

PROCEEDINGS OF THE 38TH ANNUAL MEETING OF THE



Entomological Society of Alberta

Held jointly with the Entomological Society of Canada
Banff, Alberta October 1-5, 1990

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THE ENTOMOLOGICAL SOCIETY OF ALBERTA

The Entomological Society of Alberta was organized November 27, 1952, at a meeting held in Lethbridge, Alberta, as an affiliate of the Entomological Society of Canada. A certificate of incorporation was obtained under the Societies Act of Alberta on February 19, 1953.

The membership of about 70 paid-up members at that time consisted mainly of Dominion (Federal) entomologists at the Science Service Laboratories in Lethbridge (now Canada Agriculture Research Station), Suffield Research Station, Forest Zoology Laboratory in Calgary, and students and staff from the University of Alberta.

One of the prime motives for establishing the Society was to encourage interest in amateur entomology, which had declined from its earlier vigor. The objectives of the Society are succinctly stated in the original Constitution, which differs only slightly from the present day Bylaws:

“The object of the Society shall be to foster the advancement, exchange and dissemination of the knowledge of insects in relation to their importance in agriculture, forestry, public health, and industry and, for its own sake, among the people of the Province of Alberta.”

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Membership is open to anyone interested in Entomology. Annual dues are \$10.00 (\$5.00 for students). Contact the Treasurer, C/O Department of Entomology, University of Alberta.

## PROGRAM OF THE 38<sup>th</sup> ANNUAL MEETING

### Saturday, October 6

0900 - 1700 Entomological Society of Canada. Governing Board Meeting  
1500 - 2000 Registration

### Sunday, October 7

0900 - 1400 Entomological Society of Canada. Governing Board Meeting (continued)  
1000 - 1500 Registration  
1500 - 1700 Opening Ceremonies  
1900 - 2000 Students and Board Members Mixer  
2000 - 2300 General Mixer

### Monday, October 8

0830 - 1200 Symposium: "Systematics and Entomology: Diversity, Distribution, Adaptation and Application"  
1300 - 1700 Discussion: "Effects of Climatic Change on Insect Distribution and Abundance"  
1300 - 1645 Submitted Papers: Forest Entomology; Medical/Veterinary Medicine; Systematics/Genetics; Agricultural Entomology  
1730 - 2030 Barbecue  
2130 - 2330 President's Reception

### Tuesday, October 9

0830 - 1200 Symposium: "Biotechnology and Insect Control"  
1300 - 1500 Discussion: "Arctic Insects: Faunistics, Biology, Abundance"  
1300 - 1500 Posters  
1300 - 1500 Submitted Papers: Biological Control; Mating/Reproduction; Physiology/Structure  
1530 - 1600 Heritage Lecture by John Carr: "F. S. Carr - Amateur Entomologist"  
1600 - 1730 General meeting. Entomological Society of Canada  
1745 - 2100 Banquet  
2100 - 2200 After Dinner Speaker: Ben Gadd "The Canadian Rockies in One Hour"

### Wednesday, October 10

0830 - 1200 Symposium: "Molecular Approaches to Insect Development"  
0830 - 1200 Discussion: "Livestock Insects"  
0830 - 1200 Submitted Papers: Population; Agricultural Entomology; Parasitoid Biology  
1200 - 1400 Annual General Meeting. Entomological Society of Canada  
1430 - 1600 Annual General Meeting. Entomological Society of Alberta

## HERITAGE LECTURE

"F. S. Carr - Amateur Entomologist"

J. L. Carr

It is my privilege to talk to you today about my father, F. S. Carr, an avid amateur entomologist in Alberta in the first third of this century. He specialized in beetles but collected occasionally in other orders.

Frederick Stephen Carr was born January 1, 1881, in Cobourg, Ontario, the second of three children of a farmer, and grew up on the family farm. He received his elementary and high schooling at Cobourg. Natural history fascinated him from childhood and he was able to indulge this interest in the rural surroundings of his youth. He resolved to become a medical doctor and undertook a premedical course at the University of Toronto, earning a B.A. degree in Natural Sciences in 1904. Finances were strained, so he went west immediately, to the Land of Opportunity, and attended Teacher Training College at Regina. He then continued west to the brand-new Province of Alberta with his brand-new Teacher's Certificate, and taught briefly at Lacombe and then at Innisfail. There he met and courted Laura Moyer, also a school teacher from Ontario, and they were married Christmas Day 1907. He was presently appointed Principal of Queens Avenue Public School in Edmonton, and transferred to the new Victoria High School there as Principal in 1910.

In 1912, with some savings and three children, he returned to the University of Toronto to further his medical studies. In 1914, ill health forced him to withdraw. After recovery, he abandoned a medical career and returned with his family to Leduc, Alberta, where he farmed. The venture was not entirely successful; my Mother claimed he would sooner follow a nice beetle than a nice plow-horse. To his family's great relief, he was offered and accepted the position of head of the Science Department at Victoria High School, and returned to Edmonton in 1915.

In 1920 he was appointed School Inspector at Castor, in east-central Alberta, and in 1921 became Organizer of New School Districts in the newly-settled areas west of Edmonton. In 1922, he was appointed School Inspector in the

Medicine Hat District, and remained there for the rest of his life. His health gradually deteriorated, and a brain tumor was diagnosed early in 1934. Surgery was unsuccessful and he died May 16, 1934.

Although entomology was Father's avocation, he was not wholly dedicated to insects. He was a family man. He and Mother had five children, one of whom died in infancy. The family was close-knit, and both parents took parenthood seriously. He was an enthusiastic bridge player. Reading, particularly lurid mystery novels and scientific travel books, was a great pleasure to him. He was a strong supporter of his church, and for many years served as Chairman of the Finance Committee of Fifth Avenue United Church in Medicine Hat. His garden was important, both as a source of pleasure and as a source of food for a hungry family, and his flower beds were bright and somewhat innovative. He taught Natural Science at the Teachers' Summer School in Edmonton for many summers. In the early 1930's, he was co-organizer of the Medicine Hat Regional School Musical Festival. In between, he was a coleopterist.

Father was always fascinated by the biological world around him. One of his happy memories was of a summer spent as Student Assistant on a small-mammal biological survey party in Ontario. Hidden in various corners of his beetle room at home were small boxes of rodent skulls, mollusc shells, dry sea horses, and fossils; and alcoholic bottles full of crustaceans, centipedes, scorpions, spiders and even small fish. Live toads, snakes, salamanders and horned lizards dwelt from time to time with the household.

His major interest was in the insects, and particularly the Coleoptera. At one time he collected Lepidoptera with enthusiasm, and several Riker-type frames of butterflies and moths hid in the back corners with the mouse skulls. A few boxes of pinned specimens remained from a brief dalliance with the Hymenoptera. He contributed quite a few flies to the Canadian National Collection, and at least one species

received his name. Beetles were his overwhelming enthusiasm, however, and became the primary focus of his entomological effort. His first collections were exchanged for tuition at the University of Toronto in 1912, and he started over upon his return to Alberta in 1914.

There was no automobile in the family until he became School Inspector in 1920, so until then most of his collecting was within walking distance or street car range of his home at 110 Avenue and 123 Street in Edmonton. Thus, most of his captures in those early days were made on the Hudson Bay Reserve (much of which is now occupied by Edmonton Municipal Airport) or Jasper Place or along the North Saskatchewan River, all of which were then mostly bush. He had occasional summer use of a cottage at Wabamun Lake. After 1920, his official duties took him farther afield, and his transfer to Medicine Hat opened up a whole new world for him.

His inspectorate at Medicine Hat included at various times all the area from the Saskatchewan border west to Bow Island and Alderson, and from the north slope of the Cypress Hills North to the Red Deer River, about 4,800 square miles. All the rural schools in this area had to be inspected annually, so he had opportunities to collect at many localities while traveling from school to school, and at lunch times. In those days, working hours were longer than now, but as a civil servant he had Saturday afternoons and Sundays free, and a two week vacation in the summer. Most of his collecting was done Saturday and Sunday afternoons, within a short drive of his home, and much of that within walking distance. The valleys of the South Saskatchewan River and Seven Persons Creek were favorite haunts, and since his residence was on the outskirts of the city, the prairie at his front door was an excellent and readily exploited source of beetles. Even with the roads and cars of the 1920's, Cypress Hills were within fairly easy reach in dry weather, and he made a few day-trips there each summer.

Roads and cars were not as well-developed then as now. Even short forays were not undertaken lightly. A 200-mile drive took all day, even if it didn't rain. There were no highways; a trip to anywhere meant zig-zagging over farm grid roads. The main routes, as from Medicine Hat to Calgary, were marked by colour bands painted on fence posts or telephone poles. Gravel was an exceptional luxury. Later, of course, graveled highways were developed on the main routes, and

motoring ceased to be such an adventure. These road conditions effectively restrained even holiday travel, and kept Father's horizon somewhat limited. He usually used his summer vacation to travel west, out of the dry prairie to the lush and faunally different Foothills and Rockies. There were several holidays spent at Banff where many treasures were caught. (National Parks tolerated collectors then). He also made several trips to the Crownsnest Pass - Pincher Creek area, where he met the fauna that slips across the Continental Divide from British Columbia. In 1930 and again in 1931 he spent his vacation at Waterton Lakes, enjoying the pleasure and excitement of collecting the beach drift; he had a hand-written list of about 235 species of beetles collected from the washup. Occasionally he ventured further afield, and even drove the goat track from Lake Louise to Golden. That road was wide enough for only one vehicle, with occasional turn-outs to meet oncoming traffic, and no impediments downwards between the edge of the roads and the valley floor. About 1927, he made a collecting trip to Vancouver Island, and after he became ill in 1933 spent a long leave in Vancouver. The physical difficulties of travel in those days certainly limited his collecting opportunities, but at the same time forced him to concentrate his efforts in relatively small areas.

His collecting equipment was mostly home made. Mother tailored the bags for his sweeping and aerial nets. His aquatic net was a large soup-strainer, sometimes modified to fit into his sweeping net handle for increased reach. His collection was housed in a miscellany of boxes - initially large, wooden and home-made; later, commercial cardboard insect boxes; and finally when finances improved, in good commercial Schmitt-type boxes, some of which he imported from England. Duplicates were kept in cotton in paper jackets. He used hand lenses for most of his examinations. He had a compound microscope, from his medical student days, but this of course was very awkward, with no working space between stage and objective, and I do not think that he did any dissections at all.

Local naturalists were few, so he had little opportunity for direct contact with other entomologists. Lepidopterists Mackie and Bowman in Edmonton, and dragon fly specialist Whitehouse from Red Deer were friends, and most certainly sometime collecting companions. E.H. Strickland arrived in Edmonton at about the same time Father left, so their contacts were mostly in the summer when Father was teaching at Summer

School. In Medicine Hat, several other naturalists did visit, including P.J. Darlington Jr., Norman Criddle, William Rowan from the University of Alberta; James Pepper, then collecting for the Canadian National Collection; and Owen Bryant then living in Banff.

He made up for lack of personal contact by writing letters. He corresponded vigorously with most of the leading North American coleopterists of the day including Fall, Frost, Casey, Buchanan, Chittenden, Hatch, Ralph Hopping, Knull, Nicolay, Swaine, Brown, Brimley, Criddle, Green, Wallis and Leech. He was an enthusiastic trader, exchanging specimens with anyone who was interested. He concentrated almost exclusively on the fauna north of the Mexican border, but did have a few specimens from other parts of the world. He never sold a specimen, and only very rarely bought one. He made his material freely available to specialists, and sought out taxonomists willing to identify in exchange for duplicates. As a result, specimens from his collection are now to be found in most of the major beetle collections in North America. Many of the taxa collected by him have been described by others. Beetles bearing the "F. S. Carr" label are still frequently cited in today's revisional and faunal studies. This vigorous barter built up his own collection, which at the time of his death contained about 6,500 species, more than a quarter of the recognized North American fauna at the time. His collection was deposited with the Department of Entomology, University of Alberta, largely due to the efforts of Professor Strickland, and remains there as an important teaching and research resource.

He authored five taxonomic papers, including a revision of the genus *Brychius* in the Haliplidae. He described ten species and one subspecies of the beetle as new; six of the species are considered valid. His material, however, was the basis for much taxonomic work by others. The dytiscid genus *Carrhydrus* was erected by Fall to accommodate a single specimen which Father captured at Edmonton. Some 14 or 15 other species have been named in his honour. Many more have been described from his material.

In 1920, he published a list of 525 species of beetles from Central Alberta, mostly from Edmonton. In 1924, an addendum added a further 63 species. From 1920 to 1932 he contributed provincial records to The Entomological Record, mostly from Southern Alberta, adding a further 513 species to the provincial list, for a total of

1,101 species. Including species first recorded by others (often from his specimens), it is thought that his collection contained about 1,400 identified species of beetles from Alberta.

In the Introduction to his 1920 List of the Coleoptera of Northern Alberta he wrote "neither local lists nor provincial lists are available for any region west of Toronto". The only published records for Central Alberta at that time appear to have been 5 species of Scolytidae, recorded by Dr. Swaine. The Lepidoptera of the southern half of the province were fairly well-known through the efforts of Wolley-Dodd, Bowman and others. Whitehouse at Red Deer was studying the Odonata. The Coleoptera, however, seem to have been collected only sporadically, usually incidental to agricultural or forestry research, or by traveling naturalists passing through. The field was thus wide open for an industrious coleopterist in the early 1920's. By the end of the decade, officers of the Dominion Department of Agriculture were contributing more, as staffs at experimental stations were enlarged.

Father was a contemporary of Wallis and Criddle in Manitoba. Amongst them, they put the western interior of Canada on the entomological map. Their collections pointed to the major beetle distribution patterns of this part of the country. The importance of local collectors and collections was evident as large faunal lists were built up by these local enthusiasts. The impact of local collectors is well-shown by the number of species recorded from each of the Prairie Provinces in Bousquet's 1989 draft "List of Beetles in Canada"; some 31% of the beetle species known in Canada are recorded from Manitoba; 31% from Alberta, but only 21% are listed from Saskatchewan. That last province simply lacked enthusiastic local collectors until very recently.

There were four separate faunal areas in the southern half of Alberta demonstrated by my father's work. Edmonton is largely in the Boreal Forest, with contributions from the north (*Carabus chamissonis* Fisch.) and from the west (*Scaphinotus marginatus* (Fisch.)). Records such as these occasioned some wonder even as late as the 1950's. Southeastern Alberta has a Great Plains fauna, with some elements derived from the Rocky Mountain states and the Great Basin. The northern extent of many of these forms was totally unexpected when they were first found. The Foothills and Rocky Mountains east of the Continental Divide have of course a Cordilleran fauna, with strong Boreal Forest affinities

northwards. Many of the Northern forms are replaced by Pacific Slope species southwards, especially in the Crowsnest Pass area. Finally, the Cypress Hills have an isolated Cordilleran fauna. Father's collections clearly showed these patterns for the Coleoptera for the first time.

F. S. Carr's productive collecting spanned only 18 years, from 1914 to 1932. He was severely limited for the first 6 years of this period by lack of transportation, and thereafter, though less seriously, by road and vehicle limitations of the time. Without a binocular microscope he was definitely handicapped as a taxonomist. His great advantage lay in simply being there, being the right person, at the right time, in the right place; and that was almost accidental because of his professional postings. However, vigour and enthusiasm led him to take full advantage of these opportunities.

It has been a source of wonder to me that he was able to accomplish so much in so short a

time, while pursuing a busy professional and community life. It demanded a great deal of energy and dedication, but also reflected his eagerness to freely share specimens and ideas with other workers. He was still a young man when illness terminated his activities

I wish to thank several people who aided in the preparation of this history. Dr. Gordon Pritchard provided the opportunity for this talk, and kindly read a draft of the paper. Dr. George Ball discussed the significance of Father's work to the science. Dr. Yves Bousquet permitted the use of as yet unpublished material. My sister Mary, with a wonderful memory and an intense interest in family history, furnished most of the early information. My son Richard prepared the slide. Finally, my wife Bert patiently listened to several versions of this paper and cautiously and constructively offered helpful criticism.

Thank you all for this opportunity to pay my respects to my father.

#### EDITOR'S NOTE

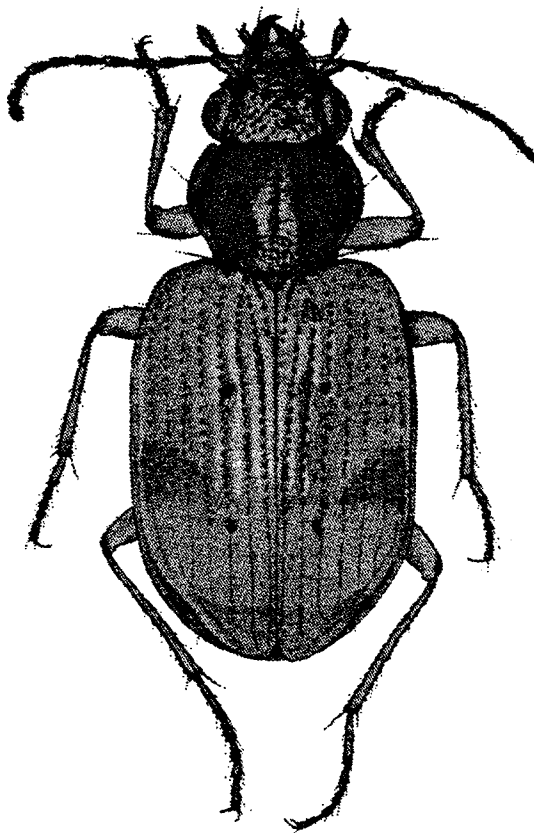
Excerpt from the Program of the Joint meeting of the Entomological Society of Canada and the Entomological Society of Alberta. Banff, Alberta. Oct. 6 - 10, 1990.

"The button handed out with the registration package shows a picture of *Bembidion lachnophorides* Darlington, (1926, *Psyche*, 33:32-35). This species was described on the basis of two specimens collected at "Medicine Hat, Alberta" by F. S. Carr in the 1920's. Additional material did not appear until 1956, when Lindroth and Ball obtained a long series at Bull's Head Creek, in the Medicine Hat area. Since then, additional specimens have been taken on the Pembina River by Henri Goulet, and Bert and John Carr have collected specimens in northeastern Alberta. The species is rare (and possibly endangered) because it seems to be associated with a transient, very local and easily destroyed habitat, namely bare, very coarse sand, in riparian situations. The figure [on the button, and shown on this page] was reproduced from Carl Lindroth's "The ground beetles of Canada and Alaska" [see below].

#### *Bembidion lachnophorides* Darlington

"Pale reddish brown, head and thorax dark aeneous, elytra with very faint metallic lustre and an obsolete dark band behind middle; antennae and maxillary palpi darkened towards tip. Entire upper surface with isodiametric microsculpture, coarsest on the head, most regular on the elytra. Wings full. Length 4.5 - 4.8 mm."

Lindroth, C.H. 1963. The ground beetles (Carabidae, excl. Cicindelinae) of Canada and Alaska. Pt. 3. *Opuscula Entomologica*. Suppl. XXIV, pp. 201-408.



## ABSTRACTS OF SUBMITTED PAPERS

**CONVERGENT ADAPTATIONS IN SOME PHORIDAE (DIPTERA) LIVING IN THE NESTS OF SOCIAL INSECTS.** B. V. Brown, Department of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3

A review of the Neotropical Aenigmatiinae shows that only one of the five genera currently placed in this subfamily belongs in a monophyletic group with the type genus *Aenigmatias*. The other genera have converged on the limuloid body form, which is a defensive adaptation for living in social insect nests.

**ASPECTS OF HOST-RELATED BEHAVIOR IN THE CATTLE-BITING BLACK FLY, *SIMULIUM ARCTICUM* (IIS-10.11) OF CENTRAL ALBERTA.** J. F. Sutcliffe, Department of Biology, Trent University, Peterborough, Ontario K9J 7B8 and J.A. Shemanchuk, Agriculture Canada Research Station, Lethbridge, Alberta

Results of behavioral field studies of host location by cattle-biting *Simulium arcticum* (IIS-10.11) are reported. Aims of the study were to confirm existing, and catalogue new, host-related and "off-the-shelf" attractants for this black fly and to characterize some of the behaviors associated with olfactory and visual-orientation to host-mimicking traps.

**EVALUATION OF "PEST REPELLER" MODEL KC-298, AN ULTRASOUND GENERATING DEVICE FOR PEST CONTROL.** J. K. Ryan and G. J. Hilchie, Ryan and Hilchie Biological Consultants Ltd., 8613 - 108A Street, Edmonton, Alberta T6E 4M7

Tests were done with "Pest repeller" to assess the practicality of pursuing Canadian registration as a pest control device. A choice chamber test with house flies indicated no effect. A farmhouse test showed limited avoidance by mice. Ultrasound generated spanned 36.5 - 53 kHz at a maximum 105 dB 10 cm from source, a narrower range and weaker power than indicated by the manufacturer. Published studies, interviews, and letters indicate skepticism of the pest control value of ultrasonic devices.

**AN ELECTROPHORETIC EXAMINATION OF SOME MEMBERS OF THE *SALDULA PALLIPES* (HEMIPTERA: SALDIDAE) SPECIES COMPLEX.** D. S. Mulyk, Department of Entomology University of Alberta, Edmonton, Alberta T6G 2E3.

The systematics of the holarctic *Saldula pallipes* species complex has resisted resolution because of the presence of several different phenotypes found in most populations. An electrophoretic examination of Alberta *S. pallipes* complex members, including light and dark color morphs, was conducted to gain insight into regional protein variation. Allozyme mobility and frequency was measured for 20 loci (16 enzymes) using vertical polyacrylamide gel electrophoresis. *Pentacora signoreti* Guérin-Méneville and *Salda provancheri* Kelton and Lattin were used as electrophoretic outgroups. *Saldula opacula* Zetterstedt was used as a functional outgroup when comparing members of the *S. pallipes* complex. *S. pallipes* complex members can be readily separated from other saldid species by their unique monomorphic arginine phosphokinase allele. The common dark color morph, found primarily on temporary shore habitats, seems genetically similar across the sampled geographic range. Light color morphs, found almost exclusively on permanent shores, have several unique alleles. Continual turnover of temporary shoreline habitats, extremely vagile adults, multiple matings by a single individual, and multivoltinism may explain the genetic similarity of the common dark phenotype. The presence of unique alleles in the light phenotypes suggests they form genetically distinct populations.

**AN ELECTROPHORETIC COMPARISON OF *PATROBUS* SPECIES (COLEOPTERA: CARABIDAE).** Pohl, G. R. Department of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3

The six North American species of *Patrobus* were electrophoresed on polyacrylamide gels to reveal electromorphs of eight loci. These characters were then used to produce a distance-based phenogram, which was compared to the accepted morphologically-based phylogeny of the group. The distance phenogram suggested



different relationships. In particular, *P. fossifrons* and *P. stygicus*, which are sister species according to morphological data, were shown to be genetically more distantly related. It is concluded that in *Patrobis*, morphological and genetic characters are under different evolutionary pressures, so they indicate different relationships in the group. Implications of these conflicting data are discussed, and it is recommended that a detailed revision of *Patrobis* be done, using both morphological and genetic characters. Electrophoresis also showed that *P. fossifrons* and *P. stygicus* occasionally hybridize, despite their genetic dissimilarity. This shows that the ability to hybridize is not necessarily an indicator of relatedness, and that species can be permeable to foreign genes and still remain distinct species.

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**SYSTEMATICS OF THE NEARCTIC WEEVIL GENUS *PANSCOPUS* (COLEOPTERA: CURCULIONIDAE).** T. G. Spanton, Department of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3

*Panscopus* weevils are briefly introduced and their classification within the Entiminae is discussed. The adelphotaxon to the tribe Leptopiini, in which *Panscopus* is classified, is the Ophryastini, based primarily on the shared apotypy of fused elytra and vestigial wings exhibited by members of both taxa. The Ophryastini are used as the outgroup in analysis of cladistic relationships among genera of Leptopiini. Preliminary analysis at this level places *Panscopus* in a monophyletic clade with the genera *Dichoxenus*, *Amphidees*, *Paranametis*, and *Anametis*, based on characters of the prementum, elytra, and surface vestiture. These genera are therefore used in a generalized outgroup approach to polarize characters in cladistic analysis of species of *Panscopus*. Morphological characters, including external structures, as well as genitalic characters, are presented which support a basal dichotomy in the genus *Panscopus* between eastern and western clades. The western clade includes 23 species which are broadly distributed across the Cordilleran, Great Basin and Pacific Coast regions of North America, primarily in forested areas, and the eastern clade includes 5 species occurring in the Appalachian and southern part of the Great Lakes - St. Lawrence forest regions of eastern North America. There is an apparent range disjunction between the eastern and western

groups of species. Structural characters support the following hypothesized relationships among the eastern species: ((*P. alternatus* + (*P. erinaceus* + *P. impressus*)) + (*P. maculosus* + *P. ovatipennis*)).

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**DISCOVERY OF THE LARVA OF *PEDILUS FLABELLATUS* (HORN) (COLEOPTERA: PYROCHROIDAE: PEDILINAE) AND ITS PHYLOGENETIC SIGNIFICANCE.** D. K. Young, Department of Entomology, University of Wisconsin, Madison, Wisconsin 53706 and D. A. Pollock, Department of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3

The recent collection and description of the larva of *Pedilus flabellatus* (Horn) has potentially profound phylogenetic implications. The presence of an uninterrupted, transverse series of asperities on sternum 9 is unique within *Pedilus*, and supports the previously hypothesized classification of Pyrochroidae: Pyrochroinae + Pedilinae + Cononotinae. This character will be discussed with respect to its presence in Pyrochroidae, and other families of Heteromera.

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**ALBERTA AMBER ARTHROPODS: ASSESSMENT AND APPLICABILITY.** E. M. Pike, Biological Science, University of Calgary, Calgary, Alberta T2N 1N4

Taphonomic processes affecting amber are outlined. Bulk sampling and assessment of diversity/kg of amber allow estimation of total arthropod fauna through category/mass curves. Community structure and organization can be described and compared with extant communities, and changes in insect diversity over time can be measured.

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**MOLECULAR ENGINEERING OF BACULOVIRUSES FOR INSECT PEST CONTROL.** K. Iatrou and R. G. Meidinger, Department of Medical Biochemistry, University of Calgary, Calgary, Alberta T2N 4N1

Methods of biological control of lepidopteran insect pests which are based on the utilization of genetically engineered baculoviruses will be considered. The effectiveness and environmental safety of recombinant viruses that allow an unregulated, ectopic expression of physiologically relevant proteins in the cells of the infected hosts will be evaluated and concepts

that may be considered for acquiring modified, fast-acting versions of such recombinant viruses will be discussed.

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**COMPARATIVE STUDIES OF AN IMPORTED AND NATIVE *APHELINUS* ATTACKING RUSSIAN WHEAT APHID.** D. S. Yu, Canada Agriculture Research Station, P.O. Box 3000 Main, Lethbridge, Alberta T1J 4B1.

The daily fecundity, longevity, developmental rate and host preference of *Aphelinus varipes* from Khazakhstan, U. S. S. R. were compared to *Aphelinus* nr. *varipes* from Alberta in laboratory studies. The imported wasp has a higher intrinsic rate of increase and a wider host range than the native *Aphelinus* and therefore may be superior to the native wasp in controlling Russian wheat aphid in southern Alberta.

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**EFFECTS OF FORESTRY ON CARABID ASSEMBLAGES OF LODGEPOLE PINE FOREST IN WESTERN ALBERTA.** D. Langor, Forestry Canada, Northern Forestry Centre, 5320 - 122 Street, Edmonton, Alberta T6H 3S5 and J.K. Niemelä and J. R. Spence, Department of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3

Results of pitfall trapping showed that ground beetles were most abundant in stands ca 8 years old, but most species in areas reforested 15-25 years ago. The fauna of mature, natural forest had only 4-5 common species. Peak activity occurred early in the season, but some species showed a second, autumn, peak.

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**HABITAT ASSOCIATIONS AND SEASONAL ACTIVITY OF GROUND BEETLES IN CENTRAL ALBERTA.** J.K. Niemelä and J. R. Spence, Department of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3

Number of species ranged from 13 in spruce bog to 25 in meadow. Particular species occurred in all five habitats, in one/several forest types or only in meadow. Carabid activity was highest in May-June. The two most abundant species, *Pterostichus adstrictus* and *Agonum decentis*, showed similar seasonal activity and spatial distribution.

**FOOD LIMITATION OF THE FISHING SPIDER *DOLOMEDES TRITON* (WALCK.) (ARANEAE; PISAURIDAE).** J. P. Wojcicki and J. R. Spence, Department of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3

Fecundity and mass of mated female spiders increased with food in larger females, but egg mass and period of egg sac production were unaffected. Cannibalism of mates did not affect reproductive output. Small females are favoured under low food conditions, while larger females do better if food is abundant.

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**APPLICATION OF ELECTROPHORESIS TO MAYFLY LIFE HISTORY EVALUATION.** J. Zloty and G. Pritchard, Biological Science, University of Calgary, Calgary, Alberta T2N 1N4

Cellulose acetate electrophoresis provides an easy method for identifying single individuals of early instar mayfly larvae. Thus, the life histories of individual species can be determined, even in habitats where several congeneric species co-occur. The applicability of the technique is demonstrated with a community of 7 species of *Ameletus*.

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**THE OPERATION WAS A SUCCESS BUT THE PATIENT DIED: CRITICAL ISSUES IN BIOLOGICAL CONTROL.** M. Y. Steiner, Alberta Environmental Centre, Bag 4000, Vegreville, Alberta T0B 4L0

The use of biological control agents for pest control in greenhouses is well accepted and has scored some notable successes. Companies supplying biologicals and researchers studying them are gearing up constantly trying to meet consumer demand. But one area appears to have been neglected; this paper examines the issue of quality control.

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**DEVELOPMENTAL REGULATION OF SILKMOTH CHORION GENE EXPRESSION.** K. Iatrou and Y. A. W. Skeiky, Department of Medical Biochemistry, University of Calgary, Calgary, Alberta T2N 4N1

Chorion proteins are synthesized by the cells of the follicular epithelium during the second half of oogenesis. The transcriptional activation of chorion genes at day 6 post-pupation correlates with the appearance of temporally-regulated transcription factors. The role of  $\beta$ -ecdysone in

triggering early regulatory cascades which underlie the establishment of the autonomous program of regulated chorion gene expression will be discussed.

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**MAINTENANCE OF LOW WINTER MOTH POPULATION DENSITY AFTER THEIR INITIAL DECLINE.** J. Roland, Department of Botany, University of Alberta, Edmonton, Alberta T6G 2E3

Life-table data and field experiments are used to determine the factors responsible for sustained suppression of winter moth after their initial decline following parasitoid introduction. Although decline was attributed to the effect of both introduced parasitoids and of predators, low numbers are maintained primarily by predators already present in the system.

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**CHIRONOMID (DIPTERA: CHIRONOMIDAE) COMMUNITY DEVELOPMENT FOLLOWING EXPERIMENTAL MANIPULATION OF WATER LEVELS.** D. A. Wrubleski, Department of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3

Colonization and succession of a chironomid community following the re-flooding of ten experimental marshes (Delta Marsh, Manitoba) will be described. Emergence traps were used to collect adults over a four year period from three habitats and two water depths.

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**CANNIBALISM AND GERRID POPULATION DYNAMICS: SOMETIMES A GREAT NOTION.** J. R. Spence, Department of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3

The possible impacts of cannibalism on population dynamics of two *Gerris* species were tested with similar field experiments executed in enclosures at the George Lake Field Site. For *G. buenoi*, a common inhabitant of temporary ponds, there was no significant effect of the opportunity for cannibalism on either juvenile-adult survivorship or body mass of males. However, females from compartments with younger bugs were significantly lighter suggesting that competition for food with younger stages overshadows any effect of cannibalism. For *G. pingreensis*, which occurs in large, monospecific populations on many permanent lakes, survival of 'cannibals' to the adult stage was nearly 30%

greater than that of bugs not given access to younger stages and, the survival of bugs in younger stages was dramatically depressed in the presence of older bugs. Although there was no effect of cannibalism on mass of males, female cannibals were 10% heavier. Thus, simple generalizations about effects of cannibalism on gerrids are useless. In striving to understand nature, we may err fatally by focusing on single processes. This error is worst when we draw generalizations about big patterns based on preoccupation with single subsystems.

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**THE EFFECT OF CANNIBALISM AND INTERSPECIFIC PREDATION ON THE POPULATION DYNAMICS AND COMMUNITY STRUCTURE OF GERRIDS.** H. A. Cárcamo, Department of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3

There was no pattern of selective predation of *Gerris pingreensis* on *G. buenoi* under laboratory or field conditions in several instar combinations. However, there was much cannibalism of first instars by adults in *G. pingreensis*. Nymphal mortality decreased with increases in food, but the effect of spatial refuges alone was only marginally significant in both laboratory and field. We conclude, that (1) selective predation does not explain observed habitat dominance of *G. pingreensis*, but that (2) cannibalism is an important regulatory factor in populations of this species.

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**SURVEILLANCE MONITORING OF ARMY CUTWORM AND BERTHA ARMYWORM MOTHS IN ALBERTA USING PHEROMONE BAITED TRAPS.** J. W. Jones, Alberta Special Crops and, Horticulture Research Centre, Bag Service 200, Brooks, Alberta T0J 0J0 and J. R. Byers, Agriculture Canada Research Station, Lethbridge, Alberta T1J 4B1

In 1989 and 1990, the Alberta cutworm and armyworm pheromone monitoring program caught record numbers of army cutworm and bertha armyworm moths indicating significant risk of larval infestations. Data are presented on the distribution and abundance of moths and larvae and the economic impact of infestations occurring in these years.

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**ECONOMIC IMPACT OF CABBAGE MAGGOT, *DELIA RADICUM* (L.), ON CANOLA IN ALBERTA.** G. C. D. Griffiths, Department of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3

Caging experiments with Tobin canola on the University Farm in Edmonton during 1989 estimated the increase in seed yield potentially attainable by maggot control as 52.8%, the increase in 1000-seed weight as 37.7%, and the increased protein content of meal as 6.43%. The incidence of fusarial foot rot in maggot-damaged plants was 100%; in plants not damaged by maggots 0%.

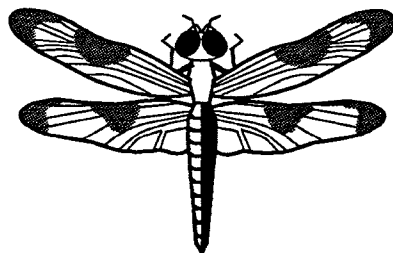
**EFFECT OF SWATHING AND CLEAR-CUTTING OF ALFALFA FOR HAY ON INSECT POPULATIONS IN SOUTHERN ALBERTA.** B.D. Schaber and A. M. Harper, Agriculture Canada, Lethbridge Research Station, Lethbridge, Alberta

In the 1960's and 1970's it was common practice by alfalfa hay producers to allow alfalfa to reach approximately 100% bloom before cutting for hay. Many routinely sprayed with insecticides to control aphids and other insect pests in their alfalfa hay fields. This indiscriminate use of insecticides was generally unwarranted and hazardous to the environment. Some of these applications were made within a few days of harvest. Protecting our environment for future generations has become the quest of environmentalists, researchers, and governments. Within an IPM program, use of control methods that allow for sustainable agricultural systems, that meet society's need for safe foods, while maintaining the quality of the environment is a major priority. The first cutting of alfalfa by swathing drastically reduced the populations of all pests for at least 2 weeks, and for some pests for 4

weeks. The second cut also drastically reduced numbers of pest insects for 6 weeks following the cut. The predatory insects were drastically reduced by the first cut for only 2 weeks and by 4 weeks had recovered to population levels higher than before cutting, but after the second cut predator population levels never recovered. The first cut of alfalfa by clear-cutting also drastically reduced all pest insect population levels for 3 weeks. The second cut drastically reduced alfalfa weevil and lygus bugs for 4 weeks, but population levels of pea aphids and leafhoppers were reduced for only 1 week after cutting. Population levels of the predators were reduced for 3 weeks by the first cut; however, after the second cut, populations of the predators were too low to show meaningful trends. The results of these studies substantiate the recommendations of agricultural field men and Research Station scientists that in the majority of cases, cutting of alfalfa for hay can be an effective means of managing insect pests and reducing the amount of insecticides used for control of pest insects.

**HOST LOCATION BY *TIPHODYTES GERRIPHAGUS* (HYMENOPTERA: SCELIONIDAE).** N. P. Moreno and J. R. Spence, Department of Entomology, University of Alberta, Edmonton, Alberta T6G 2E3

We studied how *Tiphodytes gerriphagus* finds eggs of its gerrid hosts in a complex habitat. Field experiments were done in enclosures to examine how wasp behavior was affected by presence of male and/or female adult water striders, and by different patterns and density of aquatic vegetation.



**SOLPUGIDA OF CANADA (Poster Paper)**

Robert G. Holmberg, Faculty of Science, Athabasca University, Athabasca, Alberta T0G 2R0 and  
Donald J. Buckle , 620 Albert Avenue, Saskatoon, Saskatchewan S7N 1G7

While most species of the arachnid order Solpugida occur in subtropical and warm temperate regions, seven species of *Eremobates* and *Hemerotrecha*, of the family Eremobatidae, occupy arid grassland habitats in western Canada. This paper presents the descriptions for four new species and the extended geographical ranges of three others.

**Table 1** Solpugid distribution in Canada.

| Species                         | British Columbia | Alberta | Saskatchewan |
|---------------------------------|------------------|---------|--------------|
| <i>Eremobates docolora</i>      |                  | X       | X            |
| <i>Eremobates scaber</i>        | X                |         |              |
| <i>Eremobates</i> species #1    | X                |         |              |
| <i>Eremobates</i> species #2    | X                |         |              |
| <i>Hemerotrecha denticulata</i> | X                |         |              |
| <i>Hemerotrecha</i> species #1  |                  | X       | X            |
| <i>Hemerotrecha</i> species #2  | X                |         |              |

**Editor's Report**

Copies of the Proceedings of the 37th Annual Meeting, held at Athabasca University on September 21-23, 1989, were mailed to members in May, 1990. Several changes in format and content were made at the suggestion of colleagues: a brief statement on the history of the founding of the Society appears inside the front cover; the inside back cover serves as a notice for the Annual Insect Collection Competition; though more costly to produce, prints rather than photocopies of the original photographic layout were chosen because of improved resolution of the photographs; and since the Program of the Annual Meeting has historical significance, a copy is included as part of the Proceedings. Members are urged to contact the Editor if they have suggestions or comments regarding improvements of the Proceedings. Thanks are extended to everyone involved in submitting abstracts, and reports on time, and to W. A. Nelson, for producing the Photographic Highlights much ahead of his usual schedule.

W. G. Evans  
October, 1990

**ENTOMOLOGICAL SOCIETY OF ALBERTA  
MINUTES OF EXECUTIVE MEETING  
OCTOBER 7, 1990**

|          |                                               |                                                 |
|----------|-----------------------------------------------|-------------------------------------------------|
| Present: | Burt Schaber<br>Bert Finnamore<br>Alex McClay | Rick Butts<br>Gerry Hilchie<br>Gordon Pritchard |
|----------|-----------------------------------------------|-------------------------------------------------|

Meeting called to order at 10:30 a.m.

Approval of Agenda:

Adoption of Minutes:

- MOTION: M/S Butts/Pritchard: That the minutes of the January 19, 1990 Executive Meeting be adopted. CARRIED.

Business arising from previous meeting:

- Profiles of Alberta Entomologists -  
The President discussed the Invoice from ESC regarding Profiles. However, no motion as such exists in the minutes stating that Executive has authority to pay the cost of production. In Executive minutes of November 6, 1986 discussion was to support this endeavor. A committee was to be struck to recommend the Society's response to the letter of request from Dr. P. Riegert stating that ESC would pay 50%, and the other 50% would be paid by the ESA. Apparently, this was never carried out. After much discussion, it was decided that this issue should be brought before those members present at the annual meeting and obtain a motion for payment.
- 1991 Meeting in southern Alberta:

R. Butts reported that solicitation of the Waterton business community resulted in a very promising rate from the Bayshore Inn. The rates were comparable to Lethbridge.

MOTION: M/S Butts/Hilchie: That the 1991 Annual Meeting be held at this site. CARRIED.

Reports:

- Joint Meeting of the ESC and the E.S.A. Organizing Committee Report:  
G. Pritchard reported that all was proceeding as scheduled and that about 200 were expected to attend. There were some difficulties being experienced because no one person was in charge of Registration. Some had registered through P. Scholefield, some through B. Finnamore, and some through the Banff Centre.

MOTION: M/S Pritchard/McClay: That this report be accepted. CARRIED.

Minutes of Executive Meeting, October 7, 1990 (Page 2)

- Treasurer's Report:
  - The 1988-89 financial statement had been audited.
  - The 1989-90 financial statement has been balanced, but at this time has not been audited.
  - 1990-91 financial statement as of this date showed a balance of \$18,831.64.
  - Gerry reported that the Society loses about \$1,000.00 per year directly from the principal.
  - That the society has on hand, minus income and bills for the joint meeting, about \$4,000.00
  - The GST will not affect the operations of the Society because we do not approach the \$30,000.00 annual transaction rate.

MOTION: M/S Hilchie/Butts: That the report be accepted. CARRIED.

- Secretary's Report:  
The secretary was not present, therefore, no report was given.

- Editor's Report:  
Report read by Hilchie.

MOTION: M/S Hilchie/McClay: That the report be accepted as read. CARRIED.

- Nomination's Committee Report:  
D.W. Langor not able to attend, but G. Pritchard presented the report. Committee consisted of D.W. Langor, G. Pritchard, and A. McClay. Names have been obtained for almost all of the vacancies.

MOTION: M/S Pritchard McClay: That the report be accepted. CARRIED.

- Regional Director's Report:

MOTION: M/S McClay/Butts: That this report be accepted. CARRIED.

#### New Business:

- "The Insect Collector's Guide":

MOTION: M/S Butts/Pritchard: That this publication be updated, revised and reprinted. CARRIED.

- Trust Fund:  
Because each year the Society loses about \$1,000.00 from the principal, we should set up a Trust Fund, and our Annual Meeting should have a balanced budget. That way we would have a fund that we could not touch, and put the interest towards the expenses of our Annual Meeting.

MOTION: M/S Finnamore/Hilchie: That the Executive set up a Trust Fund CARRIED.

It was agreed that the amount of money, organization and operating plan be defined later after the funds from the joint ESC-ESA Meeting has been determined.

MOTION: M/S Finnamore/McClay: That the Executive have a balanced budget each year. CARRIED.

Adjourned at 11:45 a.m.

## ENTOMOLOGICAL SOCIETY OF ALBERTA MINUTES OF THE ANNUAL MEETING

DATE: Wednesday, October 10, 1990  
PLACE: Banff Centre, Banff, Alberta

1:0 Call to order.

The meeting was called to order by the President, B. D. Schaber.

A quorum was present.

In the absence of the Secretary, the President appointed Jim Jones to take the minutes of the meeting.

2:0 Approval of agenda.

MOTION: That the agenda be adopted as presented.

Griffiths/Tellier CARRIED.

3:0 Greetings from the Entomological Society of Canada President, J. McNeil, who emphasized the importance of participation of members in the activities of the Federation of Biological Societies.

4:0 Adoption of minutes.

MOTION: That the minutes of the annual meeting held 23 October, 1989 be adopted.

Dolinski/Langor. CARRIED.

5:0 Business arising from the minutes.

MOTION: That the Entomological Society of Alberta pay our share (\$1,840.38) of costs for the publication, Profiles of Alberta Entomologists.

Pike/Shemanchuk. CARRIED.

6:0 Reports of Officers.

6:1 Treasurer's Report. G. Hilchie submitted the unaudited report.

MOTION: That the treasurer's report be accepted, subjected to the approval by the Audit Committee.

Hilchie/Leech. CARRIED.

6:2 Editor's Report G. E. Ball submitted the report.

MOTION: That the editor's report be accepted.

Ball/Leech. CARRIED.

6:3 Organizing Committee's Report. G. Pritchard gave a synopsis of the Banff Meeting. There were 246 attendees at the Entomological Society of Canada/Entomological Society of Alberta joint meeting, 60 more than had been anticipated. Some members were dissatisfied by having to attend on the Thanksgiving holiday.

6:4 Secretary's Report. No report submitted.

6:5 Regional Director's Report.

MOTION: That the Regional Director's report be accepted as stated.

Hilchie/Steiner. CARRIED.

6:6 President's Report.

MOTION: That the President's report be accepted as presented.

Schaber/Ball. CARRIED.

7:0 Reports of Standing Committees.

7:1 Awards Committee.

MOTION: That the Awards Committee's report be accepted as stated.

Hergert/Leech. CARRIED.



- 7:2 Representative to the Environmental Council of Alberta. J. Shemanchuk reported that Natalia Cravitz, as directed by Ralph Klein, had appointed a consulting firm to conduct a survey on the "usefulness" of the Environmental Council of Alberta. The annual meeting would be held before the end of 1990. There were no other meetings attended.

MOTION: That the report be accepted as presented.

Shemanchuk/Gooding. CARRIED.

- 7:3 Insect Collection Committee. Three collections were submitted. Prizes were awarded as follows:

First prize: \$50.00 to Roy Gouchey.  
 Second prize: \$30.00 to Shane Neufeld.  
 Third prize: \$15.00 to Ken Taylor.

MOTION: That the Committee's report be accepted as presented.

Zloty/Schemanchuk. CARRIED.

MOTION: That three members of the Society review the collections. There was concern that we may be just second-guessing the instructors at Olds College and the University of Alberta.

Holmberg/Zloty. CARRIED.

- 7:4 Resolutions Committee. G. Ball and M. Dolinski presented the following resolution.

Whereas the presentation of a scientific meeting incurs significant costs which exceed the budgets of the sponsoring societies,

Be it resolved that letters of appreciation be sent to the donors whose financial contributions made possible HEXAPODOXA-90, the joint annual meeting of the Entomological Society of Canada and the Entomological Society of Alberta.

Whereas the Organizing Committee of HEXAPODOXA-90 performed its tasks in such a way as to reflect favourably on the Entomological Society of Alberta,

Be it resolved that the membership of the Society offer thanks to the Organizing Committee as a whole, and in particular to its Chairman, Gordon Pritchard.

Further, whereas the Scientific Program of HEXAPODOXA-90 was outstanding and because this program was the central edifice of the meetings,

Be it resolved that the membership of the Entomological Society of Alberta offers special thanks to Ronald H. Gooding, Chairman of the Scientific Program Committee, for his efforts.

Whereas the introductory remarks offered at the beginning of the opening ceremonies of HEXAPODOXA-90 were of exceptional merit in explaining the theme of the meetings,

Be it resolved that the membership of the Entomological Society of Alberta offer special thanks to Gordon Pritchard for this statement.

Whereas the Heritage Lecture about the life and entomological activities of Franklin S. Carr was an important contribution to the history of western Canadian entomology, and reflected favourably on the Entomological Society of Alberta,

Be it resolved that the membership of ESA offer special thanks to John L. Carr, the Heritage Lecturer for HEXAPODOXA-90.

Whereas a photographic record of the proceedings of HEXAPODOXA-90 is a vital component of the history of the Entomological Society of Alberta,

Be it resolved that the membership offer special thanks to the ESA photographer, Robin E. Leech.

Whereas the post-banquet presentation entitled "The Canadian Rockies in One Hour" was delivered with consummate skill and style, and was highly appropriate to the setting of HEXAPODOXA-90,

Be it resolved that the appreciation of the membership of the Entomological Society of Alberta be expressed in a letter to the speaker, Mr. Ben Gadd.

Whereas suitable facilities and accommodations were provided by the Banff Centre for HEXAPODOXA-90,

Be it resolved that the appreciation of the membership of the Entomological Society of Alberta be expressed in a letter sent to the appropriate members of the staff of the Banff Centre.

MOTION: That the resolution be accepted as read.

Ball/Leech. CARRIED.

8:0 New Business.

8:1 Membership Committee.

MOTION: That the report be accepted as submitted.

Langor/Shemanchuk. CARRIED.

8:2 Nominations Committee. The committee presented the following slate of nominees:

|                        |                                 |
|------------------------|---------------------------------|
| Vice-President:        | J. R. Spence                    |
| Treasurer:             | D. J. Williams                  |
| Secretary:             | M. Goettel                      |
| Editor:                | W. G. Evans                     |
| Director (northern):   | R. G. Holmberg                  |
| Environmental Council: | J. A. Shemanchuk                |
| Insect Collection      | E. M. Pike                      |
| Auditors               | M. G. Dolinski & L. M. Dossdall |

MOTION: The nominations cease.

Gooding/Ball. CARRIED.

MOTION: To accept the slate of nominees.

Langor/Jones. CARRIED.

8:3 Entomological Society of Alberta 1991 meeting. It was proposed that the meeting be held 4-6 October 1991 in Waterton at either the Bayshore Inn or at another establishment in Waterton.

8:4 Insect Collector's Guide.

MOTION: That a committee be struck to look into the production of a new edition of the guide.

Holmberg/Leech. CARRIED.

8:5 Trust Fund. B. Finnamore expressed concern with the Society's bank balance which has declined from \$8,000 to \$4,000.

MOTION: That a committee be struck to investigate setting up a trust fund.

Finnamore/Shemanchuk. CARRIED.

NOTICE OF MOTION:

9:0 Adjournment.

MOTION: That we adjourn.

Griffiths/Leech. CARRIED.

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**REPORT OF THE NOMINATIONS COMMITTEE  
OF THE  
ENTOMOLOGICAL SOCIETY OF ALBERTA - 1990**

The following people were elected to the executive and council of the society at the annual meeting in Banff:

|                   |                                               |
|-------------------|-----------------------------------------------|
| Vice-president:   | Dr. John Spence (U. of A.)                    |
| Treasurer:        | Mr. Daryl Williams (Northern Forestry Centre) |
| Secretary:        | Dr. Mark Goettel (Agric. Canada, Lethbridge)  |
| Director (North): | Dr. Robert Holmberg (Athabasca University)    |

Please find attached a list of the Executive and Council for 1991.

David Langor  
Chairman

**REPORT OF THE MEMBERSHIP COMMITTEE  
OF THE  
ENTOMOLOGICAL SOCIETY OF ALBERTA - 1990**

In the last 2-3 years many new entomologists, and others with entomological interest, have taken up residence in Alberta. Although some of these new arrivals have become members of the Entomological Society of Alberta, many have not. In an effort to increase the membership of our society, the membership committee compiled a list of 20 entomologists (and others with entomological interests) who were not members of the society. Four of these joined our society at the meeting in Banff and the rest were sent letters to inform them of the existence and purpose of our society and to solicit their membership.

David Langor  
Chair, Membership Committee

## EXECUTIVE AND COUNCIL 1990

### Officers

- President: B. D. Schaber, Research Station, Agriculture  
Canada, P. O. Box 3000 Main, Lethbridge, Alberta T1J 4B1
- Vice-President: D. Langor, Canadian Forestry Service,  
Northern Forestry Centre, 5320 - 122 Street,  
Edmonton, Alberta T6H 3S5
- Treasurer: G. J. Hilchie, Department of Entomology,  
University of Alberta, Edmonton, Alberta T6G 2E3
- Secretary: R. Linowski, P. O. Box 1305, Brooks, Alberta T0J 0J0
- Editor: W. G. Evans, Department of Entomology,  
University of Alberta, Edmonton, Alberta T6G 2E3

### Council

The above plus:

- Past President: G. Pritchard, Biology Department,  
University of Calgary, Calgary, Alberta T2N 1N4
- Regional Director to  
E.S.C. A. McClay, Alberta Environmental Centre, Bag 4000, Vegreville,  
Alberta T0B 4L0 (1992)
- Directors: J. W. Jones, Alberta Agriculture, Alberta Special Crops and  
Horticultural Research Centre, Bag Service 200, Brooks,  
Alberta T0J 0J0 (1992)
- R. Butts, Agriculture Canada, Research Station, P.O. Box 3000  
Main, Lethbridge, Alberta T1J 4B (1991)
- A. T. Finnamore, Natural History Section, Provincial  
Museum of Alberta, 12845 - 102 Ave., Edmonton, Alberta  
T5N 0M6 (1990)

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REPORT OF THE SCIENCE FAIR LIAISON COMMITTEE 1990

Dr. Rick Butts represented our society as a judge at the Regional Science Fair in Lethbridge. A book titled "*Natural History of Canada*" was presented to the best entomological project at the fair. David Langor, Chairman.

EXECUTIVE AND COUNCIL - 1991

Officers

- President: David W. Langor, Forestry Canada, Northwest Region,
5320 - 122 Street, Edmonton, Alberta T6H 3S5
- Vice-President: John R. Spence, Department of Entomology,
University of Alberta, Edmonton, Alberta T6G 2E3
- Treasurer: Daryl J. Williams, Forestry Canada, Northwest Region,
5320 - 122 Street, Edmonton, Alberta T6H 3S5
- Secretary: Mark Goettel, Agriculture Canada, Research Station,
P. O. Box 3000 Main, Lethbridge, Alberta T1J 4B1
- Editor: W. George Evans, Department of Entomology,
University of Alberta, Edmonton, Alberta T6G 2E3

Council

The above plus:

- Past President: Burton D. Schaber, Agriculture Canada, Research Station,
P. O. Box 3000 Main, Lethbridge, Alberta T1J 4B1
- Regional Director
to E. S. C.: Alex McClay, Alberta Environmental Centre,
Bag 4000, Vegreville, Alberta T0B 4L0
- Directors: Jim W. Jones, Alberta Agriculture, Horticultural Research
Centre, Bag Service 200, Brooks, Alberta T0J 0J0
- Rick Butts, Agriculture Canada Research Centre,
P. O. Box 3000 Main, Lethbridge, Alberta T1J 4B1
- Robert Holmberg, Athabasca University
P. O. Box 10000, Athabasca, Alberta T0G 2R0

Statement of Finance for the Joint Meeting of the
Entomological Society of Alberta and Entomological Society of Canada
Held at the Banff Centre, October 1990

Credits:

Financing provided by Entomological Society of Alberta			
Deposit, Banff Centre	\$1,000.00		
Money to open bank account	25.00		
Joint meeting financial contribution by Ent. Soc. Canada	<u>4,000.00</u>	\$5,025.00	\$5,025.00
	\$5,025.00		
Contributors (Alberta)			
Recreation, Parks and Wildlife Foundation	\$2,000.00		
Campbell Scientific Canada Corp.	600.00		
Alberta Association of Municipal Districts and counties	200.00		
Elanco Division Eli Lilly Canada Inc.	<u>100.00</u>		
	\$2,900.00	\$2,900.00	
Contributors (other Canadian)			
National Science and Engineering Research Council, Fed. Govt.	\$1,000.00		
Hoechst Canada Inc., Saskatchewan	500.00		
Rhone-Poulenc Agriculture, Ontario	500.00		
Chemagro Limited, Ontario	250.00		
CIBA-GEIGY Canada Limited, Saskatchewan	<u>75.00</u>		
	\$2,325.00	\$2,325.00	
Registrations			
Total registrations (includes exchange on transactions)*	\$16,030.19	\$16,030.19	
Expenses paid by Ent. Soc. Canada	\$1,251.30	<u>\$1,251.30</u>	
		\$27,531.49	\$27,531.49
Debits:			
Organizing Committee expenses, meals, travel	\$606.35	\$606.35	
Postage, stationery, office supplies	1,265.80	1,265.80	
Bank charges, statement fees, cheques	81.63	81.63	
Refunds	211.03	211.03	
NSF cheque	45.00	45.00	

Expenses of the meeting			
After dinner speaker	400.00		
Banquet entertainment	\$150.00		
Invited speaker's travel expenses	2,554.24		
Banff Centre			
Deposit	1,000.00		
Meeting expenses	7,565.25		
Late fee interest	113.48		
Projectionist fees (cash)	<u>300.00</u>		
	\$12,082.97	<u>\$12,082.97</u>	
		\$14,292.78	<u>\$14,292.78</u>
Balance: (increase in cash assets):			<u>\$13,238.71</u>

* A discrepancy occurs in receipts issued at the meeting and the deposits recorded in the deposit book of the value of \$39.70. The source of error is untraceable as many persons were handling these funds before I received them. Registrations are reported as actual cash deposits and include user fees etc.

This statement was prepared to show cash flow for the joint meeting of the Entomological Societies of Alberta and Canada held October 1990, at the Banff Centre, Banff, Alberta.

by Gerald J. Hilchie
Treasurer,
Entomological Society of Alberta
(1990)

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**Entomological Society of Alberta**

Financial Statement  
Year Ending December 31, 1989

**Credits:**

Bank assets, December 31, 1988 \$5,564.85

**Memberships**

|         |      |                      |        |
|---------|------|----------------------|--------|
| Regular | 1991 | \$2.00 credit        | \$2.00 |
|         | 1991 | 1 @ \$10.00          | 10.00  |
|         | 1990 | 1 @ \$8.00 (balance) | 8.00   |
|         | 1990 | 61 @ \$10.00         | 610.00 |
|         | 1989 | 25 @ \$10.00         | 250.00 |
| Student | 1992 | 1 @ \$5.00           | 5.00   |
|         | 1991 | 3 @ \$5.00           | 15.00  |
|         | 1990 | 12 @ \$5.00          | 60.00  |
|         | 1989 | 7 @ \$5.00           | 35.00  |
|         | 1988 | 5 @ \$4.00           | 20.00  |
|         | 1988 | 2 @ \$5.00           | 10.00  |
|         | 1987 | 1 @ \$4.00           | 4.00   |

|                                 |                                         |             |                   |                   |
|---------------------------------|-----------------------------------------|-------------|-------------------|-------------------|
| Institutional                   | 1990                                    | 6 @ \$10.00 | 60.00             |                   |
|                                 | 1988                                    | 1 @ \$6.00  | 6.00              |                   |
|                                 | 1987                                    | 1 @ \$6.00  | 6.00              |                   |
|                                 | 1986                                    | 1 @ \$6.00  | 6.00              |                   |
| Currency exchange               |                                         |             | <u>1.24</u>       |                   |
|                                 |                                         |             | \$1,108.24        | \$1,108.24        |
| Annual Meeting, 1989            |                                         |             |                   |                   |
| Registration                    | 44 @ \$15.00                            |             | \$660.00          |                   |
| Banquet                         | 48 @ \$15.00                            |             | 720.00            |                   |
|                                 | 8 @ \$12.00                             |             | <u>96.00</u>      |                   |
|                                 |                                         |             | \$1,476.00        | \$1,476.00        |
| Miscellaneous                   |                                         |             |                   |                   |
| Bank interest                   |                                         |             | \$348.16          | <u>\$348.16</u>   |
|                                 |                                         |             |                   | <b>\$8,497.25</b> |
| <b>Expenditures:</b>            |                                         |             |                   |                   |
| Proceedings                     | Printing, 25 of 1986, 150 of 1987       |             | \$905.61          |                   |
|                                 | Printing, 1988                          |             | 369.37            |                   |
|                                 | Photography honorarium, 1989            |             | <u>150.00</u>     |                   |
|                                 |                                         |             | \$1,424.98        | \$1,424.98        |
| Annual Meeting, 1989            | Reception                               |             | \$243.27          |                   |
|                                 | Banquet                                 |             | 958.00            |                   |
|                                 | Keynote speaker, travel & accommodation |             | <u>560.00</u>     |                   |
|                                 |                                         |             | \$1,761.27        | \$1,761.27        |
| Miscellaneous                   | Bank service charges                    |             | \$24.50           |                   |
|                                 | Postage                                 |             | 242.59            |                   |
|                                 | Stationery                              |             | 36.10             |                   |
|                                 | Photocopy charges                       |             | 76.55             |                   |
|                                 | Science Fair book prizes                |             | \$44.70           |                   |
|                                 | Insect collection prizes                |             | 95.00             |                   |
|                                 | Prize in Entomology                     |             | 110.00            |                   |
|                                 | Booklets for school children            |             | 5.00              |                   |
|                                 | To ESC ESA meeting account 1990         |             | <u>25.00</u>      |                   |
|                                 |                                         |             | \$659.44          | <u>\$659.44</u>   |
|                                 |                                         |             |                   | <b>\$3,845.69</b> |
| <b>Balance Summary:</b>         |                                         |             |                   |                   |
| Bank Assets (December 31, 1989) |                                         |             | \$4,651.56        |                   |
| Total Disbursements             |                                         |             | \$3,845.69        |                   |
| <b>Grand Total</b>              |                                         |             | <u>\$8,497.25</u> |                   |



**Financial Statement**  
**Year Ending December 31, 1990**

**Credits:**

|                                                            |                             |                          |
|------------------------------------------------------------|-----------------------------|--------------------------|
| Bank assets, January 1, 1990                               |                             | \$4,651.17               |
| <b>Memberships</b>                                         |                             |                          |
| Regular                                                    | 1991    42 @ \$10.00        | \$420.00                 |
|                                                            | 1990    12 @ \$10.00        | 120.00                   |
|                                                            | 1989    4 @ \$10.00         | 40.00                    |
|                                                            | 1988    1 @ \$10.00         | 10.00                    |
| Student                                                    | 1991    11 @ \$5.00         | 55.00                    |
|                                                            | 1990    3 @ \$5.00          | 15.00                    |
| Currency exchange adjustment                               |                             | 3.52                     |
| Institutional                                              | 1990    3 @ \$10.00         | 30.00                    |
| Currency exchange                                          |                             | (1.82)                   |
| Total deposits on record                                   |                             | <u>\$691.70</u>          |
|                                                            |                             | \$691.70                 |
| Annual Meeting, 1990. ( See Separate Financial Statement.) |                             |                          |
| <b>Miscellaneous</b>                                       |                             |                          |
| Bank interest                                              | Account interest            | \$19.57                  |
|                                                            | Term Deposit interest       | \$343.21                 |
|                                                            |                             | <u>\$343.21</u>          |
|                                                            |                             | <b>\$5,705.65</b>        |
| <b>Expenditures:</b>                                       |                             |                          |
| Proceedings                                                | Printing 1989               | \$701.80                 |
|                                                            | Photography honorarium 1990 | <u>235.45</u>            |
|                                                            |                             | \$937.25                 |
| Annual Meeting 1990 (See separate Financial Statement.)    |                             |                          |
| Travel to Executive planning meeting                       |                             | \$48.00                  |
|                                                            |                             | \$48.00                  |
| <b>Miscellaneous</b>                                       | Bank service charges        | \$22.73                  |
|                                                            | Postage                     | 262.36                   |
|                                                            | Photocopy charges           | 43.90                    |
|                                                            | Book prize                  | 34.20                    |
|                                                            | Insect collection prizes    | <u>95.00</u>             |
|                                                            |                             | \$458.19                 |
|                                                            |                             | <u>\$458.19</u>          |
|                                                            |                             | <b>\$1,443.44</b>        |
| <b>Balance Summary:</b>                                    |                             |                          |
| Bank Assets (December 31, 1990)                            |                             | \$4,262.21               |
| Total Disbursements                                        |                             | \$1,443.44               |
| <b>Grand Total</b>                                         |                             | <u><b>\$5,705.65</b></u> |

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(Revised April, 1991)

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ENTOMOLOGICAL SOCIETY OF ALBERTA



ANNUAL INSECT COLLECTION COMPETITION

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OPEN TO ALL INTERESTED PERSONS

Enter a collection                      ♦ of pinned Canadian insects collected in one year

Collection may consist of            ♦ specific insects (i.e. butterflies or beetles)  
                                                  ♦ insects from a certain area (i.e. park or pond)  
                                                  ♦ a general nature

Two categories                           ♦ 1) Novice (under 14 years)  
                                                  ♦ 2) Open

Deadline                                   ♦ September 30

Entries judged on technical merit and display

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**PRIZES**            ♦ 1st place    -\$50.00  
                                  ♦ 2nd place    -\$30.00  
                                  ♦ 3rd place    -\$15.00  
                                  ♦ Book prizes awarded to selected contestants at the discretion  
                                  of the Insect Collections Competitions Committee

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For further information write:

The Entomological Society of Alberta

c/o Department of Entomology  
 University of Alberta  
 Edmonton, Alberta  
 T2G 2E3

or

c/o Department of Biology  
 University of Calgary  
 Calgary, Alberta  
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