Proceedings of the

Nineteenth Annual Meeting

of the

ENTOMOLOGICAL SOCIETY

of

ALBERTA

Kananaskis Research Forest,

October 14 - 16, 1971

Proceedings of the 19th Annual Meeting of the

ENTOMOLOGICAL SOCIETY OF ALBERTA

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Environmental Sciences Centre of the
University of Calgary,
Kananaskis Research Forest.

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Insect Collection Competition	D.A. Craig (Chairman) D.J. Larson J.A. Shemanchuk
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Photography and Projection	E. Gushul
Program	G. Pritchard D.J. Larson
Social and Banquet	G. Pritchard B. Porter D.J. Larson

The Entomological Society of Alberta acknowledges with thanks assistance from the Faculty of Arts and Science, of the University of Calgary.

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PROGRAM OUTLINE

Thursday 14 October 1971

REGISTRATION: commenced 20:00 in the Environmental Sciences Centre Lounge.

EXECUTIVE MEETING at 20:00.

Friday 15 October 1971

08:30 Business Meeting. Part I.

09:45 Coffee.

10:00 INVITATIONAL ADDRESS -

Dr. K.W. Cummins (Michigan State University). 'The Role of Aquatic Insects in Freshwater Ecosystems'.

11:00 SYMPOSIUM ON AQUATIC ENTOMOLOGY.

CHAIRMAN - G. Pritchard

11:00 D.J. Larson (University of Calgary). 'An Appreciation of Dytiscid Beetles'.

11:30 R.C.B. Hartland-Rowe (University of Calgary). 'Rocks in My Head - or Sampling Stream Benthos'.

11:45 K.R. Depner (Canada Department of Agriculture, Lethbridge). 'Stream Sampling and Its Relation to the Distribution of Alberta Species of Simuliidae'.

12:00 LUNCH.

13:00 SYMPOSIUM CONTINUED.

CHAIRMAN - R.C.B. Hartland-Rowe.

13:00 H.F. Clifford (University of Alberta). 'Movements of Insects in Streams with Special Reference to the Seasonal Movements of Leptophlebia cupida (Ephemeroptera) in a Brown-Water Stream'.

13:30 D.S. Radford (Alberta Department of Lands and Forests, Lethbridge). 'Adaptive Features in the Life Cycles of Stream Insects'.

14:00 M.A. Chance (University of Alberta). 'Feeding Biology of Stream Insects with Special Reference to Filter-feeding Species'.

14:30 D. Rosenberg (Fisheries Research Board of Canada, Winnipeg). 'Food Chains in Prairie Sloughs'.

15:00 COFFEE.

15:15 T.G. Leischner (University of Calgary). 'The Life History and Food Habits of the Alderfly, *Sialis cornuta* (Ross) in a Disused Beaver Pond'.

15:30 G. Pritchard (University of Calgary). 'The Terrestrial Phase of Aquatic Insects with Especial Reference to the Tipulidae'.

16:00 SUBMITTED PAPERS

CHAIRMAN - G.E. Swailes

16:00 A.W. Thomas (University of Alberta). 'Food Reserves in Autogenous and Anautogenous Tabanids'.

16:20 J.A. Shemanchuk (Canada Department of Agriculture, Lethbridge). 'Cytology of *Coelomomyces psorophorae*, A Fungus Parasite of *Culiseta inronata*'.

16:35 D.L. Struble and S. McDonald (Canada Department of Agriculture, Lethbridge). 'Selecting a New Insecticide'.

16:55 R. Kasting and D.S. Smith (Canada Department of Agriculture, Lethbridge). 'Determination of Amino Acid Requirements by the Radioactivity Method for *Melanoplus bivittatus* Using Different Tissues'.

17:15 R.H. Gooding (University of Alberta). 'Preliminary Observations on Trypsin from Seven Species of *Elaphrus* (Coleoptera, Carabidae).

17:35 W.A. Nelson (Canada Department of Agriculture, Lethbridge). 'Host Resistance to Ectoparasites: Current Thoughts'.

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18:00 COCKTAILS.

19:00 BANQUET.

Guest Speaker - W.O. Mitchell (Author in Residence, University of Calgary).

Saturday 16 October 1971

08:30 SUBMITTED PAPERS.

CHAIRMAN - W.O. Haufe

08:30 U. Soehngen (Canada Department of Agriculture, Lethbridge). 'Crop Contents of Foraging Honey Bees'.

08:50 J.R. Clearwater (University of Alberta). 'The Role of the Male Produced Pheromone in the Reproductive Behavior of *Pseudaletia separata* (Wlk.) Noctuidae'.

09:10 B. Hocking (University of Alberta). 'Insect/Plant Relationships - a Review of a Symposium'.

09:30 D.S. Smith (Canada Department of Agriculture, Lethbridge). 'Crowding in Grasshoppers'.

09:45 H. Cerezke (Canadian Forestry Service, Edmonton). 'Life Cycle of the Spruce Budworm (*Choristoneura fumiferana* (Clem)) in Northern Alberta'.

10:05 COFFEE.

CHAIRMAN - R. Gooding.

10:20 A. Carter (University of Calgary). 'Preliminary Studies on the Energetics of a Low Density, Wing Dimorphic Carabid, *Agonum retractum* of aspen woodland'.

10:40 H. Goulet (University of Alberta). '*Pterostichus haematopus* Dej. and *Carabus chamissonis* Fisch. Two Arctic Species in Central Alberta! '

10:55 F. Goulet (University of Alberta). 'Trapping of Dytiscids Illustrated by

11:10 J.K. Ryan (University of Alberta). 'Insect Emergence Traps Used on Devon Island, N.W.T.'.

11:25 B.S. Heming (University of Alberta). 'Changing Shoes in Midstream'.

11:45 D.H. Kavanaugh (University of Alberta). 'Up the Falls - Tarsal Modifications in a Carabid'.

12:00 G.E. Ball (University of Alberta). 'A TALE OF TAILS".

12:20 LUNCH.

13:30 Business Meeting. Part II.

ABSTRACTS OF PAPERS

The Role of Aquatic Insects in Freshwater Ecosystems

K. W. Cummins

Generally speaking the "role" of aquatic insects is to convert reduced carbon compounds to carbon dioxide -- as well as to provide reduced carbon sources for other organisms -- such as decomposers and fish. Usually the immature stages of the insect species are encountered in freshwater systems -- the stages concerned with growth and energy store. Thus, the primary activity of insects in the water is food gathering and general strategies have evolved in which energetically expensive locomotion is minimized and employed to maintain or relocate individuals in areas of high food density.

Utilizing stream ecosystems as examples, a generalized model of structure and function has been developed which emphasizes, in particular, the role of aquatic insects in the processing of detritus of terrestrial origin. Once the terrestrial material, such as leaf litter, has entered the stream, dissolved organic matter is rapidly leached out, microbial organisms colonize it and several species of aquatic insects reduce large portions of the litter to smaller fragments and feces. A large number of species feed on the smaller particles and, together with grazing herbivore species, are fed upon by a variety of predators, including a number of aquatic insects.

Information on aquatic insect foods and feeding rates, growth and respiration are being combined with data on primary production, microbial metabolism and detrital input in an attempt to produce a model of stream ecosystem structure and function. The evidence that has accumulated suggests that, although quantity and quality of organic matter introduced into freshwaters as waste products of human culture are often critical, a major problem centers around the initial destruction of the structural and functional relationships of complex and highly efficient heterotrophic systems. Many of the critical species are lost, such as detritivorous insects, before additional organic loads are introduced. These simplified and less efficient communities are incapable of processing organic loads, which in some cases are quantitatively less than amounts decomposed by earlier communities.

An Appreciation of Dytiscid Beetles

D. J. Larson

The province of Alberta possesses a very rich fauna of water-beetles (Dytiscidae). Well over one hundred species belonging to seventeen genera have been collected in the province. Together, these species occupy a wide range of habitats, ranging from small meltwater ponds and runoff streams to the shallows of large lakes and rivers. As far as is known, all Alberta

species are univoltine predators. Most species overwinter as adults but some overwinter as larva or perhaps eggs. Some species may overwinter in two stages. Within the boundaries of Alberta certain species, such as Colymbetes sculptilis Har., show complex patterns of geographical variation.

Rocks in My Head - or Sampling Stream Benthos

R.C.B. Hartland-Rowe

The four principal methods of sampling stream benthos are (a) kick sampling, (b) Surber sampling, (c) net sampling, and (d) colonisation sampling. All of these methods suffer from numerous disadvantages stemming largely from the fact that the organisms are beneath a layer of moving water and always include a large number of very small individuals. The first three methods share the feature that the organisms are removed by disturbance from a measured (Surber) or an unmeasured area of bottom and collected in a net downstream. Large mesh nets cause fewer problems of eddying but fail to collect the smaller individuals. All three methods do not permit any accurate estimation of the depth of the zone sampled. However careful use of any method gives reasonably comparable results. Colonisation methods depend on the provision of a region of natural or artificial substrate which can be removed for counting the organisms. Problems include the difficulty of installing and removing the substrate samples and the uncertainty of the time taken for colonisation. However by the use of this method Hynes has shown that benthic invertebrates occur down to very substantial depths in the substrate. No reasonable methods have yet been devised for obtaining an accurate estimate of the numbers of organisms actually present in a portion of natural substrate, though Hynes' freezing technique, as yet untried, involving as it does, many students and much beer and liquid nitrogen, has possibilities.

Stream Sampling and Its Relation to the Distribution of Alberta Species of Simuliidae

K.R. Depner

Sampling methods used in streams of various size are examined. Sampling immature stages, population assessment, and species succession of Simuliidae are easier in small streams than in large rivers. Population assessment on major rivers has been accomplished by sweeping adult flies from above the river surface at high speed using a power boat. The abundance of Simulium arcticum along various sections of the Athabasca River was determined by this method.

The number of species found in a stream may be related to ease of sampling rather than to the number of species present in the stream. Of the 25 species of Simuliidae that we at Lethbridge have found in Alberta, only about seven are found in large rivers. Is the lack of numbers of species in large rivers due to the fact that they do not occur in these streams, or to our present inability to find them there?

Movements of Insects in Streams with Special Reference to the Seasonal Movements of *Leptophlebia cupida* (Ephemeroptera) in a Brown-Water Stream

H. F. Clifford

Stream insects move downstream in considerable numbers by drifting downstream. Some immature insects, especially ephemeropterans, plecopterans, trichopterans, and simuliids, exhibit behavioral drift, with the greatest drift rates usually being at night. If there were no compensatory mechanism for the downstream movements, upstream areas could be completely depopulated of immature insects. Two possible ways that drift-prone stream insects might maintain upstream populations are via upstream ovipositing flights of the imagos and upstream movements of the immature insects. However the movements of adult amphibiotic insects appear to be mainly controlled by local wind conditions, and the few quantitative studies concerned with upstream movements of immature insects indicate that the number of insects moving upstream cannot compensate for the much larger number of insects moving downstream in the drift. It is possible that large numbers of immature insects move upstream undetected very deep in the substrate.

The seasonal movements of the ephemeropteran *Leptophlebia cupida* (Say) are reported from a brown-water stream of Alberta. The nymphs of the new generation appear first in the main stream during August. They are usually found first in riffle regions. As winter progresses, the nymphs move from the riffles to the pools. For a short period of time after the ice breaks up in the spring, the nymphs move from the pools to the stream's bank and then upstream following the shore-line. The initial movements are associated with a rise in water level. The upstream movements take place during the daylight hours, and this day activity considerably modifies the typical night-active drift pattern of this species. Nymphs move upstream at an average rate of 10 m/hour. By following the shore-line, which will bend in towards the tributaries, the nymphs will move into both vernal and permanent tributaries. Eventually, the nymphs will be extensively dispersed in the marshy areas drained by the tributaries. Tributaries and marshy areas usually accumulate fewer day-degrees than the main stream. Emergence takes place mainly from the marshy areas. The female imagos then fly back to the main stream to oviposit.

Adaptive Features in the Life Cycles of Stream Insects

D. S. Radford

The life histories of *Nemoura besametsa*, *Epeorus deceptivus*, *Epeorus longimanus*, and *Ephemerella coloradensis* are described as "fast

seasonal" types and Arcynopteryx aurea, Nemoura cinctipes, Nemoura columbiana, Nemoura oregonensis, Cinygmula ramaleyi, Ephemerella doddsi, and Rhithrogena doddsi as "slow seasonal" types according to Hynes' (1961) classification. All of the species are univoltine with the exception of N. cinctipes which may be bivoltine. There seems to be a correlation between life cycles and food availability. A means of ecological separation in the four Nemoura species is elucidated. Stream temperature was found to influence growth rates.

The seasonal distribution of Plecoptera in two mountain streams in Alberta is presented and compared with emergence patterns in the northwestern United States and southern British Columbia. Differences between the emergence periods in our study are attributed to differences in the amount of heat the streams accumulated. Some general aspects of the emergence pattern peculiar to the region, and its relation to the interaction between photoperiods and water temperature are discussed.

Feeding Biology of Stream Insects with Special Reference to Filter-feeders

M. A. Chance

The food and feeding habits of stream insects are discussed under three sections, herbivores, carnivores, and particulate feeders. These categories are not mutually exclusive, the feeding habits of many stream insects varying with life stage and availability of food.

The adaptation of insects to stream life is discussed with respect to their feeding habits. Carnivores and herbivores, with the exception of species which feed off periphyton, show little adaptation to life in flowing water. Periphyton feeders have mouthparts specialized for scraping algae off the substratum.

Filter-feeders, included among the particulate feeders, are among the most highly adapted stream insects. These have evolved two basic types of filters, one consisting of a filtering brush and associated brushes for transferring food into the mouth, and the other is a net, formed from salivary secretions.

The influence of current and the significance of the boundary layer to passive filter-feeders are discussed in relation to their feeding efficiency. The automatic nature of filter-feeding is also discussed.

Food Chains in Prairie Sloughs

D. Rosenberg

The relation of food chains to basic concepts in ecology (energetics and population dynamics) and applied ecology (fisheries management, radioecology, and pesticide ecology) was reviewed and the "trophic level effect" was discussed in relation to radionuclides and pesticides.

In the light of radionuclide research, the non-concentration of a single application of a low concentration (1 ppb in water) of dieldrin between trophic levels of invertebrates of a parkland slough was interpreted as being a result of the single application (vs. chronic exposure) of pesticide. The possibility that this non-concentration might be a peculiarity of the ecology and physiology of solely invertebrate food chains is not dismissed.

The Life History and Food Habits of the Alderfly, *Sialis cornuta* Ross in a Disused Beaver Pond

T. G. Leischner

Sialis cornuta has a two year life cycle. The larval stage lasts twenty-two months, pupation takes one month, adults live a few days and eggs develop in three weeks. Mature larvae move on shore to pupate through May. Adults emerge throughout June. Their activity is restricted to midday hours of sunny calm days. Egg masses are laid under objects above the water and liable to extensive parasitism by *Trichogramma semblidis* Aur.. Sialid larvae live in burrows in pond bottom mud preying upon chironomid larvae, tubificid oligochaetes, and ostracod crustacea.

The Terrestrial Phase of Aquatic Insects with Especial Reference to the Tipulidae

G. Pritchard

The terrestrial phases of aquatic insect life-cycles tend to be neglected by aquatic biologists, and yet it seems likely that these phases can have a considerable influence on the dynamics of such populations in view of the heavy mortality that apparently occurs. Complete life-tables for aquatic insects are lacking, but such aids are essential to an understanding of this particular problem. Preliminary life-tables for the crane-fly, *Tipula sacra*, support the view that particularly heavy mortality occurs during the relatively brief period on land. The pharate pupa and pharate adult are vulnerable to predation by ants and spiders, to desiccation, and to drowning. The non-pharate adult suffers heavy predation by birds and egg-laying potential is reduced considerably by inclement weather. Eighty-five percent of individuals spend 22 months as aquatic larvae but suffer relatively little (50%) mortality during this long phase. The other 15% completes the life-cycle in one year and methods must be developed to separate this segment of the population. A variety of insect life-cycle types must be investigated in this way in order to understand the adaptive strategies involved.

Food Reserves in Autogenous and Anautogenous Tabanids

A. W. Thomas

The soluble protein and lipid contents of recently emerged unfed female tabanids were estimated by the methods of Lowry *et al*. and by ether extraction in a Soxhlet apparatus respectively.

The soluble protein content of five species varied from 1.4 mg to 8.2 mg (19 - 30% of the dry weight). When the size of the fly was taken into consideration there was no significant difference between the soluble protein content of autogenous and anautogenous species.

The lipid content of six anautogenous species varied from 0.2 mg to 2.2 mg (4.3 - 9.0% of the dry weight), whilst that of seven autogenous species varied from 0.8 mg to 10.5 mg (17 - 21% of the dry weight). This difference between autogenous and anautogenous species was significant. The lipid content of five autogenous species after oviposition varied from 0.16 mg to 1.2 mg (3.9 - 6.8% of the dry weight).

It was suggested that blood-feeding reflects the state of an insect's food reserves, being especially associated with a low amount of lipid and not with the amount of soluble protein.

Cytology of *Coelomomyces psorophores*, A Fungus Parasite of *Culiseta inronata*

J. A. Shemanchuk

Coelomomyces psorophorae was first discovered in *Culiseta inornata* larvae in southern Alberta in 1956. This fungal parasite has been found in southern Alberta each year since and, in one recent collection from Eight-mile Lake near Lethbridge, 80% of the larvae were heavily infected. In a cooperating project between our laboratory and the laboratory of Dr. H. Whisler, Botany Department, University of Washington, Seattle, it is now possible to germinate the resistant sporangia of this fungal parasite by conditioning the sporangia at 5°C for several days and then exposing them to 20°C. The sporangia at 20°C will germinate and produce zoospores in five days.

Selecting a New Insecticide

D. L. Struble and S. McDonald

The sequence of events in selecting a new insecticide were outlined. This included a consideration of some of the chemical properties of organochlorine and organophosphorus insecticides, the reactions of o.p. compounds with cholinesterase, efficacy studies and residue analysis. The results of the residue analysis of phosvel and its two main metabolites on wheat plants, wheat kernels and one soil type were discussed.

Determination of Amino Acid Requirements by the Radioactivity Method for *Melanoplus bivittatus* Using Different Tissues

R. Kasting and D. S. Smith

Non-essential and essential amino acids for fifth-instar nymphs of the grasshopper *Melanoplus bivittatus* (Say) were determined by the indirect method of Kasting and McGinnis (Ann. N.Y. Acad. Sci. 139: 98-107, 1966) using glucose-u-C^{14}. Fat bodies, legs, heads, testes or ovaries, and bodies were hydrolysed to provide amino acids for which specific radioactivities were determined. A combined amino acid analyzer-scintillation radioactivity counter was used to determine the specific activities for the amino acids. Results from all tissues for both males and females showed the same amino acid requirements. Glutamic acid, glycine, serine, aspartic acid, proline, and glucosamine were labelled with C^{14} and therefore were considered to be non-essential. The amino acids valine, leucine, isoleucine, argenine, histidine, tyrosine, phenylalanine, cystine, and methionine were not labelled and are considered essential for this grasshopper.

Preliminary Observations on Trypsin from Seven Species of *Elaphrus* (Coleoptera, Carabidae)

R. H. Gooding

Specimens of seven species of *Elaphrus* were collected at various locations in Alberta, identified, dissected and frozen. The guts of males were pooled according to species (but without regard to locality or date of collection), homogenized, and centrifuged. The trypsin and chymotrypsin activities were determined by following the hydrolysis of benzoyl-arginine *p*-nitroanilide (BAPNA) and benzoyl-tyrosine-*p*-nitroanilide (BTPNA) respectively. Trypsin was purified by gel filtration and DEAE-cellulose chromatography and the molecular weights estimated by sephadex gel filtration. The results (table 1) indicate that the species groups differ with respect to the ratio of tryptic to chymotryptic activity in the gut, but not with respect to the trypsin molecular weights. Trypsins from all species except *E. pallipes* adsorb strongly to DEAE-cellulose at pH 7 (table 2).

Table 1.

Species	Trypsin*	Chymotrypsin†	Trypsin / Chymotrypsin	Trypsin / Mol. Wt.
E. lapponicus	1,230	245	4.61	
E. clairvillei	2,220	282	7.87	15,660
E. olivaceus	981	142	6.91	15,660
E. lecontei	2,400	203	11.82	16,500
E. americanus	597	48	12.43	15,660
E. californicus	766	85	9.02	13,750
E. pallipes	350	80	4.38	16,090

* pecomoles BAPNA hydrolyzed/min/gut
† pecomoles BTPNA hydrolyzed/min/gut

Table 2.

Species	0	50	100	200	300	400
E. lapponicus						100
E. clairvillei		5	2			93
E. olivaceus					69	31
E. lecontei				2	65	33
E. americanus						100
E. californicus	15				2	82
E. pallipes	93				2	5

Data in table are the % recovered trypsin.

Host Resistance to Ectoparasites: Current Thoughts

W. A. Nelson

The role of host grooming is discussed as the first line of defense against ectoparasites. When the grooming response is interfered with, the second line of defense appears to be acquired resistance. The nature of this type of resistance, common to sheep, cattle and mice, against their respective ectoparasites, results in the inability of the insects to feed and their migration to new areas on the animal, or their death from starvation. The reaction in the skin is partly of immune origin, and partly due to the irritation caused by continued presence of mouthparts. The reaction is slow in developing in certain host strains or certain members of a breed. The result is susceptibility, i.e., the exsanguination of the host before resistance can be acquired. The chances of immunization against ectoparasite attack are slight, and the breeding out of susceptibility in livestock is not too promising at our present state of knowledge.

Crop Contents of Foraging Honey Bees

U. Soehngen

A study was done in 1969-1970* to determine possible relationships between several environmental factors and the crop contents of foraging worker honey bees collected at the entrances of their colonies. The following were obtained: weather data, flowering dates of the major sources of nectar, daily changes in colony weight, and records of colony growth throughout both seasons.

The crop contents of foragers returning to their hives and those leaving their colonies were investigated for weight, sugar concentration, and concentration of pollen.

In general, the mean crop weights of returning foragers corresponded to the daily net colony gain throughout both seasons. The weights were low during most of June, but increased with the main nectar flow in early July, and remained at a high level until mid-August, when the flow deteriorated. The mean crop weights of foragers leaving their colonies remained at the same low level throughout both seasons.

The sugar concentration of nectar forager crop contents reached its highest level during the nectar flows and decreased when the flows ceased; in foragers leaving their colonies there was a slight concentration decrease over both seasons.

No definite seasonal trends were observed in the pollen concentration of crop contents. In general, the pollen concentration was highest in the spring, but tended to fluctuate at lower levels for the remainder of the season.

The biological implications were discussed.

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* at the University of Manitoba.

The Role of the Male Produced Pheromone in the Reproductive Behavior of *Pseudaletia separata* (Wlk.) Noctuidae

J. R. Clearwater

The relative importance of chemical and visual cues allowing orientation of the male towards the female was discussed. This was followed by an examination of the morphology and microstructure of the hair pencil, the major disseminating structure of the male-produced pheromone in this species. Benzaldehyde was established by chemical means to be a component of the hair pencil secretion, and its possible function as a female corestant is suggested.

Insect/Plant Relationships - a Review of a Symposium

B. Hocking

A series of 12 papers under the headings: The Variety of the Subject, Plants and Insect Life Cycles, The Evolution of Insect/Plant Relationships and Insect/Plant Relationships and Population Dynamics were summarized and discussed. These comprised the sixth biennial international symposium of the Royal Entomological Society of London.

Crowding in Grasshoppers

D. S. Smith

Crowding adults of *Melanoplus sanguinipes* in the laboratory resulted in a shortened adult life, a decreased rate of egg-laying, and a lesser number of eggs laid per female. However, in a second generation, and despite whether this one was subject to crowding or not, the progeny of crowded parents lived longer, produced more eggs per pod, and laid about twice as many eggs per female as those from uncrowded parents. Although females from uncrowded parents weighted 30% more than those from crowded ones, there was no difference in the number of ovarioles.

Life Cycle of the Spruce Budworm

(*Choristoneura fumiferana*, Clem)

H. Cerezke

Samples of spruce budworm (*Choristoneura fumiferana* (Clem.)) larvae were collected in northern Alberta at intervals during May and June, 1969. Head capsule widths of all larvae were measured, from which estimates of mean head capsule size of the six instars were made, and the dates of their appearance in the field were approximated. A seasonal growth curve of terminal branch shoots of the host tree, white spruce, was prepared and correlated with seasonal development of spruce budworm life stages. Heat units in day-degrees above a threshold temperature of 42°F were cumulated from April 1 to July 1, 1969 and correlated with seasonal host and budworm development. The results, although preliminary, provide a basis for comparison with budworm development in eastern Canada and the U.S., and provide a method for predicting within a day or two, the time of appearance of the various life stages in the field. The study also pointed out the need for further work in order to establish the relationship between early instars of spruce budworm and the occurrence of another closely related defoliator, possibly *Acleris variana* (Fern.).

Preliminary Studies on the Energetics of a Low Density, Wing Dimorphic Carabid, *Agonum retractum* of Aspen Woodland -

A. Carter

The species overwinters entirely as adults. Populations in spring consisted of individuals which overwintered as sexually immature, second year adults, and individuals which overwintered as sexually mature, third year adults. The habitat distributions of males and females were discussed in relation to their reproductive activity. No eggs were found in the field but early first instar larvae were sampled mainly from the litter and fermentation soil layers. Larvae dispersed to bark and pupated there by early September. Teneral adults were very active, as judged by pitfall trapping, in the litter during September and October, prior to hibernation. Second year adults were seldom trapped and occurred deeper in the soil.

Pterostichus haematopus (Dej.) and *Carabus chamissonis* (Fisch.): Two Arctic Species in Central Alberta

H. Goulet

The development of these two arctic species in central Alberta is so long that under Arctic conditions, their development would be incomplete. Thus, under tundra conditions the survival of these species is probably impossible. Their presence in the forested areas of the central prairies is probably explained first by isolation of these brachypterous beetles south of the giant glacial lakes, and second by elimination of the genes involved in Arctic adaptation. (For example, genes insuring a very fast development of immatures). This elimination has probably been helped by the absence of high mountains which might have preserved the genes.

Trapping of Dytiscids, Illustrated by Dytiscus oolibuckii

F. Goulet

A new trap (derived from James and Redner, 1965), and its applications with references to activity and distribution of *Dytiscus* colibuckii (Kirby) were discussed.

Changing Shoes in Midstream

B. S. Heming

"Bladder feet" are present in both larval and adult Thysanoptera but they work in different ways. In the 2 larval instars, the pretarsus is borne on the apex of the tibia. The larval cuticular parts are shed at the larval-propupal ecdysis and the leg, distal to the "knee" consists of tibia only during the non-feeding propupal and pupal instars. The larval pretarsal depressor muscle becomes disorganized during the propupal and pharate pupal stages and is replaced by the imaginal muscle through accumulation and differentiation of myoblasts in the pupa and pharate adult. During the pupal stage, the distal, tibial epidermis differentiates into 2 tarsal segments and a pretarsus, these becoming functional on the completion of adult cuticle synthesis in the late pharate adult. Associated with the development of tarsal segments is the appearance, in the pupa, of a tarsal depressor muscle. Elastic "restraining tendons", functioning in bladder retraction, are carried through from larva to adult but are altered in the points of their origin and insertion.

The events occurring during the pupal instar of members of the suborder Terebrantia, require 2 pupal instars for their completion in members of the suborder Tubulifera.

A possible explanation for the evolution of the different mechanisms in larval and adult thrips is suggested.

Up the Falls - Tarsal Modifications in a Carabid

D. H. Kavinaugh

Nebria ingens Horn (Coleoptera: Carabidae: Nebriini) is restricted geographically to the central and southern Sierra Nevada of California, and ecologically to the riparian habitat on bare, rocky slopes above timberline. In the field, adults were seen to be at home underwater, walking along rocky stream bottoms in swift current and even up small waterfalls as easily as on land. This semi-aquatic component in its life style is apparently unique for ingens among the Nebria species (all others are apparently terrestrial).

Modifications of articles of the tarsi, unique for N. ingens, include dilation of articles, excavation of ventral surfaces of the articles, and a general reduction in the lengths of all setae on ventral surfaces of the articles. Additional modification of the anterior tarsi of males involves the pads of adhesive hairs normally present ventrally on the proximal 3 to 4 articles. In N. ingens, pads are restricted to the two proximal articles and are here reduced in size and extent.

It is proposed that the unique behavior exhibited by N. ingens represents the functional significance of the unique morphological modifications seen in the tarsi. The behavior has been observed again in the laboratory, in an artificial stream.

Reference is made to the current theory of the origin of the aquatic Coleoptera in assessing the significance of this type of adaptation.

A Tale of Tails

G. E. Ball

The harpaline subgenus Glanodes of the genus Harpalus Latreille includes six species: obliquus Horn, 1879; puncticeps Casey, 1914; corpulentus Casey, 1914; and three undescribed species. The evidence used to show that these forms are specifically distinct is derived from two sources: analysis of variation in the structure of the male genitalia; and geographical distribution.

		The theme was Aquatic	Oh, the pain of it!
Mrs. D. Larson fleecing the members	Lloyd Peterson Bill Nelson		Now, the way I see it.....
Bernadette Lousier, Elsie Chaykowsky, J. Shemanchuk	I like mine with jam.	View from Dining Centre, Kananaskis	Did you say fourteen metres long?
The morning after.	Standing Room Only	K. Cummins	B. Stewart
Mrs. J. Hocking	Kay Ball		
G. Pritchard	D. Larson	R. Hartland-Rowe	K. Depner
H.F. Clifford	D.S. Radford	Mary Chance	D. Rosenberg
T. Leischner	G. Pritchard and Leischner's friend		
G.E. Swailes	A. Thomas	J. Shemanchuk	D. Struble
R. Kasting	R. Gooding	Bill Nelson	Bill Nelson
Bill Nelson	U. Soehngen		
W. Haufe	J. Clearwater	B. Hocking	D.S. Smith
H. Cerezke	A. Carter	F. Goulet	H. Goulet
L. Peterson	B.S. Heming	D. Kavinaugh	G. Ball

NINETEENTH ANNUAL MEETING - KANANASKIS 1971

High powered science-- B.Hocking	R. Gooding	F. Goulet			A.W. Thomas	A good slide is legible to the unaided eye at 100 feet

P. Wilkinson R. Hartland-Rowe	Employment Opportunities	Ted Pyke	Collection Competition	Buck Godwin	A. Thomas D. Craig G. Ball

Intellectual Discussion	Hans Boerger and the Goulets	B. Chiolino	J. Clearwater	The life of the party.	This is my best side.

F. Siddiqui	R. Kasting B. Hocking P. Wilkinson G. Ball K. Cummins	Martin Chance	Warming up for the banquet.	R. Lee

Mrs. B. Kavinaugh	E. Gushul	Clara and Ted	W.O. Mitchell	Larry Jacobson	The Chances and the Kavinaughs	J. Shemanchuk

The banquet speaker - W.O.Mitchell	Larry Jacobson elected Honorary Member	G. Dayborn M. Mitchell B. Porter	R. Kasting P.Wilkinson D. Craig Chances D.Whitehead	The Larsons D. Rosenberg	The Great Provider

A. Harper K. Depner	Tales from Weyburn, Sask.	R. Lee, J. Hocking, L. Jacobson	W.O Mitchell and Saw-whet Owl

ENTOMOLOGICAL SOCIETY OF ALBERTA

Minutes of Executive Meeting

March 4, 1971, 3:00 P.M.

Held in Room 132 of the Science B Building, University of Calgary, Calgary.

PRESENT: G. Pritchard (Pres.), G. Burgess, D. Craig, B. Godwin, R. Hartland-Rowe, D. Larson, D. Struble.

This was the first meeting of the 1971 executive of the Entomological Society of Alberta.

1. Encouragement of Amateurs:

G. Pritchard described the short course in Entomology that is to be given by some of the Calgary members of the Society in conjunction with the Calgary Field Naturalist's Society. R. Hartland-Rowe suggested that members of the Society be approached about writing keys to Alberta groups of arthropods with which they are especially familiar. These keys could be submitted to the Alberta Department of Education to be published and distributed through their Illustrated Keys to Plants and Animals of Alberta Series. D. Craig reported that the Department of Entomology, University of Alberta, sold insect collecting equipment at cost to amateurs. G. Pritchard mentioned the existence of the Teen International Entomology Group.

2. Archival Material:

The concensus of the Executive was that the proceedings of the society constituted the only important archival material of the society. It was felt that the Provincial Archives was a more suitable location for this material than the University of Alberta Archives. However, a decision as to where to place this material was postponed until an assessment of the relative accessibility of material in these two sources was investigated.

3. Financial Matters:

The books with the 1970 financial statement had not yet been received by the 1971 Treasurer. Because of this, past sales of Insect Collectors Guides could not be traced. It was not known if the annual grant to Zoological Record had been made or if the Society had been registered under the Alberta Societies Act. Also, it was not known if the National Society's grant of $90 for student encouragement had been received. It was noted that B. Godwin had neither received nor been notified of the award that had been voted to him at the 1970 Annual Meeting.

5. Entomological Society of Alberta Prize:

It was decided that the instructor of the course and not the executive was responsible for deciding to whom the prize should be given at Calgary. When the Prizes are awarded, it was suggested that congratulatory letters from the President of the Society be sent to the recipients and that the recipients be invited to the annual meeting. Also it was suggested that the prizes be given more publicity.

6. Annual Meeting:

The annual meeting is to be held at the Kananaskis Environmental Sciences Centre and the Federal Forestry Station. Acquisition of facilities, sources of financial assistance, and program theme were discussed.

7. Insect Collection Competition:

As no theme for the Collection Competition had been announced at the last meeting, an open competition was suggested in which participants could suggest their own themes.

The meeting was adjourned at 4:45 P.M. The next Executive Meeting was tentatively scheduled for early June.

Minutes of Executive Meeting

June 3, 1971, 3:00 P.M.

Held in Room 132 of the Science B Building, University of Calgary, Calgary.

PRESENT: G. Pritchard (Pres.), G. Burgess, B. Godwin, R. Hartland-Rowe, W. Haufe, D. Larson, L. Safranyik, E. Swailes.

This was the second meeting of the 1971 executive of the Entomological Society of Alberta.

1. Minutes of the March 4, 1971 executive meeting were accepted.

2. Business arising from the minutes:

   (a) Correspondence relating to the preparation of keys to groups of Alberta insects for the Alberta Department of Education Illustrated Keys to Plants and Animals of Alberta Series was read. Because of uncertainty surrounding aspects of this project, it was decided that some of the Calgary members of the Society would undertake writing certain of these keys on a trial basis.

   (b) B. Hocking's suggestion that the Society's archival material be deposited in the University of Alberta archives was accepted.

   (c) Financial matters:

      i. The sale of insect collectors guides to date has not been traced.

      ii. The Society had not as yet been registered for 1971 under the Alberta Societies Act.

      iii. F. Morrison, Chairman of the Student Encouragement Committee for the Canadian Entomological Society, has informed the Alberta Society that $90 will be forwarded to it to assist in funding its student encouragement program.

      iv. G. Burgess reported that entomological texts had been ordered for B. Godwin and that when they arrived they would be forwarded as constituting the award voted to Mr. Godwin at the 1970 annual meeting.

3. New Business:

   (a) The 1973 joint meeting of the Alberta and Canadian Entomological Societies which is to be held in Alberta, was discussed. A tentative suggestion that the Canadian Society

of Zoologists also meet at this time was made. It was agreed that this suggestion was feasible and intellectually valid. This idea was to be taken by R. Hartland-Rowe to the June executive meeting of The Canadian Society of Zoologists and by W. Haufe to the September executive meeting of the Canadian Entomological Society. Possible sites for the meeting were discussed. Suggested sites were Edmonton, Olds Agricultural College, Calgary Mount Royal College, Banff and Jasper. The matter was shelved for further consideration.

(b) The Kananaskis Environmental Sciences Center was chosen as the site for the 1971 annual meeting. The dates October 14, 15 and 16 were considered to be satisfactory to all present. Financial and local arrangements were discussed. Aquatic entomology was approved as a theme for the meeting. Suggestions for invitational speakers were considered.

(c) There was a brief discussion on making certain positions on the executive permanent but nothing was resolved. Several inconsistencies in the constitution were pointed out by G. Pritchard. It was suggested that these matters be corrected in the form of a draft to be presented at the next executive meeting.

(d) The executive approved D. Elliot and J. Rickert as the respective Calgary and Edmonton recipients of $50 Alberta Entomological Society Prizes for 1971.

The meeting was adjourned at 5:15 P.M. The next executive meeting was scheduled for mid September.

Minutes of Executive Meeting

September 16, 1971, 3:00 P.M.

Held in Room 132 of the Science A Building, University of Calgary, Calgary.

PRESENT: G. Pritchard (Pres.), R. Hartland-Rowe, W. Haufe, D. Larson, G. Swailes.

This was the third meeting of the 1971 executive of the Entomological Society of Alberta.

1. Minutes of the June 3, 1971 executive meeting were accepted.

2. Business arising out of the minutes:

   (a) Annual meeting - G. Pritchard reported that the facilities of the Environmental Sciences Centre of the University of Calgary had been booked for the Annual Meeting. The Faculty of Arts and Science of the University of Calgary had donated $500 towards the meeting, $250 for a guest speaker and $250 for financial assistance for students. Dr. K. Cummins of Michigan State University had been approached for the guest speaker. The program, fees, and local arrangements were discussed.

   (b) Constitutional changes were discussed. Several proposed changes were approved for submission to the membership.

   (c) Joint Meeting of the Entomological Society of Alberta and the Entomological Society of Canada, 1973. W. Haufe stated that the Entomological Society of Canada favored the idea of a joint meeting with the Canadian Society of Zoologists in 1973. R. Hartland-Rowe reported that the Canadian Society of Zoologists expressed general agreement with this idea but that no formal motion on this idea was made. W. Haufe suggested that the lead in arranging the joint meeting be taken by the Entomological Society of Alberta. It was decided that a Chairman be appointed at the annual meeting to set up a steering committee to initiate planning for the 1973 joint meeting.

3. New Business

   (a) W. Haufe stated that his current term as Regional Director of the Entomological Society of Canada expires this year, and that an election for this office must be held at the annual meeting.

   (b) The duties of treasurer were assumed by the secretary.

(c) W. Haufe reported that the National Society would like a complete set of the Proceedings of the Entomological Society of Alberta to be deposited in its archives. D. Larson was to look after this matter.

The meeting was adjourned at 4:55 P.M. The next Executive Meeting was scheduled for 8:00 P.M., October 14, 1971 at the Environmental Sciences Centre (Kananaskis).

Minutes of Executive Meeting

October 14, 1971, 8:45 P.M.

Held in the Library of the Environmental Sciences Centre, Kananaskis Research Forest.

PRESENT: G. Pritchard (President), R. Hartland-Rowe, W. Haufe, D. Larson, D. Struble, G. Swailes.

A. Minutes of the September 16, 1971 Executive Meeting were distributed to those present.

B. Business arising from the Minutes:

1. G. Pritchard stated that the proposed constitutional changes should be introduced into the first part of the Annual Business Meeting for the acceptance of these changes would affect the composition of the 1972 Executive.

2. Committees and auditors were appointed (a list of persons serving on committees or as auditors is given in the Minutes of the Annual Business Meeting, Part 1).

3. G. Pritchard announced that certain points regarding the 1973 joint meeting of the Alberta and Canadian Entomological Societies had to be settled. These points were: locale of the meeting; dates; and the advisability of inviting the Canadian Society of Zoologists to participate in the Meeting.

4. G. Pritchard and D. Larson reported that the following expenditures related to the annual meeting or to past commitments had been incurred:

   a. The $15.00 registration fee for the Annual Meeting had been waived for Mr. E.Gushul in return for photographic services.

   b. A gift costing $25.00 had been bought for the banquet speaker, Mr. W.O. Mitchell.

   c. The book award to Mr. B. Godwin had cost the Society $29.45.

   d. The bar for the Annual Meeting had been contracted out and should run at no loss or profit to the Society.

C. New Business:

1. G. Pritchard suggested that some permanent committees be established, for example:

a. an Employment Committee to promote liaison between University faculty and employers of entomologists, and

b. a Publications Committee responsible for matters such as encouragement of amateurs, collection competitions, etc.

R. Hartland-Rowe suggested that a Standing Committee on Publications could be set up to look after publications such as the Proceedings, Insect Collectors Guide, Keys to Alberta Insects, etc.

It was decided not to take any action on this idea at this time, but to pass it on to the following executive.

2. Prior to the Annual Meeting, the secretary received a letter from three members of the Society, nominating Mr. L. Jacobson for Honorary Life Membership. In accordance with article 3 of the Constitution, this nomination was to be presented to the members of the Society at the Annual Meeting for their vote.

The meeting was adjourned at 10:00 P.M.

Minutes of the 19th Annual Business Meeting - Part I

October 15, 1971, 8:30 A.M.

The 19th Annual Meeting of the Entomological Society of Alberta was held at the Environmental Sciences Centre of the University of Calgary in the Kananaskis Research Forest, Alberta. The meeting was opened by the President, Dr. G. Pritchard, at 8:30 A.M.

1. The minutes of the 18th Annual Meeting were adopted as published in the 1970 Proceedings on a motion by G.E. Ball and seconded by B. Hocking.

2. G. Pritchard highlighted the minutes of the 1971 executive meetings. Minutes of the 1971 executive meetings are presented elsewhere in the Proceedings.

3. Two weeks prior to the 1971 Annual Meeting, seven motions to change the constitution of the Entomological Society of Alberta were put forward to the membership by the 1971 Executive. G. Pritchard described these motions as being designed to reorganize the members of the governing body of the society, in particular their terms of office, in order to lead to a more efficient operation.

   a) Moved by G.E. Swailes and seconded by J. Shemanchuk that Motion 1 as presented by the Executive be adopted.

      MOTION1 - "That Article 5 (of the constitution) be deleted and the following two Articles be substituted:

      Article 5

      Officers

      The Officers of the Society shall consist of a President, Vice-President, Secretary-Treasurer, and Editor. These Officers shall constitute the Executive of the Society with full power to act on behalf of the Society within the bounds of the Constitution, and to appoint committees as necessary.

      Article 6

      Council

      The Council shall consist of the four Officers, the immediate Past-President, a Regional Director to the Entomological Society of Canada, and three Ordinary Directors. The Ordinary Directors shall represent the various fields of entomology and the geographical areas of Alberta as widely as possible."

b) Moved by R. Hartland-Rowe and seconded by W.B. Porter that Motion 2 as presented by the Executive be adopted.

MOTION 2 - "That Article 6 (of the constitution) be deleted and the following Article be substituted:

Elections

Elections shall be held once a year at the Annual Meeting, and Officers so elected shall take office at the beginning of the following Calendar year and remain in office for a term of one year.

The office of President shall not normally be held by the same person for two consecutive years. The Vice-President shall normally follow his/her term of office with a term as President. The Secretary-Treasurer and Editor shall be eligible for immediate re-election.

The Directors shall also take office at the beginning of the calendar year following their election.

The Regional Director shall be elected for a period of two years and shall then be immediately eligible for one more term.

The term of office of each Ordinary Director shall be three years, with one Director replaced in each year. Ordinary Directors are not immediately eligible for re-election."

CARRIED

c) Moved by R. Hartland-Rowe and seconded by M. Larson that Motion 3 as presented by the Executive be adopted.

MOTION 3 - "That the following Article be added:

Article 8

Vacancies

Vacancies in any office (except that of President) on the Council between elections shall be filled by appointment by the President, with the concurrence of Council, the tenure of such co-opted members to terminate at the end of the calendar year during which the appointment is made. A vacancy in the office of President shall be filled by the Vice-President, who will then serve his normal term as President.

Members elected at the Annual Meeting to fill vacancies on Council shall complete the period of service of the Council members whose places they have taken. On completion of this term they shall be eligible for re-election only if this period of service (co-opted and/or elected) has not exceeded 18 months."

CARRIED

d) Moved by E. Swailes and seconded by W. Haufe that Motion 4 as presented by the Executive be adopted.

MOTION 4 - "That Article 8 (of the constitution) be deleted and the following Article be substituted:

Article 9

Duties of Officers

The President shall preside at all meetings and act ex-officio on all committees.

The Vice-President shall, in the temporary absence or disability of the President, perform the duties and exercise the powers of the President, and shall perform such other duties as shall from time to time be imposed upon him by the Council.

The Secretary-Treasurer shall maintain a record of all meetings and act as custodian of minute books and current correspondence, and forward appropriate material to the University of Alberta for storage in the Society's archives. He shall also receive and disburse all funds and prepare the annual financial statement.

The Editor shall receive and record reports and publications on behalf of the Society and act as editor of the Proceedings."

CARRIED

e) Moved by R. Hartland-Rowe and seconded by J. Shemanchuk that Motion 5 as presented by the Executive be adopted.

MOTION 5 - "That the following Article be added:

Article 10

Signing Officers

The two signing Officers of the Society shall be the President and the Secretary-Treasurer."

CARRIED

f) Moved by E. Gushul and seconded by W.B. Porter that Motion 6 as presented by the Executive be adopted.

MOTION 6 - "That Article 7 (of the constitution) be renumbered to Article 11."

CARRIED

g) Moved by T. Leischner and seconded by R. Hartland-Rowe that Motion 7 as presented by the Executive be adopted.

MOTION 7 - "That By-law 2 be deleted, By-law 3 be renumbered as By-law 2, By-law 4 be renumbered as By-law 3, and By-law 5 be deleted."

CARRIED

4. The following committees submitted by the Executive were appointed:

Nominating Committee	G. E. Swailes - Chairman J. B. Gurba R. H. Gooding
Resolutions Committee	B. Heming - Chairman A. M. Harper
Insect Collection Committee	D. A. Craig - Chairman D. J. Larson J. A. Shemanchuk
Auditors	W. B. Porter D. Wales

5. A. M. Harper moved that the Entomological Society of Alberta make a 1971 contribution of $10.00 to the Zoological Record. The motion was seconded by W. B. Porter.

CARRIED

6. The report of the Regional Director to the National Society was submitted by W. Haufe. W. Haufe moved, B. Heming seconded, adoption of the Report. (Complete report is printed at the end of these minutes).

CARRIED

7. J. Gurba requested information on the National Society's grant for student encouragement. D. Larson reported that a grant of $90.00 had been received from the Entomological Society of Canada.

8. G. Pritchard brought the existence of Teen International Entomology Group (T.I.E.G.) to the attention of the members of the Society. He mentioned that a local member of this organization, Mr. J. Pyke, would be attending the meeting on the following day and perhaps Mr. Pyke would give a brief account of this Group.

9. The President brought up the matter of encouragement of amateurs. This matter was passed on to the next executive.

10. G. Pritchard stated that in 1973 the Alberta and Canadian Entomological Societies would meet jointly in Alberta. He mentioned that interest had been expressed by the Canadian Society of Zoologists to meet with the Entomological Societies at this time. Discussion on this matter was postponed to the second part of the business meeting.

11. B. Hocking reported that since he began assembling sets of the Society's Proceedings three years ago, he has managed to accumulate three complete and several incomplete sets. D. Larson said that Dr. R. Shepard had donated a fourth complete set of the Proceedings. D. Larson stated that requests for copies of the Proceedings had been received from The Entomological Society of Canada and from the Alberta Provincial Museum and Archives. These organizations were informed that sets of the Proceedings would be made available to them if a sufficient number of sets could be assembled. B. Hocking felt that any sets sent to these organizations need not be bound. J. Gurba suggested that it might be possible to Xerox missing issues of the Proceedings. E. Gushul volunteered to remake any photographic plates that might be required.

12. G. Pritchard suggested that a publications committee be set up to look after such matters as publication and distribution of the Proceedings. No action was taken on this suggestion.

13. G. Pritchard presented a display of replies that he had received in response to an inquiry he made into the possibilities of employment in various government agencies and industry for students graduating in entomology. The general tone of the replies was not encouraging.

14. B. Heming moved, L. Peterson seconded, that Part 1 of the business meeting adjourn.

Minutes of the 19th Annual Business Meeting - Part II

October 16, 1969, 1:30 P.M.

1. G.E. Swailes, Chairman of the Nominations Committee, presented the following slate of officers for 1972:

President	-	G.E. Swailes
Vice-President	-	K. Ball
	-	B. Heming
Secretary-Treasurer	-	A.M. Harper
Editor	-	W.A. Nelson
Directors		
1 year term	-	D.L. Struble
2 year term	-	L.K. Peterson
3 year term	-	W.B. Porter
Regional Director	-	W.O. Haufe

J. Shemanchuk moved, G. Ball seconded, that nominations cease.

CARRIED

A vote was held in which K. Ball was elected as Vice-President. All other offices were filled by acclamation.

2. D. Craig presented the report on the Insect Collection Competition. D. Craig moved, J. Shemanchuk seconded, that the report be accepted. (The complete report follows the minutes).

3. The report of the Resolutions Committee was presented by B. Heming.

"Whereas the success of the 19th Annual Meeting of the Entomological Society of Alberta can, to a large extent, be attributed to the following, be it resolved that letters of thanks and appreciation be sent to: -

(a) Dr. K.W. Cummins for his informed and stimulating talk of "The Role of Aquatic Insects in Freshwater Ecosystems."

(b) Mr. W.O. Mitchell for his entertaining and ever so honest appraisal of things past, present and undoubtably to come.

(c) The Faculty of Arts and Science, University of Calgary, for financial support.

(d) The staff and management of the Environmental Sciences Centre of the University of Calgary for their services during the meetings.

Be it further resolved that a vote of thanks be tendered to those involved in the preparation of the meeting and program."

B. Heming moved, A. Harper seconded, that the report of the Resolutions Committee be adopted as read.

CARRIED

4. An interim financial statement was read by the Treasurer, D. J. Larson. He forecast that the bank balance might be up slightly from last year, however all bills had not as yet been received or paid. A treasurer's report will be prepared at the end of the year. D. Larson moved, N. Holmes seconded, that the interim financial statement be accepted.

CARRIED

5. G. Ball moved, W. Haufe seconded, that the Entomological Society of Alberta extend an invitation to the Canadian Society of Zoologists to meet jointly with the Entomological Societies of Alberta and Canada in 1973.

G. Ball stated that he was against the motion on the grounds of logistics. R. Gooding pointed out that the Entomological Society of Canada and the Entomological Society of America would meet jointly in 1972, hence a joint meeting with the Canadian Society of Zoologists in 1973 would give another year of "dilution" of Canadian Entomologists. L. Jacobson stated that, on the basis of his experience in organizing the 1965 joint meeting in Banff, he felt that problems of organization would be difficult. B. Hocking suggested that a compromise may be possible, with the Entomological Societies and the Canadian Society of Zoologists holding their meetings concurrently with each doing its own local arrangements and organization but with a common program committee. G. Ball pointed out that this could lead to competition for facilities.

In the vote, the motion was defeated 16 to 14 with G. Ball voting against the motion.

R. Gooding suggested that the Entomological Society of Alberta write a letter to the Canadian Society of Zoologists stating that the Entomological Society of Alberta agrees with the idea of a joint meeting in principle but that the idea is impractical for the 1973 Alberta meeting.

6. The location of the 1973 joint meeting was discussed. J. Shemanchuk brought up the idea of establishing a steering committee to choose the date and location of the meeting. G. Ball suggested that the steering committee be instructed to choose a date between the end of August and the end of October, and to look into the Banff School of Fine Arts first and Edmonton secondly as sites for the meeting. These suggestions were approved by a vote.

R. Gooding suggested that G. Pritchard and L. Jacobson be approached as forming the steering committee. N. Holmes moved, B. Hocking seconded, that G. Pritchard and L. Jacobson be appointed co-chairmen of the steering committee organizing the 1973 joint meeting.

CARRIED

7. G. Pritchard announced that the results of an election held at the meeting were unanimous in giving L. Jacobson honorary membership in the Society.

8. G. Pritchard pointed out that each member in the Society had the right to nominate candidates for the National Society's outstanding achievement award.

9. The collection and distribution of sets of the Proceedings of the Entomological Society of Alberta were left in B. Hocking's hands. D. Larson reported that the Society has had requests for copies of its proceedings from the National Society and from the Alberta Provincial Museum.

10. The President briefly mentioned the sale of copies of the Insect Collectors Guide. He urged members in the various centers to turn in their cash receipts yearly.

11. B. Hocking expressed the appreciation of the Department of Entomology of the University of Alberta to G. Pritchard for initiating correspondence relating to employment of Entomologists and to liaison between entomologists and employers.

12. G. Pritchard mentioned that the Executive had discussed the possibility of preparing keys to groups of Alberta Insects for The Alberta Department of Education Illustrated Keys to Plants and Animals of Alberta series. At present, the matter is being left with some of the Calgary members of the Society.

13. T. Pyke, a member of T.I.E.G. (Teen International Entomology Group), gave a description of the organization and function of this group. G. Pritchard, on behalf of the Society, offered congratulations to Mr. Pyke for his work in Entomology.

14. G. Pritchard offered his thanks to W. B. Porter, M. Larson, D. Larson, and all members of the executive who appeared so faithfully at the three 1971 Executive Meetings.

15. N. Holmes moved, W.B. Porter seconded, that the meeting be adjourned.

CARRIED

The meeting was adjourned at 3:00 P.M.

Entomological Society of Alberta

Financial Statement 1971

Item	Subtotal	Total
Receipts		
Balance transferred from Edmonton		826.78
Membership fees		
1970 - 1 at $2.00	2.00	
1971 -41 at 2.00	82.00	
1972 -32 at 2.00	64.00	
	148.00	148.00
Entomological Society of Canada - Student Encouragement Grant		90.00
University of Calgary, Faculty of Arts and Science, Conference Grant		504.00
Annual Meeting		
Registration and accommodation	620.00	
Bar receipts	125.00	
	745.00	745.00
		2,313.78
Disbursements		
Entomological Society of Alberta		
Prizes:		
University of Alberta	50.00	
University of Calgary	50.00	
	100.00	100.00
Insect Collection Prizes		38.20
Award to Mr. B. Godwin, Olds Agricultural and Vocational College		29.45

		Total
Contribution to Zoological Record		10.00
Bank charges		4.00
Exchange and money order		.75
Annual Meeting		
Environmental Sciences Centre fee for meals, accommodation and conference fee	670.25	
Bar expenses and dinner wine	153.00	
Invitational speaker	254.00	
Presentation to banquet speaker	25.00	
	1,102.25	1,102.25
Ledger, postage and other secretarial expenditures		4.50
Paper, postage and xerox charges from the University of Calgary*		23.13*
Petty cash on hand December 31, 1971		12.00
		1,324.28

* Cheque outstanding

Bank Balance, December 31, 1971	1,012.63
minus outstanding cheque	23.13
	989.50

Receipts	2,313.78
minus disbursements	1,324.28
	989.50

D. Wales

B. Porter

D. Larson

Report of Annual Insect Collection Committee

Once again Olds Agricultural and Vocational College almost made a clean sweep of prizes.

In the Senior Category (13-17 years) E. E. Robertson and A. Holland, both from O.A.V.C. were awarded First and Second prizes respectively. Third Prize was taken by J. H. Acorn of Edmonton. An Honourable Mention was made of the collection entered by T. Pike of Calgary.

In the Junior Category (under 12 years) first prize was awarded to the only entry by K. Godwin of Olds. Her insect collection, arranged by damage done to plants, drew much favourable comment.

In the Open Challenge (no age limit) a Third Prize was awarded to the Pruden family of Calgary.

As in recent years the number of entries is low but the standard is high making the judging pleasurably difficult.

Dr. D. A. Craig
Chairman,
Insect Collection Competition.

Report of the Regional Director from the Entomological Society of Canada

I attended four business meetings held in the Entomological Society of Canada in 1971: -

Board of Governors, Ottawa, January 28-29, 1971
Board of Governors, Victoria, August 23, 1971
Annual Business Meeting, Victoria, August 25, 1971
Board of Governors, Victoria, August 26, 1971

Reports of national committees and representatives as well as summaries of action taken by the Entomological Society of Canada have been publicized for members of the national society in Issues 1 and 3, Volume 3 of the Bulletin. I have a complete file of minutes and proceedings to supply further detailed information that may be required. The purpose of this report is to record actions that are of concern in the regional societies.

1. Bulletin Supplements

The brief on 'Pesticides and the Environment' prepared and distributed by ESC has been widely accepted as an authoritative position on pesticide policy. Demand has exceeded the original supply of 5000 copies and further reprinting has been authorized. Recipients are also being informed that they may reproduce the supplement locally for distribution. Single reprints of supplements will continue to be available free of charge.

2. Membership in ESC

A new class of members to be known as 'Fellows' is under consideration. The establishment of a new class has been accepted in principle and an 'ad hoc' committee has been delegated to develop a detailed plan.

3. Canadian Entomologist

a) Publication in the Canadian Entomologist will be restricted to members with the exception that, if there are joint authors, only one of the authors is required to be a member in good standing.

b) Page charges will be levied against all authors. If an author claims lack of sponsorship, exemption may be authorized by the Editorial Board.

c) Offset printing of the Journal has been authorized to begin in January 1972.

4. Memoirs

Routine distribution will be limited to subscribers, the Archives, and the ESC stock of back numbers. Sponsors of memoirs will be offered

the opportunity to determine additional distribution of each Memoir to interested persons. The Canadian Entomologist will publish a notice of each Memoir and members of ESC will have to obtain copies by request to the sponsor.

5. Archives

a) The Managing Council has been directed to provide the Archivist (ESC) with complete series of The Canadian Entomologist, Memoirs, and the Bulletin.

b) Affiliated societies are requested to deposit complete series of their publications in the Entomological Archives.

6. Annual Meetings

a) The Program Committee (ESC) has been authorized to pursue the proposal that the Entomological Society of Canada meet with the Canadian Society of Zoologists in 1973.

b) The Finance Committee has been asked to review and report on the adequacy of the current grant of $1250 by ESC to the host society. (Information and pending changes should be kept in mind in ESA plans for a joint meeting in 1973).

c) It has been recommended to host societies that the Gold Medal Luncheon should not be separated from the registration fee as a cost to members. All registrants should be encouraged to attend in future programs.

d) The Editorial Board has been directed to investigate the possibility of ESC publishing symposia and invitation papers presented during the 1971 meeting. Would a regular arrangement in this regard contribute to the standard of programs for joint Annual Meetings?

7. Biological Council of Canada

An increase of dues from one to three dollars per member as proposed by B.C.C. was ratified for members of ESC effective in 1972. The increase has been justified by the need to establish a permanent secretariat essential to the progress of B.C.C. and the proposed enlarged program of communication.

8. Future Annual Meetings

1972	-	Montreal, P.Q.
1973	-	Alberta
1974	-	Maritimes
1975	-	Saskatchewan
1976	-	Ontario

W. O. Haufe
Regional Director

October 12, 1971.

ENTOMOLOGICAL SOCIETY OF ALBERTA PRIZE WINNERS

1954	Roman P. Fodchuk	Associate Professor, University of Guelph.
1955	Ronald B. Madge	British Museum, London, England.
1956	Waldemar Klassen	Insect Geneticist, North Dakota, U.S.A.
1957	Ronald H. Gooding	Associate Professor, University of Alberta.
1958	Natalka Horeczko	Medicine, Edmonton.
1959	Herbert Cerezke	Forest Biology, Edmonton.
1960	Max W. McFadden	Post-doctoral, University of Washington.
1961	Gordon Pritchard	Department of Biology, University of Calgary.
1962	Malcolm J. Reddy	Victoria, B.C.
1963	Doreen E. Waldbauer	Edmonton, Alberta.
1964	Walter Jerry Awram	Provincial Apiarist, Government of Alberta.
1965	David J. Larson	Department of Biology, University of Calgary.
1966	Mrs. Mary M. Chance David M. Rosenberg	Working for Ph.D., Edmonton Working for Ph.D., Edmonton
1967	Mrs. Jo Whitehead	Edmonton, Alberta.
1968	J. D. Shorthouse	Working for Ph.D. Saskatoon
1969	E. H. Miller	Working for Ph.D. Christchurch New Zealand.
1970	Not awarded	
1971	D. P. Elliott	Fourth year student in the Faculty of Education, University of Calgary.
	J. Rickert	Instructor at N.A.I.T., Edmonton.

INSECT COLLECTION COMPETITION

History of Awards

*Entomological Society of Alberta Prize Winners.

1954

First Prize, Senior - Norman Rollingson, 3309 Parkside Drive, Lethbridge.

Second Prize, Senior - Ronald Law, 1631 - 21 Avenue N.W., Calgary.

Third Prize, Senior - Fred Vincent, 2340 - 24 Avenue N.W., Calgary.

First Prize, Junior - Donna Mae Nattrass, Manyberries.

Second Prize, Junior - Wayne Nattrass, Manyberries.

Third Prize, Junior - Cam Huth, 2719 - 18 Street N.W., Calgary.

1955

First Prize, Senior - Donna Mae Nattrass, Manyberries.

Second Prize, Senior - Joy Molyneux, 1124 - 9 Street E., Calgary.

Third Prize, Senior - Hilary Anderberg, 927 - 7 Avenue W., Calgary.

First Prize, Junior - Wayne Nattrass, Manyberries.

Second Prize, Junior - Kenneth Beswick, Spring Coulee.

Third Prize, Junior - Clinton Walker, 11224 - 87 Avenue, Edmonton.

1956

First Prize, Senior - Doug Salt, c/o Dr. R.W. Salt, Research Station, Canada Agriculture, Lethbridge.

Second Prize, Senior - Ron Popik, Glen Park, Calmar.

First Prize, Junior - Kenneth Beswick, Spring Coulee.

Second Prize, Junior - Brian Martin, 9107 - 117 Street, Edmonton.

1957

First Prize, Senior - Kenneth Beswick, Spring Coulee.

Second Prize, Senior - Doug Salt, c/o Research Station, Canada Agriculture, Lethbridge.

Third Prize, Senior - Jane Moonen, Millet.

First Prize, Junior - Christine Marshall, Howsann School, RCAF Station Claresholm.

Second Prize, Junior - Bruce Martin, 9107 - 117 Street, Edmonton.

Third Prize, Junior - Gary Brown, 42 Cambridge Road, Calgary.

1958

First Prize, Senior - Andrew and Myron Baziuk, Redwater.

Second Prize, Senior - David Larson, 1201 - 24 Street S., Lethbridge.*

Third Prize, Senior - Keith and Neil Redding, 648 - 14 Street S., Lethbridge.

Consolation, Senior - Jack Haberman, 3115 - 10 Avenue A.S., Lethbridge.

First Prize, Junior - Joe Shorthouse, 2317 - 13 Avenue S., Lethbridge.*

1959

First Prize, Senior - David J. Larson, 1201 - 24 Street S., Lethbridge.*

Second Prize, Senior - Jack Haberman, 3115 - 10 Avenue A S., Lethbridge.

Third Prize, Senior - Joseph Shorthouse, 2317 - 13 Avenue S., Lethbridge.*

No Junior Prizes were awarded this year.

1960

First Prize, Senior - David J. Larson, 1201 - 24 Street S., Lethbridge.*

Second Prize, Senior - Joseph Shorthouse, 2317 - 13 Avenue S., Lethbridge.*

Third Prize, Senior - Kenneth Richards, 2209 - 10 Avenue S., Lethbridge.

Honorable Mention, Senior - M.S. Carleton, Banff.

Consolation, Junior - Lacombe School, Grade 8.

1961

First Prize Senior - Joseph Shorthouse, 2317 - 13 Avenue S., Lethbridge.*

Second Prize, Senior - Kenneth Richards, 2209 - 10 Avenue S., Lethbridge.

Third Prize, Senior - M.S. Carleton, Lethbridge.

Challenge Competition - David J. Larson, 1201 - 24 Street S., Lethbridge.*

No Junior Prizes were awarded this year.

1962

General Collection, First Prize (one entry) - Kenneth Richards, 2209 - 10 Avenue S., Lethbridge.

Challenge Competition (two entries) - Draw with two winners, David Larson and Joseph Shorthouse (both of Lethbridge).*

1963

First Prize, Junior - Robert Iverson.

Second Prize, Junior - Gordon Bridgewater.

Third Prize, Junior - John Kloppenborg.

First Prize, Challenge Event - Joe Shorthouse.*

Second Prize, Challenge Event - Ken Richards.

No Senior Prizes were awarded this year.

1964

First Prize, Senior - Robert Iverson, Edmonton.

First Prize, Junior - Beverly Ann Lambert, Edmonton.

No other prizes were awarded.

1965

No prizes awarded.

1966

First Prize, Senior - Norman Wood, 9135 - 142 Street, Edmonton.

Second Prize, Senior - Alan Mathieson, Box 695, Olds.

First Prize, Junior - Selma Scott, 140 Lamone Street, Calgary.

Second Prize, Junior (Draw) - Hugh Godwin, Olds, and Cecelia Williams, Taber.

C. Open - Gwen M. Walker, O.A.V.C., Olds.

1967

First Prize, Senior - Donald Wayne Chomyn, Box 977, Leduc.

First Prize, Junior - Selma Scott, 140 Lamone Street, Calgary.

Second Prize, Junior - Hugh Godwin, Box 760, Olds.

Third Prize, Junior - John Acorn, 14416 - 78 Avenue, Edmonton.

First Prize, Open - Sharon Erickson, O.A.V.C., Olds.

Second Prize, Open - Ross Hyatt, Box 128, Bowden.

Third Prize, Open - Joseph Hartwell, Box 125, Olds.

Honorable Mention (Open) - Norman Tensen, O.A.V.C., Olds, Alan and John Mathieson, Box 695, Olds.

1968

First Prize, Senior - Mr. N.G. Sperling, Olds Agricultural and Vocational College, Olds, Alberta.

Second Prize, Senior - Mr. A. Bouvier, Olds Agricultural and Vocational College, Olds, Alberta.

Third Prize, Senior - Mr. E. Leitert, Olds Agricultural and Vocational College, Olds, Alberta.

Honourable Mention - Mr. D. Kroeker, Olds Agricultural and Vocational College, Olds, Alberta.

First Prize, Junior - Mr. M. Pawluk, 7932 - 97 Avenue, Edmonton.

1969

First Prize, Senior - Richard Krahn, Olds Agricultural and Vocational College, Olds.

Second Prize, Senior - Herman Barthel, Olds Agricultural and Vocational College, Olds.

Third Prize, Senior - Wendy Groenveld, Olds Agricultural and Vocational College, Olds.

Honorable mention - Cherly Williams, Olds Agricultural and Vocational College, Olds.

First Prize, Junior - Hugh Godwin, Olds, Alberta.

1970

First equal, adult - Mike Herrington, Olds Agricultural and Vocational College, Olds.

First equal, adult - Donna Knott, Olds Agricultural and Vocational College, Olds.

Third, adult - Trevor Gould, Olds Agricultural and Vocational College, Olds.

First Prize, Senior - Jim Malyk, Airdrie, Alberta.

Second Prize, Senior - Mark Pawluk, Edmonton, Alberta.

Best Collection, Junior - Hugh Godwin, Olds Agricultural and Vocational College, Olds.

1971

First Prize, Senior - E. E. Robertson, O.A.V.C., Olds.

Second Prize, Senior - A. Holland, O.A.V.C., Olds.

Third Prize, Senior - J. H. Acorn, Edmonton.

Honorable Mention, Senior - T. Pike, Calgary.

First Prize, Junior - K. Godwin, Olds.

Third Prize, Open - The Pruden family, Calgary.

PRESIDENTS OF THE ENTOMOLOGICAL SOCIETY OF ALBERTA

Strickland, E.H.	1953*
Painter, R.H.	1954*
Hurtig, H.	1955
Hopping, G.R.	1956
Farstad, C.W.	1957
Ball, G.E.	1958
Brown, C.E.	1959
Jacobson, L.A.	1960
Edmunds, J.W.	1961*
Van Veen, N.W.	1962
Holmes, N.W.	1963
Evans, W.G.	1964
Hartland-Rowe, R.C.B.	1965
Salt, R.W.	1966
Hocking, B.	1967
Tripp, H.A.	1968
Shemanchuk, J.A.	1969
Pritchard, G.	1970
Swailes, G.E.	1971

* deceased

Entomological Society of Alberta

Membership List

		Dues Paid to
Awram, Dr. J.	Agriculturist, Alta. Dept. of Agriculture Agriculture Bldg., Edmonton	1971
Ball, Dr. G.E.	Entomology Department University of Alberta Edmonton 7, Alberta	1972
Ball, Dr. Kay	11719 - 133 Street Edmonton, Alberta	1972
Bellicak, Mr. J.	Department of Entomology University of Alberta	1972
Benn, Dr. M.	Department of Chemistry University of Calgary	1971
Blakeley, Mr. P.E.	Research Station, Canada Dept. of Agriculture Lethbridge, Alberta	1970
Boerger, Mr. H.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Borkent, Mr. A.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Burgess, Mr. G.D.	Mount Royal College, Lincoln Park Campus, Calgary, Alberta	1971
Carr, Mr. J.L.	R.R. 4 Calgary	1971
Carter, Mr. A.	Department of Biology University of Calgary	1971
Cerezke, Dr. H.F.	Canadian Forestry Service 5320 - 122 Street Edmonton 20, Alberta	1972
Chance, Mr. M.A.	Department of Entomology University of Alberta Edmonton 7, Alberta	1972

Chance, Mrs. Mary M.	Department of Entomology University of Alberta Edmonton 7, Alberta	1972
Cheung, Mr. A.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Chomyn, Mr. D.	4515 - 46 Avenue Leduc, Alberta	1971
Clearwater, Mr. J.R.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Clifford, Dr. H.	Department of Zoology University of Alberta Edmonton 7, Alberta	1971
Craig, Dr. D.A.	Department of Entomology University of Alberta Edmonton 7, Alberta	1972
Daborn, Mr. G.R.	Department of Zoology University of Alberta Edmonton 7, Alberta	1971
Depner, Dr. K.W.	Research Station Canada Dept. of Agriculture Lethbridge, Alberta	1971
Dixon, Mr. R.D.	Alberta Dept. of Agriculture O.S. Longman Bldg. Edmonton, Alberta	1971
Elliott, Mr. D.	4508 Grovehill Rd. S.W. Calgary, Alberta	1971
Evans, Dr.W.G.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Ghuman, Miss K.	Box 44 Grande Cache, Alberta	1971
Godwin, Mr. B.	Olds Agricultural and Vocational School, Olds, Alberta	1971
Gooding, Dr. R.	Department of Entomology University of Alberta Edmonton 7, Alberta	1972

Goulet, Mrs. F.	Department of Entomology University of Alberta Edmonton 7, Alberta	1972
Goulet, Mr. H.	Department of Entomology University of Alberta Edmonton 7, Alberta	1972
Griffiths, Mr. G.C.D.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Gurba, Mr. J.B.	Alberta Dept. of Agriculture Crop Protection and Pest Control Agriculture Building Edmonton, Alberta	1972
Gushul, Mr. E.T.	Research Station Canada Dept. of Agriculture Lethbridge, Alberta	1972
Harper, Dr. A.M.	Research Station Canada Dept. of Agriculture Lethbridge, Alberta	1972
Harrison, B.	6324 - 103 A Ave. Edmonton, Alberta	1970
Hartland-Rowe, Dr. R.	Department of Biology University of Calgary Calgary 44, Alberta	1971
Haufe, Dr. W.O.	Research Station Canada Dept. of Agriculture Lethbridge, Alberta	1972
Heming, Dr. B.	Department of Entomology University of Alberta	1972
Hergert, Mr. C.	Department of Entomology University of Alberta Edmonton 7, Alberta	1972
Hilton, Dr. D.	Department of Zoology University of Alberta Edmonton 7, Alberta	1971
Hobbs, Dr. G.A.	Research Station Lethbridge, Alberta	1970

Hocking, Dr. B.	Department of Entomology University of Alberta Edmonton 7, Alberta	1972
Hocking, Mrs. J.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Holmes, Dr. N.D.	Research Station, C.D.A. Lethbridge, Alberta	1972
Hopkins, Mrs. M.E.	# 3 Canyon Drive, Calgary, Alberta	1969
Hopping, Dr. G.	9924 - 5 St. S.E. Calgary, Alberta	Honorary Member
Huang, Mr. C.T.	Department of Entomology University of Alberta Edmonton 7, Alberta	1969
Hudson, Mr. J.E.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Jacobson, Mr. L.A.	Research Station Lethbridge, Alberta	Honorary Member
Johnson, Dr. P.C.	Intermountain Forest & Range Experimental Station Fed. Bldg., Missoula, Montana 59801	1971 terminate membership
Kapoor, Mrs. R.P.D.	Department of Entomology University of Alberta Edmonton 7, Alberta	1969
Kasting, Dr. R.	Research Station Lethbridge, Alberta	1972
Kavinaugh, Mr. D.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Kavinaugh, Mrs. D.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Khan, Dr. M.A.	Research Station Lethbridge, Alberta	1971

Lanier, Dr. G.N.	Entomology Research Institute C.D.A., Ottawa	1970
Larson, Mr. D.J.	Department of Biology University of Calgary Calgary 44, Alberta	1971
Larson, Mrs. M.A.	Department of Biology University of Calgary Calgary 44, Alberta	1971
Larson, Dr. R.I.	Research Station Lethbridge, Alberta	1970
Lee, Mr. R.	Department of Entomology University of Alberta Edmonton 7, Alberta	1972
Leischner, Mr. T.	Environmental Sciences Centre, University of Calgary	1971
Leng, Miss R.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Lilly, Mr. C.E.	Research Station Lethbridge, Alberta	1970
Lin, Mr. E.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Mason, Dr. W.R.M.	Entomology Research Institute K.W. Neatby Bldg., Ottawa 3, Ontario	1971
Matthey, Dr. W.	Environmental Sciences Centre, University of Calgary	1971
McCauley, Mr. V.J.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
McDonald, Dr. S.	Research Station Lethbridge, Alberta	1971
Melvin, Mr. J.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Meyer, Mr. P.A.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971

Muldrew, Dr. J.	Canadian Forestry Service 5320 - 122 Street Edmonton 20, Alberta	1971
Nelson, Dr. W.A.	Research Station Lethbridge, Alberta	1971
Nimmo, Dr. A.	'Tekarra', Market Place Corbridge, Northumberland, England.	1972
Oboite, Mr. A.C.	Department of Entomology University of Alberta Edmonton 7, Alberta	1969
Owens, Mr. R.	Department of Biology University of Calgary	1971
Pankiw, Dr. P.	Research Station Beaverlodge, Alberta	1970
Pearson, Mr. T.R.	Department of Entomology University of Alberta Edmonton 7, Alberta	1969
Peterson, Mr. L.K.	Alberta Dept. of Agriculture Field Crops Branch, Agriculture Bldg., Edmonton, Alberta	1972
Pforr, Mr. D.E.	Department of Entomology University of Alberta Edmonton 7, Alberta	1970
Philip, Mr. H.	Department of Entomology University of Alberta Edmonton 7, Alberta	1969
Pledger, Miss L.	Alberta Dept. of Agriculture O.S. Longman Bldg., Edmonton, Alberta	1971
Poter, Mr. W.B.	Department of Biology University of Calgary	1971
Powell, Mr. J.M.	Canadian Forestry Service 5320 - 122 Street Edmonton, Alberta	1971
Pritchard, Dr. G.	Department of Biology University of Calgary Calgary 44, Alberta	1972

Proctor, Mr. D.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Radford, Mr. D.	Fish & Wildlife Division Alberta Dept. of Lands and Forests, Lethbridge, Alberta	1971
Reid, Dr. R.W.	Canadian Forestry Service 5320 - 122 Street Edmonton, Alberta	1969
Richards, Mr. K.W.	Department of Entomology University of Kansas Lawrence, Kansas, 66044	1972
Rickert, Mr. J.	Northern Alberta Institute of Technology 11762 - 106 Street Edmonton, Alberta	1970
Rosenberg, Mr. D.	Department of Entomology University of Alberta Edmonton 7, Alberta	1972
Ryan, Mr. J.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Safranyik, Dr. L.	Canadian Forest Service 5320 - 122 Street Edmonton 20, Alberta	1971
Salt, Dr. R.W.	Research Station Lethbridge, Alberta	1970
Schaaf, Mr. A.C.	Scandia, Alberta	1971
Seamans, Dr. H.L.	581 Fraser Avenue McKellar Park Ottawa, Ontario	Honorary Member
Sehgal, Mr. V.K.	Department of Entomology University of Alberta Edmonton 7, Alberta	1970
Sen-Gupta, Mr. T.	Department of Entomology University of Alberta Edmonton 7, Alberta	1969
Sharplin, Dr. J.	Department of Entomology University of Alberta Edmonton 7, Alberta	1969

Watson, Mr. G.R.	36 Capilano Mall 98 Ave. & Terrace Rd. Edmonton, Alberta	1971
Weintraub, Dr. J.	Research Station Lethbridge, Alberta	1970
White, Mr. R.M.	R.R.1, West Summerland British Columbia.	Honorary Member
Whitehead, Dr. D.	Department of Entomology University of Alberta Edmonton 7, Alberta	1971
Wilkinson, Mr. P.R.	Research Station Lethbridge, Alberta	1971
Wong, Mr. D.	Canadian Forest Service 5320 - 122 Street Edmonton 20, Alberta	1971