+5} slightly angulated; $r-m$ oblique in position; cell $1st M^2$ closed, a little shorter than vein M^{1+2} beyond it; basal deflection of Cu^1 just before the fork of M .

Abdomen dark brown, the pleural integuments paler, the genital segment paler. Ovipositor with the valves elongate.

Habitat.—Colorado.

Holotype—♀, Fall River, Estes Park, August 24, 1919, (P. W. Claassen).

Erioptera (Erioptera) subseptemtrionis, new species.

Male.—Length 4.5 mm.; wing 6 mm.

Similar to *E. septemtrionis* O. S., differing as follows:

General coloration dark brown, the lateral margins of the praescutum and two stripes on the thoracic pleura paler. Legs dark brown, the femoral bases paler. Wings darker with the stigma much more distinct; veins straighter, M^{1+2} , M^3 and Cu^1 showing little tendency to bend toward the wing-tip as in *E. septemtrionis*. Male hypopygium with the spine of the inner pleural appendage much longer than in *septemtrionis*, appressed to the appendage and almost straight; the blade of this appendage is flattened and without a concave depression formed by a short, lateral ridge as in *septemtrionis*.

Habitat.—Colorado.

May, 1920

Holotype—♂, Fall River, Estes Park, August 24, 1919, (P. W. Claassen).

Paratopotypes—2 ♂'s.

Dicranota montana, new species.

General coloration gray, the mesonotal praescutum with three brown stripes; wings pale brown, the stigma dark brown; a faint brown cloud at *r-m*; cell M^1 present; cell $1st M^2$ open by the atrophy of *m*.

Male.—Length 9.3 mm.; wing 9.2 mm.

Rostrum and palpi dark brown. Antennae rather elongate, dark brown, the flagellar segments somewhat incrassated on their inner face. Head dark brown, presumably gray pruinose in dry specimens.

Mesonotal praescutum gray with three conspicuous, dark brown stripes; scutal lobes dark brown; remainder of the mesonotum and the pleura dark brown. Halteres pale, the knobs slightly darker. Legs with the coxae dark brown basally, paler brown apically; trochanters brownish yellow; remainder of the legs dark brown, the femoral bases more yellowish. Wings with a pale brownish tinge; stigma oval, dark brown; a faint brownish cloud at the deflection of R^6 and *r-m*; veins dark brown. Venation: Sc^1 ending opposite *r*; Rs short, strongly arcuated, angulated or weakly spurred beyond the base; R^{2+3+4} equal to or shorter than *r-m*; R^{2+3} before *r* longer than this cross-vein; outer deflection of R^2 close to the tip of R^1 ; deflection of R^5 short to very short; cell M^1 present; cell $1st M^2$ open by the atrophy of *m*.

Abdomen dark brown, the pleural integument pale with a linear brown mark opposite each segment. Male hypopygium with the pleurites short and stout, the outer angles slightly produced; pleural appendage bifid, the outer arm short, fleshy, with numerous setae, the inner arm longer, flattened into a yellowish chitinized blade. Penis-guard a broad depressed structure, the caudal margin produced into three short points.

Habitat.—Colorado.

Holotype—♂, Fall River, Estes Park, August 24, 1919, (P. W. Claassen).

Paratopotypes—3 ♂'s.

Nephrotoma sphagnicola, new species.

Close to *N. incurva* (Lw.); occipital spot broadly subtriangular; mesonotal scutum trivittate, there being a narrow, black, median stripe in addition to the marks on the scutal lobes; thoracic pleura indistinctly spotted with reddish brown.

Female.—Length 13.5–14 mm.; wing 10.5–11.8 mm

Frontal prolongation of the head yellow, the dorso-median line black; nasus long, black; palpi dull yellow, the last segment passing into brownish. Antennae with the first segment brown, more reddish beneath; second segment pale; flagellum black. Head broad, bright orange, the occipital mark broadly rounded or subtriangular, rather indistinct; a small brown spot on either side of the vertical tubercle, adjoining the inner margin of the eye; genae tinged with dark brown.

Pronotum dull yellow. Mesonotum pale orange-yellow with three black stripes, the median stripe very broad in front, narrowed behind; lateral stripes short, straight, not connected with the rounded velvety spot laterad of their anterior ends; scutum trivittate with black, a distinct, black, median vitta, in addition to the triangular black areas on the scutal lobes; scutellum brownish,

paler on the sides, with a narrow, blackish median vitta; postnotum orange-yellow, the median area brownish, broader on the posterior portion. Pleura yellow, indistinctly spotted with reddish brown; a narrow, almost black line immediately before the base of the halteres. Legs with the coxæ dull yellow, indistinctly brown at the base; trochanters dull yellow; femora dull brownish yellow, the tips darker; tibiae brown, the tips narrowly dark brown; tarsi dark brown. Wings with a faint yellowish tinge, the costal area but little brighter; stigma dark brown; a narrow brown seam along the cord, passing along both branches of *Cu* to the wing-margin; tip of the wing narrowly darkened; a pale vitreous area in cell *1st R*¹ before the stigma. Venation: cell *M*¹ broadly sessile; *m-cu* present, located just before the fork of *M*.

Abdominal tergites obscure yellow; segment one with a black basal ring; other segments with the caudal margin blackened, this broadest on segments two to four, more or less produced cephalad medially so as to be almost continuous along the dorso-median line; the black caudal margin is narrow and less distinct on the succeeding segments; lateral margins of the segments broadly dark brown; sternites yellow. Ovipositor with the tergal valves very long and slender, acute, greatly exceeding the sternal valves.

Habitat.—Illinois.

Holotype—♀, Antioch, Lake Co., June 5, 1919, (T. H. Frison).

Paratopotype—♀.

Type in the collection of the Illinois Natural History Survey.

This species was submitted to Dr. Dietz for his expert opinion and he agrees that the fly is undescribed, most closely related to *N. incurva* (Lw.), from which it may be told by the diagnostic characters given above. The types were secured by Mr. Frison in a sphagnum bog, associated with other species of Tipulidæ of northern affinities (*Limnophila poetica* O.S., *Tipula sarta* Lw., *Tipula senega* Alex., and others).

Tipula claasseni, new species.

Head and thorax brownish black; wings grayish subhyaline, the base and subcostal cell yellowish; abdominal tergites orange-yellow, trivittate with dark brown; ovipositor with the valves short and fleshy.

Female.—Length 11.8–12 mm.; wing 13–14 mm.

Frontal prolongation of the head rather short, narrowly dark brown above, obscure yellowish on the sides; nasus distinct. Antennæ short, dark brown, the second scapal segment a little paler. Head dark brownish black, paler on the sides of the vertex and on the postgenæ.

Thorax, in alcohol, dark brownish black, in dry specimens possibly pruinose, the dorso-pleural membranes obscure yellow. Halteres light brown. Legs with the coxæ and trochanters brownish black; femora reddish, narrowly tipped with dark brown; tibiae brown, the tips slightly darker; tarsi brownish black. Wings grayish subhyaline, the base strongly yellow; cells *C* and, especially, *Sc*, light yellow; stigma small, brown; a conspicuous obliterative area before the stigma in cell *1st R*² and another in the end of cell *R* that crosses vein *M*¹⁺² and almost fills cell *1st M*². Venation: *Rs* long, longer than *R*² but shorter than *R*³; *R*²⁺³ a little longer than *r-m*; deflection of *R*⁴⁺⁵ short or practically obliterated, the *r-m* cross-vein correspondingly lengthened; cell *1st M*² small, pentagonal; petiole of cell *M*¹ a little longer than *m*; *m-cu* short.

Abdominal tergites orange-yellow with three conspicuous brownish black stripes, on the subterminal segments the entire sclerites are darkened; basal sternites yellow, the others passing into brown. Ovipositor with all the valves short and blunt, somewhat as in the *bicornis* and *collaris* groups of the genus.

Habitat.—Colorado.

Holotype—♀, Lawn Lake, Estes Park, altitude 11,000 feet, August 27, 1919, (P. W. Claassen).

Paratopotype—♀.

This curious fly might well be mistaken for a male, but the specimens are undoubtedly females. Somewhat similar structures are found in the *collaris* and *bicornis* groups. The species is respectfully dedicated to the collector, Dr. P. W. Claassen.

SUMMARY OF WOOD'S MYRIAPODA PAPERS.

BY HORACE GUNTROP,

Washburn College, Topeka, Kansas.

We note by Science¹ that Dr. Horatio C. Wood, emeritus professor of materia medica, pharmacy and general therapeutics in the Medical School of the University of Pennsylvania, died January 3, last, at the age of 79. Before taking up the study of medicine, he was interested in natural history, and was a worker in the Academy of Natural Sciences, publishing several papers in the *Insecta*, and nine on the closely related group Myriapoda. In these latter we have by far the most extensive work done in this country on this group by any individual up to his time, and these papers must rank as the foundation on which all work on the Myriapoda has since been built.

The first of these papers (1)² was a preliminary report on the genus *Scolopendra*, and describes four species as new. The next year he issued a general catalogue of the Chilopoda (2) in which two new genera and twenty-nine new species are included. In the following year three papers appeared, the first on the Polydesmidae (3) includes the descriptions of ten new species, the second one on the Julidae (4), fourteen new species, and the last (5), two new genera and the same number of species. In 1865 appeared his "Myriapoda of North America" (6), in which there are eighteen genera and ninety-two species listed, three of the latter being classed as new. This is an extensive monograph illustrated with numerous cuts and three plates, two of which are coloured. It discusses the external structure, and brings the systematic side of the subject up to date, reviewing the work of all earlier writers with the notable exceptions of C. L. Koch and Saussure, whose writings must have been unknown to Wood, judging from omissions and the resulting synonyms. The same year he published the one paper he wrote on foreign material (7), describing a new genus (*Oligaspis*) and species (*O. puncticeps*) from Port Natal, and a single new species (*Glomeris bicolor*) from Hong Kong. His work on the group closed with two short papers published in 1867, the first one (8) describing four new species from Texas, and the second (9), six new species from Illinois and California. He retained his interest in insects for some time after this, but after 1875 cellular botany and medicine filled all his time.

1. Vol. 51:106-107. Ja 30, 1920.

2. Numbers in parenthesis refer to bibliography at end.
May, 1920

In all, Dr Wood described four new genera (*Bothropolys*, *Opisthemege*, *Octoglena* and *Brachycybe*) from the United States, and one foreign genus, and a total of seventy-two species from this country, and two from elsewhere, making a grand total of five genera and seventy-four species of Myriapoda to be placed to his credit.

The following is a list of the new species described by Wood from the United States:—

Chilopoda—

- Cermatia linceci*.
Lithobius bilabiatius.
 " *paucidens*.
Bothropolys nobilis.
 " *xanti*.
 " *bipunctatus*.
Scolopendra castaneiceps.
 " *polymorpha*.
 " *parva*.
 " *byssina*.
 " *longipes*.
 " *copeana*.
 " *bispinipes*.
Cryptops asperipes.
Opisthemege postica.
 " *spinicauda*.
Scolopocryptops gracilis.
 " *spinicauda*.
 " *lanatipes*.
Geophilus cephalicus.
 " *brevicornis*.
 " *laevis*.
 " *bipuncticeps*.
Mecistocephalus quadratus.
 " *fulvus*.
 " *melanonotus*.
 " *limatus*.
Strigamia gracilis.
 " *inermis*.
 " *bothriopus*.
 " *bidens*.
 " *laevipes*.
 " *taeniopsis*.
 " *maculaticeps*.
 " *laticeps*.
 " *cephalica*.
 " *parviceps*.
 " *epileptica*.
 " *chionophila*.
 " *walkeri*.

Diplopoda—

- Octoglena bivirgata*.
Brachycybe lecontii.
Julus venustus.
 " *pilosiscuta*.
 " *oregonensis*.
 " *immaculatus*.
 " *canaliculatus*.
 " *laqueatus*.
 " *milesii*.
 " *cinereifrons*.
 " *caeruleocinctus*.
 " *hortensis*.
 " *virgatus*.
 " *caesius*.
 " *diversifrons*.
Spirobolus spinigerus.
 " *uncigerus*.
 " *angusticeps*.
Spirostrephon caesioannulatus.
Polydesmus trimaculatus.
 " *corrugatus*.
 " *bifidus*.
 " *crassicutis*.
 " *cerasinus*.
 " *eruca*.
 " *placidus*.
 " *floridus* (var?)
 " *haydenianus*.
 " *hispidipes*.
 " *setiger*.
 " *impurus*.
 " *dissectus*.

BIBLIOGRAPHY OF HORATIO C. WOOD.

- (1) 1861. Descriptions of new species of *Scolopendra* in the collection of the Academy. Proc. Phila. Acad., pp. 10-15.
- (2) 1863. On the Chilopoda of North America, with catalogue of all the specimens in the collection of the Smithsonian Institution. Jour. Phila. Acad., n. s., Vol. V, pp. 5-52.
- (3) 1864. Descriptions of new species of North American Polydesmidae. Proc. Phila. Acad., pp. 6-10.
- (4) 1864. Description of new species of North American Iulidae. Proc. Phila. Acad., pp. 10-15.
- (5) 1864. Description of new genera and species of North American Myriapoda. Proc. Phila. Acad., pp. 186-187.
- (6) 1865. On the Myriapoda of North America. Trans. Amer. Phil. Soc., Vol. XIII, pp. 137-248, pls. I-III.
- (7) 1865. New Polyzoniidae, Gervais. Proc. Phila. Acad., pp. 172-173.
- (8) 1867. Descriptions of new species of Texan Myriapoda. Proc. Phila. Acad., pp. 42-44.
- (9) 1867. Notes on a collection of California Myriapoda, with descriptions of new Eastern species. Proc. Phila. Acad., pp. 127-130.

NOTES ON SOME MOSQUITOES NEW TO CANADA.

BY ERIC HEARLE,
Guelph, Ont.

Psorophora sayi Dyar and Knab.

This beautiful insect has not previously been recorded from Canada, although it is reported from the Atlantic and Gulf states, the Mississippi Valley, Cuba and the Bahamas.

The single specimen obtained by the writer was taken near Jordan, Ontario, on August 3rd, 1916. It was in woods, attempting to bite at 8.30 in the morning. With it were a number of *Aedes canadensis*.

This is a very distinctive mosquito; in the sunlight most of the scales give off vivid purple reflections. The hind tibiae and some of the hind tarsal segments have many erect, dark purple scales which give a brush-like appearance to these parts. The apices of the hind legs are white: the two distal tarsal segments and part of the preceding one being entirely white-scaled. The abdomen is dark-scaled, the scales having violet reflections. At the apex of each segment, on each side, there is a lateral yellow triangular patch. The venter is yellow-scaled.

Aedes triseriatus Say.

There is no previous Canadian record of this very interesting little mosquito. Howard, Dyar and Knab give its distribution as the United States east of the Rocky Mountains.

The writer found the species to be a fairly common one in woods in Southern Ontario. Females only were taken and these were found to bite fiercely during the day, but collections made after nightfall gave no specimens. Quickness of movement and a highly-strung sense of danger characterizes the species which is a very illusive one.

The writer's specimens were taken at Jordan, Ontario, on August 3rd, 1916. Dr. E. M. Walker kindly loaned for examination specimens of males and larvæ of *triseriatus* taken by him at De Grassi Point, Ontario. The larvæ were obtained from a tree-hole on July 4th, 1917, and the males bear the date June 23, 1917. These were reared from larvæ taken from the same tree-hole.

Aedes triseriatus is a small black and white mosquito in which the markings are very characteristic. The mesonotum has a broad band of dark brown scales running from base to apex and covering the central half. The sides are pure-white scaled. The abdomen is black-scaled dorsally, except for white spots laterally at the base of each segment. The venter is white-scaled, except for apical black bands on the posterior segments. The legs are black and the wings are clothed with black scales.

***Aedes aldrichi* Dyar and Knab.**

While investigating the mosquito problem of the Fraser Valley, B.C. during 1919, the writer found *Aedes aldrichi* to be the dominant mosquito of that district. Previous to this it had been known only from Montana and Idaho.

The extensive development of this species in the Fraser Valley is apparently dependant upon the fluctuation of the river. In years of high freshet, the cotton-wood bottom lands around the river become flooded and *aldrichi* is extremely abundant. The adults bite very viciously and are so small that they can penetrate ordinary screening with comparative ease.

Swarming of males was observed at six p.m. on July 12th, 1919, at Dewdney, B.C. Four or five dozen individuals were hovering in a swarm three or four feet from the ground. The swarm was composed almost entirely of males and was in a place well protected by willow growth.

This small grayish *Aedes* has the thorax clothed with yellowish-gray to pale straw-coloured scales. There is a broad median divided stripe of dark brown scales, and two short lateral markings of the same colour. The abdomen is black, with crisp white basal bands narrowed in the centre and broadening laterally in the posterior segments to form broad triangular patches. The legs are black, and the wings are entirely black-scaled.

Specimens were taken at Mission, B.C., between June 13th and August 3rd. They were found throughout the valley from Hope to Ruskin.

***Anopheles quadrimaculatus* Say.**

It is surprising that there are no previous Canadian records of this mosquito, as the writer found it to be fairly common in some parts of Southern Ontario. Specimens were taken at St. Catharines, Ontario, on August 24, 1916, and at Jordan, Ontario, on August 4, 1916. At the latter place *quadrimaculatus* was very abundant. It was not found at Guelph, where *occidentalis* is the common Anopheline.

A. quadrimaculatus is a gray-brown species in which the brown mesonotum is clothed with yellowish hair scales: the abdomen is grayish-brown and has many silky, pale hairs. The legs, proboscis and palpi are uniformly dark-scaled, save for yellow scales at the knees and the apices of the tibiae. The wings are marked with four dark spots, these being at the forks of the second and fourth veins, at the base of the second vein and at the cross-veins. The wing fringe is uniformly dark-scaled.

Anopheles occidentalis and *A. walkeri* somewhat resemble this species, but the former has a yellow coppery patch on the wing fringe, at the apex; and the latter has less distinct black spots on the wings and has white rings on the palpi.

REMOVING POLLEN FROM BEES.

It is well known to all persons who have made a collection of bees that a large proportion of specimens in some genera—notably *Andrenidae* and *Megachilidae*—are so heavily loaded with pollen that their beauty as cabinet specimens is much impaired, and also that some of the characters which need to be examined in order to identify them properly are covered and concealed.

Last season I experimented to find some practical and easy way to remove the pollen without injury to the specimens, and I succeeded so well that I thought that some of your readers would like to know about it.

I take a wide-mouthed bottle holding some five or six ounces and fill it about two-thirds full of gasoline, drop the bees in and cork tightly and shake vigorously for two or three minutes, then pour off the liquid into another bottle and empty the bees out on to a sheet of blotting paper. In a few minutes the gasoline will all evaporate and leave the bees perfectly clean. When wholly dried out they should be examined with a lens, and if not clean give them another bath of fresh gasoline. This second bath will rarely be necessary if thoroughly done the first time. In case some very shaggy species should not look fluffy enough, a little brushing with a small, soft paint brush will completely restore the natural appearance. Some pollens are more difficult than others to remove. That of viburnum is the worst I have seen yet, but it will come off. I am sure that any one who will give this plan a thorough trial will be more than satisfied. Old dried specimens cannot be cleaned.

N.B.—Do not fear to shake vigorously. You cannot injure them, and it is necessary to shake well in order to rinse them completely.

E. J. SMITH, SHERBORN, MASS.

CONCERNING THE DISTRIBUTION OF NORTH AMERICAN. CICADELLIDÆ (HEMIP.).

BY GEO. W. BARBER,

U. S. Bureau of Entomology, (*) Washington, D.C.

Some time ago a study was pursued to determine what relation the distribution of N. A. Cicadellidæ had to the life zones of N. A. fauna. It was soon found, however, that under our present knowledge of the distribution of the insects of this family, such a study would lead to considerable confusion, and it was, therefore, discontinued for the present.

Certain information did develop, however, concerning the distribution of the Cicadellidæ, and it is here presented as perhaps adding something to our conception of this family:

Undoubtedly some localities in the distribution of the species have been overlooked, but an endeavor has been made to know the distribution of each species so far as it has been recorded in literature.

*Published by permission of the Chief of the Bureau of Entomology,
May, 1920

The Cicadellidae is represented in America north of Mexico, by 70 genera through which are distributed some 773 species now held to be distinct. On the whole, very little has been done to determine the fauna of any given locality. Several lists, however, have been published and for at least six states the family has been collected extensively and recorded. There may be mentioned the New York and Maine lists by Prof. Osborn, the Tennessee list by De Long, the Wisconsin list by Saunders and De Long, the Missouri list by Gibson and Cogan, and the South Carolina list of Lathrop. In addition to these more extensive lists there have been several minor lists, which need not be mentioned here.

Of the 773 recognized species, some 294 have been recorded from but one locality, the locality of the type and apparently never recovered. The localities of these follow:

"Am. Sept."	1	Tenn	19
Boreal Am	1	Wisc	12
Carolina	1	Iowa	4
Maine	5	Arkansas	1
N. H.	1	Texas	9
N. Y.	3	Kansas	3
N. J.	3	Nevada	3
Md	2	Utah	6
D. C.	3	Colorado	62
Va	2	N. Mexico	6
N. C.	1	Arizona	15
S. C.	6	Calif	70
Ga	3	Washington	4
Fla	20	Oregon	4
Penn	4	Canada	3
Ohio	2	Manitoba	1
Ill	5	Vanc. Isd	1
Mich	1	Alaska	5
Kentucky	1	Greenland	1
Total—294.			

The number of species in addition to the above list that have been recorded from certain of the General Geographical regions may be summed up in the following list:

Generally distributed throughout the U. S. and Canada	32
Generally distributed throughout the U. S.	24
Generally through Atlantic States	33
Generally through Northern States	72
Occurring generally East of the Rocky Mountains	134
" " through the Southern States	52
" " " " Middle Western States or great plain region.	25
" " West of the Miss. River	5
" " through Rocky Mountain Region	60
" " in the South West	27
" " in the North West	3
" " in the Pacific slope	10

The number of species that have been recorded from the several states, territories and provinces is here enumerated:

Maine.....	151	La.....	8
N. H.....	74	Minn.....	8
Vermont.....	6	N. D.....	8
Mass.....	62	S. D.....	12
R. I.....	5	Nebr.....	39
Conn.....	14	Kans.....	107
N. Y.....	209	Okla.....	3
Penn.....	143	Texas.....	73
N. J.....	123	N. Mex.....	41
Del.....	1	Ariz.....	70
Md.....	46	Colo.....	268
D. C.....	65	Wyo.....	7
Va.....	17	Mont.....	7
N. C.....	112	Utah.....	61
S. C.....	121	Idaho.....	3
Ga.....	40	Nevada.....	8
Fla.....	128	Oregon.....	11
Ohio.....	89	Wash.....	21
W. Va.....	2	Calif.....	178
Kentucky.....	15	Mexico.....	15
Tenn.....	242	Quebec.....	94
Ala.....	12	Ontario.....	121
Miss.....	40	Alaska.....	11
Ind.....	11	Manitoba.....	6
Ill.....	63	Vanc. Isd.....	19
Wisc.....	208	Brit. Col.....	43
Mich.....	43	Greenland.....	1
Iowa.....	161	Nova Scotia.....	4
Mo.....	155	Newfoundland.....	1
Ark.....	9		

From the figures presented above, the most striking fact that will be apparent is not the number of species found in any one region, but the meagre information that we have concerning the Cicadellid fauna of the majority of the states and provinces. The value of state and even local lists is here quite apparent, through the service that they render in extending the known distribution of species.

It is quite evident that certain sections accommodate a considerably larger number of species of Cicadellidæ than others whose climatic conditions are less varied, but it may be estimated that nearly all of the states should give from 150 to over 250 species. Considering the meagre collecting that appears to have been done in certain parts of our territory the total number of living species of this group will undoubtedly be found to be greatly in excess of one thousand.

A NEW LEAF-CUTTING BEE FROM THE HAWAIIAN ISLANDS.

BY T. D. A. COCKERELL,
Boulder, Colorado.

Some time ago Mr. P. H. Timberlake requested me to examine the status of a *megachile* now common at Honolulu, but considered to have been introduced from some place not determined. It was very much like *M. palmarum* Perkins, also common in the Hawaiian Islands, but evidently distinct. A few days ago he sent me a long series of this bee, and after prolonged study and comparisons, I can only regard it as undescribed. It belongs to the subgenus *Eutricharax* Thomson (*Paramegachile* Friese), and is very much like the European *M. argentata* Fabr.* Bees of this type are very widely distributed over the world, so I confidently expected to locate the Hawaiian insect in Japan, China, the Phillipines, Australia, or elsewhere. It is very like *M. erimæ* Mosc., from New Guinea, but has dusky wings. Superficially, it might be taken for any one of about a dozen species, but it agrees with none. It may have come from one of the other Pacific islands, as Samoa or Tohitic, and it is perhaps significant that a Tahitian *Lithurgus* has been introduced into Oahu. It is a fact, however, that endemic species of this group of *megachile* occur in very remote places, and there is no apparent reason why they should not exist in the Hawaiian Islands. *M. palmarum* is said by Perkins to occur probably in all the islands, and it is quite possible that the new species has existed on one of the islands, though perhaps more recently brought to Oahu.

Megachile timberlakei, n. sp.

Male (Type).—Length 8-8.5 mm.; black, parallel-sided, with large head, simple antennæ, spined anterior coxæ and simple anterior tarsi. Face and front densely covered with light yellow to creamy-white hair; mandibles black, hairy at base; antennæ slender, black; vertex with long dark fuscous hair; cheeks above with light yellowish hair, but below it is long and pure white; hair on thorax above and upper part of sides ochreous, varying to paler, beneath pure white; mesothorax and scutellum dull and very finely punctured; a band of tomentum along hind margin of scutellum; tegulæ black; wings dusky with black nervures; legs black, with white hair, yellowish on inner side of basitarsi first four abdominal segments with pale yellowish hair-bands, and narrow curved bands in the depressions; upper surface of sixth segment densely covered with white tomentum; apical keel emarginate, with irregular denticles on each side; fifth ventral segment and anterior femora in front more or less pallid, brownish.

Female.—Length 10-10.5 mm.; supraclypeal area and middle of clypeus exposed; much dark fuscous hair on mesothorax and scutellum; ventral scopa pure white, black on last segment.

Type male, Kaimulai, Oahu (*Timberlake*). Also from Honolulu and Makua, Oahu.

Compared with *M. palmarum* received from Dr. Perkins, the male differs by the denticulate and less deeply emarginate keel of sixth abdominal segment, the more oblique sub-basal bands of abdomen, and the fulvous or subochraceous

*In Friese's *Die Bienen Europa's* there is a curious error in the key, in which the scopa of *M. argentata* is said to be entirely white. It is black on the last segment, as is correctly stated in Friese's description.

tint of the hair on thorax above, with a distinct band behind scutellum and a fainter one in front. The hind tibiae of *palmarum* are larger and more robust, and much less densely white-hairy. In the female, the pure white ventral scope, black on last segment, is distinctive. A *palmarum* received from Dr. Perkins has the scopa pale reddish, black on last segment; one from Mr. Timberlake has it creamy-white, black on last segment and sides of penultimate. In his description, Perkins states that the hair of the female is cinereous, with little or no fulvous tinge, and is sparse on clypeus. This agrees with *palmarum* as here recognized, but his account of the ventral scopa is more suggestive of *timberlakei*. Possibly he had the two females mixed, but his type must be considered to be the male, which is described at length. The clypeus in *timberlakei* has a large and dense brush of inwardly-directed hairs on each side, but there is little of this in *palmarum*.

A PLEA FOR DEFINITIVENESS.

I should like to bring to the attention of contributors to the Canadian Entomologist a matter which is worthy of consideration, especially to the systematist. In looking over many numbers of the "Entomologist" I have noted numerous headings such as "A Canadian Trigonals." The point which I would like to bring out is that, to the student who is not familiar with the family to which the genus Trigonals belongs, nothing is conveyed: that is, he is utterly "at sea" as to the family discussed. Would not the interest in these various genera and families be greatly increased if authors were to give not only the genus and family, but also the name of the superfamily and order under discussion. A great service would be rendered students taking up a family for study if they could quickly locate all the literature on a family, and a great many synonymous names might be avoided. After all, it must be remembered that the aim of every author is to place his findings in such a position that they will be readily available to others, and his work is judged largely by his ability to do this. The above example was selected at random, and it happens that it is but a mild example of hundreds of cases. A specialist should bear in mind that everyone is not up-to-date in his particular field, but a great deal more interest would be taken if greater definition were given.

C. HOWARD CURRAN.