

Proceedings of the Fifteenth Annual Meeting

of the

ENTOMOLOGICAL SOCIETY

of

ALBERTA



Edmonton, Alberta

October 19th, 20th, and 21st, 1967

Proceedings of the
ENTOMOLOGICAL SOCIETY OF ALBERTA

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The Fifteenth Annual Meeting of the Entomological Society of Alberta was held jointly with the Entomological Society of Saskatchewan at the MacDonald Hotel, Edmonton, on October 19, 20 and 21.

Officers 1967

	Saskatchewan	Alberta
President	L. Burgess	B. Hocking
Vice-President	J.F. Doane	H. Tripp
Secretary	W.W.A. Stewart	L.K. Peterson
Treasurer	W.W.A. Stewart	K.E. Ball
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OPENING ADDRESS

L. Burgess
Canada Agriculture Research Station
Saskatoon, Saskatchewan

Members of the Entomological Society of Alberta, members of the Entomological Society of Saskatchewan, honoured guests:

It gives me great pleasure to welcome you to this joint annual meeting of our two Societies. I am certain that this is a very happy occasion, and I trust that it will also be a very rewarding one, wherein we learn of the entomological interests, accomplishments, aspirations and philosophies of others, wherein items of common interest are freely discussed, and wherein old friendships are renewed and new friendships are made.

On behalf of the Entomological Society of Saskatchewan, I express to the Entomological Society of Alberta our sincere thanks for inviting us to meet with you at this time. It has been a great pleasure working along with you in preparing for this meeting. We hope that you will meet with us sometime in the future in Saskatchewan. In the immediate future we hope that we will see many of you at the Entomological Society of Canada Meetings that are being held in Saskatoon in August of 1968.

On behalf of everyone present at our joint meeting this morning, I express thanks and appreciation to the hard-working committees for the efforts that they have expended in organizing this meeting. To Dr. Craig and Dr. Church and the members of the Program Committee, to Mr. Edmunds and members of the Local Arrangements Committee, to Mrs. Hocking and members of the Ladies Program Committee, and to all others who assisted in various ways, we say "Thank you for a job well done". Now let us carry on with the scientific program of our meeting.

ABSTRACTS OF PAPERS

Reproduction in Male Insects:
Is there an Endocrine Involvement?

A. B. Ewen and J. Saucier
Canada Agriculture Research Station
Saskatoon, Saskatchewan

The generally accepted view that the genetic sex of an insect is determined at the moment of fertilization, depending only upon the contributions of the two gametes, should be re-examined. Recent work by Naisse (Arch. Biol. 77, 1966) clearly demonstrates that primary and secondary male sex characters are influenced by a hormone secreted by the apical tissues of the testes in the 4th instar larva. This androgenic tissue, in turn, is stimulated by the cerebral neurosecretory cells. This apical tissue is not germinal, but somatic. In this sense, the gonad in the insect contains the same tissues as the vertebrate gonad - germinal and interstitial - with the latter secreting androgenic hormones in both.

The Formation and Histochemistry of the Spermatophore
in the Caragana Blister Beetle, Lytta nuttalli Say

George H. Gerber
Department of Biology
University of Saskatchewan
Saskatoon, Saskatchewan

The spermatophore is composed of two parts, a tubular portion and an amorphous mass of jelly-like material. The tube is composed of three layers derived from three chemically different materials produced by the spiral accessory glands of the male. Large quantities of a carbohydrate-protein material, produced by the vasa deferentia of the male, are found in the jelly-like mass; a thin, carbohydrate-lipid layer surrounds this material. The mass material serves to localize the spermatozoa near the spermathecal duct opening and is used in the nutrition of the female.

Copulation, Oviposition and Fertility in Grasshoppers

D.S. Smith
Canada Agriculture Research Station
Lethbridge, Alberta

After a single copulation females of Melanoplus sanguinipes (Fab.) lived longer and laid more eggs than did females allowed to copulate ad. lib. The viability of these eggs was lower however so that the number of viable eggs per female was the same in both cases.

Glycerol Content of Insects Collected at Lake Hazen, Ellesmere Island

R. W. Salt and J. Shorthouse
Canada Agriculture Research Station
Lethbridge, Alberta

Spring arrived early at Lake Hazen in 1967, and many insects had ceased hibernating and become active by the time J.S. arrived there. Collections were nevertheless made from May 25 to 29 and later tested for the presence of glycerol. Larvae of a lymantriid moth and dipterous larvae collected from a dead lemming contained small concentrations of glycerol, probably less than during the winter. A spider and a collembolan contained no glycerol, whereas some would be expected during hibernation. Mosquito larvae, needing no protection in their warm aquatic habitat, had no glycerol.

Some Recent Advances in the Study of Insect Freezing

R. W. Salt
Canada Agriculture Research Station
Lethbridge, Alberta

Freezing of intact insects has been observed to begin only in the gut contents, both in feeding and in non-feeding forms. Isolated appendages, in which there are no digestive elements, freeze at lower temperatures than do their intact donors; their nucleation sites are not randomly located, but occur at a few preferred locations. From this it is inferred that nucleation in tissues does not occur in haemolymph or inside cells. In excised grasshopper legs, freezing starts in the femoro-tibial joint about 80% of the time. Either a structural entity in the joint or a concentration of a substance that is a good nucleator is probably responsible.

Freezing temperatures of excised grasshopper legs are linearly

related to leg weight. In view of the preponderance of nucleation in the femoro-tibial joint, it is clear that the determining factor is the size of the unknown nucleating entity in the joint, be it a structure or an accumulation of a substance, and not the size of the leg as such. Quality and quantity of nucleators therefore determine where and when freezing will start. Although gut contents have always been observed to nucleate first in intact insects, exceptions probably occur.

A Study of the Sensilla of the Larval Head
of the Yellow Fever Mosquito, Aedes aegypti

L. R. Ko
Department of Biology
University of Saskatchewan
Saskatoon, Saskatchewan

A study of the sensory organs on the head of the 4th instar larva of Aedes aegypti was made. The various types of sensilla were discussed.

A Technique for Testing Insect Susceptibility to Fumigants

C. R. Ellis
Department of Entomology
University of Alberta
Edmonton, Alberta

Six strains of adult Sitophilus granarius and one each of Tribolium confusum and Oryzaephilus surinamensis were fumigated with ethylene dibromide and ethylene dichloride to evaluate a small chamber fumigation technique as a means of establishing susceptibility levels. Fumigation chambers were quart preserving jars. Fumigant dosages were weighed in a piece of fine glass capillary tubing. Day-to-day variation in susceptibility was less than 6% when susceptibility was expressed as a ratio of the LD50's of a test and standard strain fumigated on the same day.

Differences in Susceptibility of Cutworm Species to Insecticides in the Laboratory

S. McDonald
Canada Agriculture Research Station
Lethbridge, Alberta

Comparisons were made in the laboratory between the susceptibility of fresh-molt, fifth-instar larvae of the pale western cutworm, Agrotis orthogonia (Morr.) and the red-backed cutworm, Euxoa ochrogaster (Guenée), to endrin and proposed alternate insecticides.

Endrin was found to be equi-toxic to both species, whereas Dursban (0, 0, -diethyl 0-3, 5, 6-trichloro-2-pyridyl phosphorothioate) was slightly more toxic to red-backed cutworm. With AC 47470 (2-(diethoxyphosphinylimino)-4-methyl-1, 3-dithiolane) and AC 47031 (2-(diethoxyphosphinylimino)-1, 3, dithiolane), the red-backed cutworm larvae were found to be 2 and 5 times less susceptible than pale western cutworm.

The weight differences exhibited between the species suggest that these differences would not be as pronounced under field conditions. Differences in susceptibility between species should be established before undertaking expensive field trials or making general control recommendations.

Water Absorption and Development in Eggs of the Prairie Grain Wireworm, Ctenicera destructor (Brown) in Relation to Temperature

John F. Doane
Canada Agriculture Research Station
Saskatoon, Saskatchewan

Water absorption by C. destructor eggs was shown to be directly related to embryonic development. Eggs required the same length of time for absorption at 25°, 20°, and 15°C when this was expressed as a percentage of the total developmental period. The ecological implications were discussed.

Some Predictions in Zoogeography

D.R. Whitehead
Department of Entomology
University of Alberta
Edmonton, Alberta

Most zoogeographic investigations are concerned with explaining present phenomena and suggesting past history. The assumptions and conclusions are speculative and usually cannot be subjected to the test of proof, since this is dependent on the discovery of fossil evidence. To demonstrate that these speculations are meaningful it is necessary to find circumstances from which predictions can be made. Certain cases are discussed in which it is possible to suggest present distributions, based on zoogeographic speculation. Proof of such predictions lends strong support to the underlying analysis.

The Carabid Fauna at the Gates of Hell

George E. Ball
Department of Entomology
University of Alberta
Edmonton, Alberta

During the summer of 1967, the effect of volcanism on animal life was examined by means of a study of the distribution of 28 species of the Family Carabidae in the vicinity of the volcano El Paricutin, state of Michoacan, Mexico. This volcano was active during the period 1943-1952. Its lava flows and ash deposits destroyed much of the biota in its immediate vicinity. Particular attention was given to the fauna of a small hill, Capatzun, located about a mile north of the volcano. The base of Capatzun was completely surrounded by lava which isolated it from areas immediately beyond the northern edge of the lava flow. In 1967 the hill was forested, so evidently these trees survived the catastrophe, as did the trees of moderate size beyond the lava flow, in spite of inundation by ash which accumulated to a depth of several feet. Thus the vegetation was not completely destroyed and this was taken as evidence that the habitat was not completely destroyed.

In contrast to the six species comprising the carabid fauna of the lava flow, the fauna of Capatzun consisted of 20 species, 18 of which were represented among the 26 species collected in areas peripheral to the lava flow. This suggests that Capatzun was not colonized by beetles that walked across the bare lava following cessation of volcanic activity. Further, many of the species on Capatzun were represented by brachypterous (i. e. flightless) individuals, and could not have colonized

Capatzun by flying from a peripheral area across the intervening lava field. It was suggested, therefore, that the carabid fauna of Capatzun survived the volcanic eruption in situ. It was concluded that the fauna of an area is likely to survive a catastrophe of major proportions, as long as the habitat is not totally destroyed.

Fire: A Possible Zoogeographic Isolation Mechanism
of the Mexican Transvolcanic Belt

Terry L. Erwin
Department of Entomology
University of Alberta
Edmonton, Alberta

The volcanic mountain belt of Mexico, which runs from western Vera Cruz to Jalisco and Colima, appears to be a barrier to dispersal of many animal species, some genera, and even a few families. It is suggested that fire, directly or indirectly, may be the mechanism that makes the transvolcanic belt a barrier to some animals and animal groups. The pine trees of the volcanic belt have much the same growth pattern as that of the Eastern United States' fire climax pine, Pinus palustris Mill. This indicates that the volcanic pine forests are frequently swept by light ground fires, eliminating all but the fire climax flora and fauna. Therefore, animals that cannot establish themselves in a fire climax forest are presented with an unpenetrable barrier. Other animals become dependent upon the fire climax forest and are not found outside its boundaries. It is suggested that future work done in this area by ecologists would aid zoogeographers in determining the effectiveness of the volcanic belt as a barrier to animal movements.

Territorial Relationships of the Dragonfly,
Libellula quadramaculata L.

Floyd Conner
Department of Biology
University of Saskatchewan
Saskatoon, Saskatchewan

Territorial behaviour is a form of competition which is as yet poorly understood. Libellula quadrimaculata was chosen as the object of a study of this behaviour because of the ease of observation of large numbers of interactions between individuals of this species.

Territories are found over shallow water, and consist of a perch area surrounded by a portion of oviposition habitat. The owner of a territory chases Libellula quadrimaculata males and dragonflies of some other species from this area. Females entering a territory mate with the owner and oviposit within the territory while guarded by the owner. Both mating and oviposition may be hindered if male density in the area is very high.

Few highly specialized behavioural sequences are apparent to the author, but some frequently-recurring patterns have been noted. One of these is "flying parallel". A similar territorial behaviour has been described in a great diversity of animals.

Territories were mapped and found to coincide closely with micro-topographic areas, or micro-areas, delimited by vegetation. The extent of localization of males and the use of a given micro-area by consecutive males was studied by marking individuals with spray paint on the wing tips. Considerable movement of individuals along a region of breeding habitat was observed, but use of individual micro-areas was relatively constant.

Intertidal Insects of California

William G. Evans
Department of Entomology
University of Alberta
Edmonton, Alberta

Insects are found in all the major types of marine littoral habitats of California, such as rocky shores, sandy beaches, mud flats and salt marshes. In these habitats they are present in all the zones which are differentiated by degree of exposure to tidal level and to wave action.

This intertidal insect fauna however, is imbalanced, consisting of only four orders, of which the Coleoptera and Diptera predominate. Several species of Collembola inhabit all zones in the sandy beach and rocky shore habitats while one or two species of Thysanura are found in rock crevices.

At least ten families of beetles, consisting mostly of predators and scavengers, are found in all zones. Of these, the Staphylinidae are by far the dominant group, occupying such diverse habitats as the interstices of algal holdfasts in the lowest tidal level, the rock crevice habitat extending from low water to high water and the high beach sand habitat.

The Diptera are represented by at least six families. The larvae of tipulids and chironomids feed on algae growing at all tidal levels on rocky surfaces while the larvae of canaceids and anthomyids

are scavengers on algae, mainly browns and reds, washed up on beaches.

Solar Cookers, Flowers, and Insects

Peter G. Kevan
Department of Entomology
University of Alberta
Edmonton, Alberta

Flowers act as parabolic reflectors of solar radiation. The use insects make of this heat source is considered.

The Effect of Spring Maximum Temperatures and Fall Embryological Development on the Date of Hatching in Melanoplus sanguinipes (Fabricius) (Orthoptera : Acrididae)

Robert Latham Randell
Canada Agriculture Research Station
Saskatoon, Saskatchewan

The date of hatching in the economically important grasshopper species of Saskatchewan is extremely variable. Due to the concentration of control measures on the early nymphal instars there is considerable interest in the prediction of the date of hatch.

Analysis of hatching dates, estimated from the age distribution of the post-hatch population, from two areas in Saskatchewan indicates the importance of both embryological development in the preceeding fall and the daily mean maximum temperature in early March, late May, and early June. Significant correlations were found between the estimated date of hatch for a period of ten years and the following independent variables: (1) embryological development in the preceeding fall and (2) the orthogonal polynomials; calculated by the method of Fisher, from x^0 to x^3 for the daily maximum screen temperatures from March 2 to June 28 bulked into 24 five day periods.

Analysis of Oviposition Behaviour of Grasshoppers in the Laboratory

P. W. Riegert and G. L. Gilkinson
Canada Agriculture Research Station
Saskatoon, Saskatchewan

When given a choice, in the laboratory, grasshoppers will choose their oviposition sites with great discrimination and care. Melanoplus sanguinipes preferred soil surface temperatures of 30 C but did not wholly reject sites at 40 C or 20 C. Melanoplus bivittatus preferred a wider temperature spectrum of 30 to 40 C while Melanoplus packardii almost ignored the coolest site of 20 C and deposited most of its eggs at 40 C.

When given a choice of coarse (0.84 mm diameter), medium (0.42 mm) or fine (0.25 mm) sand, as well as three soil surface temperatures, M. sanguinipes deposited more eggs in the fine- and medium-textured soil as long as these were maintained at 30 and 40 C. M. packardii was found to oviposit in any type of soil providing the surface temperature was near 40 C. Furthermore, this species laid eggs in completely dry soil at the high temperature and ignored the moist sand; this presumably because the latter was cooler due to evaporation. None of the three species laid in soil that was sodden.

These findings, when related to a roadside habitat, indicate that favoured oviposition sites of M. packardii are on the ditch crowns. Here good drainage leaves the soil fairly dry and maximum solar radiation keeps temperatures fairly high. M. sanguinipes will favour the relatively flat area under the field fence line where soils are usually fine textured (drift ridges) and not too wet. The bottom of the roadside ditch is generally unsuitable as an oviposition site because the soil is often sodden and when dry, too hard and compact.

Serological Methods in Ecological Research

J. H. Frank
Department of Entomology
University of Alberta
Edmonton, Alberta

Serological techniques are of great value to the ecologist in tracing food chains. They may be used when more conventional methods fail or are too laborious. Despite the fact that the method by which antibodies are produced has only recently been elucidated,

serological techniques have been used by zoologists and botanists, very occasionally, for over 40 years. They may be used quite empirically, without a great knowledge of biochemistry.

Both immunoelectrophoresis and direct diffusion methods are useful to taxonomists in separating species and higher categories. Ecologists, perhaps more than taxonomists, are slow to adopt these methods to their own studies.

Problems in Estimating Natalty in a Fruit-Infesting Insect with Overlapping Generations

Gordon Pritchard
Department of Biology
University of Calgary
Calgary, Alberta

Attempts are being made to estimate the number of eggs laid in a season by the Queensland fruit fly, Dacus tryoni (Diptera; Tephritidae), a serious pest of cultivated fruit in eastern Australia. Problems are of two kinds - technical and statistical.

1. The eggs are small and the same colour as the fruit. The difficulties in finding them were overcome by first localizing the possible sites of egg deposition with a water-soluble dye, and then clearing away the fruit tissue enzymatically.

2. Eggs are laid continually throughout the summer and they are laid into fruit which eventually falls and rots. Sampling must be restricted to fruit on the tree, But some fruit survives more than one sampling period, while some will receive eggs and fall between sampling periods. The final model depends on the number of hatched and unhatched eggs present at any one time, the speed of development of eggs at different times in different varieties of fruit, the percentage of eggs that are infertile, and the rate of fruit fall.

An Outline of the Expo 67 Shadfly Control Project

F. J. H. Fredeen
Canada Agriculture Research Station
Saskatoon, Saskatchewan

Abatement of a variety of nuisance insects, mainly Trichoptera, at the Expo 67 site was achieved by four 16-minute applications of less than 0.4 ppm of Rhothane to the St. Lawrence River. Each

larvicide treatment was effective for only about 4 miles downriver. No harmful effects to fish or birds were expected or observed, and only a minor increase in the natural background level of DDT or Rhothane in the St. Lawrence River waters is expected.

Pleistocene Fossil Coleoptera from Alaska

John V. Matthews, Fr.
Department of Geology
University of Alberta
Edmonton, Alberta

North America - particularly Alaska - offers an opportunity for the study of Pleistocene paleoenvironments using the evidence accumulated from an examination of fossil insects. That such an approach is worthy of investigation is revealed by the success with similar research projects of G. R. Coope in England.

In Alaska insect fossils - most of which are from Coleoptera - are abundant in organic sediments. Often only fragments of the entire insect are preserved; however, such fossils may be identified by careful comparison with museum specimens. Optimal fossil preservation is found in peats. In such situations articulated fossils possessing such important characters as the male genitalia have been found. Even peats which are known to be older than 700,000 years contain partially articulated Coleoptera fossils.

Recently, a pilot study of three late Pleistocene Coleoptera assemblages from Fairbanks, Alaska has established the feasibility of using insect fossils for environmental reconstruction in Alaska. Three examples should reveal the variety of information which such studies and those to be performed will yield. First, using extremely old samples such as the one mentioned above, the longevity of species of insects may be established. If significant evolution has occurred within the last 700,000 years, statements concerning the phylogeny of certain arctic and sub-arctic insect groups should be possible. Second, the study of insect assemblages associated with extinct small mammal fossils should enable one to infer the type of environment in which the extinct vertebrates lived. Third, species of insects which are now very rare may be relatively abundant in fossil assemblages. In at least one case (Silpha coloradensis Wick.) the associations of the fossils lead the author to infer some of the heretofore unknown ecological requirements of the species.

ENTOMOLOGICAL SOCIETY OF ALBERTA

Minutes of Executive Meeting

October 19, 1967

An executive meeting was held in the MacDonald Hotel, Edmonton at 8:00 p.m., October 19, 1967.

Present were: B. Hocking (President), Kathleen Ball, G.E. Ball, H. Cerezke, M. Chance, H. Tripp, Dr. Ruby Larson and L.K. Peterson.

Minutes of the last executive meeting and the last annual meeting in Banff were reviewed and business arising from these minutes was discussed.

Considerable discussion was held on membership fees versus student fees and the complication that arises with these differences. It was agreed a notice of motion be presented at the annual meeting to change this section of our by-laws.

The following committees were appointed by the executive:

Nominating Committee -

L.A. Jacobson (Chairman)

W.G. Evans

A. Raske

Resolutions Committee -

S. McDonald (Chairman)

W.A. Charnetski

Insect Collection Competition -

Mr. C.E. Lilly was appointed as Chairman of Judges of insect collections with the power to add to his committee as was necessary to complete the job.

The nominating committee will take note that Mr. P. Graham will not be able to continue as a representative member with Mr. J.B. Gurba on the Alberta Conservation Council.

Requests for back issues of the Annual Meeting Proceedings were discussed at length and it was decided that this should be brought to the attention of the Society as a whole at the annual meeting. These requests, if met, may influence the type of papers presented by members.

A Progress Report is requested from the chairman or co-chairman of the committee to establish guide lines for the treasurer of the Society.

Dr. K.E. Ball reported a balance of \$497.63 for Treasurer's interim report.

The meeting closed at 10:00 p.m. with pleasant hospitality.

Secretary

ENTOMOLOGICAL SOCIETY OF ALBERTA

Minutes of the 15th Annual Business Meeting - Part One.

October 20, 1967

The annual meeting of the Entomological Society of Alberta was held in the MacDonald Hotel, Edmonton, Alberta, October 20, 1967.

The meeting was opened by Dr. B. Hocking, President, who welcomed the members of the Entomological Society of Saskatchewan to sit in on our deliberations.

The minutes of the 14th Annual Meeting held in Banff were adopted as circulated in the proceedings on a motion by P. E. Blakeley, seconded by J. A. Shemanchuk, with the following correction:

Under the section on Revenue, Page 19 of 1966 proceedings it reads,

	<u>Budgeted</u>	<u>Received</u>
Entomological Society of Canada - Program speakers - Miscellaneous expenses	\$1,250.00	\$ 500.00
This should read -		
Entomological Society of Canada - Program speakers - Miscellaneous expenses	\$ 750.00	\$ 500.00
	\$ 500.00	\$ 500.00
		<u>CARRIED</u>

G. E. Ball moved and H. A. Tripp seconded a motion that the minutes of the executive meeting held on March 21 be adopted as read.

CARRIED

Moved by H. A. Tripp, and seconded by H. Cerezke, that the minutes of the executive meeting of October 19 be accepted as read.

CARRIED

Mr. P. E. Blakeley gave a progress report for chairman A. M. Harper on "guide lines for treasurers" as requested by the executive.

President Hocking suggested that the members of the society consider a memorial to the late Dr. C. W. Farstad. This will be discussed at a general meeting the following day, Saturday, October 21.

The students' award committee presented a report as per attached to minutes, on the students' award prize.

It was reported that the society library had been found in Calgary and a plea was put forth for all past editors to check their files for extra copies of the proceedings. Two complete sets of the proceedings should be kept in the archives.

A notice of motion to change the by-laws to alter students fees was put by Ruby Larson.

Interim Report was given by the treasurer, K. E. Ball, that we had a balance of \$497.63 at the start of the meetings. Moved by W. G. Evans, seconded by R. E. Leech we accept this report.

CARRIED

Because of a misunderstanding between the MacDonald Hotel and the society there was a large deficit for the liquor bar on Thursday evening. It was moved by G. E. Ball that those drinking the Thursday evening at the bar should give the treasurer \$0.75 per drink and because of the misunderstanding the society should absorb any remaining costs. Seconded by D. A. Craig.

CARRIED

The publication of the proceedings from this meeting was discussed. Since this meeting was being held as a joint meeting with the Entomological Society of Saskatchewan, it was suggested that each society publish its own papers as done regularly along with the titles of the papers from our sister society. If this was done then there would be a complete published record with the two proceedings.

After some discussion each society decided that they would share the full responsibility for financing and publication of the proceedings of the meeting. It was reported that there was a deficit of three hundred forty-five dollars (\$345.00) at present, but that part of this would be defrayed through the collection of \$0.75 per drink from a number of members and of a \$100 contribution from the University of Alberta.

Meeting was adjourned at 2:00 p.m. to continue with the paper presentation as program dictated.

ENTOMOLOGICAL SOCIETY OF ALBERTA

Minutes of the 15th Annual Business Meeting - Part Two.

October 21, 1967

The second section of the business meeting was called to order by President B. Hocking, Saturday, October 21, 1967.

Business arose from the first section of the minutes of the Part One meeting of the previous day.

The first item was a memorial to Dr. C.W. Farstad. It was decided that the executive should take action on a memorial volume and to solicit a suitable inscription from the Lethbridge group for the book to be placed in the Strickland Memorial Library. Dr. N.D. Holmes accepted the responsibility for the suitable inscription.

There was a vociferous and lengthy discussion on the sale and distribution of our annual proceedings. It was moved by G.E. Ball that the proceedings be treated as a normal publication and distribution in accordance with this through sales and to members. Motion was seconded by D.A. Craig.

R. W. Salt stated that a number of papers were preliminary reports and not available for publication. He also stated that if the proceedings were widely distributed beyond members then he would not submit an abstract but give a title only.

N.D. Holmes stated that this was considered an inter-laboratory conference and not a scientific meeting. Otherwise they would be restricted in travel. He also stated he would request that all members of his staff at Lethbridge not submit abstracts for the proceedings if the motion was passed.

G.E. Ball, on consultation with D.A. Craig, withdrew the motion.

It was finally decided that the proceedings be distributed to members in good standing as hitherto and that persons and organisations requesting copies be sent application forms for membership and advised that copies could only be supplied on receipt of fee for the year in question and subject to availability. It was also requested that all surplus issues be sent to the University of Alberta, Edmonton.

Ruby Larson moved that By-law 1(a) be amended to read, "The annual fee for full membership shall be \$2.00; that By-law 1(b) and 1(d) be deleted; that By-law 1(c) be renumbered to 1(b). Seconded by G.E. Ball.

CARRIED

It was then moved by R. H. Gooding, seconded by D. M. Rosenberg that the registration fees for students attending the Entomological Society of Canada meetings be cancelled when these were held in Alberta with the Entomological Society of Alberta as hosts.

An amendment to the motion was put by G. E. Ball, seconded by M. Chance that the fees be cancelled for students who are members of the Entomological Society of Canada.

CARRIED

P. E. Blakeley put a further amendment, seconded by N. D. Holmes that the registration fees be reduced for student members of the Entomological Society of Canada.

CARRIED

The motion as twice amended was then put and CARRIED.

Report of the Nomination Committee -

L. A. Jacobson, chairman of the nomination committee, presented the following slate of officers for 1968.

President	H. A. Tripp
Vice President	J. A. Shemanchuk
Secretary	H. F. Cerezke
Treasurer	P. E. Blakeley
Editor	R. E. Stevenson
Directors	J. H. McGeheay
	G. E. Swailes
	D. M. Rosenberg
Regional Director	R. H. Gooding (to complete 1 year term vacated by G. E. Ball)
Representative on Alberta Conservation Council	P. G. Kevan

Because of Article 5 of the Constitution, P. E. Blakeley must be replaced. L. A. Jacobson put an amendment to the motion, nominating G. N. Lanier to replace Mr. Blakeley. Seconded by W. G. Evans. N. D. Holmes moved nominations cease, seconded by G. E. Ball.

CARRIED

P.E. Blakeley was appointed for a three year term as chairman of a treasurers' committee and was directed to submit guide lines for treasurers and a draft change in the constitution to the executive for distribution to the membership at large as a notice of motion.

Report of the Resolution Committee -

S. McDonald, Chairman, and W.A. Charnetski submitted the following resolutions: 'Whereas the success of the program of the 17th Annual Meeting of the Entomological Society of Alberta held jointly with the Entomological Society of Saskatchewan has been in large measure attributed to the following parties, BE IT RESOLVED that letters of appreciation be sent to:

- The University of Alberta for sharing the cost of the banquet.
- The Manager of the MacDonald Hotel for the accommodations and services.
- Mrs. Hocking and her Committee for arranging the Ladies' Program.
- Dr. Hocking for providing the after dinner entertainment.

BE IT RESOLVED that a vote of thanks be given to:

- The members of both societies who comprised the program committee.
- The members of the society who comprised the Committee for the Local Arrangements.'

The report was accepted with some reservations concerning the MacDonald Hotel.

Insect Collection Competition -

C.E. Lilly reported that the insect collection competition drew one of the largest entries we have had. There were 14 entries this year: 1 senior, 3 junior and 10 challenge competition.

N.D. Holmes reported that the Entomological Society of Canada meetings held in Montreal were not as good as they have been in the past. Mr. I.S. Lindsay has resigned as secretary and Mr. D.G. Peterson is the new secretary.

The Zoological Record contribution will be cancelled until the Entomological Society of Canada receive a letter acknowledging receipt of the contribution. The President said he would write to D.G. Peterson about this.

Moved by N.D. Holmes, seconded by W.G. Evans that the University of Lethbridge be included in the disposal movement of the library. The sequence to be followed is University of Alberta, University of Calgary, Canada Department of Agriculture Research Station in Lethbridge, University of Lethbridge; each institution to retain such item as it wished.

CARRIED

It was moved by G. E. Swailes and seconded by C. E. Lilly that W. G. Evans and G. Pritchard be appointed as auditors.

CARRIED

Moved by N. D. Holmes, seconded by C. E. Lilly that the signing authority for treasurer be G. E. Swailes and P. E. Blakeley.

CARRIED

G. E. Swailes moved that we recommend to the Entomological Society of Canada that their meeting be held later in the calendar year. Seconded by G. E. Ball.

CARRIED

President Hocking then thanked the executive and various committees for their fine work and assistance.

The meeting was moved adjourned by C. E. Lilly, seconded by M. Chance, at 1:00 p. m.

CARRIED

Secretary

President

FINANCIAL STATEMENT OF 1967

Receipts

Bank balance transferred from Lethbridge	\$ 687.74
Membership fees:	
Entomological Society of Alberta	
84 full members @ \$2.00	168.00
14 student members @ \$1.00	14.00
Entomological Society of Canada	
34 full members @ \$8.00	272.00
9 student members @ \$4.00	36.00
Bank interest	15.01
Sale of bulletins	45.00
Annual meeting of Society	
71 registrations @ \$5.00	355.00
34 wives banquet @ \$3.00	102.00
University of Alberta contribution	100.00
Liquor contributions	81.00
Sale of Alberta Natural History Books - 40% of books less exchange	94.80
	<u>1970.55</u>
less \$1.30 exchange	<u>1.30</u>

Expenditures

Fees to Entomological Society of Canada	302.00
Insect collection competition prizes and postage	48.35
University of Alberta Prize	50.00
Proceedings	132.23
Donation Zoological Society of London	20.30
Stationery	69.44
Postage	4.20
Miscellaneous (\$10 overcharge Tripp, cards, book)	11.23
Annual meeting of Society	
Telephone calls, D. Craig	24.01
Hotel Macdonald	770.60
Programmes	40.71
	<u>1473.07</u>

Balance as at December 31, 1967\$ 496.18

Audited

W.G. Evans

G. Pritchard

K.E. Ball, treasurer

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, U.S.A.
1957	Ronald H. Gooding	Assistant Professor, University of Alberta.
1958	Natalka Horeczko	Medicine, Edmonton.
1959.	Herbert Cerezke	Forest Biology, Calgary, Alberta.
1960	Max W. McFadden	Post-doctoral, University of Washington.
1961	Gordon Pritchard	Department of Biology, University of Calgary.
1962	Malcolm J. Reddy	Finishing Ph.D., Edmonton.
1963	Doreen E. Waldbauer	Finishing M.Sc., Edmonton.
1964	Walter Jerry Awram	Working on Ph.D., Rothamsted.
1965	David J. Larson	Canada Department of Agri- culture, Lethbridge, Alberta.
1966	Mary M. Galloway David M. Rosenberg	Working for M.Sc., Edmonton. Working for Ph.D., Edmonton.
1967	G. Jo Turner	Producing <u>Quaestiones</u> <u>entomologicae</u>

INSECT COLLECTION COMPETITION

History of Awards

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 Natrass, Manyberries.

Second Prize, Junior - Wayne Natrass, Manyberries.

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

1955

First Prize, Senior - Donna Mae Natrass, 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 Natrass, 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.

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

OBITUARY

JOHN HUGH (JACK) BROWN died on 5 December 1967 at Edmonton. He was born 18 May 1904 at Parrsboro, Nova Scotia, the seventh son and eleventh of thirteen children of George Hibbert and Adelia Anne (née Lamb) Brown.

Jack was a member of the Entomological Society of Alberta from 1953 until his death and participated with enthusiasm in meetings of the Society until, in his last few years, ill health interfered with this as with so many of his other activities. He was educated in agricultural disciplines in Nova Scotia, and in Alberta at the Olds School of Agriculture and the University where he earned the B.Sc. (1940) and M.Sc. (1942) degrees in the Department of Entomology. In the wartime emergency when Professor Strickland was called to military duty he taught entomology from 1942-1944, but his abiding interest was in public health entomology and he never again left this. From 1943 onwards he was the Alberta Department of Public Health's authority in this field, conducting ectoparasite and plague surveys, directing the Department's Division of Entomology, developing the urgently needed Poison Control Centers, and publishing some sixty scientific papers, leaflets, bulletins, pamphlets and articles.

Some years before his death he generously deposited his substantial collections of ectoparasites and reprints in the Department of Entomology at the University in Edmonton where they will remain as a memorial to him and where a memorial volume in the library will be inscribed to him on behalf of the Society.

MEMBERSHIP LIST, 1967-1968

Honorary Members

Hopping, Mr. G.R.	9924 Fifth Street S.E., Calgary.
Painter, Mr. R.H.	422 - 25 Street South, Lethbridge.
Seamans, Mr. H.L.	581 Fraser Avenue, McKellar Park, Ottawa
White, Mr. R.M.	R.R. 1, West Summerland, British Columbia.

Members

Ball, Dr. G.E.	Entomology Department, University of Alberta, Edmonton.
Ball, Mrs. K.	Entomology Department, University of Alberta, Edmonton.
Barron, Mr. J.K.	Entomology Department, University of Alberta, Edmonton
Berg, Dr. C.O.	Department of Entomology, and Limnology, Cornell University, Ithaca, N.Y.
Blakeley, Mr. P.E.	Research Station, Canada Agriculture, Lethbridge.
Brown, Mr. C.E.	Department of Forestry, Centennial Tower Building, 400 Laurier Avenue West, Ottawa 4.
Burgess, Miss Angie	Entomology Department, University of Alberta, Edmonton.

Burgess, Mr. G.D.	Biology Department, University of Calgary.
Carr, Mr. J.L.	R.R. 4, Calgary.
Cerezke, Mr. H.F.	Forest Research Laboratory, 721 Public Building, Calgary.
Chance, Mr. M.	Entomology Department, University of Alberta, Edmonton.
Chance, Mrs. M.	Entomology Department, University of Alberta, Edmonton.
Charnetski, Mr. W.A.	Research Station, Canada Agriculture, Lethbridge.
Chiang, Mr. P.	Entomology Department, University of Alberta, Edmonton.
Chomyn, Mr. D.	4515 - 46 Ave., Leduc,
Craig, Dr. D.A.	Entomology Department, University of Alberta, Edmonton.
Depner, Dr. K.R.	Research Station, Canada Agriculture, Lethbridge.
Edmunds, Mr. J.W.	Alberta Department of Agriculture, 10405 - 100 Ave., Edmonton.
Ellis, Mr. C.R.	Entomology Department, University of Alberta, Edmonton.
Erwin, Mr. T.	Entomology Department, University of Alberta, Edmonton.
Evans, Dr. W.G.	Entomology Department, University of Alberta, Edmonton.

Ewen, Dr. A.B.	Canada Department of Agriculture, Research Station, Saskatoon.
Frank, Dr. J.H.	Entomology Department, University of Alberta, Edmonton.
Gooding, Dr. R.H.	Entomology Department, University of Alberta, Edmonton.
Griffiths, Mr. G.C.D.	Entomology Department, University of Alberta, Edmonton.
Gurba, Mr. J.B.	Crop Protection and Pest Control, Alberta Department of Agriculture, Edmonton.
Gushul, Mr. E.T.	Research Station, Canada Agriculture, Lethbridge.
Harper, Dr. A.M.	Research Station, Canada Agriculture, Lethbridge.
Hartland-Rowe, Dr. R.C.B.	Zoology Department, University of Calgary.
Haufe, Dr. W.O.	Research Station, Canada Agriculture, Lethbridge.
Huang, Mr. C.T.	Entomology Department, University of Alberta, Edmonton.
Hilton, Mr. D.	# 7, 6708 - 90 Ave., Edmonton.
Hobbs, Dr. G.A.	Research Station, Canada Agriculture, Lethbridge.
Hocking, Dr. B.	Entomology Department, University of Alberta, Edmonton.
Holmes, Dr. N.D.	Research Station, Canada Agriculture, Lethbridge.
Hopkins, Mrs. M.E.P.	3 Canyon Drive, Calgary.

Jacobson, Mr. L.A.	Research Station, Canada Agriculture, Lethbridge.
Johnson, Dr. P.C.	Intermountain Forest and Range, Experiment Station, Federal Building, Missoula, Montana, 59801.
Kevan, Mr. P.	Entomology Department, University of Alberta, Edmonton.
Khatamian, Mr. H.	10551 - 79 Ave., Edmonton.
Krishnan, Dr., Y.E.S.	Entomology Department, University of Alberta, Edmonton.
Kush, Mr. D.K.	Forest Research Laboratory, 721 Public Building, Calgary.
Lanier, Dr. G.N.	Department of Forestry and Rural Development, 132 - 9th Ave. S.W., Calgary.
Larson, Mr. D.J.	Research Station, Canada Agriculture, Lethbridge.
Larson, Mrs. D.J.	Biology Department, University of Lethbridge, Lethbridge.
Larson, Dr. Ruby I.	Research Station, Canada Agriculture, Lethbridge.
Lee, Mr. F.C.	633 Gore Avenue, Vancouver, British Columbia.
Leech, Mr. R.E.	Entomology Department, University of Alberta, Edmonton.
Lilly, Mr. C.E.	Research Station, Canada Agriculture, Lethbridge.
Lipsit, Mr. R.	Chemagro Ltd., P.O. Box 1208, Calgary.
McDonald, Mr. S.	Research Station, Canada Agriculture, Lethbridge.

McGeheay, Mr. J.H.	Department of Forestry and Rural Development, 132 - 9th Ave. S.W., Calgary.
Nelson, Dr. W.A.	Research Station, Canada Agriculture, Lethbridge.
Nimmo, Mr. A.	Entomology Department, University of Alberta, Edmonton.
Pankiw, Dr. P.	Research Station, Beaverlodge.
Pearson, Mr. T.R.	Entomology Department, University of Alberta, Edmonton.
Peterson, Mr. L.K.	Field Crops Branch, Alberta Department of Agriculture, Edmonton.
Pritchard, Dr. G.	Biology Department, University of Calgary, Calgary.
Pucat, Miss Amalia	Box 117, Macdonald College, Quebec.
Reddy, Mr. M.J.	Entomology Department, University of Alberta, Edmonton.
Reid, Dr. R.W.	Forest Research Laboratory, 721 Public Building, Calgary.
Richards, Mr. K.W.	Entomology Department, University of Alberta, Edmonton.
Rosenberg, Mr. D.M.	Entomology Department, University of Alberta, Edmonton.
Safaranyk, Mr. L.	Forest Research Laboratory, 721 Public Building, Calgary.
Salt, Dr. R.W.	Research Station, Canada Agriculture, Lethbridge.

Schaaf, Mr. A.C.	Entomology Department, University of Alberta, Edmonton.
Scott, Mr. J.	Entomology Department, University of Alberta, Edmonton.
Sehgal, Mr. V.K.	Entomology Department, University of Alberta, Edmonton.
Sharplin, Dr. Janet	Entomology Department, University of Alberta, Edmonton.
Shemanchuk, Mr. J.A.	Research Station, Canada Agriculture, Lethbridge.
Shepherd, Dr. R.F.	Forest Research Laboratory, 721 Public Building, Calgary.
Shore, Miss Joan	Entomology Department, University of Alberta, Edmonton.
Smith, Dr. D.S.	Research Station, Canada Agriculture, Lethbridge.
Stevenson, Mr. R.E.	Forest Research Laboratory, 721 Public Building, Calgary.
Steward, Dr. C.C.	Research Station, Canada Agriculture, Lethbridge.
Swailles, Dr. G.E.	Research Station, Canada Agriculture, Lethbridge.
Thomas, Mr. A.W.	Entomology Department, University of Alberta, Edmonton.
Tripp, Mr. H.A.	Forest Research Laboratory, 721 Public Building, Calgary.
Turner, Miss Jo	Entomology Department, University of Alberta, Edmonton.

Warren, Mr. J. W.

Chemagro Corp., 3 North
7th Ave., Ste. B., Yakima,
Washington.

Weintraub, Mr. J.

Research Station, Canada
Agriculture, Lethbridge.

Whitehead, Mr. D. R.

Entomology Department,
University of Alberta,
Edmonton.