Annual Report

of the

FOREST INSECT SURVEY

Forest Insect Investigations

1936-1938

INDEX

Introduction

In recent years the value of surveys is being appreciated more and more in the field of biology. In the case of forest entomology as practiced within an administrative unit such as the Dominion of Canada, such surveys constitute a basic need. The Forest Insect Survey has been organized to obtain as much information as possible on forest insect conditions throughout the Dominion.

In some cases, data of this nature interpreted in the light of past experience may become very significant in forecasting future eventualities; in other cases they will serve in discovering facts and agencies hitherto quite unknown. Forest Insect Surveys of one kind or another are already in operation in a few countries. The small republic of Latvia has a system of cataloguing the incidence and abundance of the principal forest insects and diseases in its different regions. In Germany, surveys are carried out by the foresters in their own respective districts but as far as is known, there is no national organization exclusively concerned in correlating data for the whole country. On this continent surveys have also been made from time to time for individual insects of great economic importance; several years ago, intensive ground and aerial surveys were undertaken in Canada in connection with spruce budworm and hemlock looper

infestations, and surveys for gypsy moth and browntail moth have been conducted for many years. In the western United States an elaborate intelligence system for the discovery of bark-beetle outbreaks has been in operation for several years. A more recent example of systematic surveys is that conducted for the European spruce sawfly in Maine and the New England states.

The Canadian Forest Insect Survey has arisen quite independently and stands more or less in a class by itself. The survey is conducted by the Division of Entomology in co-operation with provincial forest services, forest protective associations and individual commercial concerns.

History

The fact that a serious outbreak of the European spruce sawfly in the Gaspe had not been detected until an area of two thousand square miles had already been seriously damaged, emphasized the urgent necessity of some form of cooperative action between forestry interests and the Dominion Division of Entomology. Ten years ago, Dr. J.M.Swaine* stated: "It is evident that we need an intelligence service by means of which reports on insects could be obtained systematically from as many parts as possible of our commercial forest area. This need could be met, we believe, through an arrangement between the Canadian and provincial forest branches, the Canadian National Parks Branch, the lumber and pulp associations, and the forest entomologists, whereby the latter could receive periodically reports on insect injuries throughout the season from rangers and association and company officials travelling in the forest."

The intelligence service referred to above was started in 1931 and fulfilled the requirements of the industry and forest services to a certain extent. The acute economic conditions prevailing shortly after the inception of the project resulted in a marked reduction in the number of reports being received.

In 1935, the Canadian Society of Forest Engineers appointed a committee to assist in the inauguration of permanent means of contact, with a view to conducting a co-operative forest insect

*Pulp and Paper Magazine April 12, 1928.

survey having as its principal object, the study of the distribution of the spruce sawfly.

In the spring of 1936, arrangements were made with a certain number of co-operators in Quebec and Ontario for the periodical collection of insects to be found on spruce in areas under their jurisdiction. The results obtained in that summer were encouraging. 512 samples were collected, the foundations of an organized personnel and system were laid in Ottawa, and a definite system of co-operation was established.

In November, 1936, a new stimulus was imparted to forest entomology in general and to forest insect surveys in particular by the formation of a special committee under the auspices of the Woodlands Section. This committee formulated and published a plan of co-operation between various agencies interested in the protection of the forests from devastation by insects. The plan had a very decided influence on subsequent developments.

The Woodlands Section also took a most active part in maintaining the interest of co-operators by the publication of timely articles on entomological topics and of special reports to its members. In this and many other ways both the field work and the administration of the Forest Insect Survey were substantially benefitted by the support received from the Canadian Pulp and Paper Association.

The way was thus paved for real progress in 1937. A group of co-operators was formed in the maritime provinces. With the entrance of the Quebec Forest Service and of the principal private companies in that province a really good survey system was completed in Quebec. The scope was considerably extended in Ontario, collections being taken as far as the Manitoba boundary. Connections were also established with the Saskatchewan Department of Natural Resources, the British Columbia Forest Service, and the National Parks Branch. Two additional divisions of the Survey were created at Fredericton, N.B., and at Vernon, B.C. to cope with the increased volume of material. In this way the survey established connections in the West as well as the East and as many as 3,703 samples were taken, and increase of nearly 600% over the previous year.

The Forest Insect Survey, as continued in 1938, shows still further consolidation. Increasing co-operation has been given by all maritime provinces. The Ontario Forestry Branch has offered the facilities of its inspectorates and a valuable group of co-operators has offered its services in southern Ontario. In the prairie provinces, the entrance of the Manitoba Forest Service into the project has made the coverage of the Survey almost complete from coast to coast. 5117 samples were collected, representing a numerical increase of 38% over 1937. The field

was extended to include all forest insects in a general way.

For graphic and tabular record of the progress in these three years, the reader is referred to Table I and Figure I.

Table I.

Increase in number of samples taken for the Forest Insect Survey, 1936-1938.

	1936	1937	1938
Maritime Provinces			
New Brunswick Forest Service		210	611
Nova Scotia Dept. of Lands & Forests		34	46
Private Companies		195	145
		439	802
Quebec			
Quebec Forest Protection Service	33	1266	1149
Private Companies	147	526	426
Forest Protective Associations	37	362	410
	213	2154	1985
Ontario			
Ontario Forestry Branch	222	561	992
Private Companies	8	39	63
	230	600	1055
Prairie Provinces			
Manitoba Forest Service	1	1	65
Saskatchewan Dept. of Nat.Resources	2	24	22
	3	25	87
British Columbia			
B.C.Forest Service		109	345
National Parks Branch		63	77
		172	422
Dominion Division of Entomology	36	215	644
Other Dominion Departments	13	16	21
Miscellaneous co-operators	29	82	101
Grand Total	528	3703	5117

Personnel, Accomodation & Equipment

Organized work was started in the summer of 1936 in the old insectary at the Experimental Farm. The personnel then consisted of A.W.A.Brown, D.E.Gray, and K. Mickleborough. Winter office work and spring rearings were then continued by D.E.Gray, H.A.Raizenne, and P.Howard.

The season 1937-1938 was marked by the construction of a new insectary adjoining the old one, and the moving of the office staff to headquarters in the Sovereign Building. Sections of the survey, for rearing of samples from their respective regions, were inaugurated at Fredericton, N.B. and Vernon, B.C. At this time the personnel consisted of A.W.A.Brown, D.E.Gray, A.R.Hall and T.A.Johnson, with temporary summer employees, extra labour, and stenographic assistance.

The organization at the present time (1938-1939) is as follows:

Dr. A.W.A.Brown in charge, assisted by W.C.McGuffin

H.S.Fleming, forest insect ranger

H.A.Raizenne, draughtsman and technician

M.H.Melville, stenographer; C.Chenier, French Steno. (part time

H.T.Lyon, messenger

T.A.Johnson, R.Dubreiul, J.P.Perron, & J.J.Fettes, temporary staff for winter rearing work.

R.A.Calvert and J.J.Meagher, office assistants.

The following assisted in insectary rearing work in the summer of 1938: D.K.Fairbairn (in charge); G.A.Bradley; W.N.Judd, M.A.Woodside, and K. Mickleborough. Mr. L.S.Hawboldt has been in charge at Fredericton, assisted by temporary seasonal employees, and under the supervision of Mr. R.E.Balch. In charge at Vernon was G.R.Hopping, with H.B.Leech; K. Graham and C.Morgan attended to the rearing of the material at Trinity Valley Insectary.

A picture of the interior of an Ottawa insectary is given in Figure 2 in the appendix, showing the rows of samples being reared in small glass jars. Figure 3 shows the laboratory in the Sovereign Building, equipped with three incubators (constructed under the supeevision of D.E.Gray); the files of current record sheets may be seen in the background. Detail of this constant temperature and humidity incubator is shown in Figure 4, the rearing jars being plainly visible. A picture of the office, showing desks of stemographer and officer-in-charge, and the reference collection, appears in Figure 5.

Among the equipment in use may be mentioned the following:

A large wall map, 20' long by 5' high, composed of 8 inch-1 mile topographical maps, on which all returns are mapped with coloured pins.

About 500 different map sheets, filed in 3 post binders, used for locating points of collection.

Distribution maps for about 100 of the most common forest insects, filed in a post binder and kept up to date.

Host-parasite and Parasite-Host cross-reference index.

Reference collection, now in Schmitt boxes, in which 817 species of adult insects and 166 identified species of inflated larvae are represented.

A collection of larvae preserved in liquid, comprising 57 named species.

A Master File, containing all the date for all species obtained to date.

System

At present the survey system is based upon the collection of samples of live insects taken from trees in the forest. These are made periodically by the forest rangers, from spruce and other important forest trees. Besides a spacing in time, a considerable spacing geographically is also desirable, in order to obtain the fullest degree of coverage. At present this basis of samples of live insects, though involving much detailed and tedious work, is the most suitable yet devised, principally, because much has yet to be learned about the habits, life-history and natural control factors of Canadian forest insects.

All the specimens are reared at the various laboratories receiving them. The results obtained offer an immense and detailed wealth of information. All of this is collated and filed for future reference and further study. Such results as may be of immediate interest are published in an annual report distributed to all co-operating organizations; the more technical results are submitted to the entomological journals for publication.

A practice is made of acknowledging direct to each collector the names (as far as is known) of the different insects which he has submitted; special comments are also made when necessary or advisable. Every month a summary list of all collections made and an explanatory letter are sent to each district forester,

woods manager, or other chief of organization. Maps are also prepared at the end of the season showing the location of collections and the nature of the insects found therein.

The instruction of foresters, and rangers on the subject of insect collecting is an important phase of this work. In 1937, a series of short courses was given by officers of the Forest Insect Unit at various points in eastern Canada and British Columbia. This method of instruction was not conducted on such an extensive scale in 1938; there was, however, a strong demand for field demonstrations and detailed information on methods of collecting. This extension work was ably carried out by one of our forest insect rangers who travelled extensively in Ontario and Quebec.

Examples of the material and printed forms used in the survey routine are to be found in the appendix. Figure 6 illustrates the type of collapsible mailing box used for specimens. An example of the slip on which the co-operator gives the necessary information on the collection concerned is given (Figure 7). Figure 8 is a sample of the record sheet used during the rearing of the material; this sheet will be simplified for use in 1939. The type of acknowledgement made to each individual collector is illustrated by Figure 9.

Results (Part A)

The main objective of a survey is naturally to produce a picture of conditions over whole areas at any one point of time. As an illustration of this, the reader is referred to Figures 11, 14 & 17 in the appendix. Here is shown the status in 1937 and 1938 of the most destructive forest insects in Canada. It can be said in all fairness that the presentation of these maps would not have been possible in previous years, and the ability to produce them this year is due to the success of the co-operative system of forest insect surveys. Information is also available this year for a considerable number of other injurious forest insects. This is published in the annual report. Over and above this, the yearly abundance and possible importance of at least a hundred other insect species, all feeding on forest trees is being carefully followed.

Distribution maps are in process of compilation for all the more abundant species of insects, the more destructive of these are now being tabulated yearly in infestation maps such as have been cited. Species which were hitherto unidentifiable in their larval forms which represents the injurious stages are now becoming quite easily recognized. The main features of the life-history of scores of forest insects have been established. Especially important is the great body of information on the parasites which may be important factors in the control of forest

insects, the life-history of parasites themselves, and the relations of these parasites to their insect hosts. This knowledge of parasites, of their distribution and of that of their hosts is most useful in planning some of the excellent work carried out by the Dominion Parasite Laboratory.

Results are reported in detail in the pages now following. Part B. relates the current annual status of forest insects for the years 1936 to 1938. A more detailed account of the biology distribution and parasite relationships of each species is then given in Part C.

RESULTS (Part B)

Status in 1936

The distribution of the European spruce sawfly, as revealed by the 1936 survey, extends from the Gaspe and Pentecost River on the North Shore to Lake Temiskaming and for some miles into Ontario in the Temiskaming region. There is, however, a wide gap between the St. Jovite-St. Maurice records and the Temiskaming-Noranda infestation. No trace of the Sawfly was found in the Lake Baskatong district or the Lower Gatineau Valley although the co-operators in that area made an intensive search. The closest record to Lake Baskatong came from Lac Saguay, some 40 miles distant. It is possible that the link between the Temiskaming and St. Maurice infestations lies farther north, along the Transcontinental Railway; we know little about this area owing to lack of samples.

The Ontario co-operators made a thorough survey west of the Quebec border throughout the area shown on the map and there is little doubt that the European spruce sawfly would have been discovered if present in that area in any numbers. The only known infestation in Ontario is located in the Haileybury-Temiskaming area and the samples were taken approximately 25 miles from the Quebec border.

Although the survey records provide very little definite information on the severity of the infestation, so far as we know there has been no heavy defoliation west of the St. Lawrence River. Outside of the Gaspe, the largest number of larvae per tree were received from Chicoutimi, Bostonnais, St. Michel des Saints, St. Jovite and from near Haileybury.

Several other interesting and important spruce feeders were received in the survey material throughout the season. The yellow-headed spruce sawfly, (Pikonema alaskensis Roh.) is very widely distributed - probably throughout the entire range of the host tree. Records received in the survey ranged from Labrador on the east to Sultan on the west and from Kapuskasing on the north to Athens (near Brockville) on the south.

Pikonema is a native sawfly and though not usually serious in the forest, has given considerable trouble on the Prairies and has been known to kill trees in the east in some instances. This particular insect will bear watching. Local concentrations do occur and might conceivably become important. It may have a significant function as an alternate host for European spruce sawfly parasites and the specimens received in the survey are being reared to ascertain such possible relationship.

The Green Looper (Semiothisa granitata Gn.) was received in practically all shipments, and this insect is apparently

present throughout the spruce forest of the East. From the material we have tried to rear, the parasitism appears to be very high. Should anything occur to upset their present apparently balanced relationship, these loopers would very probably assume outbreak proportions.

The hemlock looper, Ellopia fiscellaria Gn. and the black-headed budworm, Peronea variana Fern, occurred in several shipments from widely separated points and these, together with a host of other spruce defoliators, which cannot be recognized in the immature stages, are being reared with a view to studying their biology as well as the natural control factors affecting them.

A word might be said concerning other forest insects received in connection with the survey. The red-headed pine sawfly, Neodiprion lecontei Fitch, was received in enormous shipments from Muskoka, Nipissing and the Ottawa Valley. In some sections, particularly the former and latter, it appears to be decidedly on the increase and may prove a serious menace. Numbers of these have been reared through to the cocoon stage and we hope to obtain a check on the parasitism in the different districts.

Two other species of Neodiprion, abietis and pinetum, were found in several collections.

The larch sawfly, Pristiphora erichsoni Hartig, was sent in from several places and sawflies of the genus Cephaleia came from a few widely separated localities.

Status in 1937

The European Spruce Sawfly is now known to occupy a considerably larger area in eastern Canada than was known in 1936. It has become abundant enough to occur in almost every sample collected on the North Shore, from Three Rivers down to Clarke City. There is a region of lighter infestation extending westwards from Lake St. John south to the St. Maurice valley and to the St. Jovite area. The Temiskaming infestation (including the area in Ontario) now extends northwest to Matachewan, southwest to Lake Nipissing, and specimens have been discovered below Mattawa on the Ottawa river. It has been thought that the Temiskaming infestation was quite isolated from the main area of spruce sawfly because the samples from the Gatineau and Lievre valleys, although numerous, have consistently failed to yield any specimens of this insect. However, the sawfly now has been discovered along the northern transcontinental railroad in Quebec, and also in Pontiac county, thus showing the existance of a northern bridge connecting the Temiskaming infestation with that of eastern Quebec. With regard to its northern limit, we have information suggesting that it does not at present extend north of Lake Abitibi; in this respect, the obtaining of samples by aeroplane, as from Chibougamou, proves especially valuable.

Careful and detailed rearing of all samples in the insectary at Ottawa has yielded valuable additional information on the spruce sawfly. The following is a report of the results obtained from the overwintering material collected in 1936, as well as the summer material of 1937. Of the overwintering cocoons from Gaspe, only 22% emerged as adults in the spring, the remainder staying in a prolonged resting-stage or "diapause" which may be of several years' duration. The material from the rest of Quebec and from Ontario gave a consistent average emergence of 58%, probably indicating that in most localities of this region a higher proportion of the adult sawflies emerges after one winter in the cocoon stage. In addition, there is evidence of a partial second generation throughout this latter region, 15% of the cocoons formed in the summer having yielded adult sawflies which emerged in the insectary from July 8th to October 12th, decreasing in proportion as the season advanced. A second generation and a lack of a prolonged winter diapause might greatly accelerate the rate of spread of the sawfly. Almost all the adults were females (99.3%) only two males being obtained last year.

The overwintering material of 1936-37 yielded one specimen of a parasitic fly, Spathimeigenia, from Chicoutimi. The summer material of 1937 yielded three specimens of

parasitic fly and two parasitic wasps: these have not yet been identified. A field officer reported the presence of eggs of a parasite on the sawfly larvae north of Parent, Que.; these were thought to be eggs of Bessa selecta, which is a useful parasite of the Larch sawfly and several other insects.

The Spruce Budworm has presented a problem this year in Ontario. The area infested lies in the triangle bounded by the east shore of Lake Superior, the north shore of Lake Huron and the C.N.R. line running northwest from Sudbury. Most intense infestation was in the valley of the Missisagi River, involving a square block of nine townships. The moths are flying and laying eggs on spruce and balsam during the first half of July. Numerous species of parasites have been obtained from samples received in the survey, but the percentage of parasitism does not appear to be high.

The Black-headed Budworm has accompanied its larger and more destructive relative throughout the infestation range in Algoma, becoming the predominant species in the northern part of this area around Chapleau and Michipicoten. This insect is evenly and widely distributed and occurred in samples from Saskatchewan to the Gaspe, with no indication of a northern limit. The adult moths of this budworm are flying in July and August. Its consistent and wide dis-

tribution on spruce is largely counteracted by its mortality. The percentage of parasitism is apparently high.

The Jack Pine Budworm is considered to be a race of the spruce budworm that apparently confines its serious attacks to hard pines. Samples were received in the survey from the infestation in the Kenora district, especially from the heavily infested area around Dryden. Moths of this budworm are flying in the second half of July. Survey data on this insect are scanty but an intensive study of this insect is in progress as a special project of the Winnipeg laboratory.

The survey has yielded important information on the native species of sawfly feeding on spruce. Of these, there are at least three: the yellow-headed, the green-headed and the black-headed spruce sawflies. The first two species have been scientifically described and were determined for us by an authority in the United States; the third species has as yet not been identified.

The Yellow-headed Spruce Sawfly would appear to be distributed throughout the range of spruce in eastern Canada, extending right up to the Labrador boundary. Ordinarily it is a constant but inconspicuous element in the forest fauna. However, it may attain sufficient abundance on open-grown spruce to cause severe defoliation, as it has done in the region southwest of Algonquin Park and at other localities in northern Ontario. An infestation over a large

area has been reported this year from northern Saskatchewan and Manitoba. In the laboratory, mortality of this sawfly was apparently quite high, especially in the cocoon stage; its parasites are apparently not very numerous but include such interesting species as Mesoleius and Bessa selecta. Cocooning is in progress from the beginning of August into late fall, and the adult sawflies emerge in the spring.

The Green-headed Spruce Sawfly has a larva which is easily confused with that of the European Spruce Sawfly but differs from it by its green head (that of the other being brown marked with black). This species is very widely distributed, occurring from British Columbia to Labrador; it is present everywhere on spruce, and becomes quite abundant in the northern regions. Its life cycle closely resembles that of the other native spruce sawfly. A number of parasites have been reared from it.

The Red-headed Pine Sawfly, or Leconte's Sawfly, has proved to be a serious pest of planted pines in the districts of Muskoka, Nipissing, and the Ottawa valley. Red, Scots and Jack Pine are the species attacked, young trees being preferred, but infestations in mature stands have been reported. The yellow-black-spotted larvae become fully grown and most conspicuous in August, and cocooning takes place as the fall approaches; adults emerge in the early

part of the following summer. Parasites seem to play an important part in effecting control. The insect is subject to occasional epidemics of disease in the field, mortality from this cause being higher when samples are reared in crowded cages. The distribution of the parasitic fauna is interesting. The fly, Spathimeigenia, is a common parasite and occurs over the entire range of the sawfly. The wasp, Perilampus, ordinarily secondary, appears to be primary on this sawfly and is limited to the more northern regions. Thus far, the fly Phorocera has only been recorded from the Ottawa valley.

Occasional shipments of Jack Pine Sawflies are being received in the survey. Several species are involved and material for study is badly needed. The parasites of one one of the species (Neodiprion swainei) appear to be largely the same as those of Leconte's sawfly. Samples of the Black-headed Pine Sawfly (or Abbott's sawfly) which is a defoliator of white pine, have also been received.

The Larch Sawfly is again becoming abundant in several regions of eastern Canada. Its distribution, as given on the map, does not give a complete picture. From recent reports, it appears that the larch is severely infested in northern Ontario, as far west as Port Arthur. One observer on the North Shore makes the following observation:- "1935,

defoliation noticeable; 1936, trees 50% defoliated; 1937, trees dead". These conditions may be typical of a large area of muskeg. It has been observed at Kapuskasing that 1937 was a peak year for the abundance of mice of several species, feeding upon the cocoons of the larch sawfly. It may also be pointed out that the parasitic fly, Bessa selecta, has been recovered from cocoons collected in the course of the survey.

The Green Looper is another widely distributed spruce defoliator, many specimens of which were received in samples submitted in the fall. The limits of its distribution are as yet unknown; it becomes a predominant form in the northern belt. This is a robust species; it has a high percentage of parasitism, involving a considerable number of different species. These data suggest that the green looper might be capable of a severe and widespread outbreak should control by its parasites become less effective.

The Hemlock Looper has been received from many points throughout Ontario and Quebec. Food trees were mainly white spruce but included also black spruce, hemlock and balsam. A severe infestation on hemlock was reported from a region immediately south of Parry Sound and information from the same source suggests that this species is increasing again in Muskoka. The moths were flying and ovipositing at the

end of August and in September. Samples reared in the insectary indicated a low percentage parasitism and very little mortality from other causes.

The Forest Tent Caterpillar infestation in Ontario has been studied again this year, as in 1936. Particular attention has been given to the Nipissing area, which is a unit infestation operating typically in second-growth poplar-birch stands. Here, the striking feature of the year has been the extension of the Powassan and French River infestations to fuse and sweep southward over the Parry Sound region and even into Muskoka; practically every poplar stand was stripped bare. A similar southward spread was reported from Huntsville, the 1936 limit being Burks Falls, 25 miles to the north. Infestation in the Mattawa valley was very heavy and its boundary was extended into Quebec and down the Ottawa valley. In districts west of Lake Superior, this destructive caterpillar appears to be on the wane, according to reports from Port Arthur, Sioux Lookout and Kenora. The season as a whole would seem to have been more advanced this year, due to a mild spring in most localities. Moths were flying during the first part of July in the Nipissing region, and about a week later in the west. A considerable number of species of parasites

was obtained from survey rearings but samples were not sufficiently large to indicate accurately the percentage of parasitism.

This completes the discussion of the principal defoliating insects which are actually causing damage to the forests of eastern Canada. There are, in addition, a host of other insects feeding on the leaves of forest trees. Many of these insects may be regarded as potential enemies of the forest. Some of them are discussed below.

The False Hemlock Looper is a species that is quite widely distributed on spruce. The larvae show two colour phases-one crimson, one green. In size and life cycle this looper resembles the hemlock looper. Its mortality and parasitism would appear to be higher. Cingilia rubiferaria is another looper frequently collected from spruce at northern points. The Grey Looperis a fairly large species that occurs quite commonly on spruce and appears to be markedly hardy and free of parasites; for this reason it should be watched. The Brown Looper is a smaller, less conspicuous spruce-feeder and is quite generally distributed.

The Spruce Coneworm is occasionally sent in from points in Algoma, Ontario; this species causes trouble to young spruce in western Canada. The Fir Harlequin, a small brown humped caterpillar, occurs quite frequently on spruce,

apparently being most abundant in the Maniwaki-St. Jovite area. A larger and more noticeable spruce feeder is the handsome Green Striped Caterpillar. A number of Climbing Cutworms difficult to identify at present, have been collected from coniferous trees at various points. Mention might also be made of the Large Aspen Leaf-Roller, collected on poplar along the North Shore. It appears to be well parasitized.

A considerable amount of material, which we are unable to identify at present, was received from our co-operators. Some of the larvae of unknown species are preserved and mounted; the balance are reared through to the adult stage. When and if the adult is identified, another addition is made to our knowledge of larval stages, and another life-history has been outlined.

A map showing the geographical extent of the current infestations of the most important species mentioned above is to be found in Fig. 11 in the appendix.

Current Annual Status 1938

The known range of the European Spruce Sawfly has again been extended. An important area of moderately serious infestation has been discovered in southern Ontario. This area, 200 miles wide, extends as far southwest as London and as far east as a little beyond Peterborough; it shows close proximity to the infestation in New York State, and pushes as far north as Muskoka. The sawfly was also discovered in eastern Ontario, and scouting extended the boundary of the main infestation from Quebec to a line from Ottawa to Cornwall. No specimens could be found in the intervening area; spruce is very scarce in the Kingston district.

The boundary of the Temiskaming infestation has receded a little, and no records were obtained in the "northern bridge" that area along the northern transcontinental railroad in Quebec which last year yielded specimens connecting this with the main infestation. Very extensive scouting in the Gatineau-Lievre region yielded but one doubtful record, which is plotted at Gracefield. However, the Quebec Entomological Service reported three records in this area. An isolated sample was received from Petit Musquarro on the North Shore and another from Hawk Junction, Algoma. The latter record, being so important was immediately followed up by an intense search in the area, which yielded no further specimens.

A considerable number of co-operators north of the St. Lawrence river reported a reduction in population density of h the sawfly, especially below the mouth of the Saguenay River, as compared with the preceding year.

The results obtained from rearing the 1937 material may now be discussed. Last spring a specimen of the imported parasite, Microplectron fuscipennis, was recovered as far west as St. Raymond. Moreover, six specimens of native parasites were obtained, giving a parasitism figure (for the Ottawa material only) of 0.11%, slightly higher than in 1936. The principal native parasite was the fly Bessa selecta, better known as an important controlling factor of the larch sawfly. A specimen of Spathimeigenia aurifrons, a parasite of jack pine sawflies and Leconte's sawfly, was also obtained.

The second or summer generation of the spruce sawfly amounted to only 3% of the total, taking all regions nf northern Quebec and Ontario into account. However, in the Temiskaming area the summer emergence was as much as 40% of all cocoons. For all areas the average emergence in the spring was 35%. Cocoons from the Gaspe differed but little in this figure from other regions, thus showing little sign of the prolonged diapause suggested by the low figure in 1936.

The Nursery Pine Sawfly is common on red, Scots and jack pine at St. Williams forest nursery. It has also been found at Angus and Spencerville, Ont. The Introduced Pine Sawfly has been collected at Leaside, Toronto, infesting Scots Pine.

The Red-headed Pine Sawfly has generally decreased in 1938. The Muskoka infestation is at only 25 per cent of its 1936 level, and it is quite rare in the Ottawa Valley. However, heavy infestations occurred at outlying points surrounding this central area, such as Sault Ste. Marie, Orangeville, Gananoque, and Berthierville. Parasites and a larval disease are considered factors in this reduction of population.

The Black-headed Fir Sawfly has been much in evidence this year. Destructive infestations on balsam have been observed at Buckingham, Que., Batchawana and Garden River, Ont., and at Goose Island in Lake Winnipegosis; large populations on balsam have been reported from Batchawana, Algoma and Prince Edward county, Ont. A sawfly which may be this species is very abundant on jack pine in the Kenora-Fort Frances area, and occurs on almost all red pine also. This area is heavily infested with budworm, and the role of the sawfly is considered a minor one, although it has caused damage in the Superior National Forest, Minn. and an infestation has been reported from Fort Frances. Slight infestations on spruce have been reported from Notre-Dame de la Merci and Weymont, Que., and from the Biscotasing area of northern Ontario.

The Black-headed Pine Sawfly has been received in a few samples from southern Ontario and Quebec defoliating isolated groups of white pine.

The Red-headed Jack Pine Sawfly has caused considerable damage along the upper reached of the Mississagi river. Small infestations have been reported from the upper reached of the Rouge River, Que. In Cochrane and northern Algoma districts there appears to be a decrease of this insect.

The Black-headed Jack Pine Sawfly has defoliated 2000 acres of jack pine near Chapleau, Ont. An outbreak is developing at Spencerville, Ont., and promises to be very destructive next year.

Swaine's Jack Pine Sawfly has been received from a number of points in northern Ontario and Quebec.

The Yellow-headed Spruce Sawfly continues to cause infestations on open-grown spruce. Records of defoliation have been received from Trout Creek, Burks Falls, Sundridge, Port Sydney, Dwight and MacTier in the Muskoka district, from Perth and Carleton county in eastern Ontario, from Foleyet, Espanola and Elk Lake in northern Ontario, from Berthierville, Sunnybank and Trinity Bay in Quebec, from South Junction, Man., Nipawin, Sask., and Gordon Lake, N.W.T.

The Green-headed Spruce Sawfly has been received in samples from Labrador to the Pacific Ocean, but never in large numbers.

The Larch Sawfly has increased in intensity in some regions and decreased in others. Larch throughout southern Ontario is heavily infested, with considerable defoliation. The area of heavy infestation extends northward through the Parry Sound district till it reaches the northern part of Sudbury district and the southern part of Sault district. On the other hand, the districts of Kapuskasing and Port Arthur, which were heavily defoliated (80% and 75% respectively) last year are only 25% defoliated this year, and the trees show some hope of recovery. (A few areas northwest of Lake Superior however, are more heavily infested than in 1936). The situation in Manitoba is easier, the insect being in "appreciable numbers" only in the Sandilands reserve, and in very scattered groups in the Riding Mountains. In Quebec, moderate infestations have been reported in the Lievre-Rouge areas, and heavy ones from Les Escoumains and Lake Chibougamou. As control factors, the tachinid fly, Bessa selecta Mg. and various species of field mice evidently achieve considerable importance. The introduced parasite, Mesoleius tenthredinis, is at work in some areas.

The Birch Sawfly has caused defoliation of isolated white birch at Spencerville, Ont., and at White Lake, near Arnprior.

Marlatt's Larch Sawfly is to be found in most samples from tamarack. In southern Ontario, there is a light infestation in the southwest and a moderate one in the southeast.

The Green-striped Maple Worm is increasing in eastern Ontario and has given records of defoliation at Cartier Lake, Petawawa Reserve and at Uxbridge, Ont. A similar species, Anisota virginiensis, has almost completely defoliated the hardwood on an island in the Ottawa River, near Fort Coulonge.

The Saddled Prominent has defoliated 100 acres of woodlot in Durham county, being most severe at Millbrook; five acres have been defoliated in the Vivian forest, York county. The Walnut Caterpillar was especially bad this year at Amherstburg, Ont., and produced local outbreaks in many parts of southern Ontario.

The Northern Fall Webworm has reached a severe infestation in the St. Lawrence valley between St. Lambert and Valleyfield, Que. Large elms suffered the most serious damage and in less degree, cherry, lilac, ash and Manitoba maple. A moderate infestation extends from Cornwall to Belleville and points along the length of the Ottawa river have also suffered from this insect. There has been a heavy infestation on basswood at Port Colborne. The fall webworm was also numerous in southeastern Manitoba.

The White-marked Tussock Moth severely defoliated elm and willows at Sunnyside, Toronto; control measures were taken by the city. Infestations have also been reported from Goderich, Brantford and Montreal.

The Forest Tent Caterpillar appears to be in general at the end of an infestation period, being largely on the wane in the original centres and severe in patches in the outlying areas. Parasites and disease were much in evidence, Sarcophaga aldrichi Mg. being very abundant and noted in many localities; this large fly overwinters as a pupa outside the host and emerges in the spring. In Saskatchewan, a heavy infestation extended for 25 miles down from Nipawin along the Saskatchewan river and pushing up the tributary valleys; defoliation has also occurred in the area south and west of Tisdale. In northern Manitoba, patches of moderate and severe defoliation occur from the Duck Mountains north to The Pas. Further south, a severe infestation extends eastward from Portage as far as Poplar Point. Other infested areas are the Red River south from St. Jean and the Pembina valley west of Mowbray.

In the Kenora district of Ontario, an infestation of many years standing is decidedly on the wane. Eastwards to Sioux Lookout there is no observable decrease in numbers, being very severe around Caribou Lake. The Nipissing infestation has more or less dispersed itself. The previously heavily infested areas

in the Parry Sound district and around Sudbury have shown a considerable reduction this year (here S. aldrichi was extremely numerous); however, infestation has pushed northwestward to new country beyond the Vermilion and Spanish rivers. Similarly, northeastward, there were infestations in Temagami, and severe defoliation around Kipawa Lake. Southeastward, the condition was stationary in Algonquin Park, but in the Ottawa valley severe defoliation reached from Mattawa to Deux Rivieres, and in patches as far down as Ottawa. Further south yet, heavy infestation was noted in Peterborough and Grenville counties, and patches extended eastward into Quebec. The Megantic and Breakeyville infestations in the Eastern Townships of Quebec were again heavy, but parasites were very numerous; a new outbreak is reported from canton Chertsey north of Montreal. An infestation at Earnscliffe in Prince Edward Island represents the only record from the Maritimes.

The Western Tent Caterpillar was quite abundant generally in areas of M. disstria infestation. It was especially noticeable at Lizard Lake, Sask., Hawk Lake, Ont., Laniel, Que. and in Algonquin Park, Ont.

Survey returns have made a contribution to the knowledge of the True Armyworm infestation in the northern regions of eastern Canada. Records thus obtained range from Jarvis river, west of Lake Superior, to Sept Iles, far down the North Shore.

A sample was obtained from Island Falls, within 90 miles of James Bay.

Several species of Climbing Outworms have been obtained from beating spruce. Work is under way on their identification which is rather difficult. Other better-known members of this family are commonly found in the survey such as the Spruce Tufted Caterpillar, the White Pine Tufted Caterpillar, the Spruce Harlequin, the Fir Harlequin and the Green-striped Caterpillar.

The Spruce Cone Worm is especially abundant in Saskatchewan, being considered at Sutherland the most important forest insect, It may be the species responsible for damage to balsam cones in the Kapuskasing area.

The Maple Leaf-cutter has defoliated 80 acres of maple near Bloomfield, Ont. Injury by this species is generally more common than in previous years and another infestation is reported fro Marmora, Ont. The Larch Case-Berer is in light infestation throughout southern Ontario.

The Large Aspen Leaf-roller has increased from a light infestation to a moderate one in an area 32 miles up the St. Marguerite river from Clarke City, Que. The Black-headed Budworm is in small numbers only throughout the range of spruce in Canada. It still accompanies the spruce budworm in the Algoma district, and is less numerous in the infested areas in New Brunswick.

The Jack Pine Budworm has produced a widespread infestation in Ontario, west of Lake Superior, and is apparently spreading eastwards. Heavy defoliation covers the whole of Kenora district, all of Fort Frances district but the western third, and south-western part of Port Arthur district. In Manitoba infestation is still severe on the Sandilands Reserve, and the population is high northward to East Braintree and Rennie, Northwestward in the Riding and Buck Mountains the infestation is light. Parasitism in heavily infested areas is high, decreasing in areas of newer infestation. Pupal parasitism figures gained in the field are: Sandilands 79 per cent, Kenora 60 per cent, Fort Frances 30 per cent, Port Arthur 25 percent.

The Spruce Budworm, during the past few years, has been building up a severe infestation on spruce and balsam in the Algoma district of Ontario. This infestation extends from the Mississagi river northeast to Foleyet, covering a pear-shaped area 100 miles long and 50 miles wide. It is probable that most of the spruce and balsam, attacked in 1937 and 1938, will be killed.

The Jack Pine Pitch-Nodule-Maker has been noted as very prevalent at Garland, Man., Armstrong, Ont., and Sault aux Mouton, Que.

The Hemlock Looper has built up a severe infestation in an area south of Parry Sound and on an island in Muskoka lake; a

large number of hemlocks are due to die. There is a moderate infestation at Owen Sound and the looper is common on spruce, balsam and white pine throughout the Parry Sound district. The damage in the Parry Sound regions was not as bad as was anticipated in 1937.

The Green Looper was again abundant on spruce but has done no damage. This species is a host to parasites of a great variety of species. Many other kinds of looper have been received in the survey, being more abundant in the fall. The most important species are the Grey Looper, the Transverse-banded Looper, the Brown Looper, and the False Hemlock Looper.

The Cottonwood Leaf Beetle has caused severe defoliation of poplar, willow and cottonwood in the Duck Mountains, Man. The Spotted Willow Leaf Beetle heavily defoliated willow at St. Williams, Ont. Two records of defoliation by the Aspen Leaf Beetle have been received from eastern Saskatchewan.

The Bronze Birch Borer has recently increased in numbers and is causing considerable damage to birch throughout eastern Canada.

The White Pine Weevil is abundant as far north as Sand Lake, Algoma, on planted white pine, and also on Scots Pine. Records on spruce have come from Chalk River, Ont., and Cascades, Que.

The Eastern Spruce Bark-beetle is in evidence near Eton, Algoma, as a relic of the 1927 infestation in that area. It has been reported as killing large trees 60 miles up the Outardes river, Que., and also at Metis Lake, Que. A bark-beetle, Myeloborus ramiperda, was found killing the twigs of Macedonian pine at Ottawa. Another bark-beetle, Orthotomicus caelatus, was observed attacking a spruce shelter-belt at Sutherland, Sask.; the trees had been previously weakened by drought.

Considerable numbers of many species of Lady Beetles have been taken in the survey. These are valuable insects, since they prey on destructive aphids and scale insects. Among those found most abundantly were the Pine Lady Beetle, the Apple Lady Beetle and Neomysia subvittata.

Ground Beetles are another valuable predaceous group of insects, of which many examples have been taken in the survey. The species most commonly obtained from spruce is Platynus sinuatus, often accompanied by Plochionus timidus. Valuable control work of Forest Tent Caterpillar in Saskatchewan has been reported for Carabus taedatus

Soldier Bugs are the third valuable group of predators. The most important species is Podisus serieventris, found to

a predator of the European Spruce Sawfly; other species of Podisus have been commonly sent in by co-operators. Several species of Euschistus, being herbivorous as well as predaceous, are often encountered.

The Pine Spittle Bug occurs very frequently on spruce throughout the range of the survey, there being three species on coniferous trees, namely Aphrophora parallela, saratogensis and signoreti. A. parallela has done damage to tips of young planted Scots pine in the Orono and St. Williams nurseries and the Kirkwood plantation, Ont. and also to jack pine at the two last-named points.

The Oak Lacebug has attacked almost every oak in Winnipeg this year.

The Pine Needle Scale may be serious on white pine at St. Williams forest nursery, Ont. The Elm Scurfy Scale has attacked up to 80 per cent of the white elm seedlings at Orono forest nursery, Ont. The Hemlock Scale is abundant on spruce at Carberry, Man., where it killed many trees in 1936.

The Jack Pine Aphid has been reported as serious at Darwin, Man., and also at Carberry along with the hemlock scale. The Pine Bark Aphid has been reported as affecting white, red, Scots and Jack Pine and also cedar in the Nairn plantation near Espanola, Ont.

Spruce Needle Fungus, (Chrysomyxa spp.) has been observed in Ontario at Vermilion Bay, Oba, Hearst, and Sturgeon Falls, and in Quebec at St. Urbain la Gelette. The alternate hosts of this fungus are the swamp plants Leather-leaf and Labrador Tea.

Needle Blight has been reported over considerable areas of jack pine in the Sioux Lookout area north of Lac Seul and Sturgeon Lake, and also from Schreiber and in patches eastward to Sand Lake, Algoma; and in the vicinity of Chapleau, Ont. It has also been observed on isolated white pine in the Mississagi Reserve and Biscotasing, Ont. The form of blight observed on mature pine in the Timagami reserve may possibly be due to sulphur dioxide fumes from the Sudbury mining area.

Results (Part C)

There now follows a list of the principal characteristics of each species received in the survey, treated in taxonomic order. For index, see that at beginning of report. It should be noted that the results for 1938, in the case of spring emergents are not included.

HYMENOPTERA

Tenthredinoidea - Sawflies

Many of the most destructive forest insects belong to this sub-order. The family Diprionidae contains a great number of serious pests or conifers, the old world genus Diprion now almost rivalling the native Neodiprion. Argidae and Tenthredinidae feed chiefly on deciduous trees or herbaceous plants, but the genera Pristiphora and Pikonema, both Nematines, are important sawflies on conifers.

Argidae

Arge pectoralis Leach - Birch Sawfly
No. of samples - 10 No. of individuals - 42
Host Tree - White Birch, Alder
Range - Ont., Que., N.B.
Cocooning - Aug.20-Sept.1
Emergence - 17-61 days of incubation
Sex Ratio - 90%
Parasites - Scolobates americana

Arge clavicornis Fab.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd. as adults July 19-20

Arge macleayi Leach
No. of samples - 2 No. of individuals - 4
Host Tree - White Elm
Range - Ont., Que.
Cocooning - July 26-Aug. 10
Emergence - 40 days of incubation
Parasites - Euthelaira sp. (?)

Arge sp.
No. of samples - 1 No. of individuals - 3
Host Tree - Cornus stolonifera
Range - B.C.
Rec'd. as larvae July 27

Diprionidae

Monoctenus juniperinus MacG. - Arbor-vitae Sawfly
No. of samples - 2 No. of individuals - 15
Host Tree- Eastern White Cedar
Range, Que.
Rec'd. as larvae - July 10

Neodiprion pinetum Nort. - Black-headed Pine Sawfly
No. of samples - 9 No. of individuals - 694
Host Tree- White Pine, Red Pine
Range - Ont., Que., N.B.
Cocooning - Aug.8-Oct.9
Emergence - 11-40 days of incubation
Sex Ratio - 77%
Larval Survival - 53% Cocoon Survival 53%
Cocoon Parasitism - 5%
Parasites:
Lamachus lophyri
Lamachus sp.
Lamachus virginianus
Lamachus nr. lophyri
Mesoleius sp.
Mesochorus sp. (hyper)
Euthelaira sp. (?)
Spathimeigenia aurifrons
Phorocera hamata

Neodiprion lecontei Fitch - Red-headed Pine Sawfly
No. of samples - 80 No. of individuals - 4661
Host tree- Red Pine, Scots Pine, Jack Pine migrating, when food is scarce, to White Pine and Spruce.
Range - Ont., Que.
Cocooning - July 30 - Oct. 10
Emergence - 13-32 days of incubation (34-65 days if not overwintered).
Sex Ratio - 71% ('36), 73% ('37)
Cocoon Survival - 46% ('36) 35% ('37)
Cocoon Parasitism - 15% ('36) 16% ('37)
Parasites - Holocremnus lophyri
Lamachus virginianus
Lamachus lophyri
Lamachus contortionis
Lamachus nr. contortionis
Lamachus sp.
Exenterus canadensis
Orthostigma sp.(hyper)
Spathimeigenia aurifrons
Phorocera hamata
Megaselia nr.proboscidea
Megaselia pulicaria
Megaselia spp.
Perilampus hyalinus

Neodiprion abietis Nort. - Black-headed Fir Sawfly
No. of samples - 43 No. of individuals - 544
Host Tree- White Spruce, B.Spruce, Balsam, Jack Pine Sitka Spruce, Engelmann Spruce. (Larvae on spruce, balsam and pine may be different species).
Range - B.C., Alta., Sask., Man., Ont., Que., N.B.
Cocooning - June 19-July 27
Emergence - July 13-Sept. 23
Sex Ratio - 65%
Larval Survival - 79% Cocoon Survival - 82%
Cocoon Parasitism - 2%
Parasites - Hemiteles tenellus
Hemitelini sp.
Delomerista sp.
Lamachus lophyri
Euceros frigidus
Ephialtes
Spathimeigenia aurifrons

Neodiprion resinosae (Provisional) - Black-headed Red Pine Sawfly
No. of samples - 8 No. of individuals - 466
Host Tree- Red Pine, Jack Pine
Range - Ont., Que.
Cocooning - June 13-Aug.29
Emergence - Sept.3- Oct. 15
Sex Ratio - 58%
Larval Survival - 72% Cocoon Survival - 85%
Cocoon Parasitism - 3%
Parasites: Lamachus lophyri
Spathimeigenia aurifrons
Phorocera hamata

Neodiprion swainei Midd'n. - Swaine's Jack Pine Sawfly
No. of samples - 5 No. of individuals - 13
Host Tree - Jack Pine, Red Pine
Range, - Ont. Que.
Cocooning - Aug. 22-Sept. 14
Emergence - 7(?) days after incubation
Parasites - Perilampus hyalinus
Spathimeigenia aurifrons

Neodiprion dubiosus Schedl - Red-headed Jack Pine Sawfly
No. of samples - 19 No. of individuals - 1460
Host Tree - Jack Pine
Range - Ont., Que.
Cocooning - July 17-Sept.11
Emergence - 11-28 days of incubation
Sex Ratio - 65%
Larval Survival - 72% Cocoon Survival - 56%
Cocoon Parasitism - 11%
Parasites - Exenterus canadensis Lamachus nr. lophyri
Exenterus diprioni Perilampus hyalinus
Euceros frigidus Bessa selecta
Delomerista sp. Phorocera hamata
Holocremnus lophyri Spathimeigenia aurifrons

Neodiprion nanulus Schedl
No. of samples - 5 No. of individuals - 160
Host Tree- Jack Pine
Range - Man., Ont., Que.
Cocooning - June 13-July 25
Emergence - Sept. 2 - Oct. 20
Sex Ratio - 69%
Larval Survival - 58% Cocoon Survival - 63%
Parasites - Phorocera hamata

Neodiprion tsugae Midd'n. - Hemlock Sawfly
No. of samples - 3 No. of individuals - 1374
Host Tree- Western Hemlock
Range - B.C.
Cocooning - June 23-July 21
Emergence - July 28-Sept.15
Sex Ratio - 57%

Neodiprion burkei Midd'n. + Lodgepole Sawfly
No. of samples - 1 No. of individuals - 17
Host Tree - Lodgepole Pine
Range - Alta.
Cocooning - July 5-11
Emergence - Aug. 4-9

Neodiprion ? n.sp.
No. of samples - 1 No. of individuals - 8
Host Tree - Red Pine
Range - Ont.
Cocooning - July 26-29
Emergence - 18 days of incubation
Parasites - Dahomerista sp.
Phorocera hamata

Diprion polytomum Htg.
No. of samples - 2388 No. of individuals - 82,363
Host Tree - White Spruce, Black Spruce, Red Spruce
Range - Ont., Que., N.B., P.E.I., N.S.
Cocooning - July 1 - Nov. 13
Emergence - 11-52 days of incubation (July 8-Aug.10 for 2nd summer generation)
Sex Ratio - 99.3% ('36) 99.7% ('37)
Larval Survival - 53% ('36) 51% ('37)
Cocoon Survival - 33% ('36) 38% ('37)
Cocoon Parasitism 0.04% ('36) 0.11% ('37)
Parasites : Microplectron fuscipennis
Spathimeigenia aurifrons
Bessa selecta
Megaselia nr. proboscidea
For advance in known distribution from 1935 to 1938 see Figure 12 and 13. Detail of the 1938 infestation is given in Figure 14. Results of cocoon analyses are presented graphically in Figures 15 and 16, for 1937 and 1938 respectively.

Diprion frutetorum Htg. - Nursery Pine Sawfly
No. of samples - 14 No. of individuals - 34
Host Tree - Red Pine, Scots Pine, Jack Pine, Mugho Pine
Range - Ont.
Cocooning - June 13-29 (1st gen'n.) Sept. 15-19 (2nd gen'n.)
Emergence - June 21-Aug.1 (1st gen'n.) 16-20 days of incubation (2nd gen'n.)
Sex Ratio - 46%

TENTHREDINIDAE

Zaraea inflata Nort.
No. of samples - 1 No. of individuals - 3
Host Tree - Honeysuckle
Range - Ont.
Cocooning - July 24
Emergence - 33 days of incubation

Trichiosoma triangulum Kby.
No. of samples - 6 No. of individuals - 9
Host Tree - Mountain Ash, Willow, White Birch (?)
Range - Ont., Que.,
Cocooning - July 29-Sept.1
Emergence - 4 months of incubation (July 15-Aug.2, summer generation)

Cimbex americana Leach - American Elm Sawfly
No. of samples - 13 No. of individuals - 13
Host Tree - Willow, Poplar
Range - Ont., Que.
Cocooning - Aug.25
Emergence - 18 days of incubation

Strongylogaster multicinctus Nort.
No. of samples - 2 No. of individuals - 10
Range - Ont.
Rec'd. as adults - June 20

Dolerus unicolor Beauv.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - May 9

Dolerus neocollaris MacG.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - May 9

Dolerus ? tectus MacG.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - May 1

Phyllotoma nemorata Fall. - Large Birch Leaf-miner
No. of samples - 1 No. of individuals - 5
Host Tree - White Birch
Range - Que.
Rec'd. as larvae Sept. 1

Priophorus salicivorus Roh.
No. of samples - 1 No. of individuals - 1
Host Tree - Willow
Range - Ont.
Cocooning - Oct. 3
Emergence 10 days of incubation (without overwintering)

Hemichroa crocea Four.
No. of samples - 3 No. of individuals - 37
Host Tree - Speckled Alder, White Birch
Range - Que.
Rec'd. as larvae - July 31-Sept. 16

Anoplonyx laricis Marl. - Marlatt's Larch Sawfly
No. of samples - 17 No. of individuals - 122
Host Tree - Tamarack
Range - Man., Ont., Que.
Cocooning - July 7-15
Emergence - July 24
Larval Survival - 8%
Cocoon Survival - 9%

Anoplonyx prob. canadensis Hrtgn.
No. of samples - 1 No. of individuals 2
Range - Ont.
Rec'd. as adults - May 23

Platycampus americana Marl.
No. of samples - 1 No. of individuals - 2
Host Tree - Poplar
Range - Que.
Cocooning - July 20-22

Pristiphora erichsoni Htg. - Larch Sawfly
No. of samples - 84 No. of individuals - 1020
Host Tree- Tamarack
Range - B.C., Man., Ont., Que., N.B.
Cocooning - July 3-Sept.3
Emergence - 14-16 days of incubation after soaking the cocoons
Sex Ratio - 99.6%
Larval Survival - 41% Cocoon Survival - 25%
Cocoon Parasitism - 19%
Parasites: Mesoleius sp.
Bessa selecta
Peromyscus (predator)
An infestation map is shown in Figure 14.

Pristiphora geniculata Htg. - Mountain Ash Sawfly
No. of samples - 4 No. of individuals - 89
Host Tree - Mountain Ash
Range - Ont.
Cocooning - July 10-Aug.20
Emergence - 38-87 days incubation (without overwintering)
Sex Ratio - 75%
Larval Survival - 36% Cocoon Survival - 23%

Pristiphora sp. ? idiotiformis Roh.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - Aug. 14

Pikonema alaskensis Roh. - Yellow-headed Spruce Sawfly
No. of samples - 565 No. of individuals - 3315
Host Tree - White and Black Spruce, Engelmann Spruce
Range - B.C., Alta., Sask., Man., Ont., Que.
N.B., N.S., P.E.I., and Nfld.
Cocooning - June 25-Oct.29
Emergence - 15-37 days of incubation
Sex Ratio - 86% ('36) 66% ('37)
Larval Survival - 50% ('36) 15% ('37)
Cocoon Survival - 31% ('36) 11% ('37)
Cocoon Parasitism - 10% ('36) 11% ('37)
Parasites: Erromenus sp? bedardi
Monoblastus sp.
Monoblastus ? varifrons
Holocremnus sp.
Orthostigma sp.
Hypoteromalus tabacum
Scopiorus quebecensis
Mesoleius sp.
Mesochorus sp. (Hyper)
Bessa selecta
Megaselia pulicaria
Megaselia sp.nr. proboscidea

Pikonema dimmockii Cress. - Green-headed Spruce Sawfly
No. of samples - 302 No. of individuals - 630
Host Tree - White & Black Spruce
Range - B.C.Alta., Sask., Man., Ont., Que., N.B. N.S., P.E.I.
Cocooning - June 26- Sept.26
Emergence - 12-24 days of incubation
Sex Ratio - 89% ('36) 100% ('37)
L rval Survival - 50% ('36) 16% ('37)
Cocoon Survival - 53% ('36) 19% ('37)
Cocoon Parasitism - 23.7% ('36) 5% ('37)
Parasites: Erromenus sp.
Holocremnus sp.
Mesochorus sp. (Hyper)

Nematus pinguidorsum Marl.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - July 21

Nematus unicolor Marl.
No. of samples - 2 No. of individuals - 3
Host Tree - W.Birch
Range - Ont., Que.
Rec'd. as larvae Sept. 17-18

Pontania populi Marl.
No. of samples - 2 No. of individuals - 3
Host - Poplar
Range - Que., N.B.
Rec'd. as larvae July 29-31

Croesus latitarsus Nort.
No. of samples - 1 No. of individuals - 20
Host - W.Birch
Range - Que.
Rec'd. as larvae Aug. 6

Empria maculata Nort.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult June 22

Taxonus multicolor Nort.
No. of samples - 1 No. of individuals - 2
Host - W.Birch
Range - Que.
Rec'd. as larvae Sept. 18

Phrontosoma belfragei Cress.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - May 27

Tethida cordigera Beauv.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - June 10

Rhogogaster omega Nort.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 19

Rhogogaster evansi Hrgtn.
No. of samples - 1 No. of individuals - 1
Range - Alta.
Rec'd. as adult - June 20

Siricidae - Horntails

Urocerus flavicornis Fab.
No. of samples - 8 No. of individuals - 8
Host Tree - White and Black Spruce
Range - B.C., Ont., Que.
Rec'd. as adults - July 22-Sept.23

Urocerus albicornis Fab.
No. of samples - 8 No. of individuals - 8
Host Tree - Eng.Spruce, Douglas Fir
Range - B.C., Alta., Ont., Que., N.B.
Rec'd. as adults July 22-Sept.1

Sirex juvencus cyaneus Fabr.
No. of samples - 8 No. of individuals - 9
Host Tree - Eng. and Sitka Spruce
Range - B.C., Alta., Ont., Que.
Rec'd. as adults July 28-Sept.15

Of the next few families mentioned here, the Vespidae and Psammocharidae belong to the supper-family Vespoidea. The Sphecidae are placed in the super-family Sphecoidea and the Andrenidae in the super-family Apoidea.

Vespidae - Typical Wasps

Vespula norvegica norvegicoides Slad. - Northern Wood Wasp
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - Aug. 20

Vespula vulgaris Linn. - Common Wasp
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - Sept.21

Psammocharidae - Spider Wasps

Episyron quinquenotatus Say.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd. as cocoons - Apr.2
Emergence - 17 days of incubation

Psammochares tenebrosus Cress.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as cocoons - Apr. 2
Emergence - 25 days of incubation

Psammochares ? virginiensis Cress.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - June 30

Sphecidae - Thread-waisted Wasps

Prionony x (?atratum Lep.)
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - Aug. 11

Andrenidae - Andrenid Bees

Sphecodes burra (Cress.)
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - June 30

ICHNEUMONOIDEA

In this superfamily have been placed many of the hymenopterous insects which parasitize other members of the Order Insecta.

Braconidae

Rhogas sp.
No. of samples - 5 No. of individuals - 5
Range - Ont., Que.
Cocooning - July 7-Nov.22
Emergence - Indirect
July 14-Sept.28
from 10 days before to 5 days after host

Hosts: Semiothisa granitata
Hydriomena divisaria

Rhogas sp. 3
No. of samples - 3 No. of individuals - 3
Range - Que.
Cocooning - Aug.9-Sept.10
Emergence - Indirect
March 6-28; same time as host
Host: Semiothisa granitata

Rhogas sp. 4
No. of samples - 7 No. of individuals - 7
Range - Ont., Que.
Cocooning - Aug.31-Sept.28
Emergence - Direct
March 16-19, from 6 days before
to 1 after host
Host: Semiothisa granitata

Rhogas sp. A
No. of samples - 3 No. of individuals - 5
Range - Ont., Que.
Cocooning - June 17-22
Emergence - Indirect. June 23-July 5, 1 month before host.

Hosts: Malacosoma disstria
Malacosoma pluvialis

Rhogas sp. B
No. of samples - 2 No. of individuals - 2
Range - Que.
Cocooning - Aug. 25-Sept.5
Emergence - Indirect, Sept.30 - 6 mos. before host
Host: Semiothisa granitata

Aleiodes sp.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Emergence - Apr.16, beginning of host emergence
Host: Semiothisa granitata

Ascogaster sp.
No. of samples - 1 No. of individuals - 1
Range - N.B.
Emergence - Sept. 15, 38 days after host
Host: Peronea variana

Microgaster peroneae Walley
No. of samples - 6 No. of individuals - 11
Range - Ont., Que.
Cocooning - July 22-Aug.13
Emergence - Indirect Feb. 26-Apr.7, 9 mos after host
Host: Peronea variana

Microgaster ? n.sp.
No. of samples - 11 No. of individuals - 16
Range - Ont., Que.
Cocooning - July 27-Aug.28
Emergence - Indirect March 9 to pril 15, same time as host.
Host: Semiothisa granitata

Microplitis ? n.sp.
No. of samples - 1 No. of individuals - 1
Range - Que.
Cocooning - July 5
Emergence - Indirect Mar.31
Host: Geometrid sp.

Apanteles halisidotae Mues.
No. of samples - 1 No. of individuals - 18 (M)
Range - Quebec
Emergence - March 18, same time as host
Host - Halisidota maculata

Apanteles congregatus Say.
No. of samples - 1 No. of individuals - 29(M)
Range - Ont.
Cocooning - Aug.14
Emergence - Indirect. Aug.19-2[illegible]
Host: Sphinx kalmiae

Apanteles smerinthi Riley
No. of samples - 1 No. of individuals - 73(M)
Range - Ont.
Emergence - Apr.16
Host - Smerinthus jamaicensis geminatus

Apanteles xylinus Say.
No. of samples - 1 No. of individuals - 22(M)
Range - Ont.
Cocooning - July 30
Emergence - Indirect. Aug.7-Sept.9
Host: Lepidoptera sp.

Apanteles ? nemoriae Ashm.
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Cocooning - Aug.26-30
Emergence - Indirect. Feb.28-March 30, 2 weeks before to 3 days after.
Host: Semiothisa granitata

Apanteles sp. nr. congregatus Say.
No. of samples - 10 No. of individuals - 83 (M)
Range - Ont., Que.
Cocooning - Aug.17-Sept.15
Emergence - Indirect, Feb.24-Apr. 11
1 week before to 2 weeks after hosts
Hosts: Panthea acronyctoides
Semiothisa granitata
Geometrid sp.

Apanteles sp. (Couplet 74)
No. of samples - 3 No. of individuals - 3
Range - Ont., Que.
Cocooning - Aug.3-Sept.11
Emergence - Indirect. Aug.10-Sept.28, 6-8 weeks before host
Host: Semiothisa granitata

Apanteles sp. nr. compressus Mues.
No. of samples - 3 No. of individuals - 8
Range - Que.
Cocooning - Aug. 31-Sept. 9
Emergence - Indirect. March. 15-29, 2 days before to same time as host
Hosts: Semiothisa granitata
Geometridae sp.

Apanteles sp. (couplet 125)
No. of samples - 1 No. of individuals - 7(M)
Range - Que.
Cocooning - Aug. 10
Emergence - Indirect. Aug. 20, 6 mos. before host.
Host: Panthea acronyctoides

Apanteles sp. (couplet 132)
No. of samples - 2 No. of individuals - 9(M)
Range - Ont., Que.
Cocooning - Aug.3-Sept.11
Emergence - Indirect; Aug.11-same time as Nepytia and Apr.26-May 1; 9-13 days after Semiothisa
Hosts: Nepytia canosaria
Semiothisa granitata

Bassus annulipes (Cress.)
No. of samples - 2 No. of individuals - 50
Range - Quebec.
Emergence: June 30-July 1, 1 week after host.
Host : Archips conflictana

Orgilus obscurator Nees.
No. of samples - 2 No. of individuals - 10
Range - Ont.
Emergence - Direct. June 21-29, same time as host
Host - Rhyacionia buoliana

Macrocentrus uniformis Prov.
No. of samples - 6 No. of individuals - 7
Range - Ont., Que.
Cocooning - Aug.13-Sept.11
Emergence - Indirect. March 25-April 28, 27 days before to 10 days after host.
Hosts: Semiothisa granitata
Semiothisa sexmaculata.

Macrocentrus texanus Mues.
No. of samples - 1 No. of individuals - 1
Range - Que.
Emergence - Direct. Sept. 21
Host: Lepidoptera sp.

Macrocentrus amicroploides Vier.
No. of samples - 2 No. of individuals - 50
Range - Que.
Emergence - July 5-7, 10 days after host.
Host - Archips conflictana

Macrocentrus cuniculus Walley
No. of samples - 1 No. of individuals - 12(M)
Range - Ont.
Emergence - Direct June 20, 9-10 days after host.
Host - Petrova albicapitana

Macrocentrus pyraustae Vier.
No. of samples - 1 No. of individuals - 20(M)
Range - Ont.
Cocooning - July 29
Emergence - Indirect. Aug.10-13
Host - Pyralidae sp.

Zele sp.
No. of samples - 6 No. of individuals - 6
Range - Ont., Que., N.B.
Cocooning - Aug.2-11
Emergence - Indirect. Aug.6-Oct.15; from 12 days before to same time as hosts
Hosts: Ellopia fiscellaria
Nepytia canosaria

Meteorus trachynotus Vier.
No. of samples - 7 No. of individuals - 11
Range - Ont., Que.
Cocooning - July 2-Aug.10
Emergence - Indirect. July 12-Aug.18, from 3 days before to 5 days after host.

Meteorus hyphantriae Ril.
No. of samples - 1 No. of individuals - 1
Range - Que.
Cocooning - Aug.13
Emergence - Indirect. Sept.7, 2 weeks after host.
Host - Nepytia canosaria

Meteorus sp.nr. vulgaris Cress.
No. of samples - 1 No. of individuals - 1
Range - Que.
Cocooning - Aug.7
Emergence - Indirect. Aug.20 during host period
Host - Nepytia canosaria

Ichneumonidae

Amblyteles unifasciatorius (Say.)
No. of samples - 1 No. of individuals - 2
Range - N.S.
Emergence - Direct. Aug.30, 13 days before host
Host - Hemerocampa leucostigma?

Platylabus sp.
No. of samples - 1 No. of individuals - 1
Range - Que
Cocooning - Sept.3
Emergence - Indirect. Apr.23, 5 weeks after host.
Host - Semiothisa granitata

Phaeogenes gaspesianus Prov.
No. of samples - 5 No. of individuals - 5
Range - Ont., Que.
Emergence - Direct. Aug.4-18, 1 week before to 1 week after host.
Host - Peronea variana

Phaeogenes hariolus Cress.
No. of samples - 12 No. of individuals - 21
Range - Ont., N.B.
Emergence - Direct. July 14-Aug.7, 5-7 days after host.
Host - Cacoecia fumiferana

Stylocryptus subclavatus (Say.)
No. of samples - 1 No. of individuals - 1
Range - N.B.
Emergence - Direct. Aug.28, 6 mos. before host.
Host - Diprion polytomum

Aptesis indistincta (Prov.)
No. of samples - 1 No. of individuals - 1
Range - N.B.
Emergence - Direct. July 12, 7 mos. before host.
Host - Diprion polytomum

Hemiteles tenellus Say.
No. of samples - 7 No. of individuals - 7
Range - Ont., Que.
Emergence - Direct. July 11-Sept.2, 3 days after host.
Host - Neodiprion abietis
Cacoecia fumiferana
Hyphantria textor
Chrypsopa sp.

Chrysopoctonus rileyi Ashm.
No. of samples-1 No. of individuals - 6
Range - Ont.
Emergence - Direct. Aug.7-9, 4 days after host
Host - Chrysopa sp.

Exetastes n.sp.
No. of samples - 1 No. of individuals - 1
Range - Que.
Cocooning - Aug.30
Emergence - Indirect. Mar.12
Host - Agrotinae sp.

Lissonota parva (Cress.)
No. of samples - 1 No. of individuals - 1
Range - Que.
Emergence - Apr.14
Host - Helice constictella

Syzeuctus slossonae (Davis)
No. of samples - 1 No. of individuals - 4
Emergence - Direct. Mar.10-12
Host - Pyralidae sp.

Glypta fumiferanae Vier.
No. of samples - 7 No. of individuals - 10
Range - Ont., Que.
Cocooning - July 1-31
Emergence - Indirect. July 2-Aug.6, 1-6 days after hosts
Hosts: Cacoecia fumiferana
Herculia thymetusalis
Archips conflictana

Glypta sp.
No. of samples - 1 No. of individuals - 1
Range - Que.
Cocooning - Sept. 7
Emergence - Indirect. Mar. 22, 6 days before host.
Host - Argyrotaenia lutosana

Phytodietus annulatus Prov.
No. of samples - 4 No. of individuals - 4
Range - Que., P.E.I.
Cocooning - July 27-Sept.10
Emergence - Indirect. Oc.6-23, 6 mos. before host (Argyrotaenia) and Apr.1, 9 mos. after host (Peronea)
Hosts - Argyrotaenia lutosana
Peronea variana

Ephialtes pedalis Cress.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Emergence - Direct. July 6-Aug.7, end of host period
Hosts: Malacosoma disstria.
Lepidoptera sp.

Ephialtes conquisitor Say.
No. of samples - 29 No. of individuals - 154
Range - Ont., Que.
Emergence - Direct. June - Aug. 15, 18 days before to 12 days after hosts.
Hosts - Malacosoma disstria
Cacoecia fumiferana
Rhyacionia buoliana
Notolophus antiqua
Hemerocampa leucostigma
Geometridae sp.

Ephialtes sp.
No. of samples - 1 No. of individuals - 1
Range - Sask.
Emergence - Direct. Feb. 24, 6 mos. after host.
Host - Neodiprion abietis

Apechthis ontario Cress.
No. of samples - 9 No. of individuals - 20
Range - Ont.
Emergence - Direct. July 11-Aug.1 , same time to 6 days after host.
Host - Cacoecia fumiferana

Calliephialtes extensor L.
No. of samples - 5 No. of individuals - 19
Range - B.C., Ont.
Emergence - Direct. June 2 - Aug.4, same time as hosts.
Hosts - Rhyacionia buoliana
Petrova albicapitana
Pinipestis zimmermanni

Iseropus coelelis Wlsh.
No. of samples - 2 No. of individuals - 2
Range - Que.
Emergence - Direct. Aug.24, 4 days after host.
Host - Notolophus antiqua.

Epuirus spp.
No. of samples - 3 No. of individuals - 3
Range - Sask., Ont.
Emergence - Direct. June 13-21, same time as Rhyacionia host and Oct.4 (Petrova)
Hosts - Petrova albicapitana
Rhyacionia buoliana

Delomerista spp.
No. of samples - 4 No. of individuals - 4
Range - Sask., Ont.
Emergence - Direct. Feb.16-Mar.2, from 4 days before to 3 days after hosts.
Hosts - Neodiprion abietis
Neodiprion dubiosus

Euceros frigidus Cress.
No. of samples - 11 No. of individuals - 14
Range - Ont., Que.
Cocooning - Aug.13-Sept.24
Emergence (Semiothisa host) Indirect. March 26-Apr.9 same time to 14 days after host.
(Neodiprion host) Direct. Feb.28-Mar.9 6 mos. after host.
Hosts - Semiothisa granitata
Neodiprion abietis
Neodiprion dubiosus

Euceros couperii Cress.
No. of samples - 2 No. of individuals - 2
Range - Que.
Cocooning - Sept.18-Nov.22
Emergence - Indirect. Apr.6-8, from 12 days before to 5 days after host.
Hosts: Hydriomena divisaria
Caripeta divisata

Euceros sp.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Cocooning - Apr.20
Emergence - Indirect. Apr. 23, 1 week after host
Host - Semiothisa granitata

Eclytus pleuralis Prov.
No. of samples - 1 No. of individuals - 1
Range - Que.
Cocooning - Sept.4
Emergence - Indirect. Mar.8, 2 days after host.
Host - Argyrotaenia lutosana

Mesoleius spp.
No. of samples - 6 No. of individuals - 10
Range - Ont., Que., N.B.
Emergence - Direct. June 24 and Feb.4-Apr.10
same time to 25 days after hosts
Hosts - Neodiprion lecontei
Neodiprion pinetum
Pikonema alaskensis
Halisidota maculata

Lamachus lophyri (Ashm.)
No. of samples - 7 No. of individuals - 14
Range - Sask., Ont., Que.
Emergence - Direct. Feb.20-Apr.14, 13-46 days after hosts
Hosts - Neodiprion lecontei
Neodiprion abietis
Neodiprion pinetum

Lamachus contortionis Davis
No. of samples - 16 No. of individuals - 47
Range - Ont., Que.
Emergence - Direct. Mar.9-Apr.2, 20-29 days after host.
Host - Neodiprion lecontei

Lamachus virginianus Roh.
No. of samples - 2 No. of individuals - 4
Range - Ont.
Emergence - Direct. Oct.7-15 May 10, 18 days after peak
of host emergence.
Hosts - Neodiprion pinetum
Neodiprion lecontei

Lamachus sp. nr. lophyri (Ashm.)
No. of samples - 4 No. of individuals -5
Range - Ont ,Que.
Emergence - Direct. Feb.28-Mar.29, 21 to 25 days after
host.
Hosts - Neodiprion pinetum
Neodiprion dubiosus

Lamachus spp.
No. of samples - 4 No. of individuals - 4
Range - Ont., Que.
Emergence - Direct. Mar. 14-30, 21-27 days after host.
Hosts: Neodiprion lecontei
Neodiprion pinetum

Syndipnus spp.
No. of samples - 2 No. of individuals - 2
Range - Ont., N.B.
Emergence - Direct. Sept.7, 6 mos. before host.
and Mar.23, same time as host.
Hosts - Pikonema alaskensis
Pikonema dimmockii

Scopiorus quebecensis (Prov.)
No. of samples - 1 No. of individuals - 1
Range - Que.
Emergence - June 1, under natural conditions.
Host - Pikonema alaskensis

Erromenus?bedardi Prov.
No. of samples - 6 No. of individuals - 6
Range - Ont.
Emergence - Direct. Mar.3-10, 2 days before host
Hosts - Pikonema dimmockii
Pikonema alaskensis

Erromenus sp.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Emergence - Direct. Feb.18-Mar. 6, 2-3 weeks before host
Hosts: Pikonema dimmockii
Pikonema alaskensis

Monoblastus ? varifrons Cress.
No. of samples - 2 No. of individuals - 2
Range - Que.
Emergence - Direct. Mar.31, under natural conditions
Host - Pikonema alaskensis

Scolobates americana Hgtn.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Emergence - Direct. Mar.30, 20 days before host.
Host - Arge pectoralis

Exenterus diprioni Roh.
No. of samples - 3 No. of individuals - 3
Range - Ont., Que.
Emergence - Direct. July 15-9 mos. before and Apr.19 50 days after host.
Host - Neodiprion dubiosus

Exenterus canadensis Auct. nec. Prov.
No. of samples - 3 No. of individuals - 4
Range - Ont.
Emergence - Direct. Mar. 25-Apr.9, 28-30 days after host.
Host - Neodiprion dubiosus
Neodiprion lecontei

Exenterus spp.
No. of samples - 5 No. of individuals - 5
Range - Ont., Que.
Emergence - Direct. Here there are two emergent periods, July 21-Aug.13 and Mar.29-Apr.25, the former being 6 months before and the latter 1-2 mos. after host emergence.
Host - Neodiprion lecontei
Neodiprion sp.

Diplazon pulchripes Prov.
No. of samples - 1 No. of individuals - 1
Range - Que.
Emergence - Direct. Apr.18,6-1/2 months after host.
Host - Syrphidae sp.

Diplazon sp.
No. of samples - 1 No. of individuals - 1
Range - N.B.
Emergence - Direct. July 28
Host - Syrphidae sp.

Syrphoctonus agilis Cress.
No. of samples - 2 No. of individuals - 2
Range - Que.
Emergence - Direct. July 2-12
Host - Syrphidae sp.

Chlorinaeus sp. nr. texanus Cr.
No. of samples - 1 No. of individuals - 1
Range - Que.
Emergence - Direct. Jan. 10
Host - Pyralidae sp.

Chlorinaeus ? n.sp.
No. of samples - 2 No. of individuals - 3
Range - Ont., Que.
Emergence - Direct. Apr.7-22, 4-6 weeks after host.
Hosts - Semiothisa granitata
Caripeta divisata?

Exochus pallipes Cress.
No. of samples 2 No. of individuals - 2
Range - Que.
Emergence - Direct. Mar.20-22, 1 week after host.
Host - Argyrotaenia lutosana

Exochus dorsalis annulicrus Nlsh.
No. of samples - 3 No. of individuals - 4
Range - Ont., Que., N.B.
Cocooning - July 14-20
Emergence - Indirect. July 25-Oct.4, 9 days before to 1 month after host.
Host - Peronea variana

Exochus sp.
No. of samples - 24 No. of individuals - 32
Range - Ont., Que., P.E.I.
Emergence - Direct. July 14-Aug.29, 6 days before - same time as host.
Host - Peronea variana.

Exochus spp.
No. of samples - 3 No. of individuals - 10
Range - Man., Ont. Que.
Emergence - Direct. June 18-Aug.12, same time as hosts
Hosts: Cacoecia cerasivorana
Sparganothis sulfureana
Lepidoptera sp. (pupa)

Eremotylus spp.
No. of samples - 2 No. of individuals - 3
Range - Ont., Que.
Cocooning - Aug.16
Emergence - Indirect. Mar.3-Apr.22, 3 wks. after host.
Host - Telea polyphemus
Schizura concinna

Atrometus clavipes Davis
No. of samples - 1 No. of individuals - 3
Range - Sask.
Emergence - Direct. July 14-23, 1-2 wks. after host.
Host - Peronea variana

Labrorychus analis Say.
No. of samples - 4 No. of individuals - 4
Range - Sask., Ont.
Emergence - Direct. July 17-Aug.10, 2-14 days after host.
Host - Malacosoma disstria.

Labrorychus sp.
No. of samples - 4 No. of individuals - 38
Range - Ont., Que.
Emergence - Direct. July 19-Aug.11, same time as host
Host-Cacoecia cerasivorana

Ophion sp.
No. of samples - 13 No. of individuals - 14
Range - Ont., Que.
Cocooning - Sept.9-Oct.6. Apr.27
Emergence - Direct and Indirect. Mar.19-July 11 and 6 days to 3 mos. after host.
Host - Semiothisa granitata

Therion ? sassacus Vier.
No. of samples - 1 No. of individuals - 1
Range - Que.
Emergence - Direct. May 20, 45 days after host.
Host - Hyphantria textor.

Campoplegidea vicina (Prov.)
No. of samples - 2 No. of individuals - 5
Range - Ont., Que.
Cocooning - Aug.20-Oct.1
Emergence - Indirect. Apr.21-May20, 60 days after host
Host - Semiothisa granitata
S. sexmaculata

Campoplegidea luctuosa (Prov.)
No. of samples - 1 No. of individuals - 1
Range - Que.
Cocooning - Sept.1
Emergence - Indirect. Apr.10, 10 days after host
Host - Hydriomena divisaria

Campoplegidea n.sp.
No. of samples - 11 No. of individuals - 12
Range - Ont., Que.
Cocooning - Aug.6-Oct.1
Emergence - Direct and Indirect.
Aug.24-Oct.12, 9 mos. before to same time as host and Apr.3-May 9, same time to 50 days after host.
Hosts - Semiothisa granitata
S.sexmaculata
S.bisignata

Campoplegidea ellopia Wly.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Cocooning - July 26
Emergence - Indirect. Aug.15, 3 days after host.
Host - Ellopia fiscellaria

Campoplegidea vitticollis Nort.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Cocooning - July 27-Aug.14
Emergence - Indirect. Aug. 8-Oct. 7, 6 mos. before host
Hosts - Anisota rubicunda
Geometridae sp.

Campoplegidea spp.
No. of samples - 3 No. of individuals - 3
Range - Ont., Que.
Cocooning - Aug.14-20
Emergence - Indirect. Aug.18-Aug.27 and Mar.25.
Hosts - Semiothisa sexmaculata
Geometridae sp.

Casinaria eupitheciae Vier.
No. of samples - 51 No. of individuals - 77
Range - Ont., Que., N.B., N.S.
Cocooning - July 9-Oct. 2
Emergence - Indirect. July 22-Aug.30 and Mar.8-Apr.7, same time as host.
Hosts - Semiothisa granitata; S. sexmaculata
Caripeta divisata; Geometridae sp.

Casinaria sp.
No. of samples - 8 No. of individuals - 8
Range - Que.
COcooning - Sept.4-29
Emergence - Indirect. Mar.29-May 1, 1 month after Host
Host - Caripeta divisata
Eupithecia sp.

Hyposoter sp. 1
No. of samples - 9 No. of individuals - 10
Range - Ont., Que.
Cocooning - Aug.31-Sept.24
Emergence - Indirect. Mar.26-Apr.1, 4-14 days after host
Host - Semiothisa granitata

Hyposoter spp.
No. of samples - 5 No. of individuals - 7
Range - Ont., Que.
Cocooning - June 26-Sept.29.
Emergence - Indirect. Aug.11 (Syrphidae), Mar. 8-Apr.4, 1-5 wks. after host (Semiothisa) and Direct. June 21(same time as (Rhyacionia) host. 6 mos. before host (Hyphantria)
Hosts: Semiothisa sexmaculata
Rhyacionia buoliana
Hyphantria textor
Syrphidae sp.

Hyposoter oedemoesiae Ashm.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Emergence - Direct. Sept.4, 9 mos. before host
Host - Datana ministra

Campoplex spp.
No. of samples - 13 No. of individuals - 13
Range - Ont., Que., N.B.
Cocooning - July 6-Aug.16 and Sept.25-29
Emergence - Direct. June 28-Aug.29 and Apr. 8-12, same time to six months before host.
Hosts: Peronea variana
Feralia jocosa
Hydriomena divisaria
Rhyacionia buoliana
Noctuidae sp.

Holocremnus lophyri (Riley)
No. of samples - 7 No. of individuals - 34
Range - Ont., Que.
Emergence - Direct. Mar.10-19, 12-16 days after hosts
Hosts - Neodiprion dubiosus
N. lecontei

Holocremnus spp.
No. of samples - 9 No. of individuals - 9
Range - Ont., Que.
Emergence - Direct. Feb.15-Apr.21, two weeks before to two weeks after hosts.
Hosts - Pikonema alaskensis
P. dimmockii
Neodiprion lecontei

Campoplegini spp.
No. of samples - 13 No. of individuals - 19
Range - Ont., Que.
Cocooning - Sept.11-Oct.23
Emergence - Indirect. Mar. 10-Apr.24, same time to 4 days after host.
Host - Semiothisa granitata

Cremastus interruptor Grav.
No. of samples - 3 No. of individuals - 10
Range - Ont.
Emergence - Direct. June 16-July 26, same time as host.
Hosts - Rhyacionia buoliana
Cacoecia fumiferana

Cremastus sp.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Emergence - Direct. Nov.7-11 days after host.
Host - Argyrotaenia pinatubana

Mesochorus spp.
No. of samples - 42 No. of individuals - 56 (some M)
Range - Ont., Que.
Cocooning - Aug.3-Oct.16
Emergence - Direct (3 individuals) and Indirect. Sept.7-Oct.18 and Feb.18-Apr.25, same time-16 days after host.
Hosts - Semiothisa granitata; Geometridae sp.; Sphinx kalmiae; Halisidota maculata; P.alaskensis; Pikonema dimmockii; Neodiprion pinetum

Cynipoidea

Amphibolips sp.
No. of samples - 1 No. of individuals - 6
Host Tree - Willow - in galls
Range - Que.
Emergence - Aug.3-30

Chalcidoidea

Monodontomerus dentipes Boh.
No. of samples - 1 No. of individuals - 6(M)
Range - Ont.
Emergence - Direct. Aug.18-25, same time as host.
Host - Neodiprion abietis

Perilampus hyalinus Say.
No. of samples - 23 No. of individuals - 240
Range - Ont., Que.
Emergence - Direct. Mar.9-Apr.16, 8-36 days after hosts.
Hosts - Neodiprion lecontei
N. dubiosus
N. swainei
Diptera sp. (hyper.)

Spilochalcis sp.
No. of samples - 1 No. of individuals - 11
Range - Ont.
Emergence - Direct. July 6, before host cocooned.
Host - Anoplonyx laricis

Eurytoma sp.
No. of samples - 2 No. of individuals - 9 (M)
Range - Ont., Que.
Emergence - Direct. June 24-Aug.6, same time as host.
Host - Rhyacionia buoliana
Lepidoptera sp.

Eupelmus cyaniceps Ashm.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Emergence - Direct. June 24, same time as host
Host - Rhyacionia buoliana

Hypoteromalus tabacum (Fitch)
No. of samples - 2 No. of individuals - 14(M)
Range - Ont.
Emergence - Direct. Sept.1
Hosts - Pikonema alaskensis
Sphinx kalmiae

Microplectron fuscipennis Zett.
No. of samples - 29 No. of individuals - 261
Range - Que., N.B. (sometimes M)
Emergence - Direct. June 29-Oct.12 and Feb.1, 6-9 mos. and 3 days before host
Host - Diprion polytomum

Pteromalidae spp.
No. of samples - 6 No. of individuals - 75(M)
Range - B.C., Alta., Ont., N.B.
Emergence - Direct. July 7-25, 2-11 days after host
Hosts - Cacoecia fumiferana
Liparidae sp.

Elachertus sp.
No. of samples - 1 No. of individuals - 7(M)
Range - B.C.
Cocooning - June 27
Emergence - Indirect. July 18, latter part of host emergence period.
Host - Cacoecia fumiferana

Euplectrus catocalae How.
No. of samples - 2 No. of individuals - 12(M)
Range - Ont.
Emergence - Direct. June 23-July 8, same time as host.
Hosts: Cacoecia fumiferana
Geometridae sp.

Cercopelus ? sp.
No. of samples - 1 No. of individuals - 1383 (M)
Range - B.C.
Cocooning - June 30
Emergence - Indirect. July 18, from larva.
Host - Feralia jocosa

Eulophus sp.
No. of samples - 6 No. of individuals - 185 (M)
Range - Ont., Que.
Emergence - Direct. July 4-Aug.29, 9 mos. before to 12 days after hosts.
Hosts - Archips conflictana
Acrobasis sp.
Tortricidae sp.
Polygonia sp.
Diptera sp.

COLEOPTERA

With the exception of wood-boring and a few coccinellid larvae the insects of this order were received as adults.

Cicindelidae - Tiger Beetles

Cicindela sexguttata Fab.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - June 30

Cicindela tranquebarica Host.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - July 12

Carabidae - Ground Beetles

Those insects of this predatory group which may be found on spruce foliage are probably of importance in the control of spruce defoliation. The predominant genus is Platynus ..

Calosoma calidum Fab. - The Fiery Hunter
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - Sept.13

Calathus sp.
No. of samples - 5 No. of individuals - 5
Range - Que., N.B.
Rec'd. as adults - June 20-Oct.3

Platynus sinuatus Dej.
No. of samples - 79 No. of individuals - 101
Range - B.C., Ont., Que.
Rec'd. as adults - May 20-Oct.22

Platynus stygicus Lec.
No. of samples 3 No. of individuals - 5
Range - Ont., Que.
Rec'd. as adults - Sept. 1 -15

Platynus 4-punctatus Dej.
No. of samples - 2 No. of individuals - 2
Range - Que.
Rec'd. as adults - July 14-Oct.5

Platynus spp.
No. of samples - 13 No. of individuals - 15
Range - B.C., Ont., Que., N.B.
Rec'd. as adults - May 18-Sept.23

Plochionus timidus Hald.
No. of samples - 18 No. of individuals - 19
Range - Ont., Que.
Rec'd. as adults - May 20-Sept.13

Dromius piceus Dej.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult - Aug. 19. On Engelmann Spruce

Cymindis sp.
No. of samples - 1 No. of individuals - 1
Range - Alta.
Rec'd. as adult - June 20 On Engelmann Spruce

Leistus ferruginosus Mann.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult - Aug. 29

Pemphus angusticollis Mann.
No. of samples - 1 No. of individuals - 2
Range - B.C.
Rec'd. as adults - Sept. 19 off Sitka Spruce

Lebia grandis Hentz.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - Aug. 25

Bothriopterus luczoti Dej.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - July 28

Euferonia coracina Newn.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - July 2

Carabus taedatus Fab.
No. of samples - 1 No. of individuals - 1
Range - Sask.
Rec'd. as adult - July 7

Sphaeroderus lecontei Dej.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - July 29

Anadaptus baltimorensis Say.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - Sept.25

Silphidae - Carrion Beetles

Silpha americana L.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - June 20

Silpha noveboracensis Forst.
No. of samples - 2 No. of individuals - 2
Range - Ont., N.B.
Rec'd. as adults - June 14-Sept.10

Necrophorus sp.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd. as adults - July 28-Sept. 8

Orthoperidae

Sacium sp.
No. of samples - 1 No. of individuals -2
Range - Que.
Rec'd. as adults - Sept.5

Staphylinidae - Rove Beetles

Quedius sp.
No. of samples - 11 No. of individuals - 11
Range - B.C.
Rec'd. as adults - Aug.5-Sept.26

Staphylinus pleuralis Lec.
No. of samples - No. of individuals - 1
Range - B.C.
Rec'd. as adult Sept.15

Histeridae - Hister Beetles

Platysoma coaretatum Lec.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - June 28

Hister sp.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - Aug. 11

Lycidae

Eros aurora Host.
No. of samples - 2 No. of individuals - 3
Range - Ont., Que.
Rec'd. as adults - Aug. 20

Lampyridae - Fire Flies

At least five species of this family occur on spruce. Many lampyrid larvae are predaceous, so these insects may aid in control of spruce pests.

Lucidota corrusca L.
No. of samples - 93 No. of individuals - 150
Range - Sask., Ont., Que., N.B.
Rec'd. as adults - May 20-Oct.6

Lucidota californica Mots.
No. of samples - 2 No. of individuals - 2
Range - B.C.
Rec'd. as adults - Aug.27-Oct.11 On W.Red Cedar

Lucidota atra Fab.
No. of samples - 2 No. of individuals - 3
Range - Ont., N.B.
Rec'd. as adults - June 27-July 11

Photuris pennsylvanica Deg.
No. of samples - 6 No. of individuals - 7
Range - Ont., Que.
Rec'd. as adults - June 15-July 21

Pyractomena borealis Rand
No. of samples - 3 No. of individuals - 3
Range - 3
Rec'd. as adults - June 28-July 14

Pyractomena borealis Rand
No. of samples - 3 No. of individuals - 3
Range - 3
Rec'd. as adults - June 28-July 14

Cantharidae - Soldier Beetles

As in the preceding family, many of the larvae of the Soldier Beetles are predaceous. They may play a small part in the biological control of forest insects.

Podabrus laevicollis Kby.
No. of samples - 5 No. of individuals - 7
Range - Ont., Que.
Rec'd. as adults June 27-July 6

Podabrus rugulosus Lec.
No. of samples - 1 No. of individuals - 2
Range - Ont.
Rec'd. as adults - June 7

Podabrus tomentosus Say.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult June 9

Podabrus simplex Lec.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - May 23

Podabrus tricostatus Say.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - June 20

Podabrus modestus Say.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - June 23

Podabrus spp.
No. of samples = 23 No. of individuals - 26
Range - B.C., Alta., Ont., Que., N.B.
Rec'd. as adults - June 9-July 21

Cantharis carolinus Fab.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - June 14

Cantharis spp.
No. of samples - 15 No. of individuals - 16
Range - Ont., Que., N.S.
Rec'd. as adults - June 28-July 28

Silis difficilis Lec.
No. of samples - 2 No. of individuals - 2
Range - B.C., Alta.
Rec'd. as adults June 2-27 on Eng.Spruce and Lodgepole Pine.

Silis percomis Say.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult June 29

Melyridae

Hoppingiana brevilabris Blais.
No. of samples - 14 No. of individuals - 24
Range - B.C., Alta.
Rec'd. as adults June 15-Aug.22 on Eng.Spruce and Lodgepole Pine.

Trichochrous sp.
No. of samples - 5 No. of individuals - 7
Range - B.C., Alta.
Rec'd. as adults June 20-Aug.8 On Eng.Spruce

Dasytes hudsonicus Lec.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult Aug.8

Cleridae - Checkered Beetles

Thanasimus undulatus Say.
No. of samples - 7 No. of individuals - 9
Range - Sask., Ont., N.B.
Rec'd. as adults - May 18-Sept.12

Corynetidae

Phyllobaenus dislocatus Say.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 13

Necrobia violacea L.
No. of samples - 2 No. of individuals - 2
Range - Alta.
Rec'd. as adults - Aug.17-Sept.19 On Eng.Spruce

Mordellidae

Anaspis rufa Say.
No. of samples - 2 No. of individuals - 2
Range - B.C.
Rec'd. as adults July 19 On Eng. and Sitka Spruce

Meloidae - Blister Beetles

Several species of this family have been received in collections.

Pomphopoea sayi Lec.
No. of samples - 1 No. of individuals - 4
Range - Ont.
Rec'd. as adults - June 19

Macrobasis unicolor Kby.
No. of samples - 5 No. of individuals - 9
Range - Ont., Que.
Rec'd. as adults - June 26-July 28

Macrobasis sp.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - July 16

Meloe spp.
No. of samples - 2 No. of individuals - 7
Range - Ont., Que.
Rec'd. as adults Aug.31-Sept.2

Pythidae

Lecontia discicollis Lec.
No. of samples - 3 No. of individuals - 4
Range - Ont., Que.
Rec'd. as adults - July 1-Sept.12

Pytho spp.
No. of Samples - 2 No. of individuals - 15
Range - Que.
Rec'd. as Larvae July 16-27 in Pine and W.Spruce slabs.

Dendroides bicolor Newm.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - July 25

Dendroides concolor Newm.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - July 15

Dendroides ephemeroides Mann.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult June 18 on Sitka Spruce

Elateridae - Click Beetles

A very great number of adults of this family evidently may be beaten off spruce. Of these by far the predominant genus is Ludius, with a great variety of species. The larval life is under the bark of trees or on roots of ground cover plants, roles at present considered unimportant. The adults are not thought predaceous but to be "just resting" on the spruce; actually little is known about the food habits of these species.

Lacon profusus Cand.
No. of samples - 7 No. of individuals - 10
Range - B.C.
Rec'd. as adults - June 20-July 16

Lacon brevicornis Lec.
No. of samples - 10 No. of individuals - 11
Range - Man., Ont., Que.
Rec'd. as adults June 17-July 12

Lacon obtectus Say.
No. of samples - 3 No. of individuals - 3
Range - Ont., Que.
Rec'd. as adults June 19-29

Limonius aeger Lec.
No. of samples - 21 No. of individuals - 10
Range - B.C., Alta., Ont., Que., N.B., N.S.

Athous rufiventris Esch.
No. of samples - 2 No. of individuals - 7
Range - B.C.
Rec'd. as adults - July 19-30

Athous vittiger Lec.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult - July 27

Athous fufifrons Rand.
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Rec'd. as adults - June 24-July 17

Athous sp.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult - July 28

Ludius triundulatus Rand.
No. of samples - 66 No. of individuals - 91
Range - Man., Ont., Que., N.B., N.S.
Rec'd. as adults - May 24-Aug.26

Ludius spinosus Lec.
No. of samples - 11 No. of individuals - 12
Range - Ont., Que., N.B.
Rec'd. as adults June 12-July 12

Ludius resplendens Esch.
No. of samples - 10 No. of individuals - 10
Range - B.C,Ont., Que., N.B.
Rec'd. as adults - June 9-July 25

Ludius nitidulus Lec.
No. of samples - 63 No. of individuals - 71
Range - Man., Ont., Que., N.B., N.S., Nfld.
Rec'd. as adults - May 24-Aug.20

Ludius aratus Lec.
No. of samples - 12 No. of individuals - 13
Range - Ont., Que., N.B., N.S.
Rec'd. as adults June 8-July 6

Ludius hieroglyphicus Say.
No. of samples - 18 No. of individuals - 20
Range - Man., Ont., Que., N.B., N.S.
Rec'd. as adults June 4-July 20

Ludius appropinquans Rand.
No. of samples - 71 No. of individuals - 113
Range - Man., Ont., Que., N.B., N.S.
Rec'd. as adults June 10-Oct. 3.

Ludius semimetallus Wlk.
No. of samples - 4 No. of individuals - 4
Range - B.C.
Rec'd. as adults - June 20-July 19

Ludius cruciatus L.
No. of samples - 3 No. of individuals - 3
Range - Ont., Que.
Rec'd. as adults - June 16-28

Ludius cruciatus pulcher Lec.
No. of samples 5 No. of individuals - 5
Range - Ont., Que.
Rec'd. as adults - June 19-July 3

Ludius cruciatus festivus Lec.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult - June 30

Ludius nigricollis Bland.
No. of samples - 8 No. of individuals - 9
Range - B.C., Alta., Ont.
Rec'd. as adults - June 20-July 28

Ludius propola Lec.
No. of samples - 96 No. of individuals - 151
Range - B.C., Alta., Man., Ont., Que., N.B., N.S., P.E.I.
Rec'd. as adults June 7-Aug.27

Ludius propola columbiana Br.
No. of samples - 6 No. of individuals - 8
Range - B.C.
Rec'd. as adults - June 10-July 24

Ludius medianus Germ.
No. of samples - 15 No. of individuals - 24
Range - Ont., Que., N.B., N.S.
Rec'd. as adults June 11-July 15

Ludius rufopleuralis Fall.
No. of samples - 2 No. of individuals - 2
Range - Ont., N.B.
Rec'd. as adults June 20-25

Ludius insidiosus Lec.
No. of samples - 3 No. of individuals -3
Range - Que., N.B.
Rec'd. as adults - June 9-16

Ludius ochreipennis Lec.
No. of samples - 4 No. of individuals - 4
Range - N.W.T., Alta., Man.
Rec'd. as adults June 16-July 15

Ludius kendalli Kby.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adults July 4

Ludius mendax Lec.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult June 12

Ludius strickland Brown
No. of samples - 1 No. of individuals - 1
Range - Man.
Rec'd. as adult June 23

Ludius umbripennis Lec.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult - June 16

Ludius aeripennis Kby.
No. of samples - 2 No. of individuals - 2
Range - B.C., Alta.
Rec'd. as adults- June 20-22

Ludius angusticollis Lec.
No. of samples - 2 No. of individuals - 2
Range - B.C.
Rec'd. as adults - June 15-23

Ludius pudicus Br.
No. of samples - 4 No. of individuals - 5
Range - B.C.Alta.
Rec'd. as adult - June 10-July.

Ludius undulatus Rand.
No. of samples - 1 No. of individuals - 1
Range -
Rec'd. as adult May 20

Ludius callidus Br.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult - June 15

Ludius falsificus Lec.
No. of samples - 1 No. of individuals - 1
Range - Que.
June 17 rec'd. as adult

Ludius watsoni Brown
No. of samples - 3 No. of individuals - 3
Range - Man,, Ont.
Rec'd. as adults June 9-July 4

Ludius splendens Zieg.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 22

Hypnoidus tumescens Lec.
No. of samples - 2 No. of individuals - 2
Range - B.C.
Rec'd. as adult July 15-Aug.15

Agriotes limosus Lec.
No. of samples - 33 No. of individuals - 90
Range - Ont., Que., N.B., P.E.I.
Rec'd. as adults June 7-July 28

Agriotes collaris Lec.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult June 14

Agriotes fucosus
No. of samples - 4 No. of individuals - 5
Range - Ont., Que.
Rec'd. as adult June 9-30

Agriotes stabilis L.
No. of samples - 3 No. of individuals - 3
Range - Ont., Que.
June 27-July 14 rec'd. as adults

Dalopius spp.
No. of samples - 9 No. of individuals - 19
Range - B.C., Ont., Que.
Adults Rec'd. May 23-Oct.3

Ampedius pullus Germ.
No. of samples - 8 No. of individuals - 8
Range - Ont., Que.
Adults rec'd. June 17-Sept.23

Ampedus nigricollis Host.
No. of samples - 1 No. of individuals - 1
Range - N.S.
Adults rec'd. July 24

Ampedus melsheimeri Leng
No. of samples - 2 No. of individuals - 2
Range - Que., N.B.
Adults rec'd. June 20-23

Ampedus evansi Brown
No. of samples - 1 No. of individuals - 1
Range - Ont.,
Adults rec'd. June 25

Ampedus apicatus Say.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Adult rec'd. June 26

Ampedus spp.
No. of samples - 38 No. of individuals - 45
Range - Ont., Que., N.B.
May 23-Aug.17 adults rec'd.

Megapenthes caprella Lec.
No. of samples - 7 No. of individuals - 9
Range - B.C.
Adults rec'd. July 15-Aug.16

Agriotella begeminata Rand.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Adult rec'd. July 30

Agriotella occidentalis Br.
No. of samples - 1 No. of individuals - 1
Range - Alta.
Adult rec'd. Aug.15

Melanonotus spp.
No. of samples - 30 No. of individuals - 49
Range - Ont., Que., N.B.
Adults rec'd. May 26-Aug.19

Cardiophorus spp.
No. of samples - 7 No. of individuals - 11
Range - Ont., Que., N.B.
Adults rec'd. May 20-July 4

Drasterius debilis Lec.
No. of samples - 3 No. of individuals - 3
Range - Ont., Que.
June 9-July 30 Adults rec'd.

Sericus brunneus L.
No. of samples - 4 No. of individuals - 4
Range - Que., N.B.
Adults rec'd. June 16-20

Eanus estriatus Lec.
No. of samples - 5 No. of individuals - 6
Range - Ont., Que.
Adults rec'd. June 20-July 13

Lepturoides denticornis Kby.
No. of samples - 2 No. of individuals - 2
Range - Que.
Adults rec'd. June 20-30

Elathous discalceatus Say.
No. of samples - 1 No. of individuals - 1
Range - Que.
Adults rec'd. July 19

Buprestidae - Metallic Wood Borers

The following adult specimens which have been received belong without exception to those species whose larval develop in coniferous trees - mainly pine in the south and spruce in the north. The most common species whose adults are encountered on spruce are evidently Dicerca tenebrosa and Buprestis maculiventris.

Chalcophora fortis Lec.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Adults rec'd. June 13

Chalcophora liberta Germ.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Adults rec'd. July 4-Aug.18

Chalcophora virginiensis Dru.
No. of samples - 5 No. of individuals - 5
Range - Ont.
Adults rec'd. June 7-Aug.8

Dicerca tenebrosa Kby. - Pine Dicerca
No. of samples - 15 No. of individuals - 16
Range - Ont., Que., N.B.
June 26 - Oct.2 Adults rec'd.

Dicerca tuberculata Gr.
No. of samples - 1 No. of individuals - 1
Range - Que.
Adult rec'd. Aug.25

Dicerca prolongata Lec.
No. of samples - 5 No. of individuals - 6
Range - Sask., Ont.
Adults rec'd. June 27-Sept.15

Dicerca divaricata Say.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Adult rec'd. Sept.22

Buprestis maculiventris Say.
No. of samples - 30 No. of individuals - 41
Range - B.C., Ont., Que.
Adults rec'd. June 24-Sept.29

Buprestis impedita Say. - Golden Buprestid
No. of samples - 5 No. of individuals - 5
Range - Ont., N.B.
Adults rec'd. June 22-July 21

Buprestis fasciata langi Mann.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Adult rec'd. June 23

Buprestis aurulenta L.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Adult rec'd. July 9

Buprestis fasciata Fab.
No. of samples - 3 No. of individuals - 4
Range - Ont., Que.
Adults rec'd. July 3-Aug.11

Buprestis striata Fab.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Adult rec'd. June 7

Buprestis nuttalli consularis Gory.
No. of samples - 3 No. of individuals - 3
Range - Ont., Que.
Adult rec'd. July 14-Sept.1

Melanophila drummondi Kby. -(Drummond's Buprestid)
No. of samples - 10 No. of individuals - 10
Range - B.C., Ont., Que.
Adults rec'd. June 16-Aug.4

Melanophila fulvoguttata Harr.
No. of samples - 4 No. of individuals - 6
Range - Ont., N.B.
Rec'd. 3 adults June 17-July 13 and 3 as larvae in Hemlock July 2

Melanophila acuminata de G.
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Rec'd. as adults July 12-29

Chrysoboyeris verdigripennis Frost.
No. of samples - 3 No. of individuals - 3
Range - Que.
Rec'd. as adults July 19-Aug.5

Chrysobothris harrisi Hentz.
No. of samples - 4 No. of individuals - 4
Range - Ont., Que.
Adults rec'd. June 30-Sept.5

Chrysobothris scabripennis Cast.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Adults rec'd. July 30

Chrysobothris pusilla Cast.
No. of samples - 1 No. of individuals - 1
Range - Que.
Adultsrec'd. Sept.8

Chrysobothris trinervia Koy.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Adult rec'd. Aug.19

Chrysobothris spp.
No. of samples - 19 No. of individuals - 23
Range - B.C., Alta., Ont., Que.
Rec'd. 2 as larvae in Sugar Maple, June 8. rest as adults June 24-Aug.21.

Perimegatoma sp.
No. of samples - 1 No. of individuals - 1
Range - Ont.

Anthaxia aeneogaster Cast.
No. of samples - 2 No. of individuals - 2
Range - B.C., Alta.
Adults rec'd. June 20

Agrilus anxius Gory.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Adult rec'd. Aug.28

Poecilonota cyanipes Say.
No. of samples - 1 No. of individuals - 1
Range - Sask.
Adult rec'd. June 30

Helodidae

The one species received, Cyphon variabilis, appears to be quite common, probably breeding in dead wood.

Cyphon variabilis Thunb.
No. of samples - 12 No. of individuals - 16
Range - B.C., Alta., Ont., Que.
Rec'd. as adults - May 24-Oct.5

Dermestidae - Dermestid Beetles

These beetles usually feed on decaying matter, or on skins, furs and dried animal substances. Their presence in the collection boxes is hard to explain.

Dermestes lardarius. L. - Larder Beetle
No. of samples - 3 No. of individuals - 3
Range - Ont.
Rec'd. as adults - June 7-July 20

Attagenus piceus Oliv. - Black Carpet Beetle
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult June 25

Perimegatoma sp.
No. of samples - 2 No. of individuals - 2
Range - B.C., Alta.
Rec'd. as adults June 20-Sept.19

Dermestes sp.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - June 9

Byrrhidae

Byrrhus sp.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult - June 28

Ostomidae

Ostoma ferruginea L.
No. of samples - 1 No. of Individuals - 1
Range - Que.
Rec'd. as adult - Aug.19

Nitidulidae

The two species of Glischrochibus below feed on the sap exuding from trees.

Glischrochilus sanguinolentus Oliv.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult - Sept.24

Glischrochilus siepmanni Br.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult June 30

Cucujidae - Cucujid Beetles

Most of these beetles live under bark and are predaceous on other small insects.

No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 22

Cucujus clavipes puniceus Mann.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Aug.3

Cryptophagidae

The members of this family have various habits; some live on fungi and others live in and on decaying trees.

Cryptophagus spp.
No. of samples - 2 No. of individuals - 2
Range - B.C.
Rec'd. as adults - Aug.29-Sept.10

Lathridiidae

Many of these small beetles live under the bark of trees. Two species have been taken in the collections.

Melanophthalma sp.
No. of samples - 4 No. of individuals - 7
Range - B.C.
Rec'd. as adults June 23-Sept.16

Corticaria sp.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Sept.16

Coccinellidae - Ladybird Beetles

Great numbers of Coccinellidae were received in the survey, belonging to a few well-marked species. The most common form was Cleis picta which has a wide distribution far into the north. Anatis mali and Neomysia subvittata were frequently received. It is probable that all these species below are predaceous in both larval and adult stages, though possibly of more value in control of Adelges than for caterpillars or sawfly larvae. A few were successfully reared from immature stages; as given below. Also early in the summer a few feeding experiments were made with Diprion polytomum; the results will be repeated when more conclusive.

Hyperaspis signata binotata Say.
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Rec'd. as adults May 19-June 27

Scymnus spp.
No. of samples - 6 No. of individuals - 9
Range - B.C.
Rec'd. as adults July 22-Sept.23

Psyllobora viginti-maculata taedata Lec.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Sept.26

Hippodamia parenthesis Say.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult Sept.23

Hippodamia tibialis Say.
No. of samples - 2 No. of individuals - 2
Range - B.C., N.B.
Rec'd. as adult Sept.16-29

Hippodamia convergens Guer.
No. of samples - 1 No. of individuals - 2
Range - Ont.
Rec'd. as adults Aug.23

Hippodamia lunato-maculata apicalis Csy.
No. of samples - 1 No. of individuals - 1
Range - Alta.
Rec'd. as adult Aug.8

Coccinella trifasciata L.
No. of samples - 6 No. of individuals - 7
Range - Ont., Que.
Rec'd. as adults Aug.14-Sept.10
Rec'd. one individual as pupa July 15. Em. July 19

Coccinella trifasciata perplexa Muls.
No. of samples - 4 No. of individuals - 4
Range - B.C., Ont., Que.
Rec'd. as adults July 28-Sept.29

Coccinella monticolla Muls.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - June 25

Coccinella transversoguttata Fald.
No. of samples - 8 No. of individuals - 10
Range - Ont., Que.
Rec'd. one sample as larvae June 25. Pupated July 2
Em. July 9. Rec'd. rest as adults July 12-Sept.29

Coccinella 9-notata Host.
No. of samples - 3 No. of individuals - 3
Range - Que.
Rec'd. as adults - Aug.22-Sept.3

Coccinella transversoguttata 15-notata Koy.
No. of samples - 2 No. of individuals - 2
Range - B.C.
Rec'd. one sample as larva July 28 Em. as adult Aug.10
Rec'd. other sample as adult Aug.27

Cycloneda munda Say.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult - Sept.18

Cycloneda sanguinea L.
No. of saples - 2 No. of individuals - 2
Range - B.C.
Rec'd. as adults June 20-Sept.24

Adalia disjuncta Rand.
No. of samples - 8 No. of individuals - 8
Range - Ont., Que.
Rec'd. as adults July 13-Sept.22

Adalia bipunctata L.
No. of samples - 3 No. of individuals - 4
Range - B.C., Que.
Rec'd. as adults July 16-Sept.21

Adalia frigida Schn.
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Rec'd. as adults July 15-Sept.1

Cleis picta Rand.
No. of samples - 125 No. of individuals - 161
Range - Ont., Que., N.B., N.S.
Rec'd. as adults June 9-Oct.9

Cleis picta minor Cay.
No. of samples - 25 No. of individuals - 38
Range - B.C., Alta.
Rec'd. 3 samples as larvae. Pupated July 21-Aug.10.
Em. as adults July 27-Aug.28
Rec'd. as adults June 13-Sept.26
The larvae were taken on Hemlock, Sitka Spruce and Eng. Spruce and fed on Adelgids.

Cleis hudsonica Say.
No. of samples - 4 No. of Individuals - 4
Range - B.C., Alta.
Emerged as adults - June 10-Sept.17

Anisoclavia 12-maculata Gebl.
No. of samples - 13 No. of Individuals - 14
Range - B.C., Ont., Que., N.B.
Emerged as adults - June 24-Sept.15

Anisoclavia 14-guttata L.
No. of samples - 4 No. of Individuals - 4
Range - Man., Que., N.S.
Emerged as adults - July 6-Aug.11

Anatis 15-punctata Oliv.
No. of samples - 6 No. of individuals - 8
Range - Que., N.B.
Emerged as adults - May 20-Sept.7

Anatis mali Say.
No. of samples - 71 No. of individuals - 86
Range - B.C., Ont., Que., N.B.
Emerged as adults - June 17-Sept.21
One sample received as larva June 29, pupated July 2 and emerged July 9.

Anatis rathvoni Lec.
No. of samples - 2 No. of individuals - 32
Range - B.C.
Emerged as adults June 30-Aug.12

Mysia randalli Csy.
No. of samples - 6 No. of individuals - 6
Range - B.C., Alta.
Emerged as adults June 25-Sept.24

Neomysia suovittata Muls.
No. of samples - 34 No. of individuals - 37
Range - Ont., Que., N.B., P.E.I.
Rec'd. 35 as adults June 13-Sept.25
Rec'd. 2 as pupae July 9. Em. July 21

Neomysia horni Cr.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult July 15

Neomysia montana Csy.
No. of samples - 3 No. of individuals - 3
Range - B.C., Alta.
Rec'd. as adult Aug.14-Sept.17

Chilocerus bivulnerus Muls.
No. of samples - 4 No. of individuals - 9
Range - Alta., Ont., Que.,
Rec'd. 5 as adults July 1-Sept.17
Rec'd. 4 as pupae Sept.17. Em. Sept.20

Exochomus sp.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. adult May 18

Alleculidae - Comb-clawed Bark Beetles

These beetles, represented here by three genera, live under bark and on flowers.

Hymenorus spp.
No. of samples - 13 No. of individuals - 17
Range - B.C., Ont., Que., N.B.
Rec'd. as adults June 9-July 8

Isomira sp.
No. of samples - 48 No. of individuals - 70
Range - Ont., Que., N.B., N.S.
Rec'd. as adults June 2-July 29

Mycetochara sp.
No. of samples - 1 No. of individuals - 1
Range - P.E.I.
Rec'd. as adult July 20

Tenebrionidae - Darkling Beetles

Eight different species of these beetles with such diverse habits have been found in the collections. The one of most frequent occurrence is Scaphidema aeneolum Lec.

Scaphidema aeneolum Lec.
No. of samples - 93 No. of individuals - 174
Range - B.C., Ont., Que., N.B.
Rec'd. as adults June 14-Oct.6

Upis ceramboides L.
No. of samples - 10 No. of individuals - 10
Range - Sask., Man., Ont., Que.,
Rec'd. as adults June 17-Sept.1

Helops punctipennis Lec.
No. of samples - 5 No. of individuals - 12
Range - B.C.
Rec'd. as adults July 14-Oct.3

Helops regulus Blais.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adults Sept.23

Boros unicolor Say.
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Rec'd. as adults July 18

Paratenetus sp.
No. of samples - 1 No. of individuals - 2
Range - Man.
Rec'd. as adults Sept.21

Tenebrio molitor L. - The Meal-Worm
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult Aug.20.

Tenebrio picipes Host.
No. of samples - 1 No. of individuals - 1
Range - Que.
Sept.19 rec'd. as adult

Lagriidae - Lagriid Bark Beetles

They live under bark and leaves.

Arthromacra aenea Say.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd. as adults July 4-29

Melandryidae

These beetles feed on fungi and dry vegetable matter. One species, Serropalpus, lives on the wounds of forest trees.

Tetratoma concolor Lec.
No. of samples - 1 No. of individuals - 3
Range - B.C.
Rec'd. as adults July 15

Scotochroa basalis Lec.
No. of samples - 4 No. of individuals - 4
Range - B.C.
Rec'd. as adults July 15-Aug.15

Serropalpus barbatus Schall
No. of samples - 3 No. of individuals - 3
Range - Que.
Rec'd. as adults July 5-Aug.25

Prothalpia holmbergi Mann.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult July 25

Dircaea quadrimaculata Say.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult July 28

Penthe pimelia Fab.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 15

Stenotrachelus aeneus Fab.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult Aug.29

Sunchroa punctata Newm.
No. of samples - 2 No. of individuals - 2
Range - Que.
Rec'd. as adults July 26-Aug.8

Tychius sp.
No. of samples - 1 No. of individuals - 1
Range - B.C. Rec'd. as adult Aug.15

Xylita laevigata Hellw.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult July

Scotochroa atra Lec.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult June 30

Ptinidae

Ptinus fur L. - Spider Beetle
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Sept.27

Anobiidae - Death Watch Beetles

Many of the beetles of this family live on dry wood.

Hadrobregmus giblucollis Lec.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Aug.5

Ernobius sp.
No. of samples - 2 No. of individuals - 2
Range - B.C., Alta.
Rec'd. as adults June 30-Sept.15

Ptilinus pruinosa Csy.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult July 9

Microbregma emarginatus Duft.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult June 27

Bostrichidae - Powder Post Beetles

The members of this family also frequent dry wood. The species received, Heterobostrychus aequalis, was in a packing case from India.

Heterobostrychus aequalis
No. of samples - 1 No. of individuals - 1
Range - Rec'd. in Ont. in shipment from India
Rec'd. as adult June 23

Scarabaeidae - Scarab Beetles

This is a large family of beetles, exhibiting a great range in size, form and habits.

Aphodius fimetarius L.
No. of samples - 4 No. of individuals - 4
Range - B.C., Que.
Rec'd. as adults July 15-Sept.29

Aphodius hamatus Say.
No. of samples - 1 No. of individuals - 1
Range - Man.
Rec'd. as adult June 23

Phyllophaga spp. - June Beetles

Phyllophaga anxia Lec.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult July 19

Phyllophaga drakei Kby.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult June 7

Dichelonyx backi Kby.
No. of samples - 20 No. of individuals - 14
Range - B.C., Alta.
Rec'd. as adults June 15-Aug.17

Dichelonyx albicollis Burm.
No. of samples - 8 No. of individuals - 12
Range - Ont., N.B.
Rec'd. as adults June 9-July 15

Dichelonyx canadensis Horn.
No. of samples - 2 No. of individuals - 2
Range - Que.
Rec'd. as adults June 17-30

Dichelonyx subvittata Lec.
No. of samples - 11 No. of individuals - 18
Range - Ont., Que., N.B.
Rec'd. as adults June 15-July 18

Dichelonyx elongata Fab.
No. of samples - 4 No. of individuals - 103
Range - Ont.
Rec'd. as adults June 12-27

Dichelonyx spp.
No. of samples - 2 No. of individuals - 3
Range - B.C.
Rec'd. as adults June 15-20

Diplotaxis sp.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adults June 24

Aegialia lacustris Lec.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adults June 24

Macrodactylus subspinosus Fab. - Rose Chafer
No. of samples - 3 No. of individuals - 6
Range - Ont.
Rec'd. as adults June 9-10

Serica sp.
No. of samples - 1 No. of individuals - 2
Range - Ont.
Rec'd. as adults June 12

Trichiotinus assimilis Kby.
No. of samples - 1 No. of individuals - 4
Range - Ont.
Rec'd. as adults July 19

Ligyrodes relictus Say.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult Aug.29

Osmoderma scabra Beauv.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 30

Cerambycidae - Longhorn Beetles

Members of this family have been frequently beaten off spruce, where they were feeding or resting. In the case of both species of Monochamus the adults were probably feeding on the spruce. Pogonocherus penicellatus is a common little form, the larvae developing secondarily in spruce twigs and the adults presumably feeding on the spruce.

Acmaeops pratensis Laich.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd. as adults June 27-29

Acmaeops proteus Kby.
No. of samples - 8 No. of individuals - 17
Range - Ont., Que.
Rec'd. as adults June 24-Sept.8

Anoplodera minnesotana Csy.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 5

Anoplodera canadensis Fab.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd. as adults July 26-29

Anoplodera nigrella Lec.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 19

Anoplodera vittata Oliv.
No. of samples - 2 No. of individuals - 2
Range - Que.
Rec'd. as adults June 30

Anoplodera chrysocoma Kby.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult July 19

Anoplodera sexmaculata L.
No. of samples - 2 No. of individuals - 3
Range - Man., Que.
Rec'd. as adults June 15-29

Xylotrechus annosus Say.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult June 20

Xylotrechus undulatus Say.
No. of samples - 8 No. of individuals - 8
Range-B.C., Sask., Ont., Que.

Xylotrechus sagittatus Germ.
No. of samples - 1 No. of individuals - 2
Range - Ont.
Rec'd. as larvae July 9

Xylotrechus schaefferi Schott
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Aug.5

Monochamus scutellatus Say. - Black Sawyer
No. of samples - 39 No. of individuals - 57
Range - Ont., Que.
Rec'd. 2 as larvae July 30 and Sept.8
Rec'd. rest as adults June 24-Oct.30

Monochamus notatus Dru. - Grey Sawyer
No. of samples - 10 No. of individuals - 22
Range - Man., Ont., Que.
Rec'd. 3 as larvae July 28 and Sept. 13
Rec'd. rest as adults June 24-Sept.22

Monochamus titillator Fab.
No. of samples - 4 No. of individuals - 6
Range - Sask., Ont.
Rec'd. as adults June 30-Aug.17

Monochamus oregonensis Lec.
No. of samples - 3 No. of individuals - 3
Range - B.C.
Rec'd. Aug.3-Sept.15 as adults

Pogonocherus penicellatus Lec.
No. of samples - 33 No. of individuals - 38
Range - Ont., Que.
Rec'd. as adults June 16- Oct.20

Stenocorus lineatum Oliv.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult July 15

Atimia dorsalis Lec.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Aug.2

Clytus canadensis Hopp.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult June 30

Plectrura spinicauda Mann.
No. of samples - 2 No. of individuals - 3
Range - B.C.
Rec'd. as adult July 21-Sept.22

Prionus californicus Mann.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Aug.16

Stenodontes dasystomus Say.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Aug.3

Pachyta lituratа Kby.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Aug.31

Asemum atrum Esch.
No. of samples - 4 No. of individuals - 4
Range - B.C., Ont., Que.
Rec'd. as adults June 13-July 19

Stenotrachelus aeneus Fab.
No. of samples - 2 No. of individuals - 2
Range - Que.
Rec'd. as adults Aug.22

Criocephalus agrestis Kby.
No. of samples - 3 No. of individuals - 4
Range - Que.
Rec'd. as adults July 9-19

Typocerus velutinus Oliv.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adults July 30

Tragosoma harrisi Lec.
No. of samples - 2 No. of individuals - 2
Range - Sask., Ont.
Rec'd. as adults - June 30-July 11

Astylidius parvus Lec.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adults - July 23

Stenocorus lineatum Oliv.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult June 27

Neoclytus muricatulus Kby.
No. of samples - 2 No. of individuals - 3
Range - Sask.
Rec'd. as adults June 7-30

Evodinus monticola Rand.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult May 20

Callidium violaceum L.
No. of samples - 1 No. of individuals - 1
Rec'd. as adult June 17

Chrysomelidae - Leaf Beetles

Evidently a number of Chrysomelids are to be beaten from the foliage in the forest. Of interest are the Grape Root-worm, the Grape Flea-beetle and the Alder Flea-beetle. Two very common species are Syneta ferruginea and Phyllodecta americana; the most predominant form is Calligrapha philadelphica which is said to breed chiefly on dogwood.

Donacia sulcicollis Lec.
No. of samples - 2 No. of individuals - 2
Range - Que.
Rec'd. as adults Aug.18-Sept.25

Donacia emarginata Harr.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult Oct.20

Donacia cincticornis Newm.
No. of samples - 2 No. of individuals - 2
Rec'd. as adults July 22-Aug.31

Donacia marginata Kby.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Sept.13

Donacia flavipes Kby.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd as adult June 12

Donacia pusilla Say.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult June 9

Syneta ferruginea Germ.
No. of samples - 15 No. of individuals - 19
Range - Man., Ont., Que., N.B.
Rec'd. as adults June 5-July 28

Syneta pilosa Br.
No. of samples - 9 No. of individuals - 11
Range - B.C., Alta., N.S.
Rec'd. as adults June 16-Aug.8

Syneta carinata Mann.
No. of samples - 3 No. of individuals - 4
Range - B.C.
Rec'd. as adults July 15-Aug.2

Syneta hamata Horn
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adultsAug.3

Syneta sp.
No. of samples - 2 No. of individuals - 4
Range - B.C.
Rec'd. as adults July 2-19

Crioceris asparagi L. - Asparagus Beetle
No. of samples - 1 No. of individuals - 21
Range - Ont.
Rec'd. as adults June 19

Crioceris duodecimpunctata L. - Spotted Asparagus Beetle
No. of samples - 1 No. of individuals - 19
Range - Ont.
Rec'd. as adults June 19

Calligrapha philadelphica L.
No. of samples - 10 No. of individuals - 20
Range - Ont., Que.
Rec'd. as adults July 19-Sept.21

Calligrapha bigsbyana Kby.
No. of samples - 5 No. of individuals - 6
Range - Ont., N.S.
Rec'd. as adults May 23-Aug.13

Calligrapha amelia confluens Schffr.
No. of samples - 9 No. of individuals - 15
Range - Ont., Que., N.B., N.S.
Rec'd. as adults June 29-Sept.12

Calligrapha alni Schffr.
No. of samples - 5 No. of individuals - 5
Rec'd. as adults June 19-Aug.19

Calligrapha sp.
No. of samples - 6 No. of individuals - 9
Range - Que.
Rec'd. as adults June 29-Sept.13

Chrysomela interrupta Auct.
No. of samples - 4 No. of individuals - 12
Range - B.C., Ont., Que.
Rec'd. as adults June 3-Aug.29

Chrysomela scripta Fab.
No. of samples - 1 No. of individuals - 7
Range - B.C.
Rec'd. as adults Sept.5

Chrysomela scriptoides Schffr.
No. of samples - 2 No. of individuals - 13
Range - Ont.
Rec'd. as adults May 26-June 7

Chrysomela tremulae Auct.
No. of samples - 6 No. of individuals - 21
Range - Ont.
Rec'd. as adults June 12-Aug.26

Phyllodecta americana Schffr.
No. of samples - 7 No. of individuals - 9
Range - Ont., Que.
Rec'd. as adults May 20-Oct.5

Phytodecta americana Schffr.
No. of samples - 4 No. of individuals - 27
Range - Man., Ont.
Rec'd. 3 as adults June 12-23
Rec'd. the rest as larvae June 24 on Aspen.
Pupation July 1 Emergence July 11-15
Parasite: Doryphorophaga macella

Trirhabda virgata Lec.
No. of samples - 1 No. of individuals - 2
Range - Ont.
Rec'd. as adults July 26

Trirhabda canadensis Kby.
No. of samples - 3 No. of individuals - 4
Range - Man., Ont.
Rec'd. as adults July 8-Aug.25

Galerucella carba Lec.
No. of samples - 6 No. of individuals - 12
Range - B.C.
Rec'd. as adults Aug.19-Oct. 3

Galerucella cavicollis Lec.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult Aug.21

Galerucella sp.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd. as adults June 25

Haltica ambiens alni Harr. - Alder Flea Beetle
No. of samples - 6 No. of individuals - 67
Range - Ont., Que., N.B.
Rec'd. 14 as adults June 17-Sept.17
Rec'd. 53 as larvae July 25-Aug.10
Pupation Aug.4-25. Emergence Aug.15-Sept.23

Haltica chalybea Ill. - Grape Flea Beetle
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult Sept.24

Monoxia sp.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Aug. 29

Adoxus obscurus L. - Western Grape Root Worm
No. of samples - 3 No. of individuals - 3
Range - B.C., Ont., Que.
Rec'd. as adults June 9-Aug.18

Syneta pilosa Brown
No. of samples - 2 No. of individuals - 3
Range - Que.
Rec'd. as adults June 21

Pachyrechys spp.
No. of samples - 2 No. of individuals - 3
Range - Ont.
Rec'd. as adults June 26-Aug.9

Xanthonia 10-notata Say.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd. as adults Aug.22-Sept.17

Chrysochus auratus Fab.
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Rec'd. as adults July 19-23

Leptinotarsa decimlineata Say. - Colorado Potato Beetle
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult July 6

Diabrotica 12-punctata Fab. - Spotted Cucumber Beetle
No. of samples - 3 No. of individuals - 3
Range - Ont.
Rec'd. as adults Aug.25-31

Zeugophora varians Cr.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult May 24

Disonycha alternata Ill.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult May 18

Zygogramma saturalis Fab.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult Aug.5

Chalcoides nana Say.
No. of samples - 1 No. of individuals - 4
Range - Ont.
May 24 rec'd. as adults

Platystomidae

The following fairly common member of this rotten wood and fungus eating family was found.

Eurymycter fasciatus Oliv.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult Sept.4

Curculionidae - Weevils

Several interesting species have been obtained in this family. The record of the Strawberry Root Weevil as far north as Wawa, north east of Lake Superior, is noteworthy. A representative collection of several species of Pissodes was obtained, including many of the White Pine Weevil from points north of the pine belt and also a new species in this genus.

Dyslobus verrucifer Csy.
No. of samples - 4 No. of individuals - 7
Range - B.C.
Rec'd. as adults June 10-Oct.15

Brachyrhinus ovatus deG. - Strawberry Root Weevil
No. of samples - 4 No. of individuals - 4
Range - B.C., Ont.
Rec'd. as adults June 29-Sept.17

Pissodes strobi Peck. - White Pine Weevil
No. of samples - 8 No. of individuals - 41
Range - Ont., Que., N.B.
Rec'd. as adults May 20-Sept.12

Pissodes rotundatus Lec. - Small Spruce Weevil
No. of samples - 9 No. of individuals - 11
Range - B.C., Ont., Que.
Rec'd. as adults July 5-Aug.29

Pissodes affinis Rand.
No. of samples - 5 No. of individuals - 9
Range - Ont., Que.
Rec'd. as adults May 20-Aug.9

Pissodes dubius Rand. - Balsam Bark Weevil
No. of samples - 3 No. of individuals - 5
Range - Ont., Que.
Rec'd. as adults July 30-Sept.16

Pissodes engelmanni Hopk.
No. of samples - 3 No. of individuals - 7
Range - B.C.
Rec'd. as adults July 19-Aug.15

Pissodes fasciatus Lec.
No. of samples - 2 No. of individuals - 2
Range - B.C.
Rec'd. as adults Aug.22-Sept.5

Pissodes approximatus Hopk.
No. of samples - 4 No. of individuals - 4
Range- Ont., Que.
Rec'd. as adults May 20-Sept.21

Pissodes n.sp.
No. of samples - 2 No. of individuals - 2
Range - Que.
Rec'd. as adults June 28-July 16

Pissodes similis Hopk.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adults July 12

Pissodes spp.
No. of samples - 3 No. of individuals - 8
Range - B.C., Ont.
Rec'd. as adults July 15-Sept.15

Hylobius pales Host.
No. of samples - 1 No. of individuals - 7
Range - Que.
Rec'd. as adults May 19

Hylobius congener D.T.
No. of samples - 5 No. of individuals - 5
Range - Ont., Que.
Rec'd. as adults May 20-July 6

Hylobius confusus Kby.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 20

Hypomolyx piceus de G. - Large Spruce Weevil
No. of samples - 74 No. of individuals - 88
Range - Ont., Que., N.B.
Rec'd. as adults June 8 - Sept.26

Magdalis gentilis Lec.
No. of samples - 7 No. of individuals - 7
Range - B.C., Alta., Sask., Ont., Que.
Rec'd. as adults May 26-Aug.17

Magdalis hispoides Lec.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd. as adults June 21

Magdalis perforata Horn
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. July 18 as adult

Magdalis austera Fall.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd. as adults June 8-20

Magdalis sp. nr. alutacea Lec.
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Rec'd. as adults June 19-July 31

Brachyrhinus singularis L.
No. of samples - 2 No. of individuals - 3
Range - Ont., N.S.
Rec'd. as adults June 8-9

Sciopithes obscurus Horn.
No. of samples - 3 No. of individuals - 3
Range - B.C.
Rec'd. as adults Aug.31-Oct.11

Geoderces melanothrix Kby.
No. of samples - 2 No. of individuals - 2
Range - B.C.
Rec'd. as adults July 27-Aug.31

Gelus californicus Lec.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Sept.5

Scythropus californicus Horn.
No. of samples - 2 No. of individuals - 2
Range - B.C., Alta.
Rec'd. as adults June 25-Aug.2

Panscopus sp.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult June 25

Dyslobus sp.
No. of samples - 2 No. of individuals - 3
Range - B.C.
Rec'd. as adults June 29-Aug.2

Sthereus quadrituberculatus Mots.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult July 19

Trichalophus didymus Lec.
No. of samples - 3 No. of individuals - 3
Range - B.C.
Rec'd. as adult July 9-Aug.29

Polydrusus impressifrons Gyll.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult June 14

Sitona flavescens Marsh.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Aug.21

Lepyrus palustris Scop.
No. of samples - 2 No. of individuals - 2
Range - Que.
Rec'd. as adults July 5-Sept.16

Lepyrus gemellus Kby.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult July 12

Elleschus bipunctatus L.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult June 16

Dorytomus sp.
No. of samples - 2 No. of individuals - 2
Range - Man., Ont.
Rec'd. as adults May 14-24

Pandeleteius hilaris Hbst.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult July 20

Cleonus plumbeus Lec.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 12

Procas lecontei Bed.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult July 18

Trachyphloeus bifoveolatus Beck.
No. of samples - 2 No. of individuals - 3
Range - N.B., P.E.I.
Rec'd. as adults July 13

Strophosoma coryli Fab.
No. of samples - 2 No. of individuals - 2
Range - N.S., P.E.I.
Rec'd. as adults June 17-18

Scolytidae - Bark Beetles

These insects are very serious pests, destroying much valuable timber each year. Eight genera are represented in the survey's collections, Dendroctonus and Ips being the most common ones.

Dendroctonus piceaperda Hopk. - Eastern Spruce Bark Beetle
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd. as adults Aug.4

Dendroctonus valens Lec.
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Rec'd. as adults May 20-June 14

Pityophthorus spp.
No. of samples - 4 No. of individuals - 10
Range - Ont., N.B.
Rec'd. as adults June 3- Sept.17

Ips pini Say.
No. of samples - 5 No. of individuals - 25
Range - Sask., Man., Ont., Que.
Rec'd. as adults May 26-Sept.14

Ips perturbatus Eich. - Large Spruce Bark Beetle
No. of samples - 1 No. of individuals - 5
Range - Sask.
Rec'd. as adults July 19

Ips chagnoni Sw.
No. of samples - 1 No. of individuals - 5
Range - Ont.
Rec'd. as adults June 23

Ips perroti Sw.
No. of samples - 1 No. of individuals - 7
Range - Man.
Rec'd. as adults May 31

Pseudohylesinus sp.
No. of samples - 1 — No. of individuals - 1
Range - B.C.
Rec'd. as adult Sept.5

Trypodendron bivittatum Kby.
No. of samples - 1 — No. of individuals - 1
Range - Que.
Rec'd. as adult Aug.2

Polygraphus rufipennis Kby.
No. of samples - 1 — No. of individuals - 2
Range - Sask.
Rec'd. as adults July 19

Pityogenes hopkinsi Sw.
No. of samples - 1 — No. of individuals - 3
Range - Ont.
Rec'd. as adults June 3

Orthotomicus caelatus Eich.
No. of samples - 2 — No. of individuals - 5
Range - Sask., Ont.
Rec'd. as adults June 8-30

HEMIPTERA - True Bugs

Pentatomidae - Stink Bugs

This family includes both predaceous and herbivorous forms. Of the latter, a considerable number of specimens were taken, the most abundant species being Euschistus tristigmus, Meadorus lateralis and Banasa dimidiata, both being known to feed on pine as well as a variety of hardwoods.

Brochymena quadripustulata Fab. - Four-humped Stink Bug
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult Sept.27

Euschistus tristigmus Say. - Three-spotted Stink Bug
No. of samples - 63 No. of individuals - 98
Range - Ont., Que., N.B.
Rec'd. as adults June 11-Sept.25

Euschistus euschistoides Voll.
No. of samples - 4 No. of individuals - 5
Range - Sask., Ont., Que.
Rec'd. as adults July 16-Sept.26

Euschistus sp.
No. of samples - 1 No. of individuals - 1
Range - N.B.
Rec'd. as adults Aug.14

Banasa dimidiata Say. - Banasa Stink-bug
No. of samples - 29 No. of individuals - 32
Range - Ont., Que., N.B.
Rec'd. as adults June 10-Sept.20

Meadorus lateralis Say. - Mottled Stink Bug
No. of samples - 35 No. of individuals - 58
Range - Ont., Que., N.B.
Rec'd. as adults June 10-Sept.20

Elasmostethus cruciatus Say. - Red-crossed Stink Bug
No. of samples - 32 No. of individuals - 57
Range - Ont., Que., N.B.
Rec'd. as adults July 11-Sept.24

Podisus modestus Dall. - Modest Soldier -Bug
No. of samples - 10 No. of individuals - 11
Range - Ont., Que.
Rec'd. as adults May 19-Sept.14

Podisus seriventris Uhl. - Forest Soldier-Bug
No. of samples - 101 No. of individuals - 120
Range - Man, Ont., Que., N.B.
Rec'd. as adults May 19-Sept.23

Podisus placidus Uhl. - Placid Soldier Bug
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - July 19

Cosmopepla bimaculata Thomas
No. of samples - 2 No. of individuals - 7
Range - Que., P.E.I.
Rec'd. as adults Sept.14-15

Chlorochroa uhleri Stahl.
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Rec'd. as adults July 29-Aug.26

Chlorochroa sp.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 31

Zicrona caerulea Linn.
No. of samples - 1 No. of individuals - 1
Range - N.B.
Rec'd. as adult Aug.10

Pentatomid nymphs
No. of samples - 44 No. of individuals - 50
Range - Ont., Que., N.B.
Rec'd. as adults July 14-Sept.8

Scutelleridae - Shield Bugs

This family is represented here by two species; one of these, Tetyra bipunctata is the first record of this insect in Canada.

Tetyra bipunctata H.S.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd. as adults June 11-Aug.27

Homaemus aeneifrons Say.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adults Aug.13

Coreidae - Squash Bug Family

Alydus sp.
No. of samples - 1 No. of individuals - 2
Range - Que.
Rec'd. as adults Aug.17

Aradidae - Flat Bugs

These insects live under the bark of dead twigs.

Aradus spp.
No. of samples - 3 No. of individuals - 3
Range - Ont.
Rec'd. as adults June 25-Aug.2

Neididae - Stilt Bugs

These insects frequent the undergrowth of forests and the grass of meadows.

Neides muticus Say.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Aug.31

Lygaeidae - Chinch Bug Family

The family is represented in the survey by the showy Lygaeus kalmii.

Lygaeus kalmii Stal.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Aug.13

Tingitidae - Lace Bugs

Three species of this plant-sucking family were beaten off trees in the survey.

Corythucha spp.
No. of samples - 5 No. of individuals - 24
Range - Ont., Que.
Rec'd. as adults June 6-Sept.5

Reduviidae - Assassin Bugs

These bugs are predaceous on other insects.

Zelus exsanguis Stahl. - Green Assassin Bug
No. of samples - 3 No. of individuals - 5
Range - Ont., Que.
Rec'd. as adults June 13-Sept.27

Nabidae - Damsel Bugs

The members of this predaceous family are usually found on flowers.

Nabis rufusculus Reut. - Little Red Damsel-Bug
No. of samples - 7 No. of individuals - 7
Range - Que.
Rec'd. as adults Aug.12-Sept.25

Nabis sp. prob. nigrovittatus Sahb.
No. of samples - 2 No. of individuals - 3
Range - N.S.
Rec'd. as adults July 15

Nabis spp.
No. of samples - 15 No. of individuals - 20
Range - Ont., Que.
Rec'd. 2 samples as nymphs July 3 and July 26.
Rec'd. rest as adults July 20-Aug.26

Miridae - Plant Bugs

Members of this very widespread family would naturally occur in a survey of this nature. Nearly all of them are plant-feeders, but it is interesting to note that the predaceous genus Deraeocoris is quite well represented.

Deraeocoris kennicotti ? Kngt.
No. of samples - 2 No. of individuals - 2
Range - Que.
Rec'd. as adults Aug.7-25

Deraeocoris sp. - Predaceous Plant Bugs
No. of samples - 7 No. of individuals - 8
Range - Ont., Que.
Rec'd. as adults July 21-Aug.7

Lygus pratensis L. - Tarnished Plant Bug
No. of samples - 1 No. of individuals - 1
Range - N.B.
Rec'd. as adult Sept.12

Lygus spp.
No. of samples - 10 No. of individuals - 10
Range - Ont., Que.
Rec'd. as adult June 17-Oct.12

Dichroascytus suspectus Reut.
No. of samples - 2 No. of individuals - 2
Range - N.B., N.S.
Rec'd. as adults July 7-20

Phytocoris spp. - Arboreal Plant Bugs
No. of samples - 30 No. of individuals - 37
Range - Ont., Que., N.S., P.E.I.
Rec'd. as adults June 21-Aug.29

Stenotus binotatus Fabr.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adults June 28

Pilophorus sp.
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Rec'd. as adults July 21-26

Miris dolobratus Linn.
No. of samples - 1 No. of individuals - 3
Range - Ont.
Rec'd. as adults June 28

Poecilocapsus lineatus Fabr.
No. of samples - 1 No. of individuals - 5
Range - Que.
Rec'd. as adults July 26

Dichroascytus sp.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 1

Platylellus sp.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 31

Belostomatidae - Giant Water Bugs
No. of samples - 1 No. of individuals - 1
Range - N.B.
Rec'd. as adult Octt 12

HOMOPTERA - True Bugs

Cicadidae - The Cicadas

The following species may indicate the source of Cicada music in the northern forest belt.

Tibicen canicularis Harv. - Dog-day Cicada
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Aug.16

Cercopidae - Spittle Bugs

The genus *Aphrophora* is of interest in this sap-sucking family, three species being evidently common on spruce.

Aphrophora saratogensis Fitch.
No. of samples - 10 No. of individuals - 19
Range - Ont., Que.
Rec'd. as adults July 20-Sept.24

Aphrophora parallella Say. - Pine Spittle Bug
No. of samples - 15 No. of individuals - 28
Range - Ont., Que., N.B.
Rec'd. as adults July 17-Sept.14

Aphrophora signoreti Fitch.
No. of samples - 8 No. of individuals - 10
Range - Ont., Que., P.E.I.
Rec'd. as adults June 19-Sept.18

Aphrophora sp.
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Rec'd. as adults June 29-Aug.2

Philaenus leucophthalmus L.
No. of samples - 2 No. of individuals - 2
Range - Que.
Rec'd. as adults Aug.20-Sept.26

Lepronia quadrangularis Say.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Aug.23

Clastoptera sp.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Sept.24

Membracidae - Tree Hoppers

Carynota stupida Walk.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult July 23

Cicadellidae - Leaf Hoppers

Idiocerus spp.
No. of samples - 3 No. of individuals - 3
Range - Ont., Que.
Rec'd. as adults July 2-Sept.18

Gypona sp.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Sept.6

Graphocephala coccinea Forst.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Aug.27

Fulgoridae - Lantern Bugs

The abundance of the following species of Epiptera (Elidiptera) may possibly indicate a host relationship with spruce.

Epiptera brittoni Metc.
No. of samples - 2 No. of individuals -2
Range - N.B.
Rec'd. as adults July 12-Aug.11

Epiptera slossonae VanD.
No. of samples - 3 No. of individuals - 3
Range - N.B.
Rec'd. as adults June 2-Aug.13

Epiptera spp.
No. of samples - 11 No. of individuals - 13
Range - Ont., Que.
Rec'd. as adults June 18-Sept.28

Aphididae - Plant Lice

Dilachnus sp.
No. of samples - 32 No. of individuals - 50
Range - B.C., Alta.
Rec'd. as adults June - Sept.

Misc. Aphididae
No. of samples - 4 No. of individuals - 8
Range - Ont., Que.
Rec'd. as adults July 2-Sept.28

Coccidae - Scale Insects

Physokermes sp.
No. of samples - 4 No. of individuals - 21
Range - B.C., Alta.
Rec'd. as adults Aug.-Sept.

Chionaspis pinifoliae Fitch - Pine Leaf Scale
No. of samples - 2 No. of individuals - 10
Range - B.C., Alta.
Rec'd. as adults Sept.

Phylloxeridae

Adelges cooleyi Gill.
No. of samples - 6 No. of individuals - 8
Range - B.C., Alta.
Rec'd. as adults Aug.- Sept.

Pineus coloradensis Gill
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult in August.

NEUROPTERA -- NERVE-WINGED FLIES

Chrysopidae - Lacewing Flies

A number of this predaceous group was received, chiefly in the adult stage and considered to be of the genus Chrysopa. In two cases, cocoons were sent in, being usually cemented to the foliage.

Chrysopa sp.

No. of samples - 5 No. of individuals - 14
Range - Ont., Que.
Rec'd as adults July 2 - Sept. 16
Rec'd as cocoons July 3 - 24
Emergence - July 24 - Aug. 7
Parasites - Chrysopoctonus rileyi

LEPIDOPTERA

RHOPALOCERA -- The BUTTERFLIES

Papilionidae Swallow-Tails and Parnassians

Papilio glaucus turnus L. - Tiger Swallow-tail
No. of samples - 1 No. of individuals - 1
Host Tree - Ash
Range - Ont.
Rec'd. as larva - Aug. 18

Pieridae - Pierids

Neophasia menapia F. & F. - Pine Butterfly
No. of samples - 1 No. of individuals - 2
Range - B. C.
Rec'd. as adults - Sept. 19

Pieris rapae L. - Cabbage Butterfly
No. of samples - 3 No. of individuals - 4
Host - Cabbage
Range - Ont., Que.
Pupation - Aug. 8-10
Emergence - Aug. 12-19

Satyridae - Meadow Browns

Megisto eurystus Fab.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - June 29

Minois alope nephele Kby.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - Aug. 20

Nymphalidae Four-footed Butterflies

Argynnis aphrodite Fabr.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - July 28

Nymphalis antiopa L. - Spiny Elm Caterpillar
No. of samples - 4 No. of individuals - 41
Host Trees - Elm, maple, poplar.
Range - Ont., Que.
Pupation - June 18 - July 20
Emergence - June 30 - Aug. 9

Basilarchia arthemis Dru. - The Banded Purple
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - June 23

HETEROCERA -- The MOTHS

Sphingidae Hawk Moths

The larvae of this family rarely do extensive damage to tree foliage. With the exception of the genus Lapara, which feeds on pines, the Sphingid larvae feed on deciduous trees and herbs.

Sphinx kalmiae S. & A.
No. of samples - 1 No. of individuals - 1
Host Tree - Lilac
Range - Ont.
Parasites: Apanteles congregatus (M)
Hypopteromalus tabacum (M)

Sphinx drupiferarum S. & A.
No. of samples - 3 No. of individuals - 4
Host Tree - Choke Cherry
Range - Ont., N. B.
Pupation - Aug. 21
Parasite - Winthemia datanae (M)

Sphinx luscitiosa Clem.
No. of samples - 1 No. of individuals - 1
Host Plant - Red Clover
Range - Que.
Pupation - Oct.
Emergence - 20 days incubation.

Lapara bombycoides Wlk. - Harris's Pine Sphinx
No. of samples - 4 No. of individuals - 4
Host Trees- Jack pine, white pine.
Range - Ont., Que.
Pupation - Aug. 26
Emergence - 23-35 days incubation

Smerinthus jamaicensis geminatus Say - Twin-spotted Sphinx
No. of samples - 1 No. of individuals - 1
Range - Ont.
Parasites - Apanteles smerinthi (M)

Smerinthus cerisyi Kby.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd as adult - June 23

Pachysphinx modesta Harr. - The Modest Sphinx
No. of samples - 3 No. of individuals - 3
Range - Ont.
Rec'd. as adults - June 23 and July 14
Rec'd. as larva - Aug. 16

Hemaris thysbe Fabr. - Thysbe Clear-wing
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd as adult - June 15

Hemaris diffinis Bdn - Bumble Bee Clear-wing
No. of samples - 2 No. of individuals - 6
Range - Ont.
Rec'd as adults - June 23 -July 22

Pholus achemon Dru - Achemon Sphinx
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd as larva - Sept. 1

Celerio lineata Fabr.
No. of samples - 5 No. of individuals - 5
Range - Ont.
Rec'd as adults - Aug. 15-Sept. 4

Celerio galii Kby.
No. of samples - 3 No. of individuals - 3
Range - Ont., Que.
Rec'd. as larvae - July 23-Aug.13
Rec'd. as adults - July 14
Parasites - Diptera sp.

Saturniidae - Giant Silk-worms

Larvae of these large species are frequently collected due to their interest or conspicuousness. Records are obtained of feeding on broad-leaved trees, but those on conifers are very doubtful.

Platysamia cecropia L. - Cecropia Moth
No. of samples - 3 No. of individuals - 3
Host Tree - Elm
Range - Ont., Que.
Emergence - 20 days incubation

Actias luna L. - Luna Moth
No. of samples - 4 No. of individuals - 4
Host Tree - Maple
Range - Ont.
Rec'd. as adult - June 30
Rec'd. as larva - Aug. 23
Rec'd. as pupae - Aug. 25-Sept.22

Telea polyphemus Hbn. - Polyphemus Moth
No. of samples - 2 No. of individuals - 2
Host Tree - Maple
Range - Ont., Que.
Pupation - Aug. 18
Emergence - 14 days incubation

Citheroniidae - Royal Moths

The genera Anisota and Eacles contain the most important forest insects of this family, the former on hardwoods, the latter on conifers.

Anisota rubicunda Fab. - Green-striped Maple Worm
No. of samples - 6 No. of individuals - 20
Host Trees Maple, birch
Range - Ont., Que., N. B.
Pupation - July 19-Aug.17
Emergence - 17-24 days incubation
(Summer gen. July 22-Sept.7)
Parasite - Compsilura concinnata

Eacles imperialis Dru. - Imperial Moth
No. of samples - 4 No. of individuals - 4
Host Trees - W. pine, r. pine, spruce.
Range - Ont., Que.
Pupation - Sept. 8
Emergence - 30 days incubation

Amatidae

Ctenucha virginica Charp
No. of samples - 5 No. of individuals - 6
Range - Ont., Que.
Rec'd as cocoons - June 28
Rec'd as adults - June 29-July 22

Arctiidae - Tiger Moths

This family contains a great variety of conspicuous forms feeding on broad-leaved trees and herbs. The most important species is Hyphantria textor Harr., the northern form of H. cunea, with the adult pure white. The genus Halisidota is also important in forest entomology.

Lexis bicolor Grt.
No. of samples - 10 No. of individuals - 10
Host Tree - Pupae may be beaten off spruce
Range - B. C., Alta., Ont., Que., N. B.
Rec'd as pupae - July 19-25
Rec'd as adults - July 19-Aug. 2

Clemensia albata Pack
No. of samples - 2 No. of individuals - 2
Host Tree - Pupae collected off W. spruce
Range - Ont.
Pupation - June 28
Emergence - June 28-July 5

Halisidota maculata Harr. - Spotted Tussock-Moth
No. of samples - 7 No. of individuals - 24
Host Tree - Poplar, Cherry, Alder, White birch
Range - Ont., Que.
Pupation - Sept. 3-15
Emergence - 14-31 days incubation
Parasites: Mesoleius sp.
Apanteles halisidota (M)

Halisidota argentata Pack. - Silver-spotted Tussock Moth
No. of samples - 1 No. of individuals - 1
Range - B. C.
Emergence - July 25

Apantesis williamsii Dodge
No. of samples - 1 No. of individuals - 1
Host Tree - Oak pine
Range - Ont.
Pupation - June 22
Emergence - July 6

Diacrisia virginica Fab. - Yellow Bear
No. of samples - 1 No. of individuals - 1
Range - N. B.
Rec'd as larvae - July 27

Isia isabella S. & A. - Banded Woolly Bear
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd as larva - Aug. 26

Estigmene acraea Dru. - Salt-marsh Caterpillar
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd as adult - Sept. 10

Hyphantria textor Harr. - Spotless Fall Webworm
No. of samples - 11 No. of individuals - 101
Host tree - Choke Cherry, W. birch
Range - Ont., Que.
Pupation - Aug. 19-Sept. 2
Emergence - 16-32 days incubation
Larval Survival - 12%
Pupal Survival - 25%
Parasites: Apanteles sp.
Therion ? sassacus

Ecpantheria deflorata Fab. - Great Leopard Moth
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd as larva - Aug. 12

Phalaenidae - Cutworms, Owlet Moths

This Noctuid family contains a few genera, larvae of which feed on coniferous foliage The most important of these are Panthea, Elaphria, Palthis, Feralia, Camptylochila, and certain of the genus Autographa. A great variety of species of cutworms are often to be found crawling, in their final larval stages, on forest tree foliage.

Colocasia propinquilinea Grt.
No. of samples - 1 No. of individuals - 1
Host Tree - Pupa taken off spruce
Range - Que.
Emergence - 38 days incubation

Panthea acronyctoides Wlk. - Spruce Tufted Caterpillar
No. of samples - 40 No. of individuals - 34
Host Trees - White spruce, black spruce, tamarack, Balsam.
Range - Ont., Que.
Cocooning - July 31-Sept.28
Emergence - 8-42 days incubation
Larval Survival - 79%
Pupal Survival - 77%
Parasites: Apanteles nr congregatus
Apanteles spp.

Panthea furcilla Pack. - White Pine Tufted Caterpillar

No. of samples - 3 No. of individuals - 6
Host Trees - White pine, red pine
Range - Ont.
Cocooning - Aug.1-Sept.15
Emergence - 12-49 days incubation
Parasites - Winthemia nr. sinuata

Acronicta impressa Wlk.
No. of samples - 1 No. of individuals - 1
Host Tree - Larva taken off tamarack
Range - Ont.
Pupation - July 14
Emergence - July 29

Acronicta innotata Gn.
No. of samples - 1 No. of individuals - 1
Host Tree - Willow
Range - Que.
Pupation - Before Sept. 21
Emergence - 16 days incubation

Acronicta oblinita S. & A.
No. of samples - 1 No. of individuals - 1
Host Tree - Maple
Range - Que.
Rec'd. as larva - Aug. 24

Anomogyna climata Wlk.
No. of samples - 6 No. of individuals - 6
Host - White spruce, Englmann spruce
Range - Alta, Ont., Que., N. B.
Pupation - June 18-July 8
Emergence - July 26-Aug. 10

Anomogyna perquiritata Morr.
No. of samples - 3 No. of individuals - 6
Host Trees - W. spruce, b. spruce, Engelmann spruce
Range - Alta, Que.
Pupation - June 25-July 6
Emergence - July 13-14

Anomogyna youngi Sm.
No. of samples - 1 No. of individuals - 1
Host Tree - White spruce
Range - N. S.
Pupation - June 29
Emergence - Aug. 26

Polia secedens Wlk.
No. of samples - 1 No. of individuals - 1
Range - Alta
Rec'd as adult - June 20

Orthodes contrahens Wlk.
No. of samples - 1 No. of individuals - 1
Range - Man.
Pupation - June 22
Emergence - July 8

Ceramica picta Harr. - Zebra Caterpillar
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as larva - Sept. 20

Leucania unipuncta Haw. - Army Worm
No. of samples - 28 No. of individuals - 250
Range - Ont., Que.
Rec'd as larvae - June 22-Aug. 2
Emergence - Aug. 15-25

Cucullia intermedia Spe.
No. of samples - 1 No. of individuals - 1
Host Tree - Maple
Range - Que.
Rec'd. as larva - Aug. 24

Cucullia convexipennis G. & R.
No. of samples - 1 No. of individuals - 1
Host - Goldenrod
Range - Ont.
Rec'd as larva - Sept. 2

Feralia jocosa Gn. - Green Striped Caterpillar
No. of samples - 78 No. of individuals - 85
Host Trees - W. spruce, b. spruce, balsam, tamarack
Range - Ont., Que.
Pupation - July 31-Sept. 20
Emergence - 2 days incubation
Larval Survival - 53%
Pupal Survival - 2%

Feralia major Sm.
No. of samples - 1 No. of individuals - 1
Host Tree- White spruce
Range - Que.
Emergence - 1 day incubation

Litholomia napaea Morr.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd as adults - Sept. 17-20

Graptolitha pexata Grt.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd as adult - Sept. 13

Graptolitha innominata Sm.
No. of samples - 2 No. of individuals - 2
Host Tree - Maple
Range - N. B.
Pupation - July 12-Aug.1
Emergence - Aug.26-Sept.20

Graptolitha baileyi Grt.
No. of samples - 6 No. of individuals - 6
Host Tree - Jack pine
Range - Que., N. B.
Pupation - July 1
Emergence - Aug. 19

Phlogophora periculosa Gn.
No. of samples - 2 No. of individuals - 2
Range - Que.
Rec'd as adults - July 17-29

Amphipyra tragopoginis L.
No. of samples - 1 No. of individuals - 1
Host - White spruce
Range - Que.
Pupation - June 28
Emergence - July 20

Elaphria versicolor Grt. - Fir Harlequin
No. of samples - 59 No. of individuals - 86
Host Trees - White spruce, black spruce
Range - Ont., Que.
Pupation - Aug. 5-Oct.2
Emergence - 10-19 days incubation
Larval Survival - 23%
Parasites: Chaetophlepsis orbitalis
Braconidae sp.

Elaphria festivoides Gn.
No. of samples - 1 No. of individuals - 1
Host Tree - White spruce
Range - Que.
Pupation - Sept. 21
Emergence - 14 days incubation

Cosmia canescens Behr.
Nostof samples - 1 No. of individuals - 1
Host Tree - Ash (?)
Range - Ont.
Pupation - June 17
Emergence - July 4

Marathyssa inficita Wlk.
No. of samples - 2 No. of individuals - 31
Host Tree - Staghorn Sumach
Range - Ont.
Pupation - July 20
Emergence - Aug.1-8 (35-42 days incubation)

Sarrothripus revayana Scop.
No. of samples - 1 No. of individuals - 3
Host Tree - Willow
Range - Que.
Pupation - July 12
Emergence - July 21-25

Baileya ophthalmica Gn.
No. of samples - 1 No. of individuals - 1
Range - Que.
Pupation - Aug. 6
Emergence - 10 days incubation

Autographa interalia Ottol.
No. of samples - 1 No. of individuals - 1
Host Tree - Pupa taken off Engelmann spruce
Range - B. C.
Emergence - July 1

Autographa selecta Wlk.
No. of samples - 1 No. of individuals - 1
Range - Que
Emergence - July 9

Autographa rectangula Kby.
No. of samples - 2 No. of individuals - 2
Host Tree - Larvae beaten off white spruce
Range - Que.
Pupation - June 26-30
Emergence - July 9-11

Catocala relicta clava Beut.
No. of samples - 1 No. of individuals - 1
Range - Que.
Pupation - July 29
Emergence - Aug. 15

Zale prob. benesignata Harv.
No. of samples - 2 No. of individuals - 2
Host Tree - Jack pine
Range - Ont.
Pupation - July 27-28
Emergence - 3-5 days incubation

Bomolocha abalienalis Wlk.
No. of samples - 1 No. of individuals - 1
Host Tree - White pine
Range - Ont.
Pupation - July 22
Emergence - July 30

Camptylochila aemula Hbn.
No. of samples - 1 No. of individuals - 2
Host Tree - White spruce
Range - Ont.
Pupation - June 22
Emergence - July 4-8

Camptylochila americalis Gn.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd as adult - July 14

Epizeuxis prob. protumnusalis Wlk.
No. of samples - 5 No. of individuals - 5
Host Trees - White spruce, black spruce
Range - Ont., Que.
Pupation - June 18-28
Emergence - June 24-July 11

Palthis angulalis Hbn.
No. of samples - 13 No. of individuals - 17
Host Tree - White spruce, black spruce
Range - Ont., Que.
Web spun - Aug. 11-Nob. 26
Emergence - 10-15 days incubation

Notodontidae - The Prominents

This family contains a number of large forms feeding on hardwoods. Two species of Datana and several species of the genus Heterocampa achieve considerable importance as forest insects.

Datana ministra Dru. - Yellow-necked Caterpillar
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as larva - Aug. 26

Symmerista albifrons A. & S. Red-humped Oak Worm
No. of samples - 3 No. of individuals - 3
Host Tree - White pine
Range - Ont., Que.
Emergence - 21 days incubation

Heterocampa manteo Dbbdy - Variable Oak-leaf Caterpillar
No. of samples - 1 No. of individuals - 1
Host Tree - White Oak
Range - Ont.
Pupation - Sept. 19
Emergence - Oct. 5 (continuously incubated)

Heterocampa guttivitta Wlk. - Saddled Prominent
No. of samples - 6 No. of individuals - 19
Host Trees - W. oak, maple, elm and mixed hardwoods
Range - Ont., Que.
Pupation - July 25-Aug. 8
Emergence - Aug. 22-Sept. 24

Heterocampa biundata Wlk.
No. of samples - 1 No. of individuals - 1
Host Tree - Maple
Range - Ont.
Pupation - Aug. 2
Emergence - Sept. 24 (incubated)

Schizura unicornis A. & S. - Unicorn Caterpillar
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Rec'd as larvae - Aug. 21-Sept.15

Schizura concinna A. & S. - Red-humped Apple Worm
No. of samples - 2 No. of individuals - 6
Host Tree - Manitoba maple
Range - Ont., Que.
Pupation - Aug. 16-Sept. 20
Emergence - 21 days incubation
Parasite - Eremotylus sp.

Liparidae - Tussock Moths

Almost all the genera in this family may lay claim to be important forest insects. Notolophus, Olene and Hemerocampa contain species feeding on conifers, while Liparis, Stilpnotia, Nygmia, Euproctis and Hemerocampa again contain forms defoliating hardwoods.

Notolophus antiqua L. - Rusty Tussock Moth
No. of samples - 69 No. of individuals - 184
Host Trees - W. spruce, r. spruce, blue spruce, tamarack
Range - Ont., Que., N. B.
Pupation - July 9-Aug. 24
Emergence - July 29 Sept.12
Larval Survival - 43%
Pupal Survival - 56%
Pupal parasitism - 8%
Sex Ratio - 25%
Parasites: Itoplectis conquisitor
Iseropus coelebs
Pteromalidae sp.

Notolophus antiqua badia Hy. Edw.
No. of samples - 6 No. of individuals - 7
Host Tree - Engelmann spruce
Range - B. C.
Pupation - Aug. 2-23
Emergence - Aug.19-Sept.14

Hemerocampa leucostigma Abb. - White-marked Tussock Moth
No. of samples - 10 No. of individuals - 107
Host Trees - Willow, poplar, elm, maple, Man.maple, birch, apple; also found on tamarack, balsam, spruce
Range - Man., Ont., Que., N. S.
Cocooning - July 16-Sept.1
Emergence - july 22-Sept. 28
Parasites: Amblyteles unifasciatorius
Itoplectic conquisitor
Exorista mella
Phorocera claripennis

Hemerocampa pseudotsugata McD. - Douglas Fir Tussock Moth
No. of samples - 2 No. of individuals - 2
Host Tree - Douglas Fir
Range - B. C.
Rec'd. as adults - Sept.

Olene plagiata Wlk - Grey Spruce Tussock Moth
No. of samples - 46 No. of individuals - 65
Host Trees - W. spruce, b. spruce, tamarack, balsam, hemlock and jack pine
Range - Man., Ont., Que.
Pupation - June 15-July 25
Emergence - June 24-Aug.10
Larval Survival - 37%
Pupal Survival - 100%
Parasite - Compsilura concinnata

Olene grisefacta Dyar
No. of samples - 4 No. of individuals - 4
Host Trees - Englmann spruce, Sitka spruce
Range - B. C., Alta
Pupation - June 20-27
Emergence - June 27-July 18

Stilpnotia salicis L. - Satin Moth
No. of samples - 1 No. of individuals - 1
Range - N. S.
Rec'd. as adult - Aug. 9

Lasiocampidae - Tent and Lappet Caterpillars

Three genera, -Tolype, Malacosoma and Epicnaptera-, occur on forest trees to any extent. Of these, the genus Malacosoma, or Tent Caterpillars, is far the most important. Second-growth hardwood stands in America are periodically stripped by the various species of Malacosoma.

Tolype laricis Fitch - Larch Lappet Moth
No. of samples - 14 No. of individuals - 22
Host Trees - Tamarack, w. spruce, Norway spruce, jack pine
Range - Ont., N. B.
Pupation - July 18-Aug.15
Emergence - Aug. 6- Oct.7

Malacosoma disstria Hbn. - Forest Tent Caterpillar
No. of samples - 34 No. of individuals - 3,230
Host Trees - Trembling aspen, large-toothed aspen, hazel, white birch, misc. hardwoods except r. maple, occasionally found on spruce.
Range - Sask., Man., Ont., Que., N.B., P.E.I., N.S.
Cocooning - June 17-24
Emergence - June 29-July 19
Cocoon survival - 50% ('37) 35% ('38)
Cocoon parasitism - 53% ('37) 51% ('38)
Parasites:

Itoplectis conquisitor	Achaetoneura frenchii
Labrorychus analis	Achaetoneura samiae
Gambrus sp.	Achaetoneura sp.
Rhogas sp.	Exorista mella
Sarcophaga aldrichi	Agria affinis
Megaselia nr. ursina	

Malacosoma pluvialis Dyar - Western Tent Caterpillar
No. of samples - 10 No. of individuals - 212
Host Trees - Choke cherry, redcherry, willow, elm
Range - Sask., Ont., Que.
Cocooning - July 6
Larval Survival - 1%
Parasite - Rhogas sp.

Malacosoma americana Fab. - Orchard Tent Caterpillar
No. of samples - 4 No. of individuals - 116
Host Trees - Choke cherry, red cherry, black cherry
Range - Ont., Que.
Hatching - May 17
Cocooning - June 13-23
Emergence - June 23-July 13

Epicnaptera americana - American Lappet Moth
No. of samples - 2 No. of individuals - 2
Host Tree - poplar
Range - Ont.
Cocooning - Aug. 15-27
Emergence - 10 days incubation

Geometridae - Loopers, Spanworms

Larvae of this family are very common on spruce and other forest trees, especially as the summer advances. In most cases, the species are relatively unimportant, and thus very little known; their identification is further complicated by their variability. Perhaps the most important group of forest insects in this family is the genus Ellopia. In the fauna of conifers, the genera Nepytia, Semiothisa, Eupithecia, Caripeta and Hydriomena are all interesting.

Eupithecia palpata Pack. - Brown Spruce Looper
No. of samples - 22 No. of individuals - 28
Host Trees - White spruce, black spruce
Range - Ont., Que.
Pupation - Aug. 17-Oct. 22
Emergence - 8-11 days incubation
Parasite - Casin ria sp.

Eupithecia frostiata Swett.
No. of samples - 1 No. of individuals - 1
Host Tree - Tamarack
Range - Ont.
Pupation - July 7
Emergence - July 22

Eupithecia bradorata McD
No. of samples - 1 No. of individuals - 1
Host Tree - White spruce
Range - Que.
Pupation - Sept. 6
Emergence - 27 days incubation

Eupithecia luteata Pack.
No. of samples - 2 No. of individuals - 3
Host Tree - White spruce
Range - Que.
Pupation - Aug. 11-31
Emergence - 9-10 days incubation

Eupithecia fletcherata Tayl.
No. of samples - 1 No. of individuals - 1
Host Tree - Tamarack
Range - Que.
Pupation - Aug. 27
Emergence - 13 days indubation

Hydriomena divisaria Wlk. - Transverse-banded Looper
No. of samples - 57 No. of individuals - 106
Host Trees - W. spruce, b. spruce, balsam, tamarack
Range - Man., Ont., Que.
Pupation - Aug.25-Nov.22
Emergence - 7-14 days incubation
Larval Survival - 78%
Pupal Survival - 66%
Pupal Parasitism - 8%
Parasites - Rhogas sp. Campoplex sp.
Euceros couperii Camploplegidea luctuosa

Eulype hastata gothicata Gn.
No. of samples - 3 No. of individuals - 7
Range - B. C., Ont.
Rec'd. as adults - June 29-July 15

Physostegania pustularia Gn.
No. of samples - 1 No. of individuals - 1
Host Tree - Spruce
Range - Que.
Pupation - July 5
Emergence - July 19

Semiothisa oweni Swett.
No. of samples - 1 No. of individuals - 1
Host Tree - Red spruce
Range - Que.
Pupation - July 18
Emergence - Sept. 19 (cont. incubated)

Semiothisa sexmaculata Pack. - Green Larch Looper
No. of samples - 8 No. of individuals - 60
Host Tree - Tamarack
Range - Ont., Que.
Pupation - July 5-Sept.3
Emergence - July 26-Aug. 6
Larval Survival - 50%
Pupal Parasitism - 23%
Parasites: Casinaria eupitheciae Campoplegidea sp.
Hyposoter nr. geometrae Macrocentrus uniformis
Hyposoter sp.

Semiothisa granitata Gn. - Green Spruce Looper
No. of samples - 609 No. of individuals - 2022
Host Trees - W. spruce, b. spruce, balsam, tamarack
Range - Sask., Man., Ont., Que., N. B.
Pupation - Aug. 7-Oct. 23
Emergence - 8-13 days indubation (occasional up to 101 days)
Summer gen. - July 24 to Oct. 21

Larval Survival - 54% ('36) 42% ('37)
Pupal Survival - 57% ('36) 34% ('37)
Pupal Parasitism - 36% ('36) 33% ('37)
Parasites: Macrocentrus uniformis Euceros frigidus
Meteorus sp. Euceros sp.
Microgaster sp. Amblyteles sp.
Microgaster ? n. sp. Ophion sp.
Alciodes sp. Hyposoter sp.
Chorinaeus ? n. sp. Rhogas spp.
Apanteles nr. congregatus Platylabus sp.
Apanteles nr. compressus Campoplegidea vicina
Apanteles ? nemoriae Campoplegidea n. sp.
Apanteles spp. Casinaria eupitheciae
Mesochorus sp. (Hyper.)

Dysmigia loricaria Evers.
No. of samples - 1 No. of individuals - 1
Host Trees - Poplar and Willow
Range - Ont.
Pupation - May 30
Emergence - June 8

Eufidonia notataria Wlk.
No. of samples - 1 No. of individuals - 1
Host Tree - Hemlock
Range - Que.
Pupation - Aug. 14
Emergence - 15 days incubation

Paraphia piniata Pack.
No. of samples - 13 No. of individuals - 14
Host Trees - W. spruce, tamarack
Range - Man., Ont., Que., N. B.
Pupation - June 17-July 10
Emergence - June 24-July 15

Melanolophia canadaria Gn.
No. of samples - 2 No. of individuals - 2
Host Tree - W. spruce, tamarack
Range - Ont., Que.
Pupation - Aug. 6
Emergence - 2 days incubation

Protoboarmia porcelaria Gn.
No. of samples - 15 No. of individuals - 22
Host Tree - W. spruce, tamarack
Range - Ont., Que., N. B.
Pupation - June 13-July 5
Emergence - June 22-July 19

Anacamptodes vellivolata Hlst.
No. of samples - 3 No. of individuals - 4
Host Tree - Spruce
Range - Ont.
Pupation - July 27-Aug. 16
Emergence - 2 11 days incubation

Anacamptodes larvaria Gn.
No. of samples - 2 No. of individuals - 2
Host Trees - Balsam, white spruce (?)
Range - Ont., Que.
Pupation - July 12
Emergence - July 18

Ectropis crepuscularia Schiff.
No. of samples - 4 No. of individuals - 5
Host Trees - Spruce, tamarack
Range - Que.
Pupation - July 25-30
Emergence - Aug.10-Sept 10

Erannis tiliaria Harr. - Lime-tree Looper
No. of samples - 2 No. of individuals - 2
Host Tree - Basswood
Range - Ont.
Pupation - June 17-23
Emergence - Sept. 1

Amphidosis cognataria Gn. - Pepper-and-salt Currant Moth
No. of samples - 8 No. of individuals - 21
Host Trees - Mountain ash, tamarack, Japanese larch; also w. spruce and b. spruce
Range - Que.
Pupation - Aug 26-Sept. 12
Emergence - 15-18 days incubation

Xanthotype urticaria Swett.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult - June 29

Campaea perlata Gn.
No. of samples - 3 No. of individuals - 3
Host Trees - white oak; also spruce and tamarack
Range - Ont., Que.
Pupation - June 8-Aug. 4
Emergence - June 27-Aug. 15

Hyperetis amicaria alienaria H.-S.
No. of samples - 3 No. of individuals - 5
Host Trees - Elm; also taken on white spruce
Range - Ont., Que.
Pupation - Aug. 27-31
Emergence - 11 days incubation (also Sept. 14 when cont. incubated)

Nematocampa limbata Haw.
No. of samples - 3 No. of individuals - 56
Host Trees - W. hemlock, elm
Range - B. C., Ont.
Pupation - June 22-July 25
Emergence - June 30-Aug. 8

Ennomos subsignarius Hbn.
No. of samples - 1 No. of individuals - 1
Host Tree - Maple
Range - Ont.
Pupation - Aug. 3
Emergence - Aug. 8

Pero morrisonarius H. Edw.
No. of samples - 1 No. of individuals - 1
Host Tree - Larch
Range - Que.
Pupation - Sept. 11
Emergence - 15 days incubation

Nepytia phantasmoria Streck. - Green Hemlock Looper
No. of samples - 5 No. of individuals - 19
Host Trees- Sitka spruce, Douglas fir (?)
Range - B. C.
Pupation - July 18-Aug. 8
Emergence - Aug.28-Sept.22

Nepytia canosaria Wlk. - False Hemlock Looper
No. of samples - 46 No. of individuals - 64
Host Trees - W. spruce, b. spruce, r. pine, cedar
Range - Ont., Que.
Pupation - July 7-Aug. 25
Emergence - Aug. 9-Oct. 1
Larval Survival - 49%
Pupal Survival - 60%
Pupal Parasitism - 40%
Parasites: Meteorus hyphantriae Apanteles sp.
Meteorus nr. vulgaris Madremyia saundersii
Zele sp.

Caripeta divisata Wlk - Grey Spruce Looper
No. of samples - 114 No. of individuals - 159
Host Trees - W. spruce, b. spruce, balsam, tamarack
Range - Sask., Ont., Que.
Pupation - Aug. 27-Oct. 22
Emergence - 17-46 days incubation (also Oct. 17 when cont. incubated)
Larval Survival - 51%
Pupal Survival - 63%
Pupal Parasitism - 18%
Parasites: Euceros couperii Madremyia saundersii
Casinaria eupitheciae Xanthophyto n. sp.
Casinaria sp.

Caripeta angustiorata Wlk. - Rusty Pine Looper
No. of samples - 1 No. of individuals - 2
Host Tree - Jack pine
Range - Ont.
Pupation - Sept. 3
Emergence 37-48 days incubation

Ellopia fiscellaria Gn. - Hemlock Looper
No. of samples - 78 No. of individuals - 167
Host Trees - Hemlock, w. spruce, b. spruce, balsam, cedar, r. pine
Range - Ont., Que.
Pupation - July 24-Aug. 27
Emergence Aug. 3-Oct. 1
Larval Survival - 63%
Pupal Survival - 87%
Pupal Parasitism - 7%

Ellopia fiscellaria Gn. (Cont.)
Parasites: Nemoremyia saundersii
Blondelia eufitchiae
Blondelia sp.
Chaetoplepsis orbitalis

Ellopia quercivoraria Gen.
No. of samples - 1 No. of individuals - 3
Host Tree - W. spruce (?)
Range - Que.
Pupation - Oct.
Emergence - 10-12 days incubation

Cingilia catenaria Dru. - Chain-spotted Geometer
No. of samples - 7 No. of individuals - 33
Host Trees - black spruce, red pine, jack pine (?)
Range - Ont., Que.
Pupation - Aug. 1-25
Emergence - Aug. 23-Oct. 1

Sicya agyllaria Wlk.
No. of samples - 1 No. of individuals - 1
Host Trees - Taken from white pine and hemlock
Range - B. C.
Rec'd as adult - Aug. 25

Deuteronomos nagharius Gn. - Notched-wing Geometer
No. of samples - 1 No. of individuals - 1
Range - Que.
Pupation - July 25
Emergence - Aug. 16

Synaxis jubararia Hlst.
No. of samples - 1 No. of individuals - 1
Host - Engelmann spruce
Range - B. C.
Pupation - Aug. 2
Emergence - Sept. 9

Tetracis lorata Grt.
No. of samples - 1 No. of individuals - 1
Range - Que.
Pupation - Sept. 11
Emergence - 13 days incubation

Abbottana clemataria A. & S.
No. of samples - 1 No. of individuals - 2
Hosts - Currant, raspberry
Range - Ont.
Pupation - Aug. 2
Emergence - 4-5 days incubation

Prochoerodes transversata Dru.
No. of samples - 5 No. of individuals - 5
Host Trees - White spruce, tamarack, white pine
Range - Ont., Que.
Pupation - July 15-Aug. 1
Emergence - July 28-Aug. 15

Pyralidae

Contained in this family are a number of forms affecting twigs, buds and foliage. The genus that is most important as affecting coniferous trees is Pinipestis. The distinction between P. reniculella and P. abietella is obscure.

Pinipestis reniculella Grt. - Spruce Cone Worm
No. of samples - 20 No. of individuals - 33
Host Tree - Spruce (cones and needles)
Range - B. C., Sask., Man., Ont., Que.
Pupation - June 6-Nov. 2
Emergence - June 16-Aug. 14

Pinipestis abietella D. & S. - Cone Pyralid
No. of samples - 1 No. of individuals - 1
Range - N. S.
Pupation - Oct.

Pinipestis cambiicola Dyar.
No. of samples - 3 No. of individuals - 10
Host Trees - Red pine, scots pine
Range - Ont.
Pupation - July 10
Emergence - July 23-31

Pinipestis zimmermanni Grt. - Zimmermann Pine Moth
No. of samples - 3 No. of individuals - 6
Host Tree - Scots pine, Austria pine
Range - Ont.
Pupation - July 22
Emergence - Sept. 9
Parasite: Calliephialtes extensor

Ephestia elutella Hbn. - Chocolate Moth
No. of samples - 1 No. of individuals - 50
Host - White spruce seeds
Range - Ont.
Pupation - Mar. 11 (incubated)
Emergence - Mar. 18-28 (incubated)

Loxostege sticticalis L. - Beet Webworm
No. of samples - 1 No. of individuals - 4
Range - B. C.
Rec'd. as adults - June 26

Herculia thymetusalis Wlk - Spruce Needle Worm
No. of samples - 9 No. of individuals - 23
Host Trees - White spruce, black spruce
Range - Ont., Que.
Cocooning - July 23-Nov. 22
Emergence - Sept. 21-Oct. 21 (continuously incubated)
Parasite - Meteorus sp.

Phlyctaenia extricalis Gn. - Alder Leaf-tier
No. of samples - 3 No. of individuals - 3
Host Tree - White birch
Range - Ont., Que.
Cocooning - Oct. 6
Emergence - 17 days incubation

Tetrolopha asperatella Clem.
No. of samples - 2 No. of individuals - 8
Host Trees - Sugar maple, basswood
Range - Ont.
Pupation - Sept. 6
Emergence - Sept. 21 (continuously incubated)

Moodna ostrinella Clem.
No. of samples - 1 No. of individuals - 8
Host Tree - Staghorn Sumach (spikes)
Range - Ont.
Pupation - Aug. 10
Emergence - Aug. 19-24

Tortricidae - Leaf Rollers

This family contains a number of feeders on hardwood and coniferous trees, the feeding being accompanied by leaf-rolling or webbing. Species in the coniferous groups comprise some of the most destructive forest insects. Cacoecia, Tortrix, Peronea and Zeiraphera contain species feeding on evergreen foliage, Petrova and Rhyacionia on twigs and shoots of conifers.

Anchylopera discigerana Wlk.
No. of samples - 3 No. of individuals - 10
Host Trees - Yellow birch
Range - Que.
Pupation - 10 days incubation (webs spun in fall)
Emergence - 16-21 days incubation

Petrova albicapitana Busk. - Jack Pine Pitch-nodule Maker
No. of samples - 28 No. of individuals - 155
Host Trees - Jack pine, white pine
Range - Sask., Man., Ont., Que.
Emergence May 25-Sept. 17 (continuous through summer)
Parasites: Epiurus sp.
Macrocentrus cuniculus
Calliephialtes extensor

Rhyacionia buoliana Schiff. - European Pine Shoot Moth
No. of samples - 14 No. of individuals - 120
Host Trees - Scots pine, jack pine, Mugho pine, lodgepole pine
Range - B. C., Ont.
Pupation - June 5-15
Emergence - June 8-July 5
Parasites - Orgylus obscurator
Hyposoter sp.
Campoplex sp.
Epiurus sp.
Cremastus interruptor
Calliephialtes comstockii
Calliephialtes extensor
Itoplectis conquisitor

Exartema atrodentanum Fern.
No. of samples - 1 No. of individuals - 1
Host tree - White oak
Range - Ont.
Pupation - June 22
Emergence - July 6

Epinotia nisella Cl.
No. of samples - 1 No. of individuals - 5
Host Tree - Found on green ash bark
Range - Sask.
Rec'd. as adults - June 30

Ecdytolopha insiticiana Zell.
No. of samples - 2 No. of individuals - 9
Host Tree - Honey locust (boring in twigs)
Range - Ont.
Pupation - Aug. 8
Emergence - Aug. 27

Aphania capreana Hbn.
No. of samples - 1 No. of individuals - 1
Host Trees - Poplar, willow
Range - Ont.
Pupation - May 31
Emergence - July 15

Sparganothis tristriata Kearf.
No. of samples - 2 No. of individuals - 2
Host Tree - White spruce
Range - Ont., Que.
Pupation - July 15-28
Emergence - July 24-Aug. 5

Sparganothis pettitana Rob.
No. of samples - 2 No. of individuals - 3
Host Trees - Oak, basswood
Range - Ont., Que.
Pupation - June 18-22
Emergence - June 25-27

Sparganothis sulfureana Clem.
No. of samples - 2 No. of individuals - 2
Host Tree - Taken from white spruce
Range - Ont., Que.
Pupation - June 3
Emergence - Aug. 4
Parasite - Exochus sp.

Argyrotaenia lutosana Clem. - Fall Spruce Needle Moth
No. of samples - 40 No. of individuals - 50
Host trees - white spruce, black spruce, balsam
Range - Que.
Pupation - Aug. 30-Oct. 6
Emergence - 6-14 days incubation
Larval Survival - 82%
Pupal Survival - 66%
Pupal Parasitism - 15%
Parasites: Exochus pallipes Glypta sp.
Eolytus pleuralis Phytodictus annulatus

Argyrotaenia quercifoliana Fitch.
No. of samples - 1 No. of individuals - 2
Host Tree - Oak
Range - Ont.
Pupation - June 16
Emergence - June 29

Cacoecia fumiferana Clem. - Spruce Budworm
No. of samples - 36 No. of individuals - 302
Host Trees - Balsam, white spruce, black spruce, Engelmann spruce
Range - B. C., Alta., Ont., Que.
Pupation - June 22-July 8
Emergence - June 28-July 15
Larval Survival - 44%
Pupal Survival - 50%
Pupal Parasitism - 15%
Parasites:

Itoplectis conquisitor	Amblymerus verditer
Meteorus trachynotus	Megaselida nr. xanthocera
Apechthis ontario	Zenillia caesar
Phaeogenes sp.	Zenillia vulgaris
Winthemia fumiferanae	Zenillia sp.

Cacoecia fumiferana Clem. - Jack Pine Budworm
No. of samples - 40 No. of individuals - 430
Host trees - jack pine, red pine, scots pine; also spruce and tamarack
Range - Man, Ont.
Pupation - June 25-July 25
Emergence - July 4-Aug. 17
Larval Survival - 83%
Pupal Survival - 28%
Pupal Parasitism - 18%
Parasites:

Ephialtes conquisitor	Cremastus interruptor
Apechthis ontario	Nemorilla maculosa
Phaeogenes lariolus	Zenillia vulgaris
Hemiteles tenellus	Zenillia caesar

Cacoecia argyrospila Wlk. - Fruit-tree Leaf-roller
No. of samples - 1 No. of individuals - 1
Host tree - Oak
Range - Ont.
Pupation - June 18
Emergence - June 25

Cacoecia cerasivorana Fitch. - Cherry Ugly-nest Leaf-roller
No. of samples - 10 No. of individuals - 695
Host Trees - Choke cherry, alder, aspen
Range - Sask., Man., Ont.
Pupation - June 16
Emergence - June 27-Aug. 12
Larval Survival - 68%
Pupal Survival - 66%
Pupal Parasitism - 10%
Parasites: Labrorychus sp. Zenillia blanda
Exochus sp. Anachaetopsis tortricis
Phytomyptera leucoptera Nemorilla maculosa
Phorocera tortricis

Cacoecia rosaceana Harr. - Oblique-banded Leaf-roller
No. of samples - 6 No. of individuals - 9
Host trees - Choke cherry, poplar, willow
Range - Ont., Que.
Pupation - June 6-Aug. 22 (probably continuous)
Emergence - June 13-Sept. 2

Archips conflictana Wlk. - Large Aspen Leaf-roller
No. of samples - 4 No. of individuals - 75
Host tree - Trembling aspen
Range - Ont., Que.
Emergence - June 3-30
Parasites: Clypta fumiferanae Bassus annulipes
Hypopteromalus sp. Megaselia nr proboscidea
Macrocentrus amicroploides

Tortrix pallorana Rob.
No. of samples - 1 No. of individuals - 1
Host Tree - Scots pine (?)
Range - Ont.
Emergence - June 14

Tortrix packardiana Fern. - Spring Spruce Needle Moth
No. of samples - 11 No. of individuals - 38
Host trees - white spruce, blue spruce
Range - Man., Ont., N. B., P.E.I., N. S.
Pupation - June 8-July 4
Emergence - June 20-July 21

Tortrix alberta McD.
No. of samples - 2 No. of individuals - 2
Host tree - Black spruce
Range - Ont., Que.
Pupation - Aug. 7
Emergence - Aug. 5-13

Peronea variana Fern. - Black-headed Budworm
No. of samples - 148 No. of individuals - 467
Host tree - W.Spruce, B.Spruce, Engelmann Spruce
Range - B.C., Alta., Sask., Ont., Que.
Pupation - June 22-Aug. 13
Emergence -July 2-Sept.7
Larval Survival - 46%
Pupal Survival - 37%
Pupal Parasitism - 31%
Parasites - Phygadeuon sp.
Exochus sp.
Atrometus clavipes
Phaeogenes gaspesianus
Campoplex sp.
Exochus dorsalis annulicrus
Meteorus trachynotus
Phytodietus annulatus
Microgaster peroneae
Eubadizon sp.
Anachaetopsis sp.
Actia diffidens

Peronea heindelana Fern
No. of samples - 1 No. of individuals - 1
Host tree - Willow
Range - Sask.
Rec'd. as larva Aug.15

Zeiraphera fortunana Kearf.
No. of samples - 9 No. of individuals - 19
Host tree - W.Spruce
Range - N.B., N.S.
Pupation - June 10-25
Emergence - July 1-11

Zeiraphera ratzeburgiana Ratz.
No. of samples - 1 No. of individuals - 1
Host tree - Engelmann Spruce
Range - B.C.
Rec'd. as adult Aug.16

Elachistidae

Schreckensteinia sp.
No. of samples - 1 No. of individuals -25
Host Tree - Staghorn Sumack Spikes
Range - Ont.
Pupation - Aug. 10
Emergence - Aug.13-15

Gelechiidae

Larvae of this family are leaf-miners, or borers in shoots or seeds, and are all of small size.

Gelechia sp.
No. of samples - 1 No. of individuals - 2
Host tree- Trembling Aspen
Range - Man.
Pupation - Oct. 5
Emergence - Oct.29 (continuously incubated)

Dichomeris prob. ligulella Hbn.
No. of samples - 1 No. of individuals - 4
Host tree- Scots Pine
Range - Ont.
Pupation - June 22
Emergence - June 30

Duvita dodecella L.
No. of samples - 1 No. of individuals - 1
Host Tree- Scots Pine
Range - Ont.
Pupation - June 15
Emergence - July 4

Helice constrictella Zell.
No. of samples - 1 No. of individuals - 3
Host Tree - Elm
Range - Que.
Pupation - Aug.27
Parasite - Lissonota parva

Gracilariidae

Gracilaria syringella Fab. - Lilac Leaf-miner
No. of samples - 3 No. of individuals - 58
Host Tree - Lilac
Range - Ont., Que., N.B.
Pupation - Aug.20-Sept.3
Emergence - Sept.6-26

Pterophoridae - Plume Moths

Oidaematophorus sp.
No. of samples - 1 No. of individuals - 1
Range - Que.
Pupation - July 1
Emergence - July 15

Aegeriidae - Clearwing Moths

Parharmonia pini Kellicott ♂ Pine Clearwing Moth
No. of samples - 2 No. of individuals - 2
Host tree - W.Spruce
Range - Ont.
Emergence - Dec.1-7 (incubated continuously)

Hepialidae - Swifts

Hepialus gracilis Grt.
No. of samples - 2 No. of individuals - 2
Host - Moss
Range - N.B.
Emergence - July 13-20

DIPTERA - Two-Winged Flies

Anisopodidae - False Crane Flies

Anisopus marginatus Say.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Nov.3

Tipulidae - Crane Flies

The adults of this family are occasionally found resting on spruce. Two genera are represented in the survey, Tipula and Dicranomyia.

Tipula labradorica Alex.
No. of samples - 2 No. of individuals - 3
Range - B.C., Ont.
Rec'd. as adults June 20-21

Tipula angustipennis Lus.
No. of samples - 1 No. of individuals - 1
Range - Alta.
Rec'd. as adults July 18

Tipula sp. nr. trivittata Say.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adults July 2

Dicranomyia sp.
No. of samples - 1 No. of individuals - 1
Range - Alta.
Rec'd. as adult Aug.17

Culicidae - The Mosquitoes

Aedes excrucians Wlk.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Aug.20

Chironomidae - The Midges

Chironomus hyperboreus meridionalis Joh.
No. of samples - 1 No. of individuals - 1
Range - Alta.
Rec'd. as adult June 25

Mycetophilidae - The Fungus Gnats

Mycetophila falcata Joh.
No. of samples - 2 No. of individuals - 2
Range - Alta.
Rec'd. as adults Aug.17-Sept.22

Acnemia psylla Joh.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult - July 15

Allodia sp.
No. of samples - 1 No. of individuals - 1
Range - Alta.
Rec'd. as adult June 20

Sciaridae

Sciara Munda Joh.
No. of samples - 1 No. of individuals - 2
Range - B.C.
Rec'd. as adult June 25

Sciara spp.
No. of samples - 2 No. of individuals - 2
Range B.C., Ont.
Rec'd. as adults June 28 and Sept.28

Bibionidae - The March-Flies

Bibio longipes slossonae Cock.
No. of samples - 11 No. of individuals - 19
Range - B.C., Ont., Que.
Rec'd. as adults Sept.9-Oct.11

Bibio xanthopus Wd.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult June 16

Bibio variabilis Lw.
No. of samples - 1 No. of individuals - 1
Range - Alta.
Rec'd. as adult June 20

Plecia heteroptera Say.
No. of samples - 3 No. of individuals - 3
Range - Ont., Que.
Rec'd. as adults Sept.1-14

Dilphus nr. caurinus McAt.
No. of samples - 1 No. of individuals - 2
Range-B.C.
Rec'd. as adults June 28

Stratiomyiidae - Soldier Flies

Actina viridis Say.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult May 27

Odontomyia interrupta Oliv.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult June 17

Microchrysa polita Linn.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult July 2

Tabanidae - The Horse-Flies

Chrysops vittata Wied.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult July 28

Chrysops carbonaria Walk.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 6

Chrysops sordida O.S.
No. of samples - 2 No. of individuals - 2
Range - Ont., Que.
Rec'd. as adults July 12-13

Chrysops niger Macq.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adults June 29

Rhagionidae - Snipe Flies

Certain species of this family are predaceous on other insects.

Chrysopilus quadratus Say.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 5

Rhagio californicus Leon.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult July 19

Atherix variegata Walk.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 24

Cyrtidae

Ogcodes metampus Lw.
No. of samples - 1 No. of individuals - 2
Range - Man.
Rec'd. as adults July 19

Bombyliidae - The Bee-Flies

Villa moriodes Say.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult June 24

Therevidae - The Stiletto Flies

Thereva strigipes Lw.
No. of samples - 2 No. of individuals - 7
Range - Ont., N.B.
Pupation June 18
Emergence June 25

Asilidae - The Robber Flies

The members of this family are predators in both larval and adult stages. Nine different species are represented in the collections.

Laphria sadales Wlk.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Aug. 19

Laphria gilva L.
No. of samples - 3 No. of individuals - 3
Range - B.C., Ont., Que.
Rec'd. as adults July 16-Sept. 15

Cryptopogon dasyllis Will.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adults Sept. 3

Neoitamus brevicornus Hinc.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult July 11

Eucyrtopogon diversipilosis Curr.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Sept.26

Metapogon nr. setiger Cole
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Aug.18

Machimus nr. callidus Will.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Rec'd. as adult July 30-Oct.5

Dioctria sp.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 12

Laphria n.sp.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult Aug.25

Dolichopodidae - The Long-legged Flies

Dolichopus obcordatus Ald.
No. of samples - 1 No. of individuals - 1
Range - Alta.
Rec'd. as adult June 20

Empididae - The Dance Flies

Rhamphomyia spp.
No. of samples - 2 No. of individuals - 2
Range - B.C., Que.
Rec'd. as adults June 29-Aug.31

Syrphidae - The Syrphus Flies

A large number of pupae of Metasyrphus lapponicus were received from spruce, strongly indicating that the predaceous larvae ranged on spruce foliage.

Sphaerophoria sp.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as larva; pupated July 16 and emerged Aug.9

Metasyrphus lapponicus Zett. - Northern Aphid-Eater
No. of samples - 19 No. of individuals - 26
Range - Ont., Que., N.B.
Pupation - May 30-July 22
Emergence June 2-Aug.8

Metasyrphus wiedmanni (John)
No. of samples - 1 No. of individuals - 2
Range - N.B.
Pupation July 20
Emergence - July 29
Predaceous on elm wool aphis

Eristalis tenax L.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Sept.11

Cartosyrphus pallipes Lw.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult July 5

Rhingia nasica Say.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult June 20

Scaeva pyrasti L.
No. of samples - 1 No. of individuals - 2
Range - Man.
Rec'd. as pupae. Emergence July 11-13

Sericomyia militaris Wlk.
No. of samples - 1 No. of individuals - 1
Range - Que.
Rec'd. as adult Aug.26

Sarcophagidae - Flesh Flies

One species of this family, Sarcophaga aldrichi, parasitizes the Forest Tent Caterpillars.

Sarcophaga aldrichi Park.
No. of samples - 6 No. of individuals - 16
Range - Ont.
Rec'd. as adults June 22-Sept.17

Sarcophaga spatulata Ald.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adults June 23

Tachinidae - Tachina Flies

Wagneria sequax Will.
No. of samples - 2 No. of individuals - 6
Range - Ont.
Rec'd. as adults June 16-Sept.17

Wagneria helymus Wlk.
No. of samples - 1 No. of individuals - 2
Range - Alta.
Rec'd. as adults Sept.22

Peletria sp.
No. of samples - 1 No. of individuals - 1
Range - Alta.
Rec'd. as adult Sept.22

Cylindromyia intermedia Mg.
No. of samples - 1 No. of individuals - 1
Range - Man.
Rec'd. as adult June 24

Archytas nr. vulgaris Curr.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Sept.17

Cnephaliodes dakotensis Tns.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Aug.26

Cnephaliodes piceifrons Ins.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Aug.10

Muscidae - House Flies

Muscina assimilis Fall.
No. of samples - 2 No. of individuals - 2
Range - Que., N.B.
Rec'd. as adult Aug.9 (from Que.)
The specimen from N.B. was received as pupa in a large bunch of D. polytomum. It emerged Aug.30.

Calliphoridae - Blow Flies

Pollenia rudis Fab. - The Cluster Fly
No. of samples - 2 No. of individuals - 4
Range - Que.
Rec'd. as adults July 21-Aug.30

Anthomyiidae - Wood Flies

Lispocephala erythrocera Desv.
No. of samples - 1 No. of individuals - 1
Range - Alta.
Rec'd. as adult Sept.22

Pegomyia sp.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult July 6

Spilaria lucorum Fall.
No. of samples - 2 No. of individuals - 3
Range - B.C.
Rec'd. as adults Aug.1-3

Limnophora magnipunctata Mall.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult Sept.29

Spilogona velutina Mall.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult July 22

Hoplogaster intacta Wlk.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Sept.1

Fannia carbonaria Mg.
No. of samples - 3 No. of individuals - 3
Range - B.C., Que.
Rec'd. as adults June 10-Aug.20

Chloropidae

Madiza n.sp.
No. of samples - 2 No. of individuals- 3
Range - B.C,Alta.
Rec'd. as adults Aug.1/-22

Dryomyzidae

Heterocheila nudiseta Curr.
No. of samples - 1 No. of individuals - 1
Range - B.C.
Rec'd. as adult July 12

Agromyzidae

Agromyza schineri Giraud
No. of samples - 1 No. of individuals - 1
Range - Ont.
Rec'd. as adult Mar. 15

PARASITIC DIPTERA

Tachinidae

Anachaetopsis tortricis Coq.
No. of samples - 8 No. of individuals - 12
Range - B.C., Sask., Ont.
Pupation July 6-28
Emergence - Direct and Indirect. June 30-Aug.5
Hosts - Peronea variana
Caceocia cerasivorana

Xanthophyto n.sp.
No. of samples - 3 No. of individuals - 3
Range - Ont., Que.
Emergence - Direct. Sept.2-Apr.8, 6 mos. before to 12 days after hosts.
Hosts - Semiothisa granitata
Caripeta divisata

Actia diffidens Curr.
No. of samples - 5 No. of individuals - 7
Range - Ont.
Pupation - June 29-Aug.13
Emergence - Indirect. July 7 and Apr.1-4, same time and 9 mos. after hosts.
Hosts - Peronea variana
Caceecia fumiferana

Actia interrupta Curr.
No. of samples - 3 No. of individuals - 3
Range - B.C.
Pupation July 14-21
Emergence - Indirect. July 20-28, 12 days before to same time as hosts.
Hosts - Peronea variana
Cacoecia fumiferana

Blondelia eufitchiae Towns.
No. of samples - 6 No. of individuals - 16
Range - Ont.
Pupation - July 28-Aug.5
Emergence - Indirect. Aug.8-Sept.9, 3 weeks before to same time as host.
Hosts - Ellopia fiscel aria
Semiothisa granitata
Geometridae sp.

Blondelia sp.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Pupation - Aug.9
Emergence - Indirect Aug.20, 2 days after host
Host - Ellopia fiscellaria

Chaetophlepsis orbitalis Webb.
No. of samples - 33 No. of individuals - 46
Range - Ont., Que.
Pupation - July 22-Sept.30
Emergence - Indirect. Feb. 27-May 17, same time to 7 mos. after hosts.
Hosts - Semiothisa granitata
Ellopia fiscellaria
Geometridae spp.
Monodes versicolor

Chaetophlepsis sp.
No. of samples - 1 No. of individuals - 1
Range - Que.
Emergence - Sept.21, six months before host
Host - Semiothisa sexmaculata

Zenillia caesar Aldr.
No. of samples - 6 No. of individuals - 38
Range - Ont.
Pupated July 4-8
Emergence - Indirect. July 11-18, same time as host
Host - Cacoecia fumiferana

Zenillia olanda O.S.
No. of samples - 1 No. of individuals - 1
Range - Que.
Emergence - July 25, 1 wk. after host.
Host - Cacoecia cerasivorana

Zenillia vulgaris Fall.
No. of samples - 4 No. of individuals - 12
Range - Ont.
Pupation - July 4-Oct.10
Emergence Indirect. July 13-Oct.17, same time to 5 days after host.
Hosts - Cacoecia fumiferana
Noctuidae sp.

Zenillia sp.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Pupation - Circa July 2
Emergence - Indirect. July 13, at end of host emergence period.
Host - Cacoecia fumiferana

Phytomyptera leucoptera Johns.
No. of samples - 2 No. of individuals - 2
Range - Sask , Que.
Emergence. Direct. July 21 - Aug.3, same time to 3 days after host.
Host - Cacoecia cerisivorana

Phorocera hamata A.& W.
No. of samples - 42 No. of individuals - 143
Range - Man., Ont., Que., N.B.
Emergence - Direct. July 7-Oct.10 and Feb.19-Mar.12 6 mos. before to 3 days after hosts
Hosts- Diprion polytomum
Neodiprion dubiosus
Neodiprion lecontei
Neodiprion pinetum
Neodiprion nanulus
Neodiprion abietis
Pristiphora erichsoni

Phorocera tortricis Coq.
No. of samples - 2 No. of individuals - 7
Range - B.C., Que.
Pupation - July 8
Emergence - Indirect. July 18-22, 9 days before to 4 days after host.
Host - Cacoecia cerasivorana

Phorocera claripennis Macq.
No. of samples - 3 No. of individuals - 3
Range - Ont.
Emergence - Direct. Aug.8-Oct.15, from 8 days to 6 mos. after hosts.
Hosts - Hemerocampa leucostigma
Datana integerrima

Spathimeigenia aurifrons Curr.
No. of samples - 60 No. of individuals - 565
Range - Ont., Que.
Emergence - Direct. July 4-Nov.9 and Feb.19-Apr.1, same time to 6 mos. before and 8 days before to 16 days after hosts.
Hosts - Diprion polytomum
Neodiprion lecontei
Neodiprion swainei
Neodiprion abietis
Neodiprion pinetum
Pristiphora erichsoni

Bessa selecta Mg.
No. of samples - 124 No. of individuals - 230
Range - Ont., Que., N.B.
Pupation (some emerged direct). July 21-Aug.28 and Feb.27
Emergence Direct and indirect
July 27-Nov.1 and Feb.18-Mar.5, 6 months before to same time as hosts.
Hosts - Diprion polytomum, Hemichroa crocea
Neodiprion dubiosus Nymphalis antiopa
Pristiphora erichsoni
Pikonema alaskensis

Madremyia saundersii Will.
No. of samples - 13 No. of individuals - 18
Range - Alta., Ont., Que.
Pupation - July 29-Dec.11
Emergence - Direct and Indirect. Aug.9-Apr.4, from 3 mos. before to same time as host.
Hosts - Nepytia canosaria
Ellopia fiscellaria
Caripeta divisata
Semiothisa granitata

Compsilura concinnata Mg.
No. of samples - 3 No. of individuals -3
Range - Que., N.B.
Pupation - July 12-Aug.26
Emergence - Indirect. July 23-Aug.26, 7 mos. before host
Hosts - Anisota rubicunda
Olene plagiata
Arctiidae sp.

Agria affinis Fall.
No. of samples - 2 No. of individuals - 3
Range - Ont.
Pupation - July 13-23
Emergence - Indirect. July 16 and Apr.4, 9 days to 9 mos. after hosts
Host - Malacosoma disstria

Euthelaira sp.
No. of samples - 2 No. of individuals - 2
Range - Ont.
Emergence - Feb.26-Apr.25, 4 days after host.
Hosts - Neodiprion pinetum
Arge sp.nr.macleayi

Doryphoraphaga macella Reinh.
No. of samples - 1 No. of individuals - 2
Range - Man.
Emergence - Direct. July 13-15, same time as host.
Host - Phytodecta americana

Achaetoneura frenchii Will.
No. of samples - 1 No. of individuals - 13
Range - N.B.
Pupation - Aug.23
Emergence - Indirect. Sept.22, 6 mos. before host.
Host - Sphinx kalmiae

Achaetoneura sordida Curr.
No. of samples - 2 No. of individuals - 12
Range - Man, Ont., Que.
Emergence - Direct. July 13-22, same time as host.
Host - Malacosoma disstria.

Achaetoneura spectabilis Ald.
No. of samples - 1 No. of individuals - 1
Range - Que.
Emergence - Direct. Sept.29
Host - Noctuidae sp.

Achaetoneura samiae Webb.
No. of samples - 1 No. of individuals - 3(M)
Range - Que.
Pupation - July 2
Emergence - Indirect. July 11, same time as host.
Host. Malacosoma disstria.

Achaetoneura sp.
No. of samples - 2 No. of individuals - 3
Range - Ont.
Emergence - Direct. July 8-12, same time as host.
Host - Malacosoma disstria

Nemorilla maculosa Mg.
No. of samples - 14 No. of individuals - 18
Range - Man., Ont., Que., P.E.I.
Pupated July 14-20
Emergence - Direct and Indirect. July 8-Aug.6, 12 days before to 8 days after hosts.
Hosts - Peronea variana,
Cacoecia fumiferana
Cacoecia cerasivorana
Acrobasis rubrifasciella
Acrobasis sp.

Exorista mella Wlk.
No. of samples - 5 No. of individuals - 7
Range - Ont.
Pupation - July 14-25
Emergence - Direct and Indirect. July 19-Sept.2, 6 mos. before to 1 week after host.
Host - Malacosoma disstria
Hemerocampa leucostigma
Hyphantria textor

Winthemia fumiferanae Toth.
No. of samples - 2 No. of individuals - 3
Range - Ont.
Pupation - July 8
Emergence - Indirect. July 28-29, 3 weeks after host.
Host - Cacoecia fumiferana

Winthemia datanae Ins.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Pupation - Aug.9
Emergence - Indirect. Sept.9
Host - Diacrisia virginica

Winthemia sinuata Reinh.
No. of samples - 3 No. of individuals - 7(M)
Range - Ont., Que.
Pupation - Aug.1-Sept.24
Emergence - Indirect. Aug.22-Oct.14, 6 mos. before host
Hosts- Panthea furcilla
Schizura unicornis

Winthemia datanae Towns.
No. of samples - 1 No. of individuals - 15(M)
Range - Ont.
Pupation - March
Emergence - Indirect. Apr. 5-11
Host - Sphinx drupiferarum

Mericia ampela Walk.
No. of samples - 1 No. of individuals - 1
Range - Ont.
Emergence - Direct. Oct. 15, 6 mos. before host.
Host - Datana integerrima

Sarcophagidae - Flesh Flies

Sarcophaga aldrichi Park.
No. of samples - 3 No. of individuals - 17
Range - Ont., Que.
Pupation - July 14-25
Emergence - Indirect. Apr. 3-6, 9 mos. after host.
Host - Malacosoma disstria

Phoridae - Hump-backed Flies

Megaselia sp.nr.ursina Mall.
No. of samples - 1 No. of individuals - 15(M)
Range - Que.
Pupation - Aug.2
Emergence - Indirect. Aug.14-18, 1 month after host.
Host - Malacosoma disstria

FIG. 1

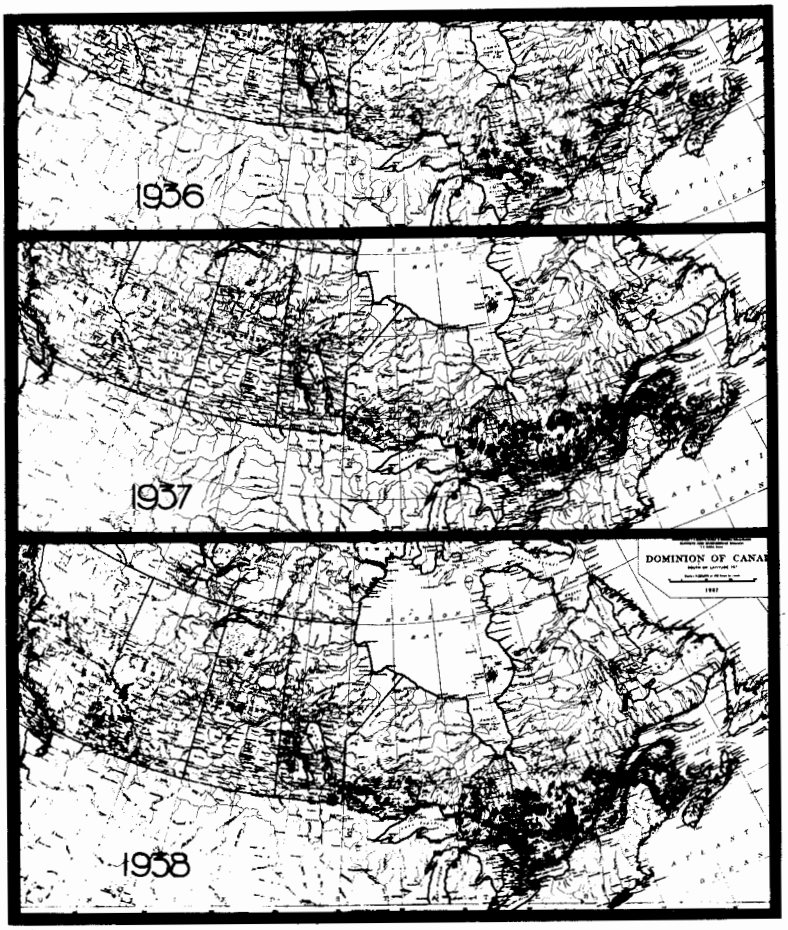

Figure 1. Increase in the number of samples taken for the Forest Insect Survey, 1936-1938.

Fig. I Samples taken for the Forest Insect Survey from 1936 to 1938 (indicated by black dots).

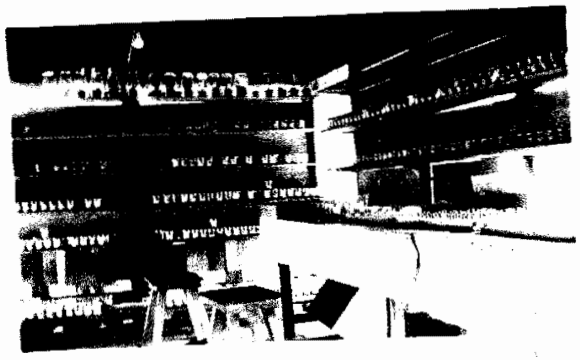

Fig.2 Interior of Insectary during Rearing Work
(showing jelly jars and lamp chimneys).

Fig.3 Interior of Laboratory at Sovereign Building (note incubators, hygrothermographs, record sheet files, vials of preserved specimens, riker mounts and maps).

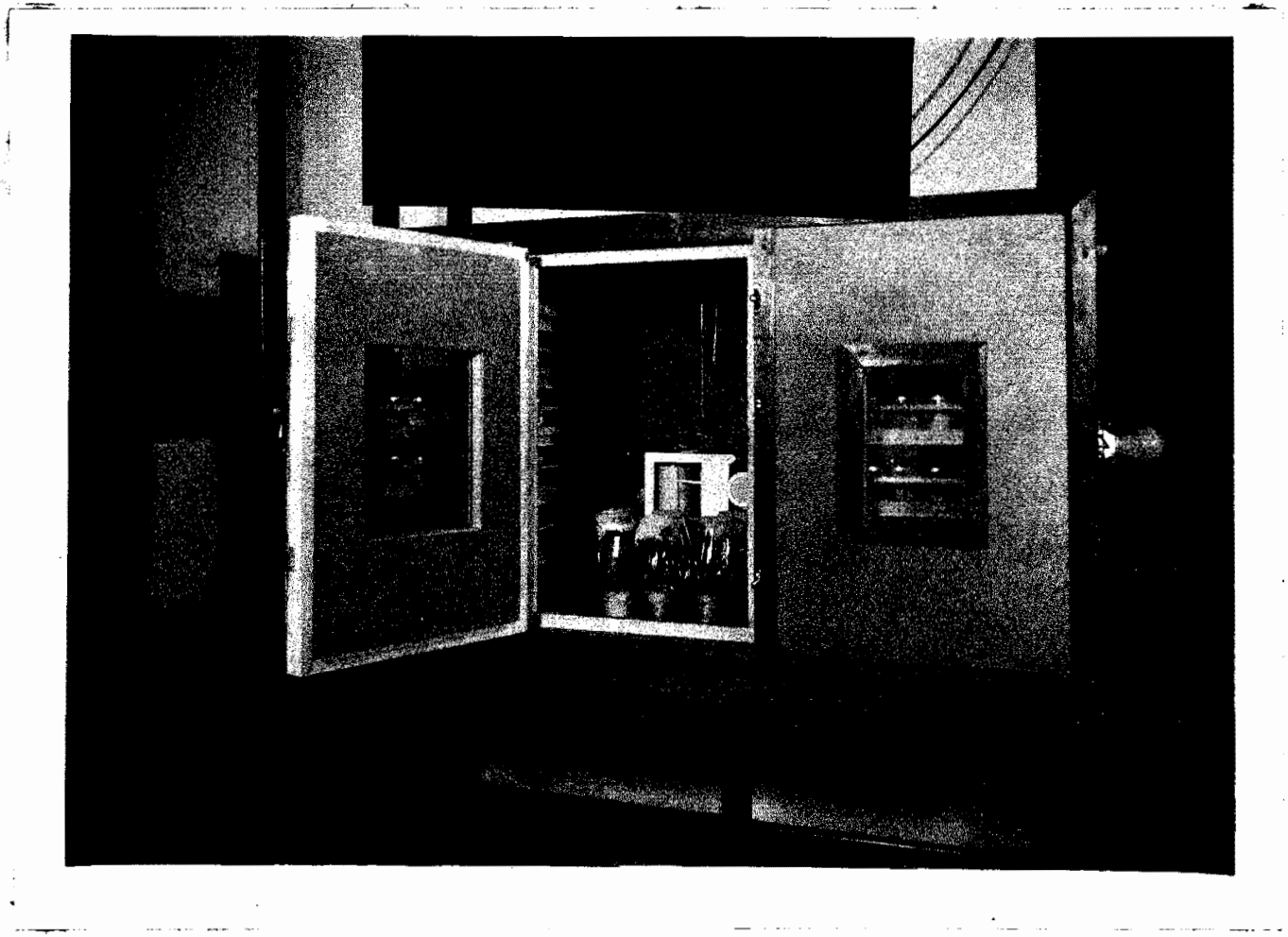

Fig.4 Incubator for Constant Temperature and Humidity (note thermoregulator and racks for pupae in jelly jars).

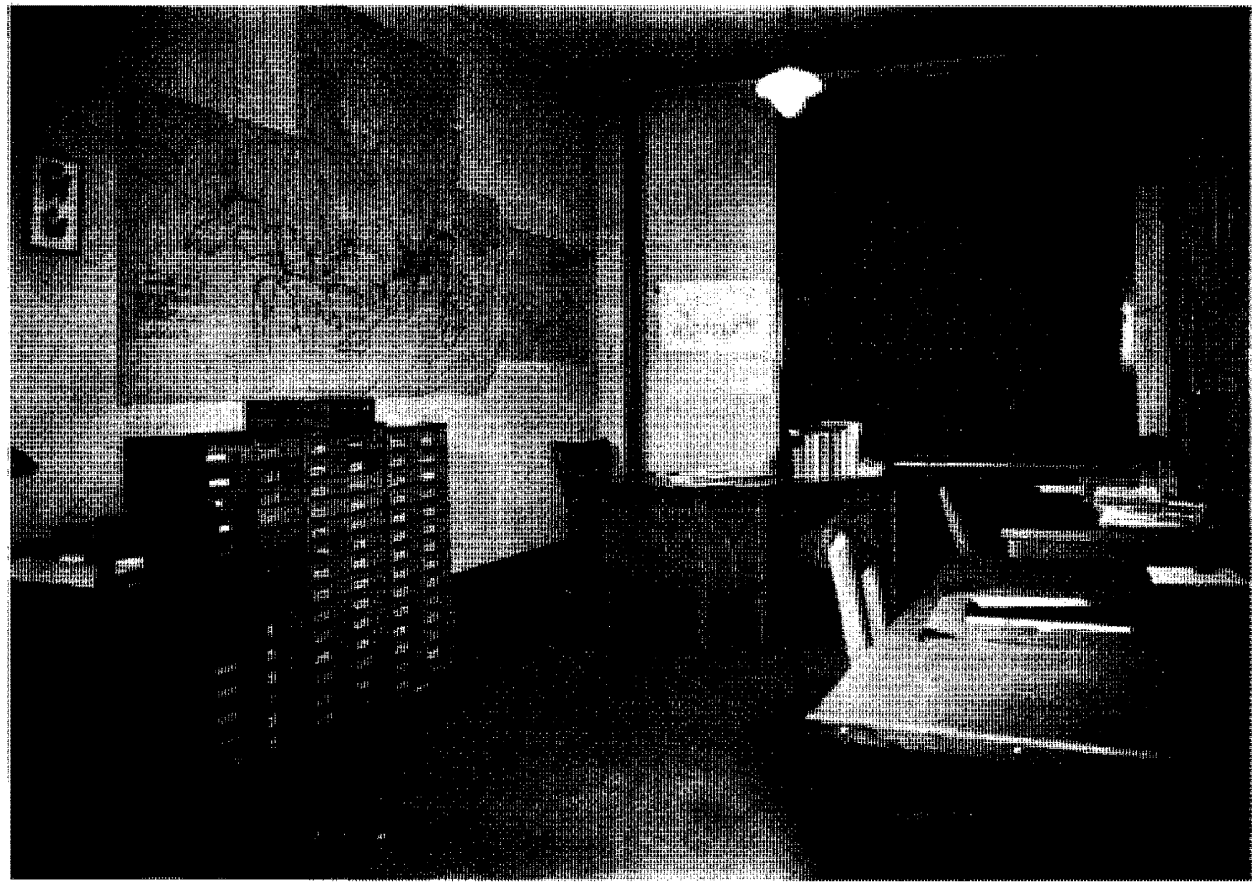

Fig. 5 Interior of Office at Sovereign Building
(note reference collection and host-parasite index).

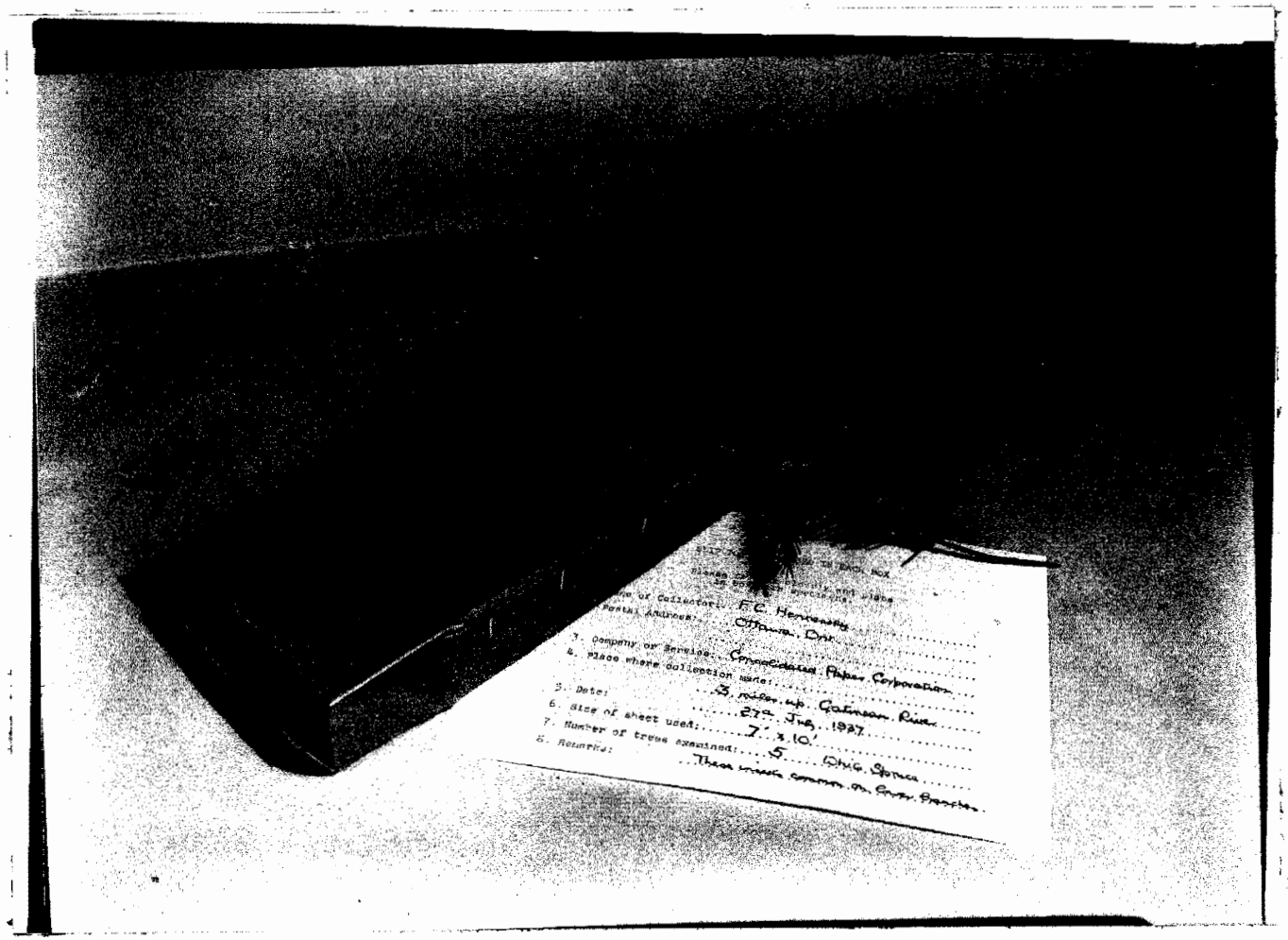

Fig.6 Collapsible Mailing Box for Samples
(note twig of host tree, and full data on enclosure slip).

(Pour directions en français, voir au verso)

SLIP TO BE ENCLOSED IN EACH BOX

Please fill in clearly and place
in box with specimens.

1. Name of Collector: Donald Greig
2. Postal Address: Windigo, P. Q.
3. Company or Service: Brown Corporation
4. Place where collection made: Trenche River
(Specify County or ~~Township~~) Adams
5. Date: Sept. 13 - 1937 6. Size of sheet used:
7. Number of trees examined: 4 8. Size of trees: 8' x 10'
9. Species of trees examined: Black Spruce
10. Remarks: Isolated along River Bank, a number of Exenterus parasites liberated in this area early this summer.

Fig.8 1937
Specimen Record Sheet

Box No:- 12826 Date Received:- Record No. 2817

Contents:-

Collector: Donald Greig
Organization: Brown Corporation
Postal Address: Windigo, P.Q.
Locality: Trenche River
Size of Sheet: 8x10' Host: Black Spruce No. of trees: 4
Remarks: Isolated along River Banks, a number of Epenterus parasites were liberated in this area early this summer
Received:: Sept. 15 90 D. polytomum larvae
Rearing Notes:

Sept 29 5 cocoons 82 larvae 3 parasite cocoons
Oct 8. 20 cocoons - numerous larvae.
Oct 16. 22 cocoons - 30 - D. poly larvae.
Oct 23 28 cocoons - 13 larvae.
Oct 28 - 33 cocoons - 5 larvae - 1 dead (discarded)
Nov. 18 - 34 cocoons - into cold storage
Jan. 17 - Began warming
Jan 28 33 cocoons in incubator
Jan 30 Small dipteran parasite emerged from cocoon + pupated on the
Feb 6 4 adult ♀s emerged.
Feb 8 1 adult Tachind emerged from its puparium - Bessa selecta Mg.
Feb 16 3 adult ♀s emerged
Feb 19 5 adult ♀s emerged 20 cocoons still in ice.
Feb 21 2 adult ♀s emerged
Feb 23 2 adult ♀s emerged
Feb 26 1 adult ♀ emerged - 15 cocoons still in ice

Fig.9
Form of Acknowledgement to Co-operators for a Collection.

DIVISION OF ENTOMOLOGY

CANADA

SCIENCE SERVICE

DEPARTMENT OF AGRICULTURE

Mr. R.H.McKee,
Ontario Forests Branch,
Lisle, Ont.

Ottawa, Ont. Sept.30, 1938

Dear Sir:

We wish to acknowledge, with thanks, receipt of your shipment of Box No 26092, containing insect specimens collected in connection with the Forest Insect Survey.

The specimens submitted by you are as follows:

50 larvae and 9 cocoons of the European Spruce Sawfly, Diprion polytomum Htg.

3 larvae of the Yellow-headed Spruce Sawfly, Pikonema alaskensis Roh.

2 larvae of the Green Spruce Looper, Semiothisa granitata Gn.

Your co-operation is of great value to us and deeply appreciated.

Very truly yours,

J. J. de Gryse,
Chief, Forest Insect Investigations.

Fig.10
Questionnaire for Co-operating Organizations.

FOREST INSECT SURVEY

1 9 3 9

1. Will you co-operate in the Forest Insect Survey in 1939?

2. Approximately, how many men in your organization will make observations and collections in 1939?
   Please attach hereto or furnish a list of names and field addresses of these men. This is required for checking returns. If such a list has been furnished previously and if no notable changes in personnel have been made, this will not be necessary.

2a. To what trees, other than spruce, do you recommend attention be paid?

3. How many boxes have you left over from last year?

4. Would you be interested in field instructions for your men, given by a member of our staff, on collecting and reporting?

5. Would you be interested in a more advanced short course (2 or 3 days' duration) for trained men? How many of your men would attend? (Give names and positions, if possible).

6. Signature:

Brown Corporation,
71 St. Peter St.,
Quebec, Que.

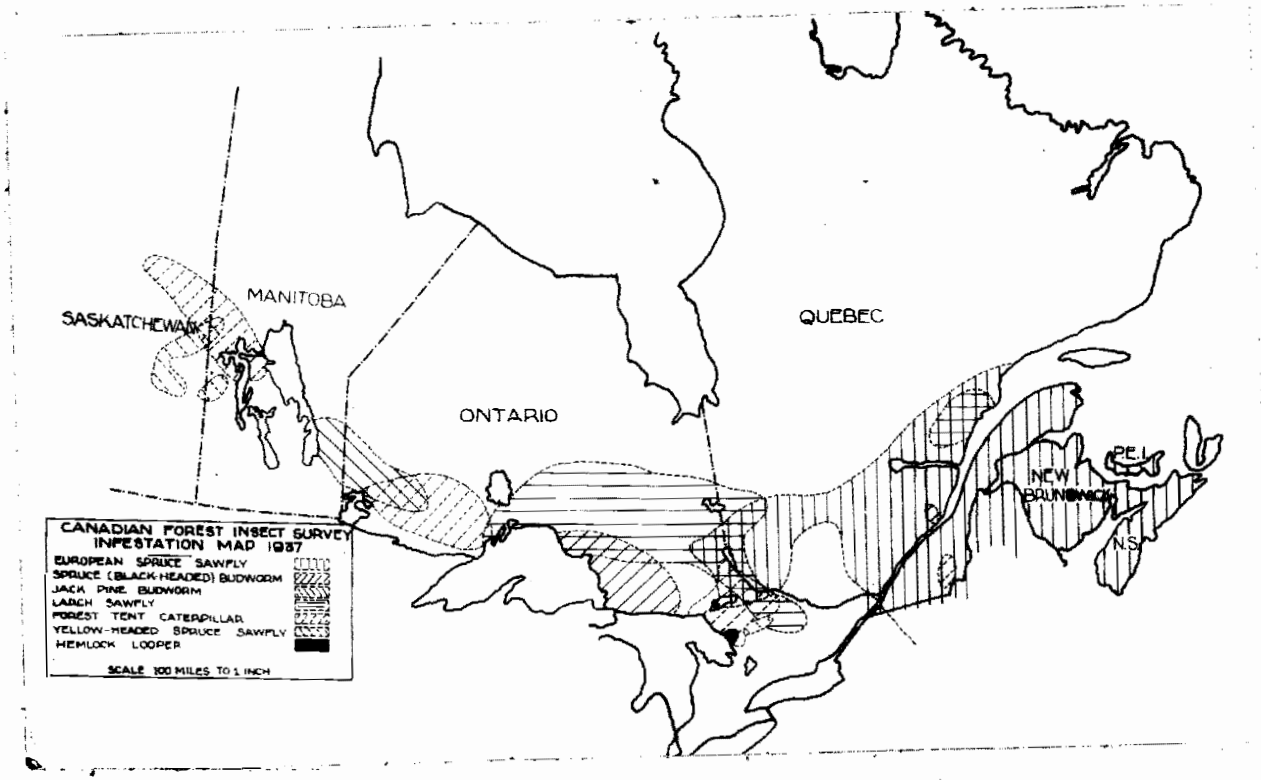

Fig.11 Approximate Status of Forest Insect Infestation in 1937

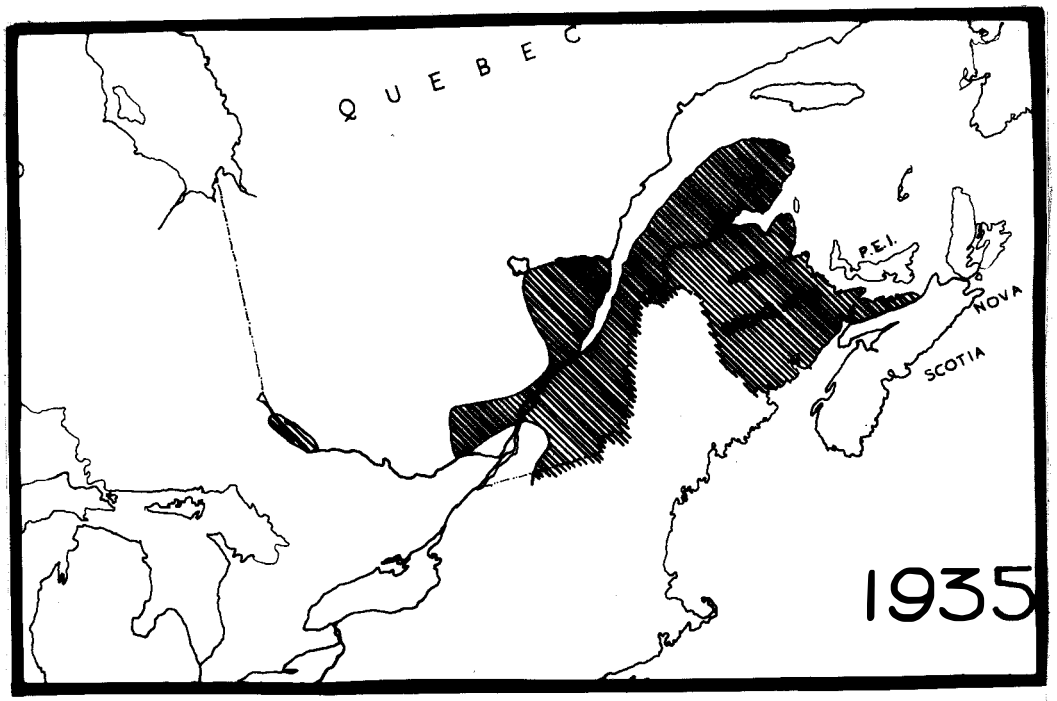

Fig 1 Known distribution of European Spruce Sawfly in 1935

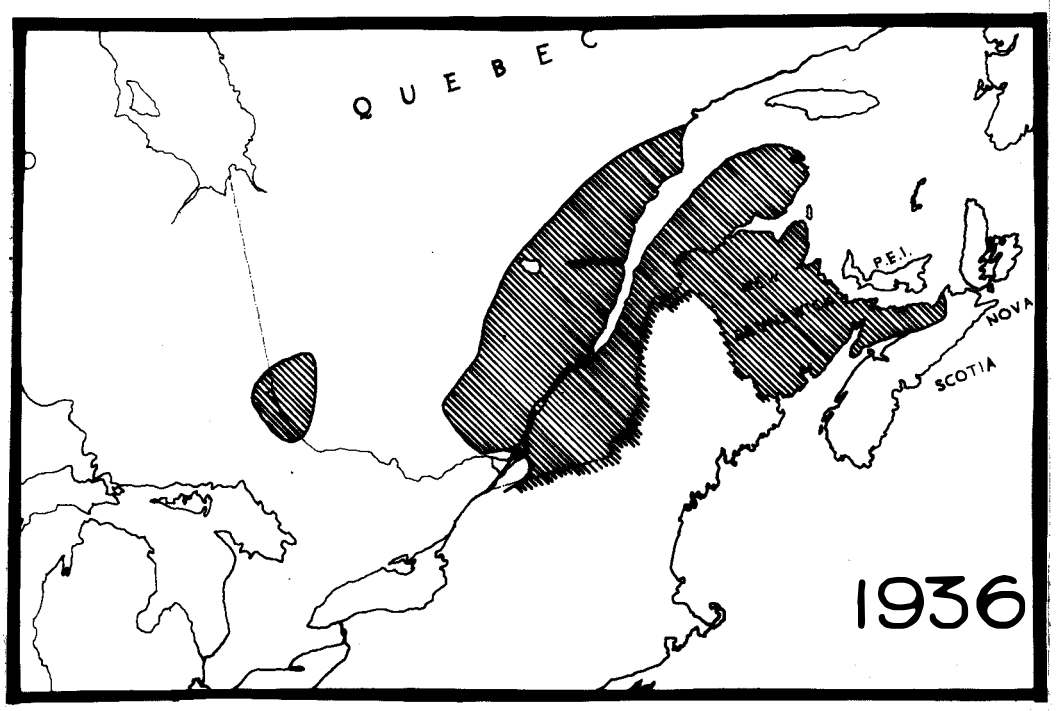

Fig 2 Known distribution of European Spruce Sawfly in 1936

Fig.12

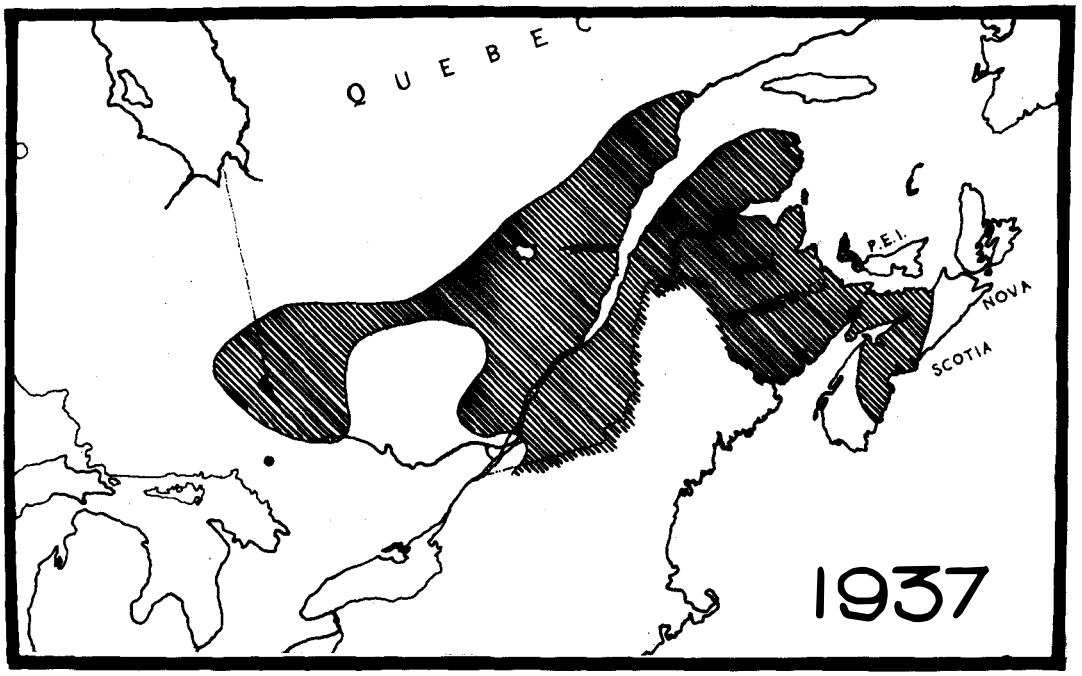

Fig 3 Known distribution of European Spruce Sawfly in 1937

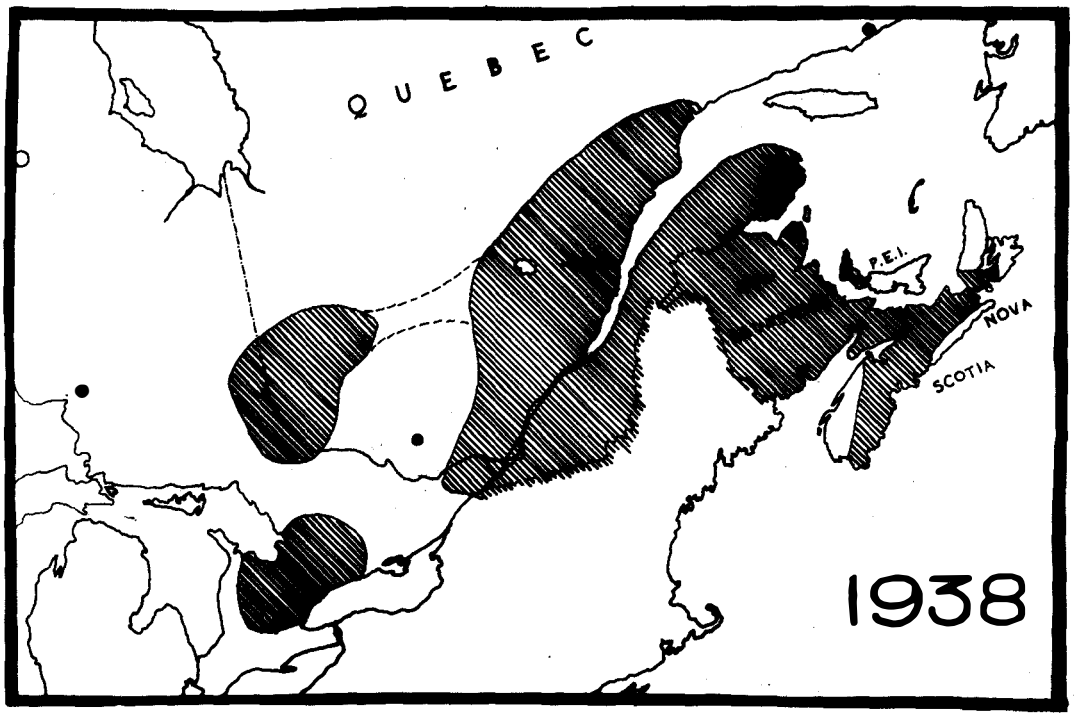

Fig 4 Known distribution of European Spruce Sawfly in 1938

Fig.13

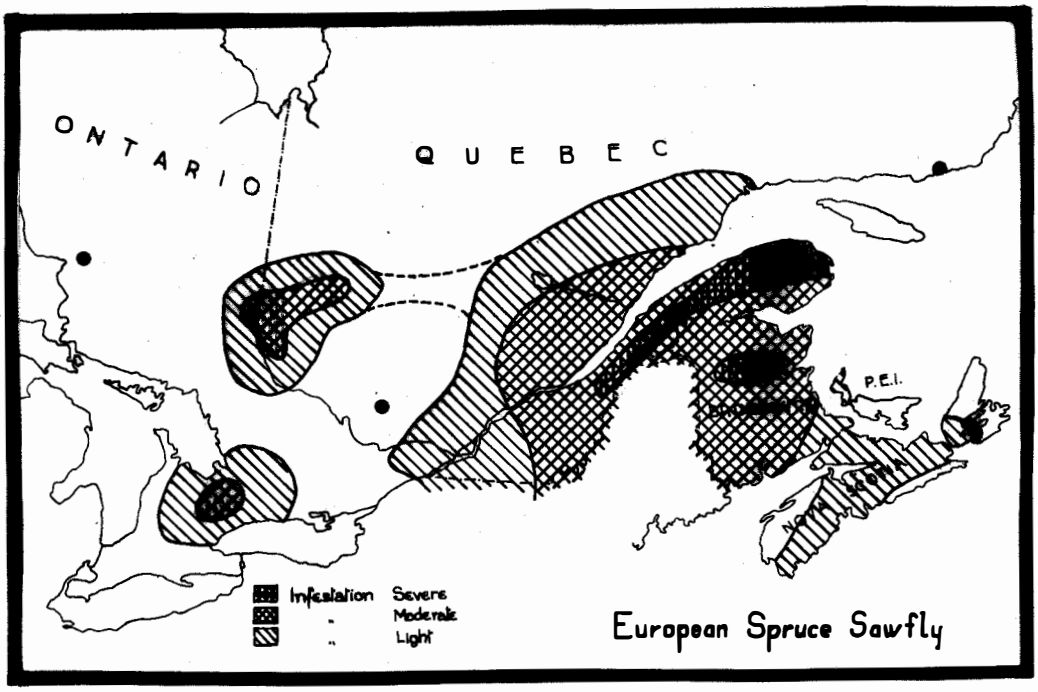

Fig. 1 Degree of infestation of European Spruce Sawfly in 1938

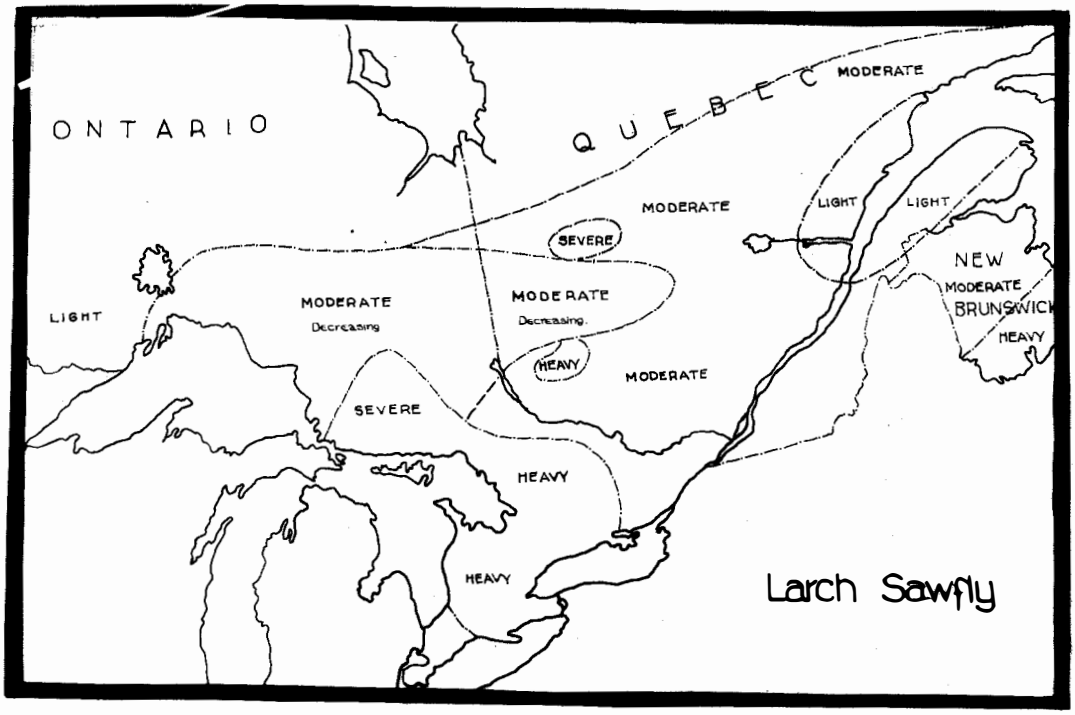

Fig. 2 Degree of infestation of Larch Sawfly in 1938

Fig.14

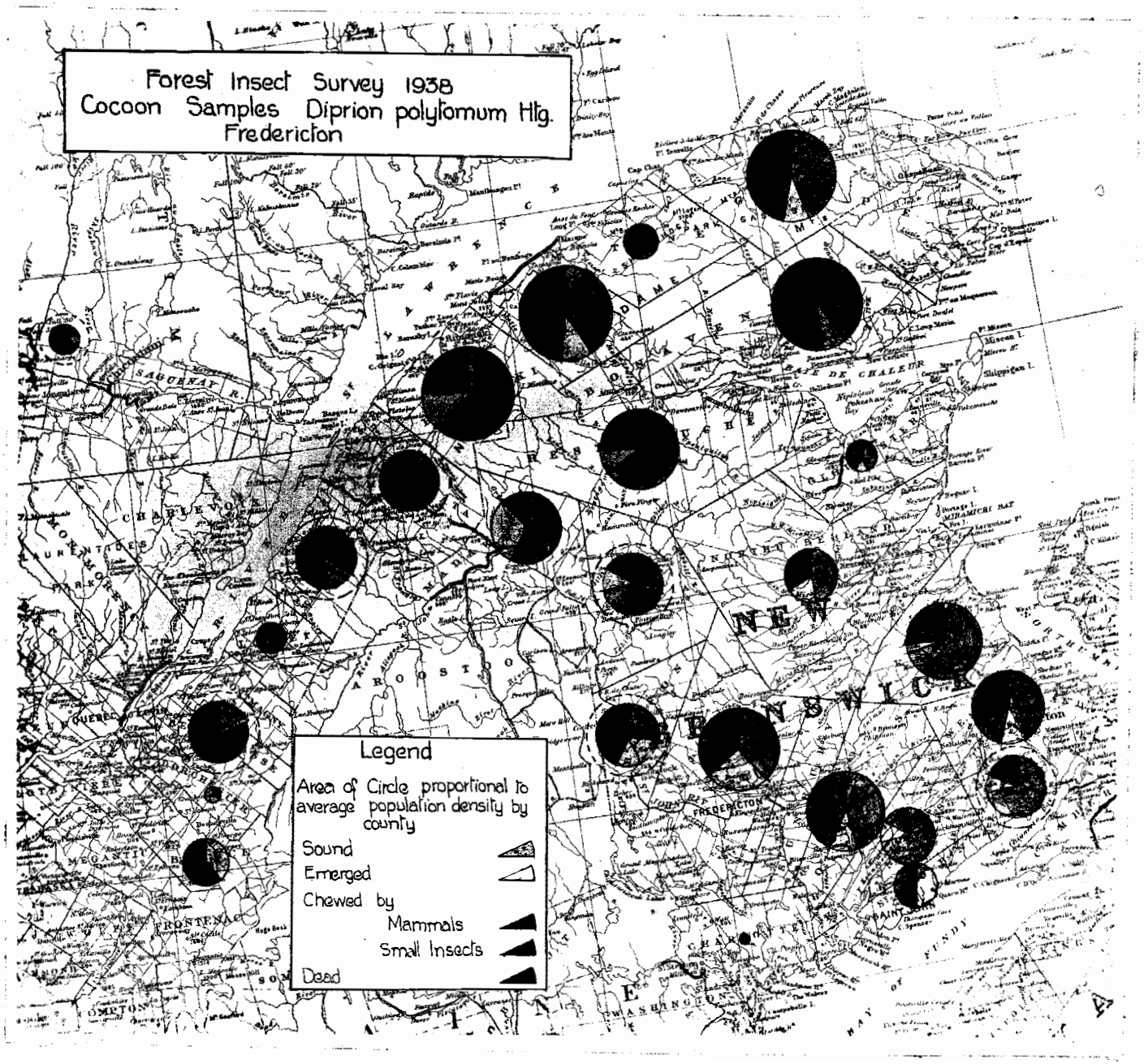
Forest Insect Survey 1938
Cocoon Samples Diprion polytomum Htg.
Fredericton
Legend
Area of Circle proportional to average population density by county
Sound
Emerged
Chewed by
Mammals
Small Insects
Dead

Fig.16

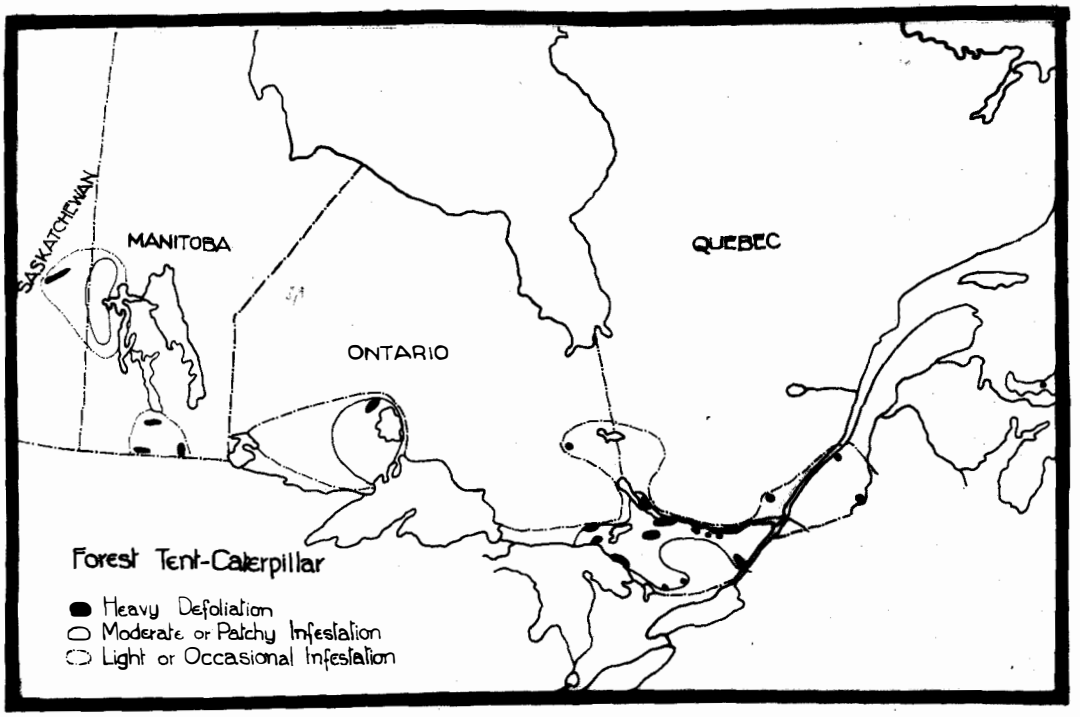

Fig. 3 Degree of infestation of Forest Tent-caterpillar in 1938

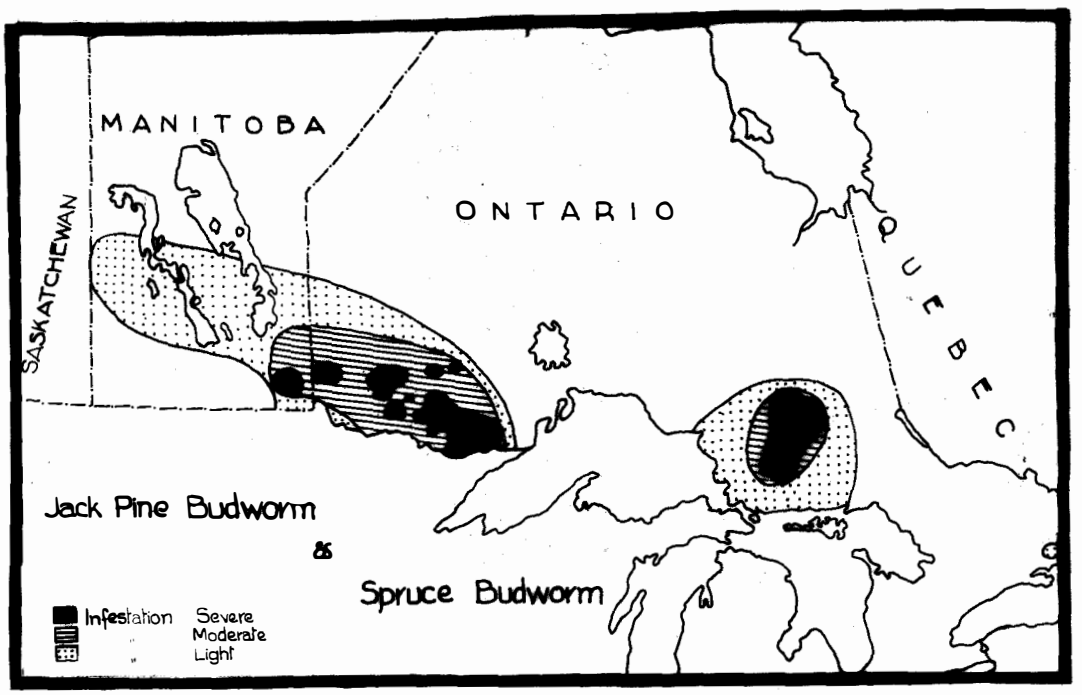

Fig. 4 Degree of infestation of Spruce Budworm and Jack Pine Budworm in 1938

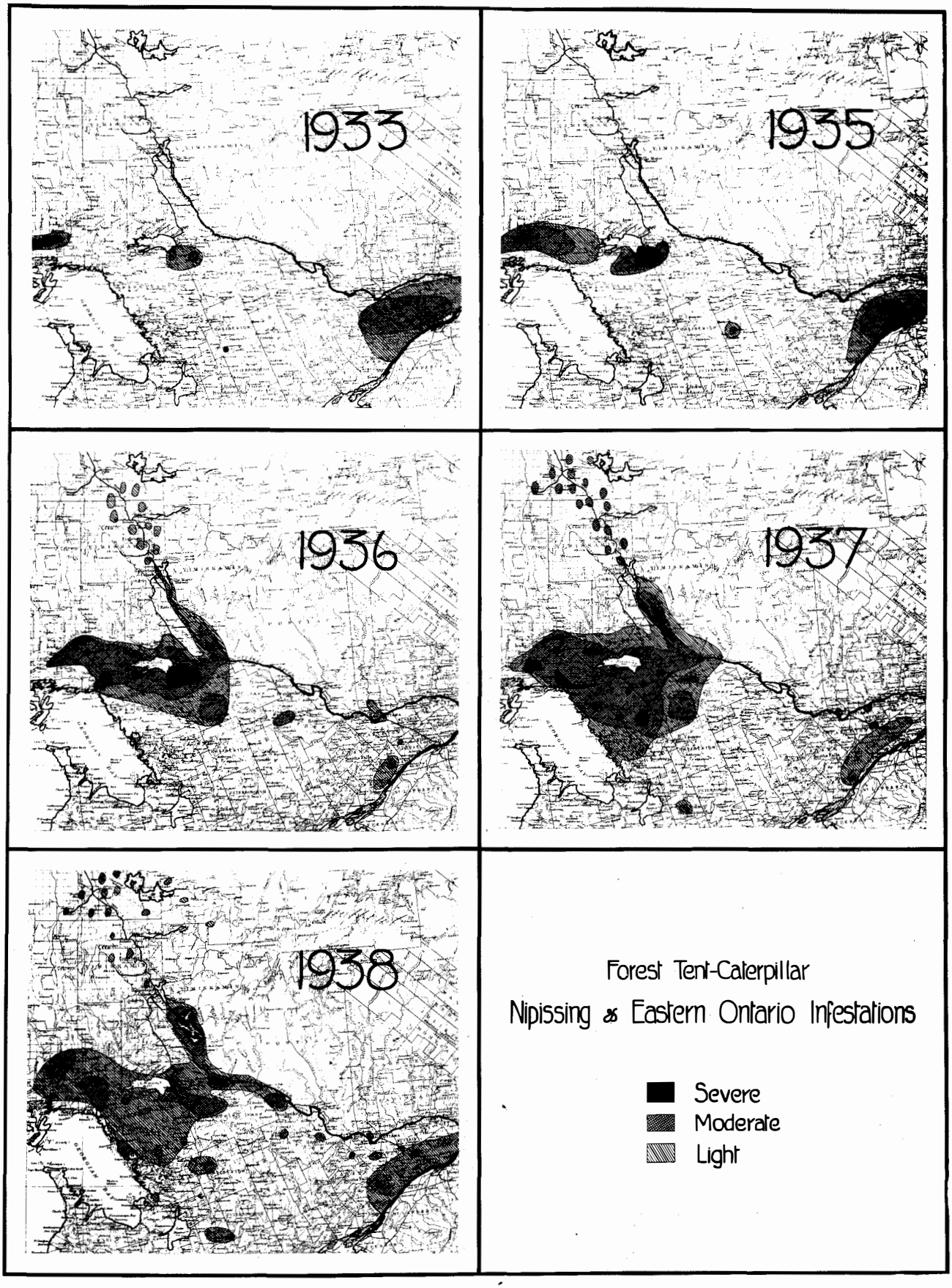
1933
1935
1936
1937
1938
Forest Tent-Caterpillar
Nipissing & Eastern Ontario Infestations
Severe
Moderate
Light

Fig. 18

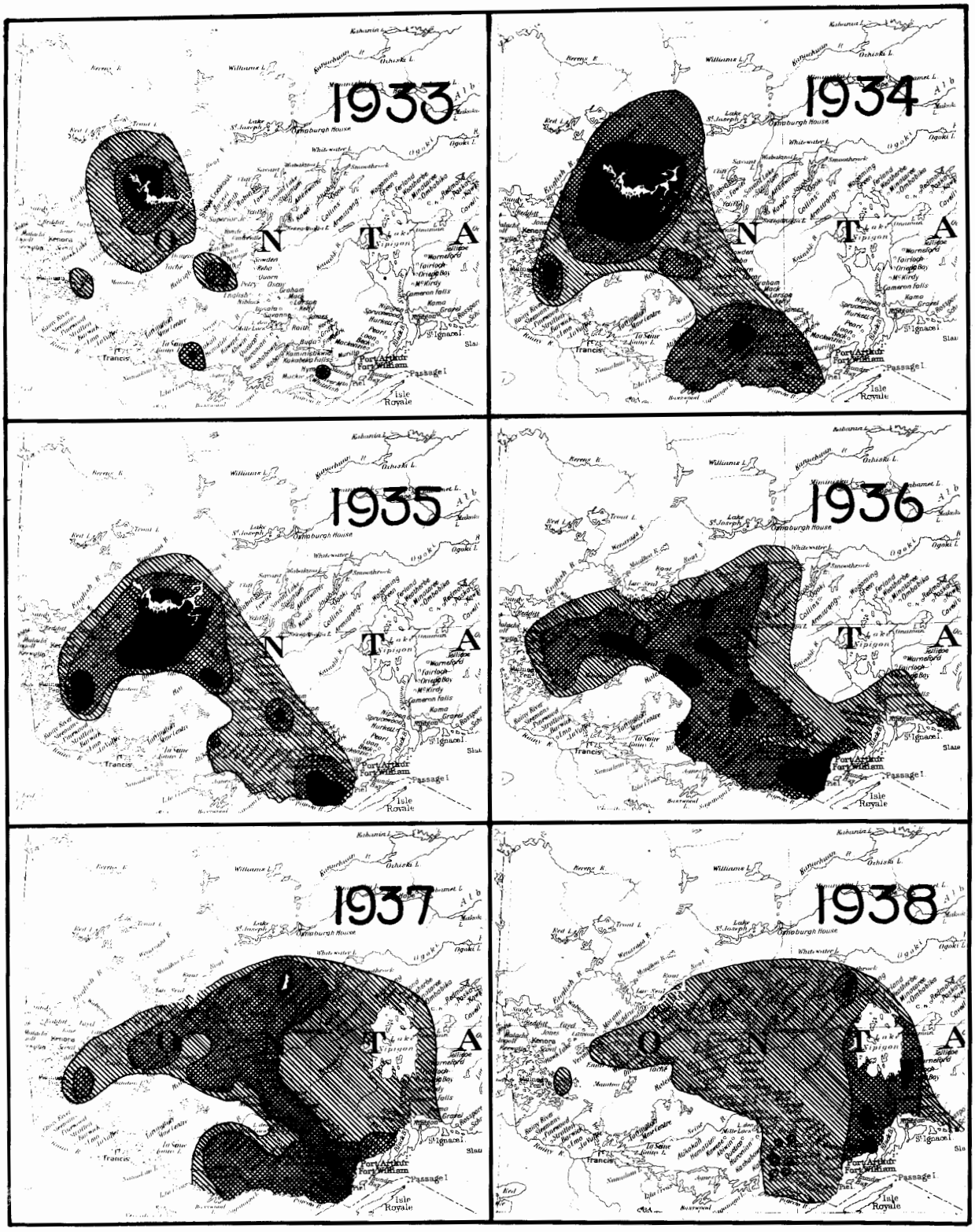

Fig. 2 Western Ontario Infestation of the Forest Tent-caterpillar

Severe ■ Moderate ▨ Light ▨

Fig.19