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Proceedings of the Sixteenth Annual Meeting

of the

ENTOMOLOGICAL SOCIETY

of

ALBERTA



Kananaskis Research Forest

Seebe, Alberta

November 14, 15 and 16, 1968

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Proceedings of the  
ENTOMOLOGICAL SOCIETY OF ALBERTA

Volume 16

November 1968

The Sixteenth Annual Meeting of the Entomological Society of Alberta was held at the Kananaskis Research Forest, 50 miles west of Calgary, November 14, 15.

Officers 1968

President	H. A. Tripp
Vice-President	J. A. Shemanchuk
Secretary	H. F. Cerezke
Treasurer	G. N. Lanier
Editor	R. E. Stevenson
Regional Director	R. H. Gooding

# CONTENTS

	Page
Prologue .....	3
Opening Remarks by President - H. A. Tripp .....	4
Abstracts of Papers Presented	
Some aphids don't survive Alberta winters but - A. M. Harper & P. Blakeley .....	5
Biology of the spiny rose leaf gall - J. D. Shorthouse .	5
Occurrence of Collembola in relation to some physical characteristics of sandy beaches of Eastern Tropical Pacific - D. Rosenberg .....	6
Arctic survival of bumble-bees - K. W. Richards .....	6
Analysis of variation in studies of aphid chromosomes - A. M. Harper & M. D. MacDonald .....	7
Some leaf-mining flies (Agromyzidae) from Alaska - G. C. D. Griffiths .....	7
Blackfly problem in the county of Athabasca - L. K. Peterson .....	8
Feeding mechanism of the sheep ked on the trans-illuminated mouse ear - D. M. Petrunia & W. A. Nelson ..	9
Penetration of bovine skin by newly hatched warble larvae - W. A. Nelson & J. Weintraub .....	10
Organized warble control area - J. B. Gurba .....	10
Estimation of speeds of development in natural populations from laboratory data - G. Pritchard .....	11
Visual estimates and sweep net samples in field work with grasshoppers and locusts - D. S. Smith .....	11
Methods of photographing insects - E. T. Gushul .....	12
Role of bioassay in the identification of the sex pheromone of <u>Limonius californicus</u> - C. E. Lilly .....	13

A field bioassay of insecticides for mosquito control - R. D. Dixon & R. B. Brust .....	14
A common tick <u>Ixodes sculptus</u> in Alberta - J. A. Shemanchuk .....	14
Alfalfa leaf-cutter beekeeping, 1968 - G. A. Hobbs .....	14
Influence of behaviour on capture-recapture methods - H. F. Cerezke .....	15
Influence of time and initial density on population trends - R. F. Shepherd .....	15
Specificity of sex-pheromones in the spruce-infesting <u>Ips</u> - G. N. Lanier .....	16
Spatial pattern and its influence on sampling design - L. Safranyik .....	16
Society Business	
Minutes of the Executive Meeting, November 14, 1968 .....	18
Minutes of the 16th Annual Business Meeting, Part one, November 15, 1968 .....	20
Part two, November 16, 1968 .....	22
Financial Statement for the Year Ending January, 1969 .....	26
1968 Report of Regional Director - R. Gooding .....	28
Annual meeting agenda .....	30
List of Entomological Society of Alberta insect col- lection competition winners, 1968 .....	33
List of the Presidents of the Entomological Society of Alberta, 1953 to 1968 .....	34
Obituary .....	35
Membership List .....	37

## PROLOGUE

The meeting was opened by the President, Mr. Howard A. Tripp who welcomed the members and honoured guests. Mr. Tripp introduced Dr. G. P. Thomas, Regional Director of the Alberta Region, Department of Forestry, who in turn welcomed all those present to the facilities available at the Kananaskis Forest Experimental Station.

THE 16TH ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY  
OF ALBERTA

14 - 16 November 1968

Held at the Department of Forestry Research Station and the Environmental  
Sciences Centre of the University of Calgary in the  
Kananaskis Research Forest.

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THURSDAY 14th November 1968

REGISTRATION commences at 6:00 p.m. in the Forestry Lounge; followed by a  
SOCIAL commencing at 9:00 p.m.

EXECUTIVE MEETING at 8:00 p.m.

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FRIDAY 15th November 1968

0830 Opening remarks by the President, H.A. Tripp.

0845 Business Meeting. Part I.

0915 INVITATIONAL ADDRESS -

'Pests, Pesticides, and Pestology'

Dr. B.P. Beirne (Dept. Biological Sciences, Simon Fraser University).

1015 Coffee.

1035 SUBMITTED PAPERS - Chairman: G. Pritchard.

1035 C.E. Lilly (Canada Agriculture, Lethbridge):

'The role of bioassay in the identification of the sex-  
pheromone of Limonius californicus'.

1055 G.N. Lanier (Forestry Department, Calgary):

'Specificity of sex-pheromones in the spruce-infesting Ips  
(Coleoptera : Scolytidae)'.

1115 R.D. Dixon and R.B. Brust (Alberta Dept. Agriculture, Edmonton):

'A field bioassay of insecticides for mosquito control'.

1135 G.A. Hobbs (Canada Agriculture, Lethbridge):

'Leaf-cutter beekeeping'.

1200 LUNCH.

FRIDAY 15th November 1968. (continued)

- 1330 SYMPOSIUM ON POPULATION MEASUREMENT - Chairman: R.F. Shepherd.
- 1330 L. Safranyik (Forestry Department, Calgary):  
'Spatial pattern and its influence on sample design'.
- 1400 R.F. Shepherd (Forestry Department, Calgary):  
'Influence of time and initial density on population trends'.
- 1430 H.F. Cerezke (Forestry Department, Calgary):  
'Influence of behaviour on capture-recapture methods'.
- 1500 Coffee.
- 1520 D.S. Smith (Canada Agriculture, Lethbridge):  
'Use of visual and sweep-net methods to estimate populations'.
- 1550 G. Pritchard (Department of Biology, University of Calgary):  
'Estimation of speed of development in field populations from laboratory data'.
- 1620 D.R. MacDonald (Forestry Department, Victoria, B.C.):  
'Interpreting population data'.

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- 1800 Cocktails.
- 1900 BANQUET.  
Guest Speaker - Dr. J.B. Cragg (Director, Environmental Sciences Centre).

\*\*\*\*\*

SATURDAY 16th November 1968.

- 0830 SUBMITTED PAPERS - Chairman: G.N. Lanier.
- 0830 J.B. Gurba (Alberta Dept. Agriculture, Edmonton):  
'Organized warble control areas'.
- 0850 W.A. Nelson and J. Weintraub (Canada Agriculture, Lethbridge):  
'Penetration of bovine skin by newly hatched warble larvae'.
- 0910 J.A. Shemanchuk (Canada Agriculture, Lethbridge):  
'Ixodes sculptus, a common tick in Alberta'.
- 0925 D.M. Petrunia and W.A. Nelson (Canada Agriculture, Lethbridge):  
'Feeding mechanism of the sheep ked on the transilluminated mouse ear'.



SATURDAY 16th November 1968 (continued)

- 0940 A.M. Harper (Canada Agriculture, Lethbridge):  
'Analysis of variation in studies of aphid chromosomes'
- 1000 Coffee.
- 1020 G.C.D. Griffiths (Entomology Department, University of Alberta):  
'Some leaf-mining flies from Alaska'.
- 1040 K.W. Richards (Entomology Department, University of Alberta):  
'Arctic survival of bumblebees'.
- 1100 D.M. Rosenberg (Entomology Department, University of Alberta):  
'The occurrence of Collembola in relation to some physical characteristics of sandy beaches of the eastern tropical Pacific'.
- 1115 A.M. Harper and P.E. Blakeley (Canada Agriculture, Lethbridge):  
'Some aphids don't survive Alberta winters, but ----'.
- 1125 E.T. Gushul (Canada Agriculture, Lethbridge):  
'Methods of photographing insects'.
- 1200 LUNCH.
- 1330 SUBMITTED PAPERS - Chairman: R.W. Reid.
- 1330 J.D. Shorthouse (Entomology Department, University of Alberta):  
'Biology of the spiny rose leaf gall'.
- 1350 L.K. Peterson (Alberta Dept. Agriculture, Edmonton):  
'The blackfly problem in the county of Athabasca'.
- 1430 Business Meeting. Part II.

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# OPENING ADDRESS

H. Tripp  
Department of Fisheries & Forestry  
Calgary, Alberta

We have with us today a distinguished Entomologist from beyond our Province, Dr. Brian P. Beirne. I first met Dr. Beirne in Ottawa in 1950. At that time he was the taxonomic specialist on Hemiptera-Homoptera with the Entomological Systematic Unit of the Department of Agriculture. During the early fifties, Dr. Beirne studied and published extensively on the taxonomy of the Homoptera, particularly the leaf hoppers, Cicadellidae. The culmination of this work was the production of a monograph on the leaf hoppers of Canada and Alaska which was published as one of the first supplements to the Canadian Entomologist. Although I never had much occasion to become involved with leaf hoppers, an association with Dr. Beirne was not denied because as my work on parasitic hymenoptera progressed I found myself studying a paper dealing with cephalic structures of Ichneumonid larvae written by Dr. Beirne while he was teaching at Trinity College in Dublin.

All of us, I'm sure, are familiar with and have learned from that little blue book called "Collecting, Preparing, and Preserving Insects" which was largely the product of Dr. Beirne.

Between 1956 and 1967, Dr. Beirne was the Director of the Institute of Biological Control at Belleville, Ontario, and during those years he quite naturally became very much involved and interested in the broad subject of Pest Control or, as I believe he prefers, Management of Pests. So it happened that when the opportunity arose to teach his concepts he accepted a post at Simon Fraser University, Burnaby, B. C. Ladies & gentlemen I present Dr. Beirne.

## Influence of Behaviour on Capture-Recapture Methods

H.F. Cereške  
Dept. of Fisheries & Forestry  
132 - 9th Ave. S. W.  
Calgary 2

The application of capture-recapture techniques for describing behaviour patterns and relative abundance of the root weevil, Hylobius warreni Wood were presented. Important assumptions underlying the application of these techniques for estimating absolute numbers were also given. Specific problems of adult weevil behaviour were illustrated to provide evidence for the introduction of bias in weevil estimates. These included the weevil's reaction to the trap design, the effects of marking, its distribution pattern within the forest, its diurnal activity pattern, its rate of dispersion, its activity in relation to temperature and light, its longevity and its changes in activity pattern during the summer period.

## Influence of Time and Initial Density on Population Trends

R.F. Shepherd  
Dept. of Fisheries & Forestry  
132 - 9th Ave. S. W.  
Calgary 2

Populations of the two-spotted mite were randomly sampled from apple leaves and brushed onto a revolving plate for counts under a microscope. A graph was devised to show required sample sizes for various mite densities and required levels of accuracy. A graph was also prepared to indicate the number of sectors of the plate that need to be counted; the time required to count decreased as density increased, thus it is more efficient to bulk samples. Logarithms of population per leaf were plotted over accumulated degree days and trends indicated that the variety of the host influenced maximum densities that could be reached, while the size of the initial populations in the spring determined the time at which these peaks were reached. Predator populations followed the same trends as the mite populations. Dangers of ad hoc short term tests on trees with controls at different stages of the annual population cycle were brought out. Tests should be run on pairs of trees with similar initial populations in the early part of the year before overpopulation effects become noticeable.

## ABSTRACTS OF PAPERS

### Some Aphids Don't Survive Alberta Winters but -----

A.M. Harper & P. Blakeley  
Research Station, Canada  
Agriculture, Lethbridge

The oat bird-cherry aphid, Rhopalosiphum padi L. has not been known to survive winters on the Canadian prairies. Each year the aphid appears to migrate to western Canada from the south and southeast to infest grain and cover crops. In 1966 this aphid was able to survive and reproduce during periods of cold weather on sprouting barley underneath field-stored grain.

### Biology of the Spiny Rose Leaf Gall

J.D. Shorthouse  
Entomology Department  
University of Alberta  
Edmonton

A brief introduction to cecidology, the study of plant galls, was given. The spiny rose leaf gall found on Rosa acicularis and believed to be formed by the cynipid, Diplolepis nebulosus, was chosen for a study of the various aspects of this field. Study area was the Entomology Department George Lake Field site about 50 miles northwest of Edmonton.

The spiny rose leaf gall is of the prosoplastic type, characterized by constant external form, size, and tissue differentiation. Parenchyma cells differentiate into four well defined zones as the gall matures. Inside the gall, each larva becomes surrounded by another thick layer of parenchyma cells and forms an "inner gall". Galled leaves mature and fall to the ground about three weeks before normal abscission.

Three species of hymenopterous predators were commonly found inhabiting the gall. Each species could be recognized by its characteristic feeding activities. Most predators overwinter inside the gall, as do the gall formers, although about 5% of the predator population emerged early this fall.

A forest fire on May 20th destroyed about one quarter of the research site. This had interesting effects on the gall population. Galls appeared on new rose plants in the burned area about 6 weeks after galls started to form in the unburned area. Galls in the fire area were bright red as opposed to the light green colour of those found in the unburned

area. Because gall cells mature so much faster than normal leaf cells, the fire zone galls probably were able to mature, even though their period of growth started so late in the season.

The Occurrence of Collembola in Relation to Some  
Physical Characteristics of Sandy Beaches of the  
Eastern Tropical Pacific

D.M. Rosenberg  
Entomology Department  
University of Alberta  
Edmonton

1. The data showed no correlation between temperature and salinity and the occurrence of Collembola.

2. Collembola were taken largely in the middle and high portions of the beach. These areas appear to offer the best combinations of moisture, particle stability, salinity, and food conditions.

3. Collembola occurred mostly in medium and coarser grades of sand. These would seem to afford the best combination of interstitial space and sieving ability.

4. The less well sorted categories of sand seem to be the most hospitable to Collembola as were beaches with medium to heavy surf.

5. Angularity of the sand grains and composition of the sand (i.e. ratio of shell to rock fragments) bore no correlation to the occurrence of Collembola. The same was true of latitude.

Arctic Survival of Bumble bees

K.W. Richards  
Entomology Department  
University of Alberta  
Edmonton

Observations on Bombus alpinobombus polaris Curtis and Bombus alpinobombus hyperboreus Schönherr were made during the summers of 1967 and 1968 at Lake Hazen, Ellesmere Island, N.W.T. Main aspects of the study included natural nest location and composition, brood development, flower preference, nest temperature, flight activity, and parasites and predators. Twenty-four natural nests as well as a limited number of artificial nests supplied some data on brood development. Another seventy natural nests were located after having been destroyed by arctic fox.

These species are confined to the arctic tundra and high alpine areas where the active season is brief. The bees make up for this lack of time by depositing the full complement of first brood eggs in a single cell, by feeding worker broods by means of pollen pockets; and by feeding male and queen broods with mixtures of pollen and honey. Time required for development of workers is 18-22 days, males 20-26 days and queens 22-24 days.

#### Analysis of Variation in Studies of Aphid Chromosomes

A.M. Harper and M.D. MacDonald  
Research Station, Canada  
Agriculture, Lethbridge

Analyses of karyotypes is used in taxonomy and medicine but may be subject to many sources of error.

Karyotype analyses of two species of aphids were significantly affected by the operators who traced the chromosomes on the projected images, and by the photographs and somatic figures that were chosen.

In this investigation there was considerable variation in total complement length within the species.

Transformation of the data to percentages or the use of a split-plot design removed errors due to operators, photographs and somatic figures.

Valid comparisons of karyotypes of aphid species can be made from absolute data and photographs by using relative length and simple statistical methods.

#### Some leaf-mining flies (Agromyzidae) from Alaska

G.C.D. Griffiths  
Entomology Department  
University of Alberta  
Edmonton

Some 85 species of Agromyzid larvae were collected during a visit to Alaska in June-August 1968. Evidently the family contains numerous circumboreal species whose distributions will be of interest to students of the former Bering land connection. A preview of the work was presented, illustrated by slides of leaf-miners and their habitats. It was emphasized that this account was of a provisional nature, as detailed comparison of the material collected will take some time.

## The Blackfly Problem in the County of Athabasca

L.K. Peterson  
Field Crops Branch, Alberta  
Department of Agriculture  
Edmonton

A project to study the blackfly in the Athabasca - Lac La Biche area was started in 1963. Farmers complained that small black flies were irritating to people and damaging to their animals. In 1964 because of a severe outbreak of blackflies, beef and milk production was noticeably affected. Animals were prevented from grazing and breeding; the farmers claimed two bulls became sterile after a heavy attack by blackflies. The testicles swelled to a considerable size and the sheath was badly damaged. The farmers observed that bulls reared in the area are less affected than those bulls purchased and brought into the area from a district where blackflies are not a problem. District residents believed that the blackfly emerged from swampy areas. Even today a number of residents are not convinced their problem arises from rivers and streams.

In 1964, 92% of blackflies collected from cattle and horses were Simulium arcticum, 6% were Simulium venustum, and 2% were Simulium vittatum. There were at least 12 species found in the region but only these three appeared to be involved in outbreaks causing damage.

Residents of the area find it difficult to work out-of-doors during an outbreak. These outbreaks occur in June and July, then another peak period often occurs again in the fall during harvest.

Since 1966 co-operating farmers in the county of Athabasca and the Wandering River area have been collecting adult blackflies from their own cattle. These collections are made when the flies are bothersome and appear to be causing damage.

In 1966, 13,000 adult flies were collected and Simulium arcticum was the only pest species in most of the collections. Wind data indicated that this species emerged mainly or entirely from the Athabasca River.

In 1967 the cooperator farmers collected 33,000 blackflies in 106 collections. At least 6 species of adults were collected. These were Simulium arcticum - 89% 7% Simulium vittatum, 2% Simulium venustum, 0.9% Simulium decorum, 0.4% Simulium tuberosum and less than 0.1% Simulium latipes. The identification of the adults was done by Mr. H. Fredeen, Entomologist, Canada Research Station, Saskatoon, Saskatchewan.

At the same time these collections were being done, a new phosphate insecticide "Abate" was field-tested as a larvicide.

The results have indicated that Abate as an emulsifiable concentrate applied at 0.3 ppm to a stream containing mostly Simulium

venustum was effective. Larvae were detached from the stream substrates for about 7 miles of stream. No observable effect occurred at the 9 miles point. Dip net samples indicated other stream fauna were not affected.

Abate on sand also applied at the rate of 0.3 ppm gave good control for about one and one half miles. This material would work well for spot treatments of rapids area or in concentrated infestations.

In 1969 further larvacide testing will be done using Methoxychlor. Recent information from a study by Dr. K. Depner, Canada Research Station, Lethbridge indicates that the Athabasca River contains very high population of Simulium arcticum. These populations are presumably the source of blackflies affecting cattle and other animals in the County of Athabasca.

If shorter-lasting insecticides prove effective on a trial basis in the area than consideration will be given to treating the Athabasca River.

#### Feeding Mechanism of the Sheep Ked on the Trans-illuminated Mouse Ear

D.M. Petrunia & W.A. Nelson  
Research Station, Canada  
Agriculture, Lethbridge

The sheep ked, when fed on a mouse ear, is a vessel feeder (solenophage). The ked's haustellum gains entry into the skin through the stratum corneum by the rapid eversion and inversion of the prestomal teeth reinforced by pressure on the haustellum. It probes the sub-epidermal tissue with a reciprocating motion, accompanied by continuous activity of the prestomal teeth. When a venule of 30-100  $\mu$  is contacted, it is immediately penetrated and the prestomal teeth evert and anchor the tips of the labella to the vessel wall. Sucking of blood follows immediately and engorgement is complete within 5-10 minutes. Puffs of saliva can be seen entering the vessel four or five times during engorgement. Sheep skin biopsy material containing the haustellum indicates that the ked feeds from venules near the level of the apocrine glands and bases of wool follicles. Previous work is discussed in relation to these results.



## Penetration of Bovine Skin by Newly Hatched Warble Larvae

W.A. Nelson & J. Weintraub  
Research Station, Canada  
Agriculture, Lethbridge

The biotaphology of the invasion of skin by grubs was shown by slides. Evidence was presented to suggest that the skin of sensitized cattle acted as a barrier to penetration.

## Organized Warble Control Area

J.B. Gurba  
Crop Protection and Pest  
Control, Alberta Department  
of Agriculture, Edmonton

A pilot project is underway in the County of Westaskiwin to attempt to exterminate the warble fly of cattle. The experiment consists of putting control knowledge to work and the interplay of human relations. The Forestburg Warble Test Project 1959-61 showed that if practically all cattle were treated in a large area (200 farms with 6500 cattle in area of 15 x 20 miles) the warble fly was exterminated after three years in the central part.

Systemic insecticides provide for almost complete control with one fall treatment. Yet about one half of Alberta's over 3 million cattle show infestation. There is no doubt that untreated animals provide the reservoir. Since there is little dollar incentive in selling grub-free cattle under our live-cattle marketing system, some means of getting 100% cooperation in treating cattle must be developed.

Voluntary area control has been promoted and successful to a degree. In 1967 the west part of Westaskiwin County petitioned for compulsory control. Its success spread to the rest of the County. The Alberta Department of Agriculture agreed to supply technical and financial assistance for organization and operation. The Lethbridge Research Station, Canada Department of Agriculture, agreed to provide evaluation. The County passed a by-law outlining control responsibility and methods. Fourteen area captains have surveyed, recorded and checked on treatment of some 62,000 cattle on 1,700 farms.

The program is of special interest since it means that many people and agencies must work in close liaison and trust. If this combination of science and human development works in Wetaskiwin County it could become a model that would be copied across the province and beyond to eradicate one of the worst insect pests of cattle.

## The Estimation of Speeds of Development in Natural Populations From Laboratory Data

G. Pritchard  
Biology Department  
University of Calgary  
Calgary

The relationship between temperature and speed of ovarian maturation in Dacus tryoni has been investigated in the laboratory, in field cages, and in natural populations, using the time required for 50% of the females to develop mature eggs (TM<sub>50</sub>) as the basis for comparison. When measurements were made at a series of constant temperatures, speed of maturation increased logistically with increasing temperature up to about 26°C, but decreased at higher temperatures. A similar relationship apparently held under field conditions also, because considerably more day-degrees were required to complete development when high temperatures were frequent than when temperatures did not rise above 26°C. The usefulness of various methods of estimating maturation times in natural populations was judged by measuring speeds of maturation of populations held in large field cages and comparing them with theoretical estimates. The best method estimated the amount of development completed each hour under field conditions from data on the percentage development per hour obtained at a series of constant temperatures in the laboratory. The method of 'temperature summation' was considered quite inadequate, but a simple method relating TM<sub>50</sub> to mean temperature was almost as good in practice as the detailed method.

## Visual Estimates and Sweep Net Samples in Field Work With Grasshoppers and Locusts

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

Visual estimates are used for assessing population density on an absolute basis while sweep net samples are primarily used for comparative estimates of population between different areas and are difficult to convert to an absolute numerical basis. Both methods tend to underestimate the actual population density; the latter, in particular, partly because of the difficulty of picking up smaller nymphs.

Visual estimates are usually taken as the number of insects that are flushed over a certain distance while walking. The number flushed in a certain time period has also been used but this has been shown to be less accurate. Land vehicles and helicopters have been successfully employed.

Visual estimates are generally corrected by some factor, either explicit or implied, that is, dependent on climatic conditions, vegetation height, etc. In populations of less than 10 individuals per sq. yd. this method can be quite accurate but the accuracy decreases with larger numbers. The accuracy can be checked by various numerical methods such as cages set over a certain area and capture-recapture methods.

Visual methods being subjective are liable to such errors as observer bias and fatigue and differences between observers.

Both methods require careful consideration with regard to distribution of sampling units over the area. A small area may be sampled as a unit. Larger areas may be sampled at random or by some system of stratified sampling or by ecological habitat.

One method of density measurement that is a combination of numerical and visual measuring is the "nearest-neighbour distance". In this the distance between a randomly chosen individual and the one closest to it is measured. This is repeated to get a mean distance that is converted, in effect, into the mean area occupied by an individual and hence to the population density. This is most effective with a random distribution but has given good results in grasslands where the density was not too high. (cf. R.E. Blackith: Ecology 39: 147-150, 1958)

### Methods of Photographing Insects

E.T. Gushul  
Research Station, Canada  
Agriculture, Lethbridge

Carefully chosen materials, equipment, and techniques add up to consistently high-quality insect photographs.

Settle for a high resolution color slide film of medium speed. Exposures for natural light can be determined with an exposure meter that can measure both incident and reflected light. Close-up lenses do not require correction for exposure, but an increase is needed when the extended-bellows technique is used.

Electronic flash provides a fast "action-stopping" light permitting the use of small or minimum apertures in close-up work, when the lamp is used at lens-to-subject distance (1). When measurements are needed, use a millimeter scale on the edge of the picture area, or photograph the subject on grid paper. Slides of scales or grids can also be made at frequently used magnifications and used as overlays for measurement recording.

### Methods of Shooting (photographing)

- 1) Use a "plumbers' nightmare" to hold the camera when taking

extreme close-ups (1).

2) Use a 300-mm telephoto follow-focus lens from horseback to photograph fly populations on cattle backs.

3) Use a wire-frame finder with electronic flash when you must follow fast-moving insects on or near plants.

4) Use standard or zoom-type proxar (close-up) lenses attached to front of normal camera lens. They permit use of normal exposures at medium to close working distances. When possible, use smaller apertures for greater depth of field. Longer focal length bases, especially tele-zoom, permit longer working distances.

5) Photograph extremely fine detail at higher magnifications through a microscope in the laboratory, e.g., eye cells, tarsi, mouthparts, scales, etc.

6) Some slides can be improved by duplicating in the laboratory. This enables corrections to be made for color shift and for over-or under-exposure. Improve composition by cropping; by doing this you can control image placement and size. Any number of slides can be made this way.

#### Reference

1. Gushul, E.T. 1963. A proven method of close-up photography. Alta. Ent. Soc. Proc. 11: 10-11.

#### The Role of Bioassay in the Identification of the Sex Pheromone of Limonius californicus

C.E. Lilly  
Research Station, Canada  
Agriculture, Lethbridge

Laboratory and field bioassay techniques, which were developed to facilitate the chemical determination of the sex pheromone from female click beetles of Limonius californicus, were discussed. Some of the problems encountered were associated with the concentration and purity of the compounds being tested, and the sensitivity of the antennal chemoreceptors of the male beetles. The olfactometric method used to quantitatively assess sexual responses of the males to aromatic chemicals and to the natural attractant (n-valeric acid) was described.

## A Field Bioassay of Insecticides for Mosquito Control

R.D. Dixon & R.B. Brust  
Alberta Department of  
Agriculture, Edmonton

Sixteen insecticides were evaluated in the field using a bioassay technique. Sixteen artificial pools, ten feet in diameter, were constructed at the Glen Lea research station, Manitoba. The insecticides were applied at manufacturers recommended rates. Native mosquitoes were placed in cages constructed from wire and nylon stockings. These cages were placed in the pool and mortality recorded twenty-four hours later. DDT was the longest lasting compound. Dursban was second in residual life, lasting up to three weeks. The remaining insecticides varied in residual action from two days to two weeks.

## Ixodes sculptus, a Common Tick in Alberta

J.A. Shemanchuk  
Research Station, Canada  
Agriculture, Lethbridge

The host, seasonal geographical distribution of Ixodes sculptus in Alberta, and its potential as a disease vector was discussed.

## Alfalfa Leaf-cutter Beekeeping, 1968

B.A. Hobbs  
Research Station, Canada  
Agriculture, Lethbridge

We have been able to domesticate the alfalfa leaf-cutter bee, Megachile rotundata L., largely because it is gregarious, will live in man-made nests, and can be protected from its insect enemies. Fortunately, all of the insect parasites that have attacked it to date have had shorter incubation periods than that of the bee, and they can, therefore, be destroyed by light-trapping them in the incubators. A major problem has been to design and manufacture interchangeable equipment that will allow us to handle millions of alfalfa leaf-cutter bees efficiently. This has been solved by building shelters out of 4 ft. x 8 ft. sheets of composition board, hives out of molded polystyrene, and cell-removers out of  $\frac{1}{4}$ -inch hardwood dowelling.

## Specificity of Sex-pheromones in the Spruce-infesting Ips

G.N. Lanier  
Dept. of Fisheries & Forestry  
132A - 9th Avenue S.W.  
Calgary 2

Ips tridens and Ips borealis as sympatric along the eastern slope of the Canadian Rocky Mountains. These two polygamous species frequently attack the same spruce tree but they maintain discrete gallery systems. Fertile hybrids have been produced in the laboratory but putative hybrids are rare in nature. Species integrity is maintained by a difference in the sex (attractant) pheromones produced by males.

Laboratory hybrids produce a pheromone of intermediate attractiveness to the parent species but of paramount attractiveness to hybrid females. Moreover, relative response to the various pheromones is in direct proportion of the "blood" relationship. For example, to tridens females, pheromone of  $F_2$  tridens x tridens-borealis is approximately 1.75 times more attractive than pheromones of borealis and 1.25 times more attractive than the pheromone of  $F_2$  borealis x tridens-borealis. These results are best explained by the hypothesis that hybrids produce a mixture of pheromones and inherit a mixture of pheromone receptors.

## Spatial Pattern and its Influence on Sampling Design

L. Safranyik  
Dept. of Fisheries & Forestry  
132A - 9th Avenue S.W.  
Calgary 2

Pattern is defined as the spatial arrangement of organisms in their habitat. The broad outlines of spatial pattern are determined by the structural features of the physical environment and the biology of the organism. In the world of organic nature there seems to be an uneasy balance between factors which increase randomness of spatial arrangement and those which oppose it. For example, continuous dispersal from breeding centers tend to increase randomness, while antagonism (territorial behaviour) and certain social tendencies within species tend to bring about regular and clumped (aggregated) spatial arrangements.

Three of the most common requirements of a sampling plan are a) estimate mean density/unit area for general survey purposes, b) estimate mean density (or population total) and its variance for intensive population studies and c) ascertain the spatial arrangement for the purpose of investigating social behaviour or environmental effects on the population. In practice, all three of these requirements are usually satisfied by collecting data on fixed sampling units and by examining the

frequency distribution of the counts. The frequency distribution of counts per unit is a natural outcome of the spatial pattern of an organism but, unfortunately, the converse is not true. The shape of the frequency distribution is affected by the spatial arrangement of individuals indirectly through the relationship between the latter to sampling unit size and sometimes, shape. Consequently, indices of pattern based on frequency distributions derived from only one sampling unit size (and shape) are not reliable. In general, the analysis of the spatial pattern of organisms should be done with a series of sampling unit sizes and shapes.

When the objective of sampling is to estimate mean density/unit, the strategy should be to reduce the variability of this estimate as much as possible. This is done by the appropriate selection of the sampling method and sampling unit size and shape. When sampling randomly or regularly dispersed populations the size and shape of the unit is of importance only from the point of view of convenience. However, when sampling clumped spatial arrangements, unit sizes or shapes coinciding with those of a mean clump of individuals, will have the greatest variability. Therefore these unit sizes and shapes should be avoided. For the mean to be a precise indicator of population density the spatial arrangement of individuals has to be uniform but random spatial arrangement approaches this idea. It is entirely efficient to sample these spatial patterns by the simple random method, and the precision of the mean, in general, will not be improved by stratification. Clumped spatial arrangements should be sampled by dividing the sampling universe into more or less homogeneous strata. Under certain conditions, i.e. when there is a density gradient from one end of the field to the other, the systematic sample will always be more precise than some random samples and stratified random samples, for a given sample size. Although no valid estimate of the sampling variance can be calculated from a single systematic sample, systematic sampling has great potential for general survey purposes.

Aren't the mountains beautiful today!!		Kananaskis Forest Experiment Station		Howdy!!	High cost of meeting!
Let's eat!	Howard Tripp  Erla & Bob Stevenson		That was a good meal!		Change in the weather
Howard Tripp	General Assembly				Wild dog of Kananaskis
Hear ye! hear ye!	Herb Cerezke	Brian Bierne "Guest Speaker"	Welcome to Kananaskis		Charlie Lilly
Gordon Hobbs	Gerry Lanier	Bob Dixon	Another good meal!		Joe Shorthouse  Alex Harper  Charlie Lilly
Roy Shepherd	Very interesting!  Herb Cerezke Gerry Lanier	Gordon Ritchard  Les Safranyik		Brian Bierne	Joe Shemanchuk
Ceth Smith	Lepidopteran beauties		"Albertan Insecta"	Mrs. Marg Hopkins	G.D. Griffiths
			Ross MacDonald "Guest Speaker"		





SIXTEENTH ANNUAL MEETING - KANANASKIS - 1968

Gordon Fritchard	Alex Harper	Joe Gurba	Bill Nelson	D. M. Petrunia	Sheep ked feeding
G.C.D. Griffiths	Alex Harper	Dave Rosenberg	Joe Shorthouse	K.W. Edwards	George Ball
Joe Gurba Lloyd Peterson	Ron Gooding	Neil Holmes	Dave Evans	Evan Gushal	Gordon Hbbs Rob Reid
Les Safranyik	Herb Cerezke	D.Larson	Lloyd Peterson	Mrs. G.C.D. Griffiths	D.M. Petrunia Jim Cragg
Mr. & Mrs. Griffiths Joe Rickert	"Having a good time"	Stu McDonald & "Friend"	M.S. Tawfik Dr. & Mrs. D.A. Craig	Joe Rickert	
Roy Shepherd Neil Holmes Ceth Smith	Stu McDonald Katheline & Glen Burgess Ed. Swailes	Ross MacDonald Jean Jones Phil Thomas	Dean Struble		
Charlie Steward	James Cragg Brian Bierne	Gordon Prichard	James Cragg	Brian Bierne Mrs. Mary Thomas	





ENTOMOLOGICAL SOCIETY OF ALBERTA

ENTOMOLOGICAL SOCIETY OF ALBERTA

Minutes of Executive Meeting

November 14, 1968 - 8:00 p.m.  
Held at the Kananaskis Forest Research  
Experimental Station

Present were: H.A. Tripp (President), H.F. Cerezke, R.H. Gooding,  
G.N. Lanier, D.M. Rosenberg, J.A. Shemanchuk, R.E. Stevenson and G.E. Swailes.

1. Appointment of Committees by the Executive for the 16th Annual Meeting

- (a) Nominating Committee; duties were to appoint a slate of executives for 1969 and a Regional Director to the Ent. Soc. of Canada.

R.F. Shepherd	-	Calgary (Chairman)
R.H. Gooding	-	Edmonton
L.A. Jacobson	-	Lethbridge

- (b) Resolutions Committee

R.W. Reid (Chairman)  
W.G. Evans

- (c) Dr. A. Raske was appointed Chairman of the Insect Collection Competition. The authority was granted to him to appoint another taxonomic expert to assist in the judging of collections.

2. Gold Medal Achievement Award - E.S.C.

A letter received from Dr. E.J. LeRoux (President elect, E.S.C.) was read re: the submission of names of possible recipients for this award for making outstanding contributions in entomology. Mr. Tripp proposed that a committee of three members, one from each locality, be established to execute this request. He suggested that other members assist the committee by submitting to them names of possible recipients. The committee members appointed were as follows.

H.A. Tripp	-	Calgary (Chairman)
N.D. Holmes	-	Lethbridge
G.E. Ball	-	Edmonton

3. Interim Treasurer's Report

G.N. Lanier reported that as of November 14, 1968, a.m. the total cash on hand for the Society was \$334.29.

4. Review of Last Business Meeting Minutes

The minutes of the previous executive and general business meetings were reviewed to up-date the proposed agenda for this year's annual business meeting.

5. Future Annual Meetings

The suggestion was made that the incoming executive allow more time for workshops and discussions at the next meetings.

6. Dr. E. Swailes proposed that \$15.00 be paid by the Soc. to Mr. E. Gushul to cover his costs for attending the meeting. The sum was proposed in view of Mr. Gushul's valuable contributions in photography and projection services. Mr. Tripp suggested that the stipulation of payment be specifically for Mr. Gushul's services. Mr. J. Shemanchuk then moved, R. Gooding seconded, that the Alberta Ent. Soc. pay E. Gushul \$15.00 for his projection and photography Services at the 1968 annual meeting.

Carried

7. E. Swailes moved, seconded by D. Rosenberg, that the meeting adjourn.

Carried

H.F. Cerezke  
(Secretary)

## ENTOMOLOGICAL SOCIETY OF ALBERTA

### Minutes of the 16th Annual Business Meeting - Part One.

November 15, 1968

The 16th annual meeting of the Entomological Society of Alberta was held at the Kananaskis Forest Experiment Station, using the combined facilities of the University of Calgary Environmental Sciences complex and the federal Forestry Research establishment. Following the opening addresses of welcome, the President, Mr. H.A. Tripp called the business meeting to order.

1. Mr. H.A. Tripp noted that since all members present had received copies of the 1967 Proceedings of the Ent. Soc. of Alta, they were aware of the minutes of meetings recorded therein. He then called for any errors or omissions arising from these recorded minutes. It was moved by J. Shemanchuk, seconded by G. Ball that the minutes of the 1967 Proceedings be adopted as recorded.

Carried

2. The secretary read the minutes of the Executive meeting held at Calgary on March 22, 1968. H. Tripp called for any errors or omissions, and asked that any discussion arising from these minutes be deferred until later. G. Lanier moved, D. Rosenberg seconded, that the minutes be adopted as read.

Carried

3. The minutes of the Executive meeting, held at Kananaskis, November 14, 1968 were read. R. Gooding moved, L. Safranyik seconded, that the minutes be adopted as read.

Carried

4. The correspondence re the Ent. Soc. of Ontario celebrating their centennial in 1969 was reviewed. From the discussion that followed, it was apparent that no one had definite word of a centennial celebration taking place in 1969. Mr. Tripp suggested that the Ontario Soc. had celebrated their centennial in 1963, as indicated in the 1963 published Proceedings which commemorates the joint meeting of the E.S.C. and the E.S.O. (Can. Ent. 96 (1-2): 1-475, 1964). It may be further noted that minutes of the 103rd annual meeting of the E.S.O. are recorded in its 1967 Proceedings (Proceedings, Ent. Soc. Ont. (1966), vol. 97, 1967). In view of the situation the earlier proposal to appropriately congratulate the E.S.O. in 1969 was dropped.

5. The secretary reported that final disposal of the Alta. Ent. Soc. library was being taken care of by the Lethbridge group.

6. An up-to date report of the Memorial for the late Dr. Farstad was given by Dr. R. Gooding. He stated that a volume had been received and suitably inscribed, and that it is now contained in the Strickland Memorial Library, University of Alberta.
7. No further report on guidelines for treasurers was available from Mr. P.E. Blakeley.
8. Dr. G. Lanier reported that since acknowledgement had been received for Alta. Ent. Soc. contributions to the Zoological Record for 1966-67, a 1968 contribution of \$10.00 was made.
9. Dr. R. Gooding reviewed the highlights of his 1968 report as Regional Director to the E.S.C. A copy of this report was presented to the secretary for inclusion in the 1968 Proceedings. A matter arising from the report was presented as a motion by R. Gooding - that we extend an invitation to hold the Can. Ent. Soc. meeting in Alberta in 1973. R. Shepherd added to the motion that the matter of extending an invitation be left in the hands of the incoming executive, and that we leave the decision of choosing an exact location for a future meeting. N. Holmes seconded.

Carried

10. The topic of the Gold Medal Achievement Award - E.S.C. was reviewed re letter from Dr. E.J. LeRoux (President-elect, E.S.C.). Mr. Tripp asked for the co-operation of members to help the 3-member committee in selecting a name or names of possible recipients by Saturday, Nov. 16, 1968.
11. A memo from Dr. A.S. West was read re the Honourary Membership Committee of the Entomological Society of Canada. Action requested by Dr. West was that the President of each Regional Society should appoint one member to represent this Committee. Following the suggestion of Dr. West, Mr. Tripp stated that he would add this duty onto those of the Regional Director, and that he would inform the new Director of his new assignment. Mr. Tripp suggested that the memo from Dr. West be incorporated into the 1968 Proceedings to serve as a guideline for the Regional Director.
12. Mr. Tripp announced to the membership that the Entomological Society of Alberta Prize of \$50.00 for 1968 had been awarded to Mr. Joseph David Shorthouse. It was noted that Mr. Shorthouse had demonstrated an interest in entomology since 1958. Last semester he obtained a grade point of 7 in two senior courses in entomology and received his Bachelor of Science degree in June, 1968.

A motion by L. Jacobson was called to adjourn part I of the general business meeting. G. Ball seconded.

Carried

ENTOMOLOGICAL SOCIETY OF ALBERTA

Minutes of the 16th Annual Business Meeting - Part Two.

November 16, 1968

1. A matter of business which arose from the Executive Meeting held on March 22, 1968 was the proposal that the Soc. Proceedings bear the inscription "Not for Publication". This was presented as a motion by N. Holmes, and seconded by R. Stevenson. However, after some discussion, Holmes proposed the inscription be amended to read:  
"For citation only by author's permission"

Carried

2. The Treasurer, G. Lanier reported that \$1035.25 was the total money taken in at the meeting but that the total expenditure for bills had not been totalled.

3. The following auditors were nominated:

G. Pritchard  
L. Safranyik

4. A letter from Chemical Abstracts Services was read, inquiring whether the Alta. Ent. Soc. Proceedings contained articles of chemical and chemical engineering information for abstraction. Mr. Tripp's reply to the C.A.S. was in the negative.
5. A letter from Professor J.C. Downey was read re the official seal or emblem of the Alberta Ent. Soc. The request was made to ultimately avoid duplication in any emblems which may be designed for new societies. In his reply, Mr. Tripp included an additional page bearing the Society's emblem for Dr. Downey's purpose.
6. General information on the Ent. Soc. of Alberta was requested by the Assistant Librarian of the National Science Library, National Research Council of Canada. This information had been previously published in Part II of "Scientific and Technical Societies of the United States and Canada", but will now be published in a separate journal, "Scientific and Technical Societies of Canada". The information requested was updated and submitted by Mr. Tripp.
7. A letter and proposed plan for use of Ent. Soc. of Canada funds in support of Young Entomologists was received from Dr. F.O. Morrison. The plan was sub-divided into three areas for dispersal of funds, the net amount being up to \$1000.00 annually. The letter was referred to the Alta. Soc. for further suggestions toward the possible implementation of the proposed plan. Briefly, the three subject areas were as



follows:

- I. Prize for best High School Science Project on an entomological subject in each geographical area.
- II. Prize for best Undergraduate Project in each of 26 universities.
- III. Prize for best paper presented by a Graduate Student at the E. S.C. meetings.

The considerable discussion which followed is summarized below and represents a variety of viewpoints: A. Harper suggested there would be difficulties in judging, especially II and III. G. Lanier, G. Ball, and R. Shepherd agreed with the plan in principle but predicted problems in judging, in appointment of judges and in the establishment of guide-lines for judges. H. Tripp suggested that III may be easiest to judge at annual E.S.C. meetings. As a graduate student, D. Rosenberg suggested that the appointment of judges to establish guidelines was too subjective and that he did not feel he would want to compete at meetings. J. Shemanchuk noted that we may lose potential contributors by imposing competition. The suggestion was made by H. Tripp that the money be divided and sent to University Professors for dispensing to the best student who would present a paper at the E.S.C. meetings. J. Shemanchuk further suggested that the money be given to Regional Societies for distribution to qualified students. The discussion was terminated by R. Shepherd who suggested that the President and Secretary draft a reply letter to Dr. Morrison, incorporating the views expressed by the Society members.

8. R. Shepherd noted that the Alta. Ent. Soc. Prize had been given to students at U. of A. and asked whether consideration should now be given to undergraduate students at U.A.C. and at the new Lethbridge University. The matter was discussed and the general view was that up to the present there was no problem concerned with the inclusion of the two other universities. However, G. Lanier suggested that H. Tripp appoint two committee members, one from each of U.A.C. and U. of A., to prepare a report on the matter for the 1969 Annual Meeting. The two appointed members are Dr. G. Ball (U. of A.) and Dr. G. Pritchard (U.A.C.).
9. Mr. J. Shemanchuk announced that Dr. Charlie Steward had passed away recently, and that he would provide an obituary to include in the 1968 Proceedings.
10. The Report of the Insect Collections Competition was read by H. Tripp as prepared by A. Raske. Mr. C. Lilly then asked that he pass on his duties as Chairman of this competition to A. Raske. The prize winners for 1968 were as follows:

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

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

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

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

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

11. The Report of the Resolutions Committee was presented by W.G. Evans as follows: 'Whereas the success of the 16th Annual Meeting of the Ent. Soc. of Alberta can, in large part be attributed to the following, be it resolved that letters of appreciation be sent to:

The University of Calgary and the Federal Forestry Branch for the use of their facilities at the Kananaskis Forest Research Station;

Dr. J.B. Cragg for his informative and entertaining banquet address;

Dr. B.P. Beirne for his invitational address; and

All the kitchen staff who helped with food preparations and those personnel who assisted in preparing rooms for accommodation and for the general meeting.

Be it further resolved that a vote of thanks be extended to the local arrangements committee and the program committee'.

W.G. Evans moved that the Resolutions Committee Report be adopted as read. L. Safranyik seconded.

Carried

E. Swailes asked members to join with him in complimenting the local arrangements committee for their fine job.

12. The President announced that four names of possible recipients for the Gold Medal had been received.
13. R. Shepherd, Chairman of the Nominations Committee, presented the following slate of officers for 1969.

President - Mr. J.A. Shemanchuk

Vice - President - Mr. J.B. Gurba

Secretary	- Dr. W.A. Nelson
Treasurer	- Mr. P.E. Blakeley
Editor	- Mr. C.E. Lilly
Directors	- Dr. Ruby I. Larson (Lethbridge)
	- Dr. A. Raske (Calgary)
	- Dr. D.A. Craig (Edmonton)
Regional Director	- Dr. W.O. Haufe

R. Shepherd indicated that all the named officers had agreed to accept their executive positions and asked that his report be adopted as read. L. Pederson seconded.

Carried

G. Ball moved that nominations cease, seconded by S. McDonald.

Carried

14. An item of new business arose in connection with the Alberta Conservation Council. Two examples were cited in Alberta where complaints could be issued for action by the government: broken bottles along highways and the method of coal mining in the Kananaskis area. After some discussion J. Shemanchuk presented the motion 'that we (Alta. Ent. Soc.) are unable to take action because we do not send a representative to the A.C.C.', seconded by C. Lilly.

Carried

Since no further new business arose from the floor, the President then thanked the Executive and the various Committees. Special thanks were extended to Dr. R. Shepherd who contributed considerably to the meeting in spite of the fact that he was not on any committee. Special thanks were also extended to Mr. E. Gushul and to Mr. R. McDonald.

Mr. D. Rosenberg moved that the meeting be adjourned, seconded by J. Shorthouse.

Carried

H.F. Cerezke  
(Secretary)

H.A. Tripp  
(President)

ENTOMOLOGICAL SOCIETY OF ALBERTA

Financial Statement of 1968

Receipts

<u>Item</u>	<u>Sub Total</u>	<u>Total</u>
Bank Balance transferred from Edmonton		496.18
Membership fees:		
Entomological Society of Alberta		
63 full @ \$2.00	126.00	
1 student @ \$1.00	1.00	
Entomological Society of Canada		
45 full @ \$8.00	360.00	
3 students @ \$4.00	12.00	
Credits from Ent. Soc. Canada	10.00	
	<u>509.00</u>	509.00
Sale of ESA literature		
Proceedings	12.46	
Collector's Guide	11.00	
	<u>23.46</u>	23.46
Annual Meeting of ESA		
Registration	642.50	
Liquor	194.30	
Banquet donations	31.10	
	<u>867.90</u>	867.90
Grand Total	1,896.54	1,896.54

Expenditures

Dues to Entomological Society of Canada		
Membership Fees forwarded	372.00	
Rebates for overpayment	6.00	
	<u>378.00</u>	378.00
Proceedings	101.08	101.08
Donations and Prizes		
Zoological Record	10.15	
Memorial Volumes	50.95	
University of Alberta Prize	50.00	
Insect Collection Prizes	21.98	
	<u>133.08</u>	133.08
ESA Annual Meeting		
Groceries	268.43	
Kitchen Services	143.55	
Liquor	216.00	
Photography Services	15.00	
Rent of University of Calgary facilities	50.00	
	<u>692.98</u>	692.98

Miscellaneous		
Postage and Supplies	10.35	
Bank Service Charge and Exchange	<u>2.67</u>	
	<u>13.02</u>	<u>13.02</u>
Grand Total	<u>1,318.16</u>	<u>1,318.16</u>
Cash Deficit Unaccounted		.05
Balance 7 March 1969		578.33

Audited

L. Safranyik

G.N. Lanier  
(Treasurer)

G. Pritchard

## ENTOMOLOGICAL SOCIETY OF ALBERTA

### 1968 Report of Regional Director

1. Time of annual meeting of Entomological Society of Canada.
  - a. At the 1967 meetings of the Entomological Society of Alberta the following resolution was passed: "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."
  - b. At the executive meeting of the Entomological Society of Alberta on March 22, 1968 (which I was unable to attend) the question was discussed and Mr. Tripp supplied me with the following resolution "Be it resolved that since the field season for most entomologists in Canada does not terminate until after September, annual meetings of the Entomological Society of Canada should be held after this date".
  - c. On May 15, 1968 I informed Dr. D.G. Peterson, Secretary of the Entomological Society of Canada, of my intent to submit the above resolution at the 1968 meetings of the national society. Mr. Peterson suggested that I also bring this matter up at the board meeting on August 25, 1968.
  - d. The matter was on the agenda of the board meeting for August 25, 1968; was brought up and opposed by nearly everyone there.
  - e. The matter was not listed on the agenda of the general meeting on August 27, 1968 but was dealt with under item 16 "other business". The resolution was seconded by Mr. Tripp and opposed by virtually everybody else. An attempt was made to amend the motion but was ruled out of order. We withdrew the motion and resubmitted a milder version calling for meetings after September "whenever possible". The vote was 2 in favor and about 52 opposed.
  - f. If the Entomological Society of Alberta wishes to attempt again to change the date of the national meetings, I would suggest either:
    1. Providing the society representatives with your proxy votes or
    2. Attempting a change in the constitution. I think this can be accomplished by mailed ballot which would of course include those members who don't attend the meetings in August. At least this will be the procedure if the new constitution is adopted.
2. Location of future meetings of the Entomological Society of Canada - This item was discussed at the board meeting August 25, 1968.

1969 - Guelph, Ontario.

1970 - Winnipeg, Manitoba, (August ).

- 1971 - Victoria, British Columbia (in later half of August).
- 1972 - Montreal, Quebec as a joint meeting with the Entomological Society of America.
- 1973 - "The Board expressed the opinion that the venue of the 23rd General Meeting should be Alberta and the Chairman requested Dr. Gooding to discuss this with the Executive of the Entomological Society of Alberta."

In an off the record discussion it came out that there may be an especially significant meeting in Ontario in either 1974 or 1975.

After the defeat of our resolution on the timing of the national meetings, Dr. Al West, the president of the Entomological Society of Canada, expressed the "hope" that Alberta Society would soon extend an invitation to the national society to meet in Alberta late in the fall of 1973.

3. Briefs to the Biological Council of Canada.

The Entomological Society of Canada is preparing a three-part brief to be submitted to the Biological Council of Canada which in turn is submitting a brief to a senate committee. The Entomological Society brief will cover the areas of pesticides, ecology and training in basic research. The object of the exercise is to assure that when the government divides up the money biology isn't overlooked.

4. Bulletin of the Entomological Society of Canada.

Discussed at the Board of Directors meeting.

The bulletin is envisioned as a newsletter about entomologists rather than about entomology. The first issue was to be published on or about April 1, 1968 but wasn't out at the time of the Entomological Society of Canada meetings in August. There was apparently a lack of material being submitted to Dr. Pielou for the Bulletin. It was suggested that the Regional Directors make a strong plea to the local societies for articles to be submitted to the Bulletin of the Entomological Society of Canada. Virtually any newsy or philosophical article would be considered for publication.

5. The Constitutional Bylaws of the Entomological Society of Canada.

These bylaws were reviewed in detail (for about 6 hours) at one meeting. After further editing and clearing up a few minor points the new bylaws will probably be submitted to the membership for approval.

6. Other Items.

Lots of other society business was dealt with but I don't think it needs to be included in this report.

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



## OBITUARY

DR. CHARLES COWLEY STEWARD died on 22 September 1968. He was born at Wallasey, England on 29 July 1907 and completed his secondary school education at the Caldys Grange Grammar School, West Kirby, England in 1922. In 1928 he took up residence in Canada. In 1941 he completed a course in commercial radio operating at the Sprott-Shaw Schools in Vancouver. In 1942 Charles joined the Merchant Navy as a wireless operator and served with the Canadian Pacific Steamships from 1942 to 1945, the Canadian National Steamships from 1945 to 1946 and the Lunham and Moore Steamships from 1946 to 1950. For his war service in the Merchant Navy he was awarded the 1939-45 Star, Atlantic Star and the War Medal. After retirement from the Merchant Navy in 1950 Charles enrolled at the University of Toronto and obtained a B.A. (Biology) degree in 1954, M.A. (Entomology) degree in 1955 and a Ph.D. (Entomology) degree in 1959. As a student at the University of Toronto, his scholastic abilities were recognized by the Isabella Moffat Gilchrist Prize in Botany, the Ann Shepard Memorial Gold Medal in Biology, the Kenneth Joanneret Memorial Prize and an Ontario Research Foundation Scholarship. In June 1959 he was appointed Research Officer at the Veterinary-Medical Entomology Laboratory, Canada Department of Agriculture at Guelph, Ontario. In 1964 when the laboratory at Guelph was closed out Charles transferred to the Veterinary-Medical Entomology Section, Research Station, Lethbridge, Alberta. His contribution to entomology is represented by the following comprehensive research publications.

- 1961 Steward, C.C. and J.W. McWade. The mosquitoes of Ontario (Diptera: Culicidae) with keys to the species and notes on distribution. Proc. Ent. Soc. Ont. 91: 121-188.
- 1963 Steward, C.C. and C.E. Atwood. The sensory organs of the mosquito antenna. Can. J. Zool. 41: 577-594.
- 1967 Steward, C.C. Distribution of cholinesterase in larvae of Hypoderma bovis and Hypoderma lineatum (Diptera: Oestridae) and its inhibition by systemic insecticides. Can. Ent. 99: 340-350.
- 1968 Steward, C.C. Numerical classification of the Canadian species of the Aedes (Diptera: Culicidae). J. Systematic Zool. In Press.
- 1969 Inhibition of cholinesterase in the cattle grub Hypoderma bovis (Diptera: Oestridae) after treatment of the host cattle with systemic insecticides. Can. Ent. In press.

In addition to the above publications, a considerable amount of data has been compiled towards a monograph on the mosquitos of Canada.

Dr. Steward was an active member in the Entomological Society of Alberta, Entomological Society of Canada, American Mosquito Control Association, Professional Institute of the Public Service of Canada, Entomological

Society of America, Wildlife Diseases Association, and Society of Systematic Zoology.

Dr. Steward was a kindly, quiet and unassuming man, honest with himself and others. He will long be remembered in the Society by his friends, colleagues and associates.

MEMBERSHIP LIST, 1968-1969

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.

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Carr, Mr. J.L.	R.R. 4, Calgary.
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