

---

---

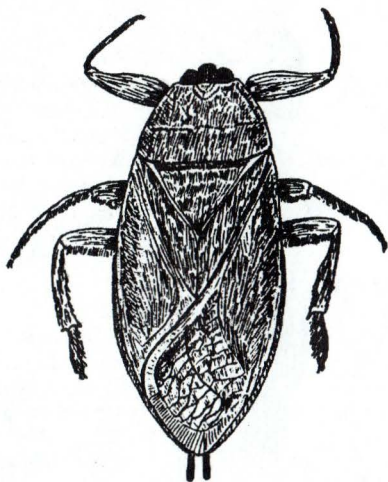
**VOL 25 September - septembre, 1993 No. 3**

---

---



# **BULLETIN**



**ENTOMOLOGICAL SOCIETY OF CANADA  
LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA**

**ENTOMOLOGICAL SOCIETY OF CANADA  
LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA  
BULLETIN**

**VOL 25(3) - September / septembre, 1993**

---

<b>Letter to the Editor</b> .....	105
<b>Society Business / Affaires de la Société</b> .....	106
Meeting Announcements .....	106
Joint Meeting ESM and ESC .....	107
Fellow of the ESC - Thelma Finlayson .....	107
Call for Nominations - Honorary Membership .....	108
Elections Committee Report .....	108
Achievement Awards Committee Report .....	109
Student Affairs Committee - Call for Volunteers .....	109
On the onion thrip's authority's surname .....	109
Call for Nominations - Achievement Awards Committee .....	110
Comité des décorations .....	111
<b>Members in the News</b> .....	112
Retirement of John Frederick Doane .....	112
Transfer of Work - Peter G. Mason .....	113
<b>In Memory</b> .....	113
Timothy Gordon Spanton .....	113
<b>News of Organizations</b> .....	114
International Commission on Zoological Nomenclature .....	114
Nominations - International Commission on Zoological Nomenclature .....	116
Biological Survey of Canada (Terrestrial Arthropods) .....	116
The Canadian Forum on Biological Control .....	120
News from the Florida Entomological Society .....	121
<b>Publications</b> .....	121
Book Reviews .....	121
<b>Scholarships and Grants</b> .....	128
ESC Research-Travel Grants .....	128
Pestcon Graduate Scholarship .....	130
<b>Positions Available</b> .....	130
<b>Upcoming Meetings</b> .....	131
<b>Membership Form (new members only)</b> .....	132

---

Contributions and correspondence regarding the *Bulletin* should be sent to the *Bulletin* Editor. Inquiries about subscriptions and back issues should be sent to the E.S.C. at:  
Faites parvenir vos contributions au *Bulletin* ou votre correspondance à l'Éditeur du *Bulletin*. Pour renseignements sur l'abonnement ou les numéros passés, prière de s'adresser à la S.E.C.:

Entomological Society of Canada  
393 Winston Ave.  
Ottawa, Ontario  
K2A 1Y8

## LETTER TO THE EDITOR

### ... lures are always flashy

Getting people (children included) interested in a subject is something that many specialists try to do, and often their very depth of knowledge gets in the way. I do a lot of interpretive signage and publications for specialists and the biggest problem is to get the highly knowledgeable individual to recognize that you can't explain it all in one program (or sign), that you have to start with basics and that those basics have to be presented only with interest to the layperson as the highest order of priority. The mass media are suited only to "hooking" your audience, not to reeling them in. For that you produce other materials, in succeeding degrees of specialization, until you come to the professional level of detail.

It is not dishonest to simplify, to pick the startling, the superlatives, to emphasize the arcane or unique. By doing so you draw the interest of a portion of your audience further into the subject and at the very least acquire the empathy of the others. Perhaps your first attraction to entomology was the techniques of field isolation, but if I might be permitted, I doubt it. Your first interest was most likely a fascination with the animals themselves, from which you specialized to your current degree of knowledge.

I have noticed a current of disquietude in the writings of professionals whose area of interest has been popularized; a dissatisfaction that the "truth" of a subject cannot always be conveyed to the general public, almost a feeling as if a private preserve has been violated without the appropriate rites. I find parts of Stephen Jay Gould's delightful book *Bully for Brontosaurus* has this current. And yet, the payback to science of an enhanced public regard (though thin and even inaccurate in details) can be quite significant. I understand that *Jurassic Park* funded some new research as part of its budget, millions of children do not suffer from Latin fear (as their parents often do), and palaeontology is better funded now than in the past. I know that *Jurassic Park* has the "frankenstein" and "pandora's box" complexes (as did *Arachnophobia*) and it isn't *Macbeth*, but then it didn't claim to be a master's course in palaeontology.

If you want to get young people interested in a career in entomology you have to hook them. Lures are always flashy, and there's good reason for that. Once the little fellows are landed, there's no end to what you can influence them to do. I have an 8-year old friend who is conducting an insect emergence study (with environmental records and careful documentation) of a river in his back yard this summer. He started out thinking bugs were "keen"; he's now excited by the prospect of collecting and documenting exuviae of *Hagenius brevistylus*. The latter would not have happened in the absence of the former.

Paul-Michael Brunelle  
Member of ESC & AES  
President of Society of Graphic Designers of Canada  
Halifax, Nova Scotia

The deadline for submissions to be included in the next issue (Vol. 25(4)) is **November 1, 1993**

La date limite pour recevoir vos contributions pour le prochain numéro (Vol. 25(4)) est le **1 novembre 1993**

# SOCIETY BUSINESS / AFFAIRES DE LA SOCIÉTÉ

## 43rd Annual General Meeting

The Annual General Meeting of the Entomological Society of Canada will be held at the Watertower Inn in Sault Ste. Marie, Ontario on September 28, 1993. Matters for consideration at this meeting should be sent to the Secretary, Dr. R.J. West.

## Governing Board Meeting

The Annual Meeting of the Governing Board will be held at the Watertower Inn in Sault Ste. Marie, Ontario on September 25, 1993. If necessary, the meeting will continue on September 26. Matters for consideration at this meeting should be sent to the Secretary, Dr. R.J. West.

## 43 Réunion Générale Annuelle

La Réunion Générale Annuelle de la Société d'Entomologie de Canada aura lieu 28 septembre 1993 à la Watertown Inn, à Sault Ste Marie. Tous sujets pour être considérés doivent être soumis au secrétaire, Dr. R.J. West.

## La conseil de direction

La conseil de direction sa réunira le 25 et 26 septembre 1993 à la Watertown Inn, à Sault Ste Marie. Tous sujets pour être considérés doivent être soumis au secrétaire, Dr. R.J. West.

Dr. Rick West, Forestry Canada,  
Newfoundland and Labrador Region,  
P.O. Box 6028,  
St. John's, Newfoundland A1C 5X8

Fax 709-772-2576  
email address: rwest@vax1.nefc.forestry.ca

Please send all correspondence  
concerning the *Bulletin* to:

Dr. Fiona F. Hunter  
*Bulletin* Editor  
Department of Biological Sciences  
Brock University  
St. Catharines, Ontario  
L2S 3A1

Tel. (416) 688-5550 Ext. 3394  
Fax. (416) 688-1855  
Email: hunterf@spartan.ac.BrockU.ca

Please send all correspondence  
concerning Book Reviews for the *Bulletin* to:

Dr. Lloyd M. Dosdall  
Chair, ESC Publications Committee  
Alberta Environment Centre  
Bag 4000, Vegreville  
Alberta  
T0B 4L0

Tel. (403) 632-8211  
Fax. (403) 632-8379

**Joint Meeting of the Entomological Societies of Manitoba and Canada**

16-19 October 1994 in Winnipeg, Manitoba

CONTACT:

Dr. Don Dixon (General Chair), Manitoba Agriculture, Agricultural Services Complex, 201-545 University Cres., University of Manitoba, Winnipeg, Manitoba, R3T 5S6

or

Dr. Paul Fields (Science Program Chair), Agriculture Canada Research Station, 195 Dafoe Road, Winnipeg, Manitoba R3T 2M9 (Tel. 204-983-1468; Fax. 204-983-4604)

**Réunion conjointe des Sociétés d'entomologie de Manitoba et du Canada**

16-19 octobre 1994 à Winnipeg, Manitoba

CONTACTER:

Dr. Don Dixon, Manitoba Agriculture, Agricultural Services Complex, 201-545 University Cres., University of Manitoba, Winnipeg, Manitoba, R3T 5S6

ou

Dr. Paul Fields, Agriculture Canada Research Station, 195 Dafoe Road, Winnipeg, Manitoba R3T 2M9 (Tel. 204-983-1468; Fax. 204-983-4604)

**Fellow of the Entomological Society of Canada**

The Fellowship Selection Committee has nominated, and the Governing Board has approved the nomination of Ms. Thelma Finlayson for Fellow of the Entomological Society of Canada.

Thelma, during her professional entomological career, has been involved in studies of parasites as natural control agents of noxious insects. For 30 years (1937-1967) she was employed by the Dominion Parasite Laboratory, Belleville, Ontario, renamed the Entomology Research Institute in 1959. Here she reared entomophagous insects for release to control the spruce sawfly; studied diapause and nutrition of hymenopterous parasites; curated insect collections, and detailed the taxonomy and systematics of the immature forms of dipteran and hymenopteran parasites.

After becoming a member of the Pestology Centre at Simon Fraser University in 1967, she continued the work of larval taxonomy, developed courses in entomology for the M.P.M. program, and taught courses in entomology, introductory biology and pest management. Even after retirement and as Professor Emerita, Thelma continues her research on the taxonomy of the final-instar larvae of hymenopterous insects and parasites of aphids. Tangible products of her work are the 38 scientific research papers, monographs and book chapters on insect parasitology and taxonomy. Thelma served as President of the Entomological Society of B.C. in 1975.

J.A. Shemanchuk  
Lethbridge, Alberta

## Call for Nominations - Honorary Membership

Nominations are invited for two Honorary Memberships in the Entomological Society of Canada. Honorary Members may be active members or former active members of the Society who have made outstanding contributions to the advancement of entomology.

Nominations must be signed by at least five active members of the Society and are then reviewed by the Membership Committee, who will select two names to be placed on the ballot. Nominations should include a brief biography of the candidate and a statement of her/his contributions to the advancement of entomology.

Nominations should be received by the Chair of the Membership Committee by **January 31 1994**. They should be sent in an envelope marked "Confidential" to the following address:

Dr. A.S. McClay,  
ESC Membership Committee,  
Alberta Environmental Centre,  
Bag 4000, Vegreville,  
Alberta T9C 1T4

## Elections Committee / Le Comité des Elections

The committee was comprised of S. Pernal, B. Timlick, and T. Galloway. The committee met on 26 July, 1993, in the Department of Entomology, University of Manitoba, Winnipeg and examined the ballots for the 1994 election of officers. In total, 241 ballots were received. The successful candidates were:

Le comité a compris S. Pernal, B. Timlick, et T. Galloway. Le comité a tenu une réunion le 26 juillet 1993 au Département d'Entomologie, Université du Manitoba, Winnipeg, où ils ont examiné les bulletins de scrutin pour l'élection des officiers pour 1994. Un total de 241 bulletins ont été reçus. Les candidats élus sont:

Second Vice-president / Le deuxième vice-président:	Guy Boivin
Directors-at-Large / Directeurs nationaux:	Cedric Gillott Hugh Thistlewood
Fellowship Selection Committee / Comité pour la sélection des compagnons de la société:	Peter Harris Geoff Scudder
Results of the CFBS vote:	No / Non 134
Résultats du vote FCSB:	Yes / Oui 33
Results of the time of year for the Annual Meeting:	
Résultats du temps de l'année pour la Réunion annuelle:	
September - November / septembre - novembre	99
June - August / juin - août	33
March - May / mars - mai	23
December - February / décembre - février	17

T.D. Galloway  
Winnipeg, Manitoba

### Achievement Awards Committee

The C. Gordon Hewitt Award for 1993 has been awarded to Dr. Sandy Smith of the Faculty of Forestry, University of Toronto. The selection was made by the 1993 Achievement Awards Committee and approved by the Governing Board.

L. Safranyik  
Victoria, B.C.

### Student Affairs Committee-Call for Volunteers

As she is no longer a student, Kenna Mackenzie will be resigning as chair of the Student Affairs Committee. I have been asked to take over the position, which I would be happy to do. Any students interested in serving on the committee should let me know by telephone (604) 420-5318, or e-mail, tomlina@sfu.ca as soon as possible. I hope to see you at the annual meeting in Sault Ste. Marie, so bring your ideas and plan to attend the symposium we have arranged on writing grant proposals.

Elizabeth Tomlin  
Burnaby, B.C.

### On the onion thrips authority's surname

Spelling of the surname of the authority for the onion thrips, *Thrips tabaci*, is inconsistent. The authority's surname for this species has been variously represented as **Lindeman** or **Lindemann**, and abbreviated as **Lind**. While working on the joint book project by the Entomological Society of Canada and the Canadian Phytopathological Society, ie., *The Diseases and Pests of Vegetable Crops in Canada*, this inconsistency came to my attention during routine editing. I would like to record what I have since learned.

The onion thrips was described in 1888 by K(arl) E(douard) Lindemann, who was a Professor of Zoology in Moscow and a member of the Imperial Society of Naturalists (Moscow). A membership list, in English, in that Society's *Bulletin* for 1888 indicates several members with the same surname, recorded as **Lindemann**. What I consider to be the same person, identified as a Professor in Moscow and living from 1844 to 1929, has the surname **Lindemann** in W. Horn and I. Kahle's *Über entomologische Sammlungen, Entomologen & Entomo-Museologie, ein Beitrag zur Geschichte der Entomologie. Entomologische Beihefte 2-4 (1935-37)*. In addition, the 1964 book by N.P. Dyadechko, *Thrips or Fringe-winged Insects (Thysanoptera) of the European Part of the USSR*, which was translated into English (USDA ARS, 1977, Amerind Publ. Co., 344 pp.), also spells the surname **Lindemann**.

I conclude, therefore, that **Lindemann** is a justified spelling for the onion thrips authority's surname and, without evidence to the contrary, that spelling will be used in the book, *The Diseases and Pests of Vegetable Crops in Canada*.

J.A. Garland  
Chair, ESC Steering Committee

**Call for Nominations  
Achievement Awards Committee**

**Gold Medal for Outstanding Achievement in Canadian Entomology  
and  
The C. Gordon Hewitt Award**

Members of the Society are invited to nominate individuals whom they regard as eligible for these awards (for the year **1994**). Nominations should be sent in an envelope marked "Confidential" to the following address:

Achievement Awards Committee  
Entomological Society of Canada  
393 Winston Avenue  
Ottawa, Ontario  
K2A 1Y8

and should comprise: (1) the name and address of the nominee(s); (2) a statement of relevant achievements; and (3) the name of the nominator and at least one seconder. To be considered by the Achievement Awards Committee, nominations must bear a postmark no later than **November 30 1993**.

The following conditions govern these awards:

1. Outstanding contributions should be judged on the basis of
  - (a) superior research accomplishment either as a single contribution or as a series of associated endeavours and which may be either in entomology or a related field where the results obtained are of great consequence;
  - or
  - (b) dedicated and fruitful service in the fields of Society affairs, research administration or education.
2. No more than one of each award shall be granted per year but, where circumstances warrant, more than one individual may be mentioned in a single award.
3. Recipients need not be members of the Society providing their contribution is judged to have a major impact on entomology in Canada.
4. The award may be granted on different occasions to the same recipient but for different contributions to entomology in Canada.
5. Nominees for the C. Gordon Hewitt Award must be less than 40 years of age throughout the calendar year in which the award is both announced and awarded.



**Comité des décorations**

**Médaille d'Or pour Contributions Exceptionnelle à l'Entomologie Canadienne  
et  
Prix C. Gordon Hewitt**

La Société invite les membres à lui faire parvenir les noms des personnes qu'ils considèrent éligibles à ces deux prix. Veuillez envoyer vos nominations (pour l'année **1994**) au:

Comité des décorations  
La Société d'entomologie du Canada  
393 Winston Avenue  
Ottawa, Ontario  
K2A 1Y8

dans une enveloppe portant la mention "Confidentiel". La nomination doit contenir: (1) le nom ainsi que l'adresse du (ou des) candidat(s) désigné(s); (2) un compte rendu des réalisations pertinentes; et (3) le nom du parrain et celui d'au moins une deuxième personne appuyant la mise en nomination. Pour être acceptées par le Comité les nominations devront porter un sceau postal d'au plus tard le **30 novembre 1993**.

Les conditions suivantes régissent le choix des récipiendaires de ces prix:

1. Les contributions exceptionnelles devraient être jugées dans le contexte

(a) d'un accomplissement hors par en recherche, soit comme résultat d'une seule contribution ou d'une série d'efforts reliés, réalisés dans le secteur entomologique ou tout autre domaine connexe et ayant abouti à des résultats de grande valeur

ou

(b) de service dévoué et fructueux au profit de la Société, de l'administration de recherche, ou de l'éducation.

2. Chaque prix ne sera décerné qu'une seule fois annuellement, quoique, les circonstances le justifiant, plus d'une personne pourront collectivement devenir récipiendaires d'un prix.

3. Les récipiendaires ne doivent pas nécessairement être membres de la Société en autant que l'on juge que leur contribution a exercé un impact majeur sur l'entomologie au Canada.

4. Chaque prix peut être décerné à différentes occasions au même récipiendaire mais pour différentes contributions à l'entomologie au Canada.

5. Le candidat désigné pour le prix C. Gordon Hewitt doit être âgé de moins de 40 ans pour toute la durée de l'année au cours de laquelle le prix est annoncé et décerné.

## MEMBERS IN THE NEWS



### **Retirement of John Frederick Doane**

John Frederick Doane retired from Agriculture Canada Research Branch on March 31, 1993, after 35 years of service at the Saskatoon Research Station.

Born and raised in Southern Ontario, John received his B.S.A. in entomology from the Ontario Agricultural College in 1954, and his M.S. and Ph.D. degrees in 1956 and 1958, respectively, from the University of Wisconsin. The subject of his doctoral thesis was the transmission of soft rot by cabbage maggot.

John went west in 1958 to become a research officer with the Saskatoon Research Station, investigating the ecology and behaviour of wireworms. He became a research scientist in 1965 and continued to work on wireworm biology, monitoring, and control. In 1970-71

John undertook a postdoctoral transfer of work at the Swiss Federal Research Station, Wädenswil, Switzerland, researching wireworm feeding behaviour and orientation response to CO<sub>2</sub>. John took another sabbatical in 1981-82, when he worked on predation of Australian soldier fly by wireworms at DSIR in Auckland, N.Z. In response to outbreaks of wheat blossom midge and Russian wheat aphid in the 1980's, John conducted research on the biological control of these insects.

John has been an active member of the Entomological Societies of Saskatchewan, Canada, and America, the Saskatchewan Institute of Agrology, and the Agrology Institute of Canada. He served as President of ESS in 1967 and 1978, and was a member of the governing board of the ESC from 1989 to 1991. He was co-chair of the publicity committee of the Botany, Entomology, and Pathology Joint Annual Meeting in 1975, and the chair of the finance committee for the 1992 Annual Meeting of the ESC.

John has written or co-authored 40 research and other scientific publications and a plethora of reports, proceedings, and technology transfer releases. His administrative skills were well tested when he served as section head of cereals protection at the Station from 1982 until 1992. His softspoken common sense and wry humour will be fondly remembered by his colleagues.

John is neither truly gone, nor will he ever be forgotten. He is currently co-ordinating the teaching of entomology at ecology camps for public school students. He is active in the fostering of awareness of biological control of insects in the province. He maintains a strong interest in wireworm distribution and innovative methods of control, such as the judicious use of golf clubs. His colleagues and friends wish John a retirement as long and as rewarding as his career.

J.J. Soroka  
Saskatoon, Saskatchewan

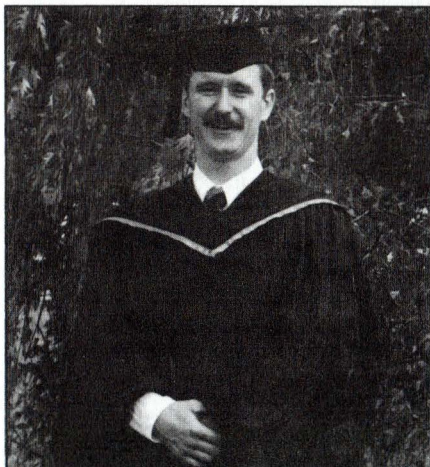
## Transfer of Work - Peter G. Mason

Dr. Peter G. Mason has accepted a Post-Doctoral Transfer of Work from the Agriculture Canada Research Branch, Saskatoon, to spend a year in France. Peter will be conducting research at the USDA-ARS European Biological Control Laboratory in Montpellier beginning September 1, 1993. The primary objective is to explore and evaluate the potential of parasitoids in Europe that may be useful as classical control agents of oilseed Lepidoptera, particularly the bertha armyworm, *Mamestra configurata*, and the diamondback moth, *Plutella xylostella*.

## IN MEMORY

### Timothy Gordon Spanton (1954-1993)

The Canadian entomological community suffered an irretrievable loss with the death of Dr. Tim Spanton on May 27th 1993. Born on October 2nd 1954, Tim grew up in Ottawa, where he gained an early and deep interest in natural history and the outdoors. Among his non-entomological passions in life were hunting, fishing, backpacking and bicycle touring, all of which he enjoyed in Alberta as well as his native Ontario. His hunting prowess led him to early employment as a collector of bird specimens for the Canadian Museum of Nature, and coincided with his interest and expertise in birdwatching.



Within the confines of his entomological work, Tim was a systematist interested in beetles. His M.Sc. work was done at Lakehead University, where his thesis was a revision of the *Cicindela sylvatica* group of tiger beetles. In this study (later published in *Questiones Entomologicae*) he clarified species limits and reconstructed phylogenetic relationships of a number of Nearctic Region species. For his Ph.D. studies at the University of Alberta, Tim turned to weevils, revising the higher classification of subfamily Entiminae and producing a species-level revision of the genus *Panscopus*. All of his work was of the highest quality, and he was well-known for his painstaking care and accuracy.

Tim was an ardent field entomologist. During two trips we took together to the western United States, he developed a nightly habit of strapping on his headlamp and pounding nearby bushes over his beating sheet. Although occasionally terrifying to fellow campers, this method produced large numbers of hitherto rarely collected nocturnal weevils, including *Panscopus*. During the day, he often liked to collect tiger beetles, a pursuit that sometimes carried risk. One day on the Wilcox playa in Arizona (a sort of Mecca for tiger beetle collectors), he casually strolled past a posted sign that said "No entry-bombing range." Reflecting on the unlikeliness of such an attack, he nevertheless felt a few tinges of terror when a small squad of fighter jets later appeared on the horizon and flashed over him. Luckily, no bombs were dropped, and Tim was able to complete his collecting trip in one piece.

Tim Spanton was fun-loving, outgoing, intelligent, enthusiastic and dedicated. He will be sorely missed by his family, his many friends, and his co-workers at Forestry Canada.

Brian Brown

## NEWS OF ORGANIZATIONS

### International Commission on Zoological Nomenclature

Applications published in the *Bulletin of Zoological Nomenclature*

The following applications were published on 30 June 1993 in Vol. 50, Part 2 of the *Bulletin of Zoological Nomenclature*. Comment or advice on these applications is invited for publication in the *Bulletin of Zoological Nomenclature* and should be sent to the Executive Secretary, I.C.Z.N., c/o The Natural History Museum, Cromwell Road, London SW7 5BD.

**Case 2864 *Termes lacteus* Froggatt, 1898 (currently *Coptotermes lacteus*; Insecta, Isoptera): proposed conservation of the specific name**

J.A.L. Watson & H.M. Abbey

Division of Entomology, CSIRO, G.P.O. Box 1700, Canberra, ACT 2601, Australia

**Abstract.** The purpose of this application is to conserve the specific name of *Coptotermes lacteus* (Froggatt, 1898), an abundant and well known termite of south-east Australia. Froggatt published the specific name as *lactis* in a "popular" work the previous year, but following his own rejection of this spelling it has remained unused.

**Case 2843 *Aradus caucasicus* Kolenati, 1857 (Insecta, Heteroptera): proposed replacement of syntype by a neotype, so conserving usage of the specific name and that of *A. hieroglyphicus* Sahlberg, 1878**

I.M. Kerzhner

Zoological Institute, Russian Academy of Sciences, St. Petersburg 199034, Russia

Ernst Heiss

Entomological Research Group, Tiroler Landesmuseum, Josef-Schrafflstrasse 2A, A-6020 Innsbruck, Austria

**Abstract.** The purpose of this application is to conserve the specific name of the Caucasian flat bug *Aradus caucasicus* Kolenati, 1857 in its current usage. The only known syntype belongs to the Siberian species *A. hieroglyphicus* Sahlberg, 1878. It is proposed that this syntype should be replaced by a neotype representative of the current usage of *A. caucasicus*.

**Case 2829 *Notonecta obliqua* Gallén in Thunberg, 1787 (Insecta, Heteroptera): proposed conservation of the specific name**

Antti Jansson

Zoological Museum, P.O. Box 17, FIN-00014 University of Helsinki, Finland

John T. Polhemus

University of Colorado Museum, 3115 S. York, Englewood, Colorado 80110, U.S.A.

**Abstract.** The purpose of this application is to conserve the specific name of the backswimmer species *Notonecta obliqua* Gallén in Thunberg, 1787 by the suppression of the unused senior subjective synonym *Notonecta marginata* Müller, 1776.

**Case 2830 *Corisa nigrolineata* Fieber, 1848 (currently *Sigara (Pseudovermicorixa) nigrolineata*; Insecta, Heteroptera): proposed conservation of the specific name**

Antti Jansson

Zoological Museum, P.O. Box 17, FIN-00014 University of Helsinki, Finland

John T. Polhemus

University of Colorado Museum, 3115 S. York, Englewood, Colorado 80110, U.S.A.

**Abstract.** The purpose of this application is to conserve the specific name of the water-boatman species *Corisa nigrolineata* Fieber, 1848 by the suppression of the unused senior subjective synonyms *Notonecta minutior* Sulzer, 1776 and *N. minuta* Gmelin, 1790.

**Case 2831 *Corisa sexlineata* Reuter, 1882 (currently *Sigara (Tropocorixa) sexlineata*; Insecta, Heteroptera): proposed conservation of the specific name**

Antti Jansson

Zoological Museum, P.O. Box 17, FIN-00014 University of Helsinki, Finland

**Abstract.** The purpose of this application is to conserve the specific name of the water-boatman species *Corisa sexlineata* Reuter, 1882, which is threatened by the unused senior subjective synonym *Corisa confluens* Fieber, 1851.

**Case 2777 *Dytiscus biguttatus* Olivier, 1795 (currently *Agabus biguttatus*; Insecta, Coleoptera): proposed conservation of the specific name**

A.N. Nilsson

Department of Animal Ecology, University of Umeå, S-90187 Umeå, Sweden

**Abstract.** The purpose of this application is to conserve the specific name of the diving water beetle *Dytiscus biguttatus* Olivier, 1795. It is threatened by the unused senior homonym *Dytiscus biguttatus* Gmelin, 1790, which may be a junior synonym of *D. nebulosus* Forster, 1771.

The following **Opinions** were published on 30 June 1993 in Vol. 50, Part 2, of the *Bulletin of Zoological Nomenclature*:

Opinion 1722. *Acrolocha* Thomson, 1858 (Insecta, Coleoptera): conserved, and *Coprophilus* Latreille, 1829: *Staphylinus striatulus* Fabricius, 1792 designated as the type species.

Opinion 1723. *Carabus mollis* Marsham, 1802 (currently *Calathus mollis*; Insecta, Coleoptera): specific name conserved.

Opinion 1724. *Helophorus* Fabricius, 1775 (Insecta, Coleoptera): conserved as correct original spelling.

Opinion 1725. *Meladema* Laporte, 1835 (Insecta, Coleoptera): conserved.

Opinion 1726. *Mycetoporus* Mannerheim, 1831 (Insecta, Coleoptera): *Tachinus punctus* Gravenhorst, 1806 designated as the type species; *Ischnosoma* Stephens, 1829 conserved; and *Mycetoporus* given precedence over *Ischnosoma*.

Opinion 1727. *Schizopus* Le Conte, 1858 (Insecta, Coleoptera): placed on the Official List of Generic Names.

Opinion 1728. *Planoplatuscelis* Kaszab, 1940 (Insecta, Coleoptera): *Platuscelis margelanica* Kraatz, 1882 designated as the type species.

Opinion 1729. *Platuscelis* Latreille, 1818 (Insecta, Coleoptera): *Tenebrio hypolithus* Pallas, 1781 designated as the type species, so conserving *Oodescelis* Motschulsky, 1845.

## **Call for Nominations - New members of the International Commission on Zoological Nomenclature**

The following members of the Commission reach the end of their terms of service at the close of the XXV General Assembly of the International Union of Biological Sciences to be held in Paris in September 1994: Dr. F.M. Bayer (U.S.A., Corallia); Prof. J.O. Corliss (U.S.A., Protista); Prof. Dr. G. Hahn (Germany, Trilobita); Prof. Dr. O. Halvorsen (Norway, Parasitology); Dr. Ya. I. Starobogatov (Russia, Mollusca); Dr. V.A. Trjapitzin (Russia, Hymenoptera).

The addresses and specialist fields of the present members of the Commission may be found in the *Bulletin of Zoological Nomenclature*, 50(1) (March 1993). Under Article 3b of the Commission's Constitution a member whose term of service has ended is not eligible for immediate re-election unless the Council of the Commission has decided to the contrary.

The Commission invites nominations, by any person or institution, of candidates for membership. Article 2b of the Constitution prescribes that:

*The members of the Commission shall be eminent scientists, irrespective of nationality, with a distinguished record in any branch of zoology who are known to have an interest in zoological nomenclature.*

Nominations made since June 1990 will be reconsidered automatically and need not be repeated. Additional nominations, giving the date of birth, nationality and qualifications (by the criteria mentioned above) of each candidate should be sent by **1 June 1994** to:

The Executive Secretary,  
International Commission on Zoological Nomenclature,  
c/o The Natural History Museum,  
Cromwell Road, London SW7 5BD, England.

## **Biological Survey of Canada (Terrestrial Arthropods) Survey Report**

The Scientific Committee met in Ottawa on 21-22 April 1993. A fuller account of the meeting appears in the Fall 1993 issue of the *Newsletter of the Biological Survey of Canada (Terrestrial Arthropods)*

### **Notes on selected scientific projects**

1. *Arthropods of peatlands in Canada*  
Papers from the 1991 peatlands symposium are now in press as a memoir of the E.S.C.
2. *Arctic invertebrate biology*  
Grant support has been secured for core Arctic research activities, and collaboration and interest outside Canada continue.

3. *Old-growth forests*

An NSERC strategic grant proposal for work on old-growth forests has been submitted by several Survey cooperators.

4. *Invasions and reductions*

The contents of a workshop at the 1993 Entomological Society's meeting in Sault Ste. Marie has been defined. The workshop will help to show how to develop this project further.

**Other scientific priorities**

1. *Arthropod fauna of soils*

A May 1993 conference on the functional significance and regulation of soil biodiversity includes several contributions by Canadian students, demonstrating that there is an upsurge of interest in ecological research on soil arthropods.

2. *Systematics and entomology*

An ESC memoir on systematics and entomology, stemming from the Survey's symposium held in Banff in 1990, was published after the meeting.

3. *General matters related to biodiversity*

Copies of the Survey's resolution on biosystematics and biodiversity have been sent to the National Round Table on the Environment and the Economy, the Parliamentary Standing Committee on the Environment, the Biodiversity Convention Advisory Group of Environment Canada, and the Task Force on Canadian Biosystematics. The Survey remains in touch with the ESC committee considering how to respond to the ideas raised by Dr. G.B. Wiggins in his 1992 Gold Medal address.

4. *Brief on biodiversity*

The Committee discussed the draft of a brief on biodiversity, focussed on sampling requirements. The brief will be expanded, and reconsidered at the next meeting.

5. *Global change*

The Committee received information about relevant developments. It also noted that other scientists have proved very reluctant to include invertebrates when projects are finally defined, even though they acknowledge that invertebrates are valuable for studying environmental effects.

6. *Article on Canadian environmental policies*

The Committee discussed and approved a draft article commenting on the fact that typically the scientific follow-up of Canadian government environmental policies is very limited.

7. *Expansion of the Biological Survey*

The Committee, and the representative of the Parasitology section of the Canadian Society of Zoologists, confirmed that the Survey should grow by addition of a small number of modules adding disciplinary expertise, and not by enlarging the current terrestrial arthropods module.

**Secretariat activities**

The 1992 round of visits by Dr. H.V. Danks to entomological centres in Canada continued informal discussions about the Survey and its projects with other biologists as well as entomologists. Several formal seminars on subjects related to the Survey and its interests were also presented.

**Liaison and exchange of information with other organizations**

1. *Canadian Museum of Nature*

Dr. P. Colgan, Associate Director, Programmes Branch, reported that the Museum is realigning its activities to be consistent with the scientific and social priorities of the country, driven by both budgetary and social concerns. The driving programme is that on Environmental Issues, which supports research activities and includes the Research Division, the Canadian Centre for Biodiversity and the Biological Survey of Canada.

Dr. Colgan reported that the Memorandum of Understanding between the Canadian Museum of Nature, Agriculture Canada and Forestry Canada to establish a Federal Biosystematics Group is now in effect. Working groups will be implemented on selected topics. Dr. Colgan also reported that the Task Force on Canadian Biosystematics is developing a document on the state of biosystematics in Canada, and intends to emphasize the need for that discipline in relation to the Convention on Biodiversity.

2. *Biological Resources Division, CLBRR*

Dr. P. Marriage, Executive Deputy Director for the Biological Resources Division, Centre for Land and Biological Resources Research, reported that a BRD business plan emphasizing support to assessment of pests, support to the potential for biocontrol, evaluation of the roles of organisms in relation to environmental sustainability, and examination of genetic diversity has been developed, responding to the requirements of Research Stations and of the Food Production and Inspection Branch.

The BRD's wider roles, supported by the Memorandum of Understanding for a Federal Biosystematics Group, focus on the broad benefits of systematics to Canadian environmental, economic and social requirements.

Dr. Marriage also reported that the continued production of the handbooks recently has been jeopardized by changes in Research Program Services, which has left BRD without the manpower or funds to produce the handbooks and related publications.

3. *Entomological Society of Canada*

Dr. P.W. Riegert, President, ESC, reported on some activities of the Society, especially possible efficiencies and economies being considered for the publication series, and the important question as to whether ESC membership in the Canadian Federation of Biological Societies will continue.

4. *Forestry Canada*

Dr. J. Huber, Forestry Canada, reported that taxonomy is receiving support in Forestry because biological control demands such support. The fact that the public wants more environmentally friendly methods of control to be used has helped to foster interest in biological control.

5. *Committee on the Status of Endangered Wildlife in Canada (COSEWIC)*

Dr. T. Anikowicz noted that COSEWIC, which includes government and some non-governmental representatives, meets annually to consider status reports and to decide on categories for species at risk. She reported that last year COSEWIC was given permission to start considering how to deal with invertebrates, and a working group has been established.



6. *Canadian Nature Federation*

Dr. Anikowicz, and Ms. C. Schultz, Canadian Nature Federation, reported that a programme for endangered plants and invertebrates in Canada (EPIC), focussing on non-vascular plants and invertebrates, is being initiated. The Canadian Nature Federation sees itself as a facilitator to give biodiversity more profile, and to augment fundraising and educational aspects to ensure essential public support. Information is being sought by means of questionnaires, and input from experts is required, for example to discover which groups or communities are the key to different ecological functions, which are indicators, and so on, in order to help concentrate efforts on the most crucial aspects.

7. *Canadian Society of Zoologists*

Dr. Cone, on behalf of the Parasitology Section, CSZ, reported that a formal proposal for a parasitology module has been drafted for the attention and information of the Canadian Museum of Nature. A project on parasites of yellow perch continues, and has confirmed the collaborative ability of Canadian zoological parasitologists.

**Other items**

1. *Regional developments*

Members of the Committee summarized relevant information from different parts of the country. Among many other items, it was noted that detailed planning for a centre for biodiversity at the University of British Columbia is in progress. Reviews of the mandate of the Royal British Columbia Museum continue and developments suggest that research and the research collections at the museum may be in danger.

Insect exhibits, including those with living material, are proving very successful at the Provincial Museum of Alberta. The Entomological Society of Manitoba continues to be active, supporting the Manitoba arthropod database, a distinguished lecturers programme, and a 1993 symposium on biodiversity and climate change.

The BADIQ database (Base de Données sur les Invertébrés du Québec) at the University of Chicoutimi is fully functional and is now seeking collaborators or customers. Several departments at Macdonald College, including entomology, have been amalgamated into a single department.

2. *Other matters*

The Committee also discussed the Biological Survey Foundation, the 1993 Annual Report to the Museum, a future workshop on Coleoptera, Canadian-Russian interactions, endangered species and the role of the ESC's committee, efforts for a U.S. Biological Survey, and other topics.

H.V. Danks  
Canadian Museum of Nature  
Ottawa, Ontario

## The Canadian Forum on Biological Control

The Steering Committee appointed the following interim executive:

President:

Mark Goettel Tel. 403-327-4561 Fax. 403-382-3156 GOETTEL@ABRSLE.AGR.CA

Vice-President:

Dan Polonenko Tel. 306-668-8225 Fax. 306-975-1215

Secretary:

Glen Sampson Tel. 902-893-6608 Fax. 902-895-4547

Treasurer:

Dan Johnson Tel. 403-327-4561 Fax. 403-382-3156 JOHNSON@ABRSLE.AGR.CA

Members at Large:

Lorne Duczek Tel. 306-975-7014 Fax. 306-242-1839

Linda Gilkeson Tel. 604-387-9410 Fax. 604-387-8897

Peter Harris Tel. 403-327-4561 Fax. 403-382-3156 HARRIS@ABRSLE.AGR.CA

Alec McClay Tel. 403-632-8207 Fax. 403-632-8379

Vince Nealis Tel. 705-949-9461 Fax. 705-759-5700 NEALIS%SOO.DNET@

CEDAR.PFC.FORESTRY.CA

Bill Turnock Tel. 204-983-5533 Fax. 204-983-4604

TO JOIN the Canadian Forum on Biological Control

Send the following application to Treasurer Dan Johnson, Agriculture Canada, Box 3000, Lethbridge Alberta, T1J 4B1 or any of the ad hoc executive members.

### Canadian Forum on Biological Control Application for Membership

NAME: \_\_\_\_\_  
                    first                                    middle initial                                    last

ORGANIZATION: \_\_\_\_\_  
\_\_\_\_\_

ADDRESS: \_\_\_\_\_  
                    street and #  city

\_\_\_\_\_ province  postal code

PHONE: \_\_\_\_\_ FAX: \_\_\_\_\_

ELECTRONIC MAIL: \_\_\_\_\_

DUES: \$15 regular; \$7 student

Make cheques payable to "Canadian Forum on Biological Control"

Please check here if you require a receipt \_\_\_\_

## News from Florida Entomological Society

The Florida Entomological Society (FES) is contemplating publishing its journal, Florida Entomologist (An International Journal for the Americas), on the Internet while continuing the printed version. The advantage of parallel electronic publication is that researchers will be able to access, via their computers, machine-readable files of all published articles. These files can be viewed and, if desired, printed to produce copies of articles that are equal to reprints or photocopies.

An FES committee has concluded that such publication is feasible with present technology and is optimistic that the technology will rapidly improve once this type of publication is accepted.

We invite you to participate in an early test of a prototype system. If interested, please send e-mail to our server FLAENT@IFASGNV or FLAENT@GNV.IFAS.UFL.EDU. You will automatically be sent information on our project and the test if you enter GENINFO in the SUBJECT line of your e-mail message. No text is required in the body of the message. (If you enter text, it will not be seen.) Requests may be entered in upper and/or lower case. The server will automatically send you the requested information by return e-mail. If you fail to get GENINFO using the above procedure, please send e-mail to the author:

Thomas J. Walker, Department of Entomology and Nematology,  
University of Florida, Gainesville 32611-0620  
(e-mail: TJW@IFASGNV or TJW@GNV.IFAS.UFL.EDU)

## PUBLICATIONS BOOK REVIEWS

**Carpenter, F.M. 1992. *The Treatise on Invertebrate Paleontology, Part R, Arthropoda 4, Volumes 3 and 4, Hexapoda*. Series edited by R.L. Kaesler. The Geological Society of America, Boulder, CO, U.S.A. 655 pp. Hardcover \$(U.S.)\$87.50 for the set of both volumes.**

I would like to begin this review by providing some background. The purpose of *The Treatise on Invertebrate Paleontology* is to present a comprehensive and compact statement of knowledge of invertebrate fossils, down to the level of genus (with many illustrated type species). Earlier volumes on Arthropoda were: *Part O* (1959) on generalia and Trilobitomorpha; *Part P* (1955) on Chelicerata, etc.; *Part Q* (1961) on Crustacea-Ostracoda; *Part R*, Vol. 1 and 2 (1969) on Crustacea exclusive of Ostracoda, Myriapoda, and an introduction to Hexapoda (by S.M. Manton, which is a good summary of her now-abandoned ideas on the polyphyly of Arthropoda). With the publication of *Part R*, Vols. 3 and 4 on the Hexapoda, the series on Arthropoda has now been completed.

For insects, which are by far the largest arthropodan group, the previous summaries of their fossil record was "Fossilium Catalogus" by A. Handlirsch (1922), and Vol. 9 in the "Osnovy Paleontologii", edited by B.B. Rohdendorf (1962), which offers a short description of higher taxa and of many genera. Other than this, advancements in the higher classification of fossil insects were brought to our attention in the "Traité de Paléontologie" by D. Laurentiaux (1953), in the "Classification of Insects" by Ch.T. Brues, A.L. Melander, and F.M. Carpenter (1954), in the "Historical Development of the Class Insecta",

edited by B.B. Rohdendorf and A.P. Rasnitsyn (1980), in "The Origin and Evolution of Hymenoptera" by A.P. Rasnitsyn (1980), in "Insect Phylogeny" by W. Hennig (1981), and in "The Insects of Australia" by J. Kukulova-Peck (1991). Since the "Osnovy Paleontologii" was in Russian, that latest summary of the fossil record was inaccessible to most western entomologists until it was published in English in 1991 by the Smithsonian Institution Libraries. Also, a group of Russian scientists of the Arthropod Laboratory (Paleontological Institute, Russian Academy of Sciences, Moscow) is currently working on an updated summary of their, mainly Mesozoic, fossil record which will be published in English. This rather sudden output of information is good news for modern systematists who increasingly seek out fossil insects as a useful source of data for a reliable polarization of characters, especially at higher systematic levels.

I would like to point out the enormity of the task undertaken by Prof. F.M. Carpenter in *The Treatise of Invertebrate Paleontology*. The two hexapod volumes provide a monumental amount of information and are the product of over 30 years of work (which took all his spare moments while teaching at Harvard). This comment comes from an insider. During my two prolonged stays in his laboratory in 1963 and 1969, my research was aimed at removing major "grey" systematic areas from among the Paleozoic insects. Every day, several catalogues gathering the data for *The Treatise* were attended to. The frequently unreliable figures of the 19th and early 20th century authors were the major concern. Therefore, all older holotypes available in European and other museums were examined and most of them redrawn. This solid, carefully emended input of basic data is, in my opinion, the major and lasting merit of the two volumes.

All insect orders, families, and genera that had appeared in the literature on the fossil record up to 1983 are included. For each genus (if it is an extinct genus) a brief statement documents its publication, type species, a diagnosis, often an illustration, later references, and an approximate age and geographic location. The stratigraphic occurrence of families is tabulated.

As also pointed out by the editors of *The Treatise*, Prof. Carpenter is almost certainly the last in a gallery of entomologists with a knowledge broad enough to cover all Insecta. The information input for *The Treatise* stops in 1983, and the volumes were published in 1992. However, the time gap of the past 10 years spans a decade of the most turbulent changes in the understanding of systematics within the past 150 years of entomological history. Also, it is marked by the rapidly growing use of paleomorphological characters from fossil insects as an objective basis for the phylogeny of modern insect orders. The decade brought the long wanting pan-pterygote homologization of wing venation and wing articulation. Through the cladistic method, a richness of strong, newly polarized characters suddenly became available for unraveling the obstinately nebulous relationships between the orders, suborders, and superfamilies.

Progress has been so fast and so overwhelming that the traditional conservative morphology and higher classification of Hexapoda and Insecta from 10 years ago, used by Prof. F.M. Carpenter, will probably find few followers. As an example, the insectan leg is listed in *The Treatise* as having only five segments, while the ancestral count in Paleozoic fossil insects is now up to 11 segments. The basic wing venation system lacks a precostal (PC) and jugal (J) vein and the ScA+, many designations of MA and MP sectors and of AA and AP sectors which, together with the respective rows of original articular sclerites, are now playing an important role in the higher systematics of the Pterygota (as summarised in "The Insects of Australia", 1991). "Prestostal area" in *The Treatise* stands for the C-ScA area in the homologized veinal system. The venational fluting (= convex [+] and concave [-] position of veins) is

not marked in Paleozoic wings, which is an obstacle in homologizing their venation and referring them to higher taxa. The Apterygota, including Archaeognatha, Monura, and Zygentoma, are treated in the text as a monophyletic taxon, but Archaeognatha and Zygentoma are shown as independent orders in the pterygote phylogenetic tree (Fig. 10), in accord with the now generally accepted scheme. The Order Monura is included as a suborder of Archaeognatha (= Monocondylia), but it was discovered in 1987 that Monura have 2-articulated jaws and belong to the Dicondylia, together with Zygentoma and Pterygota. The extinct order Permothemistida is included as a family of the order Paleodictyoptera, but in 1991 the wing venation and articulation were found derivable only from the primitively wing-flexing, but paleopterous, order Diaphanopteroidea (the lateral spread of wings in many Paleoptera is secondary and convergent).

Protanisoptera and Protozygoptera, listed as Odonata, were recognised in 1984 as Protodonata, because they share distinctive protodonatan articular plates and other characters. The traditional venational interpretation of Protodonata and Odonata used in *The Treatise*, if correct and subjected to cladistic analysis, would justify their sistergroup relationship with the rest of Pterygota (as proposed by Matsuda 1981). The error was shown in 1984, when odonatan venation was homologized with the rest of Paleoptera by E.F. Riek and J. Kukalova-Peck. The Paleozoic giant mayflies Syntonopteridae in *The Treatise* are mistakenly included in the Paleodictyoptera due to an error in interpretation, explained by Kukalova-Peck in 1985.

Following tradition, the acquisition of a complicated metamorphosis (= holometaboly) is used in *The Treatise* to subdivide Neoptera into Exopterygota and Endopterygota. However, most entomologists now believe that Hemiptera and Endopterygota are sistergroups and that the use of the types of metamorphosis as a high-level character is a mistake. Pleconeoptera, Orthoneoptera and Blattoneoptera are lumped together in a large, polyphyletic group "Orthopteroid Exopterygotes", traditionally based on symplesiomorphic similarities. According to shared derived characters in wing venation and articulation, published in 1991 and 1992, Pleconeoptera and Orthoneoptera are sistergroups, whereas Blattoneoptera share a different set of characters with the Hemineoptera + Endoneoptera. Willmann (1987, 1988) documented that Diptera are the closest relatives of the Mecoptera. Boudreaux (1979) maintained that Grylloblattodea and Zoraptera have typical, autapomorphic, blattoid changes in wing musculature. Tshekardocoleidae and related families were excluded from Coleoptera and put into the coleopterid stem group by Kukalova-Peck and Lawrence (1993).

All Paleozoic stem group assemblages of modern Neoptera have primitive, richly dichotomously branched venation, and look very much alike. They have traditionally been lumped into the "wastebasket" order Protorthoptera. This artificial taxon has been partially resolved by Kukalova-Peck and Brauckmann (1992) and "Protorthoptera" were identified as containing all stem-group assemblages of modern Neoptera, but mainly of the hemipteroids, while Liomopteridae, Lemmatophoridae and related families belong to the Pleconeoptera stem group assemblage. The famous Paleozoic family Oedischiidae of the orthopteroid stem group assemblage was recognized in 1991 as polyphyletic because it includes the ancestors of at least two orthopteroid orders: Orthoptera *sensu stricto* (with CuP divided), and Grylloptera (with CuP simple or suppressed).

The above mentioned and other systematic changes that occurred in the last decade should not subtract from the great and lasting value of *The Treatise* for every serious entomological systematist. *The*

*Treatise* provides a quick orientation to hundreds of taxa, and reliable figures of all characters that can be observed on a fossil (however, many museums resented the cleaning of holotypes and additional characters may be uncovered in the future). A special contribution is the abundant photographs and drawings which give shape and form to the fossil names, which many entomologists may have heard of but had no concept of their appearance. Who knows, the text and drawings may inspire additional interpretative ideas.

The volumes should be of great interest and use to everyone involved in the systematics and evolution of insects, but to two groups of people in particular. The first is teachers, students, and researchers interested in the richness and diversity of insects (both extinct and extant) through the geological record. The second is researchers who are concerned with the evolution and phylogeny of groups. For these, at last, in one place, they can find a figure and a record of where to find the basic data. Because of this very significant advantage, the price of these two volumes must be viewed as the best book buy of the decade. These volumes belong in all libraries with holdings on insects.

### References

- Brues, Ch. T., Melander, A.L., and F.M. Carpenter. 1954. Classification of insects. *Bull. Mus. Comp. Zool.* **108**: 1-917.
- Handlirsch, A. 1922. Fossilium Catalogus I: Animalia. Insecta Palaeozoica. Berlin. pp. 1-230.
- Hennig, H. 1981. Insect Phylogeny. John Wiley & Sons, New York. 514 pp.
- Kukalova-Peck, J. 1991. Fossil history and the evolution of hexapod structures. pp. 141-179 in Commonwealth Scientific and Industrial Research Organization (Ed.), *The Insects of Australia*. Vol. 1. 2nd ed. Melbourne University Press, Melbourne.
- Kukalova-Peck, J., and C. Brauckmann. 1992. Most Paleozoic Protorthoptera are ancestral hemipteroids: major wing braces as clues to a new phylogeny of Neoptera (Insecta). *Can. J. Zool.* **70**: 2452-2473.
- Kukalova-Peck, J., and J.F. Lawrence. 1993. Evolution of the hind wing in Coleoptera. *Can. Ent.* **125**: 181-258.
- Laurentiaux, D. 1953. Classe des insectes. pp. 141-200 in Piveteaux, J. (Ed.), *Traité de Paléontologie*. Vol. 3.
- Matsuda, R. 1970. The origin of insect wings (Arthropoda: Insecta). *Int. J. Insect Morphol. Embryol.* **10**: 387-390.
- Rasnitsyn, A.P. 1980. The origin and evolution of Hymenoptera. *Trans. Paleont. Inst. Akad. Nauk USSR*.
- Riek, E.F., and J. Kukalová-Peck. 1984. A new interpretation of dragonfly wing venation based upon early Upper Carboniferous fossils from Argentina (Insecta: Odonatoidea) and basic character states in pterygote wings. *Can. J. Zool.* **62**: 1150-1166.
- Rohdendorf, B.B. (Ed.). 1962. *Osnovy Paleontologii, Arthropoda, Trachaeata and Chelicerata*. Nauk Akad. Sci. USSR, Moscow, pp. 1-374. (In Russian).
- Rohdendorf, B.B., and A.P. Rasnitsyn. 1980. Historical development of Class Insecta. *Trans. Paleont. Inst. Akad. Nauk USSR*, 1975. pp. 1-256. (In Russian).

Jarmila Kukalova-Peck  
Department of Earth Sciences  
Carleton University  
Ottawa, Ontario

**Ward, J.V., and B.C. Kondratieff. 1992. *An Illustrated Guide to the Mountain Stream Insects of Colorado*. University Press of Colorado, Niwot, CO, U.S.A. ix + 191 pp. Softcover \$(U.S.)9.95; hardcover \$(U.S.)19.95.**

With this small book, James Ward and Boris Kondratieff have collaborated to produce a standard reference on the ecology and systematics of the underwater stages of insects, exclusive of pupae, inhabiting high gradient, rocky-bottomed streams in the western half of Colorado. The book is aimed at naturalists, fly fishermen, and specialists in stream ecology including students at the graduate and undergraduate levels.

Although chapter designations are not used, the book is subdivided into six sections. The first briefly describes the physiographic regions of Colorado to clarify the area being covered by the book. The second section outlines the basic attributes of mountain stream ecosystems, and the third describes the importance of selected physical, chemical, and biological characteristics of streams that can determine the composition and abundance of stream insects. Section four describes the life histories of aquatic insects and their behavioural and morphological adaptations to current. The fifth section summarizes some human impacts on mountain stream ecosystems and their consequent effects on habitat and aquatic insect communities. The final section, which comprises most of the book, deals with the systematics and ecology of aquatic insects inhabiting mountain stream ecosystems. This section includes a key to orders, followed by keys to families and genera. General ecological information is also given for orders, families, and genera.

The book concludes with 1) three appendices that summarize collection records by drainage basin for Colorado species of mayflies (Appendix A), stoneflies (Appendix B), and caddisflies (Appendix C), 2) a short glossary with about 50 terms pertaining to aquatic entomology, 3) an extensive reference section, and 4) subject and taxonomic indexes.

The book is clearly and concisely written. Sections preceding the taxonomic portion briefly but accurately summarize such basic principles as stream classification, the river continuum concept, and the indicator organism concept, with references given to key publications where more in-depth information can be accessed. In the large taxonomic section, key couplets are unambiguous and appropriately illustrated. Here, too, discussions of the taxonomy and ecology of orders, families, and genera include comprehensive reference citations of papers having more detailed information.

The illustrations are superb. In fact, some 56 pages are devoted to illustrations which vary from simple line drawings showing characters described in the taxonomic keys, to finely stippled and beautifully rendered habitus drawings. Thirty pages of the book are comprised of habitus drawings occupying a full page each. The illustrations were apparently prepared by eight different artists, and consequently there is some lack of consistency among the drawings in quality and technique. However, the overall impact of the illustrations has been to greatly enhance the usefulness of the guide while making for an extremely attractive volume.

The major shortcoming of this book is that the taxonomic detail presented for the various taxa of aquatic insects is uneven, with most emphasis on the Plecoptera, Ephemeroptera, and Trichoptera. For example, keys to genera are provided for these three orders, and the appendices give species lists with recorded distributions by major drainage basin, but odonates are not keyed at all below the order level. Despite the abundance and ecological importance of chironomids, they are keyed only to subfamilies.

In addition, keys to genera are not given for Dytiscidae, Dixidae, and Ceratopogonidae. To be fair, it is important to note that in the area covered by the book, most systematic research has been conducted on the Plecoptera, Ephemeroptera, and Trichoptera, but even among these orders taxonomic treatments are inconsistent. Keys are provided for all genera of mayflies, but stonefly and caddisfly genera that occur infrequently in Colorado mountain streams are excluded in order to simplify the keys. Unfortunately, such simplification detracts from the accuracy of the work and limits its usefulness.

Other problems I had with the book are minor. Functional feeding groups are specified for some, but not all (e.g., *Caenis*, *Brachycercus*) genera covered in the book. Some drawings of body parts are overly large (e.g., Fig. 46, claw of *Camelobaetidius*; Fig. 48, gill of *Callibaetis*) and could easily have been reduced without loss of resolution. Well-labelled figures are presented to illustrate the generalized morphology of Plecoptera and Coleoptera, but similar drawings are not given for other orders.

Despite these few problems, the authors have succeeded in their objective of providing "a source of information for those interested in aquatic insects and mountain streams, ...and a foundation upon which future studies can be built". Moreover, they have done so for a remarkably reasonable price; in fact, I would argue that the illustrations alone justify the purchase price of this book. It is an important contribution that should stimulate further study on the aquatic insect fauna of this region. Perhaps future editions will show the fruits of research prompted by this work by expanding coverage to include pupae and adults, species of diverse yet poorly studied groups (e.g., aquatic Diptera), species inhabiting the surface film, and aquatic insect species of springs and lentic habitats.

Lloyd M. Dosdall  
Alberta Environmental Centre  
Vegreville, Alberta

**Holmes, A.M., Hess, Q.F., Tasker, R.R., and A.J. Hanks. 1991. *The Ontario Butterfly Atlas*. D.W. Friesen, Altona, MB, Canada. viii + 167 pp. Softcover \$(Can.)29.00.**

The *Ontario Butterfly Atlas* provides a comprehensive listing of the butterfly species occurring within the Province of Ontario. The book summarizes the geographic distributions and periods of occurrence for various life stages for both resident and stray species. Of special interest is reference to butterfly conservation and an assessment of the abundance of each species.

The driving force behind this publication is the Toronto Entomologists' Association which works to further the knowledge of Ontario insects and highlight the need for conservation activities.

The introduction is relatively short, with descriptions of the life zones of Ontario and relationships to the forest regions of the province, butterfly habitats, life stage timetables, abundance status, physiographic features, and species occurrence records. Specific reference is made to nomenclature and references used. Those who are familiar with North American butterfly taxonomy and identification are aware that in the past there has been debate on the status of certain species and subspecies. These divergent themes, especially at the subspecific level, are always of concern for those producing field guides and check lists. *The Ontario Butterfly Atlas* has neatly bypassed any potential problems by simply



using the single and most accepted source for species notation (*A Catalogue/Checklist of the Butterflies of North America North of Mexico*), and more importantly generally avoided subspecific references. The authors briefly discuss "problem species" in the introduction.

The printing is clear on quality paper. An entire page is utilized for each butterfly species. There is large map showing actual collection locations and a life stage timetable which is informative, concise, and well-designed. Each species is accompanied with a brief summary of its habitat, provincial distribution, status (in terms of abundance and habitat availability), and a listing of larval food plants.

The source lists and summaries used to compile species distribution and individual location records are well-documented. The authors noted that they did not want to clutter the location record maps, although there seems to be room on most of them for additional collection locations if appropriate. In reviewing the location record maps, I noted that for some species occurring in areas 51 (Rainy River) and 54 (Kenora) some locations seem to have been missed. Several Manitoba lepidopterists have collected extensively in these regions with specimens deposited in private and public collections. Additional location records could have been provided for *Erynnis martialis*, *E. lucilus*, *E. persius*, *Pyrgus centaureae*, *Pieris napi*, *Colias interior*, *Satyrrium acadicum*, *Incisalia polia*, *Speyeria cybele*, and *Polygonia comma*. Perhaps collectors in Quebec and/or adjacent States to Ontario may also have additional information on locality records for Ontario butterflies. Although omission of additional location records may not significantly affect species distributions, their presence informs the reader of collecting activity in their particular area. Despite this minor point, I am confident that the authors have recorded the presence of all butterfly species in Ontario and accurately described the distributions.

This book will appeal to those interested in Ontario butterfly distribution and the occurrence of the life stages. Users will have to be familiar with Ontario butterfly identification, as this book is not intended to be used as a field guide or an in-depth summary of butterfly biology. The location data and life stage timetables in this publication are especially valuable as this type of information is not always well-summarized in many field guide manuals.

There are some excellent color photographs dispersed through the book depicting habitat types, and various butterfly life stages. The authors have gone to considerable effort to assess the abundance status of each butterfly species in the province. The system of status assessment is adapted from that used by the Nature Conservancy of Canada. A detailed description of the format to determine abundance status is provided at the end of the book. Given the importance of this system I felt it should have been placed at the beginning of the book. Few field guides to butterflies (or other insects) have addressed conservation and assessment of abundance to the level of this publication and the authors should be commended for their efforts.

I would recommend the *Atlas* to those with a keen interest in Ontario butterflies. It will also serve as a very useful resource for lepidopterists in adjacent provinces and states.

Richard Westwood  
Forest Protection  
Forestry Branch  
Manitoba Natural Resources  
Winnipeg, Manitoba

## **SCHOLARSHIPS AND GRANTS**

### **Entomological Society of Canada Graduate Research-Travel Grants Invitation for Applications**

#### **Preamble**

To foster graduate education in entomology, the Entomological Society of Canada will offer two research-travel grants, awarded annually on a competitive basis. The intent of these grants is to help students increase the scope of the graduate training. These grants, up to a maximum of \$2,000, will provide an opportunity for students to undertake a research project or to do course work pertinent to their thesis subject that could not be carried out at their own institution.

#### **Eligibility**

To be eligible, a student must:

- 1) be enrolled as a full-time graduate student
- 2) be an active member of the Entomological Society of Canada

#### **Format of the Application Form**

The application form will be in the format of a grant proposal, where the applicant will provide the following information: 1) the subject of the thesis; 2) a pertinent review of the literature in the field; 3) a concise presentation of the status of the ongoing thesis research; 4) a description of the research or course work to be undertaken, clearly indicating a) the relevance to the overall goal of the thesis, b) an explanation of why such work cannot be carried out at the student's own university and c) the justification of the site where the research/course work will be carried out; 5) a budget for the proposed project; 6) anticipated dates of travel and date on which grant money is needed.

The application form should also be accompanied by: 1) an up-to-date C.V.; 2) a supporting letter from the senior advisor; 3) When appropriate, a support letter from the scientist or Department Head at the institution where the applicant wishes to go.

#### **Evaluation Procedure**

The scientific merit of each application will be evaluated by a committee that has the option of sending specific projects out for external review by experts in the field. A constructive written report, underlining the positive and negative aspects of the proposal, will be returned to the applicant.

#### **Timetable and Application Procedure**

Application forms, which may be obtained from the Secretary of the Society, must be completed and returned to the Secretary of the Society by **15 January 1994**. The committee will evaluate all applications by 30 April 1994 and determine if, and to whom, grants will be awarded. The successful applicants will be informed immediately, thereby providing sufficient time for students wishing to start in the fall to make necessary arrangements. Grants must be used in the 12 months following the award.

Recipients must provide a short final report, as well as a detailed list of expenses, in the three months that follow the trip. Any money not spent must be returned to the Society.

## La Société d'entomologie du Canada Allocations de Voyage pour Étudiants Gradués

### Appels pour Allocations

#### Préambule

Afin de promouvoir les études graduées en entomologie, la Société d'Entomologie du Canada offrira deux bourses de voyage associées à la recherche. Celles-ci seront décernées annuellement sur une base compétitive. Le but de ces bourses est de permettre aux étudiants gradués d'élargir les horizons de leur formation. Les bourses, d'une valeur maximale de \$2,000 permettront à des étudiants de réaliser un projet de recherche, ou de suivre des cours pertinents à leur sujet de thèse qui ne peuvent être entrepris dans leur propre institution.

#### Éligibilité

Afin d'être éligible, l'étudiant doit:

- 1) être inscrit à temps plein comme étudiant gradué
- 2) être un membre actif de la Société d'Entomologie du Canada

#### Format du Formulaire de Demande

Le formulaire de demande sera dans le style d'une demande d'octroi et l'étudiant devra fournir les renseignements suivants: 1) le sujet de la thèse; 2) une présentation de la littérature pertinente au domaine d'étude; 3) une présentation concise du statut du projet de recherche en cours; 4) une description de la recherche ou des cours qui seront entrepris, indiquant clairement a) la pertinence des objectifs généraux de la thèse, b) les raisons pour lesquelles ce travail ne peut être entrepris à l'université où l'étudiant est inscrit, et c) une justification concernant le choix de l'endroit où la recherche/les cours seront entrepris; 5) un budget pour le projet proposé; 6) dates prévues pour le voyage et date pour laquelle la bourse sera requise.

La demande devra aussi être accompagnée: 1) d'un C.V. complet mis-à-jour; 2) d'une lettre de recommandation du directeur de thèse; et 3) lorsque convenable, une lettre d'appui d'un administrateur de l'institution que le candidat désire fréquenter.

#### Évaluation

La valeur scientifique de chaque demande sera évaluée par un comité qui aura l'option d'envoyer des demandes spécifiques pour évaluation par un lecteur externe, expert dans le domaine. Un rapport écrit, contenant une critique constructive, faisant ressortir les aspects positifs et négatifs de la demande, sera retourné à chaque candidat.

#### Échéances et Procédures

Les formulaires de demande, qui peuvent être obtenus du Secrétaire de la Société, doivent être remplis et retournés pour le **15 janvier 1994** au Secrétaire de la Société. Le comité évaluera toutes les demandes pour le 30 avril 1994 et déterminera si, et à qui, les bourses seront décernées. Les candidats choisis seront contactés immédiatement, cela afin d'allouer suffisamment de temps pour les préparatifs nécessaires à un départ possible à l'automne. La bourse doit être utilisée dans les 12 mois suivant l'octroi.

Les récipiendaires devront préparer un court rapport final, en plus d'une liste détaillée de leurs dépenses, dans les trois mois suivant le voyage. Tout argent non dépensé devra être remis à la Société.

## **Pestcon Graduate Scholarship - Support of Postgraduate Work in Pesticide Research**

The Pestcon Graduate Scholarship has been established from the surplus funds generated by the VIth International Congress of Pesticide Chemistry held in Ottawa, Canada in August 1986. The Scholarship is open to Canadian students (including landed immigrants) for graduate study in any area of pesticide research including alternative pest control strategies. The Scholarship is tenable for a period of twelve months and has a value of approximately \$3,000. One Scholarship is awarded each year and may be held simultaneously with other scholarships, fellowships or awards.

Applications must be submitted in writing before **March 1** of each year, along with a curriculum vitae and brief description (500 words or less) of the research project undertaken and the progress to date. Applications must also be accompanied by an official transcript of the academic record of the candidate. Applicants must also include the name and address of their supervisor and one other person whom they have asked to provide a confidential assessment of their ability to conduct research. The name of the Scholarship holder will be announced prior to June 1, unless the Selection Committee feels that no suitable candidate exists. Payment of the Scholarship will be made in two instalments, October 1 and January 1, on notification from the supervisor that the student is making satisfactory progress.

The Scholarship is administered by The Chemical Institute of Canada. All applications should be submitted to: Program Manager, Student Affairs, The Chemical Institute of Canada, Suite 550, 130 Slater Street, Ottawa, Ontario, K1P 6E2

## **POSITION AVAILABLE / POSTE DISPONIBLE**

### **Graduate Research (Ph.D.) Opportunity**

Applications are currently being accepted for a graduate student at the Ph.D. level to conduct research as part of a research team working on the use of the egg parasitoids *Trichogramma* spp. against lepidopterous pests of crucifers. Research will be focused on the impact of plant architecture on host searching behaviour and sex and progeny allocation by *Trichogramma*. The student should have a strong background in ecology and behaviour studies. Stipend of \$8,000 per year for three years. Position available immediately. Interested individuals are asked to send applications to: Dr. Guy Boivin, Department of Entomology, Macdonald College of McGill University, Ste-Anne-de-Bellevue, Qc, Canada H9X 1C0. Tel. (514) 346-4494 or Fax (514) 346-7740.

### **Poste pour étudiant gradué (Ph.D.)**

Un poste pour un étudiant gradué au niveau Ph.D. est actuellement disponible à l'intérieur d'une équipe de recherche travaillant sur l'utilisation de *Trichogramma* spp. contre les lépidoptères ravageurs des crucifères. Le programme de recherche portera sur l'impact de l'architecture de la plante, sur le comportement de recherche et sur l'allocation des sexes et de la progéniture par *Trichogramma*. L'étudiant devra posséder une expérience dans les domaines de l'écologie et du comportement. Un support financier de \$8,000 est prévu pour trois ans. Le poste est disponible immédiatement. Toute personne intéressée peut envoyer une demande d'application au Dr. Guy Boivin, Département d'Entomologie, Collège Macdonald de l'Université McGill, Ste-Anne-de-Bellevue, Qc, Canada H9X 1C0. Tel. (514) 346-4494 ou Fax (514) 346-7740.

## UPCOMING MEETINGS / RÉUNIONS À VENIR

### **The 10th Association of African Insect Scientists (A.A.I.S.) Biannual Meeting and Conference. Beneficial African Insects - A Renewable Natural Resource.**

September 5-9, 1993, Mombasa, Kenya

CONTACT: M.N. Mungai, Secretary of the Entomological Society of Kenya, c/o National Museum of Kenya, P.O. Box 40658, Nairobi, Kenya

### **Thirteenth International Congress of Biometeorology - Interdisciplinary Assessments of Impacts and Potential Adaptations Strategies to Climate Variability/Change**

September 12-18, 1993, Calgary, Alberta, Canada

CONTACT: Jim Byrne, Water Resources Institute, University of Lethbridge, Lethbridge, Alberta, CANADA T1K 3M4 (Tel. 403-329-2002; email "Byrne@hg.uleth.ca") or Dan Johnson, Agriculture Canada Research Station, PO Box 3000, Lethbridge, Alberta, CANADA T1J 4B1 (Tel. 403-327-4561; email "Johnson@abrsle.agr.ca").

### **1993 International Conference on Thysanoptera**

September 28-30, 1993, Burlington, Vermont

CONTACT: Dr. Bruce L. Parker, Entomology Research Lab, 655B Spear St., So. Burlington, 05403 Vermont, U.S.A. Tel. (802) 658-4453; Fax. (802) 656-0285.

### **1993 Joint Meeting of the Entomological Society of Quebec and the Quebec Society for the Protection of Plants**

October 13-14, 1993, Saint-Georges de Beauce, Québec

CONTACT: Michel O'c. Guibord, Service de phytotechnie de Québec, M.A.P.A.Q., Complexe scientifique, 2700 rue Einstein, Sainte-Foy, Qc G1P 3W8. Tel. (418) 644-9457; Fax. (418) 643-3361.

### **Third International Conference on Pests in Agriculture**

December 7-9, 1993, Montpellier, France

CONTACT: ANPP, 6, Boulevard de la Bastille, F-75012 Paris, France. Tel. 33.1 43 44 89 64; Fax. 33.1 43 44 29 19.

### **International Conference on Ecology and Environment**

June 20-24, 1994, Drake Bay, Península de Osa, Costa Rica

CONTACT: Celso Vargas, Departamento de Computacion, ITCR, Aptdo 159, Cartago, Costa Rica, Fax (506) 51 53 48, email: vargase@bitnet.ucrvm2 or vargase@earn.ucrvm2 or José Castro, Apartado 7137-1000 San José, Costa Rica.

### **Third International Congress of Dipterology**

August 15-19, 1994, Guelph, Ontario, Canada

CONTACT: Dr. S.A. Marshall, Chair, ICD3, Department of Environmental Biology, University of Guelph, Guelph, Ontario, Canada, N1G 2W1.

### **5th European Congress of Entomology**

August 29 - September 2, 1994, University of York, England

CONTACT: IFAB Communications, Institute for Applied Biology, University of York, York YO1 5DD, UK. Tel. +44 (0)904-432940; Fax. +44 (0)904-432917.

\* For details see ESC *Bulletin* Vol 25(2): 99-102

**ENTOMOLOGICAL SOCIETY OF CANADA  
LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA**  
395 Winston Ave., Ottawa, Ontario K2A 1Y8  
**Application for membership - (new members only)**  
**Demande d'adhésion (nouveaux membres seulement)**

Name and Address (please print):  
Nom et Adresse (lettres moulées):

telephone (bus.) / téléphone (au travail):

Fax:

Electronic mail address / Adresse électronique:

Key words describing interests (up to six):  
Décrivez vos intérêts en utilisant jusqu'à six  
mots clés:

**MEMBERSHIP DUES / COTISATION**

Regular member <sup>1</sup> / Membre actif <sup>1</sup> .....	\$80.00 *
Student member <sup>1</sup> / Membre étudiant <sup>1</sup> .....	\$40.00 *
Student member - <i>Bulletin</i> only / Membre étudiant - <i>Bulletin</i> seulement .....	\$20.00 *

<sup>1</sup> includes *The Canadian Entomologist* and *Bulletin*

<sup>1</sup> incluant l'abonnement au *The Canadian Entomologist* et au *Bulletin*

Endorsement / Signature du professeur \_\_\_\_\_

Students - ask your professor to endorse form/demandez l'appui de votre professeur

MEMOIRS (including discount for members) ..... \$20.00 \*  
MÉMOIRES (incluant l'escompte pour les membres)

\* Canadian members, add 7% GST ..... \$ \_\_\_\_\_

\* membres canadiens, ajouter 7% TPS

Total ..... \$ \_\_\_\_\_

If you need an official receipt please check:

Si vous désirez un reçu officiel, indiquez, s'il vous plaît:

Enclose cheque or money order payable to: Entomological Society of Canada  
Inclure un chèque ou mandat payable à: Société d'Entomologie du Canada

**ENTOMOLOGICAL SOCIETY OF CANADA - 1993**  
**LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA - 1993**

**Executive Council - Conseil Exécutif**

**President/Président**

P. W. Riegert  
Department of Biology  
University of Regina  
Regina, Saskatchewan S4S 0A2  
Tel. 306-584-1160 or 585-4224  
Fax 306-586-9862

**First Vice President/Premier Vice-Président**

G.H. Gerber  
Agriculture Canada Research Station  
195 Dafoe Road  
Winnipeg, Manitoba R3T 2M9  
Tel. 204-983-1460  
Fax 204-983-4604

**Second Vice President/Second Vice-Président**

L. Safranyik  
Forestry Canada  
Pacific & Yukon Region  
506 West Burnside Road  
Victoria, B.C. V8Z 1M5  
Tel. 604-363-0600  
Fax. 604-363-0775

**Past President/Président sortant**

R. Ring  
Department of Biology  
University of Victoria  
Victoria, B.C. V8W 2Y2  
Tel. 604-721-7102  
Fax 604-721-7120

**Trustees - Fiduciaires**

**Treasurer/Trésorier**

R.G. Foottit  
393 Winston Ave.  
Ottawa, Ontario K2A 1Y8  
Tel. 613-725-2619 or 613-996-1665  
Fax 613-725-9349 or 613-995-7283

**Secretary/Secrétaire**

R.J. West  
Forestry Canada  
P.O. Box 6028  
St. John's, Nfld., A1C 5X8  
Tel. 709-772-2386  
Fax 709-772-2576

**Scientific Editors/Editeur Scientifique**

**The Canadian Entomologist**

A.B. Ewen  
P.O. Box 509  
Dalmeny  
Saskatchewan, S0K 1E0  
Tel. 306-254-4443

**Memoirs**

V. Behan-Pelletier  
Centre for Land and Biological Resources  
Research, Agriculture Canada  
Ottawa, Ontario K1A 0C6  
Tel. 613-996-1665  
Fax 613-995-6833

**Bulletin Editor**

F.F. Hunter  
Department of Biological Sciences  
Brock University  
St. Catharines, Ontario L2S 3A1  
Tel. 416-688-5550 Ext. 3394  
Fax 416-682-9020

**Assist. Scientific Editors/Assists. de l'éditeur  
scientifique**

C.H. Craig  
R.H. Elliot

**Directors - Administrateurs**

**Directors-at-Large/Directeurs nationaux:** G. Boivin (1993), K. Richards (1993), J. Turgeon (1994), S. Marshall (1994), H. Danks (1995), S. Smith (1995)

**Regional Directors/Directeurs régionaux:** T. Shore (ESBC), B.K. Mitchell (ESA), J. Soroka (ESS), P.G. Fields (ESM), R.S. MacDonald (ESO), D. Coderre (SEQ), J. Sweeney (AES).

**OFFICERS OF AFFILIATED SOCIETIES****1993***ENTOMOLOGICAL SOCIETY of BRITISH COLUMBIA*

President T. Shore  
 President-Elect S. Fitzpatrick  
 Past-President B. Vernon  
 Secretary S. Clements  
 Agriculture Canada  
 Vancouver  
 Treasurer J. Troubridge  
 Editor (Journal) R. Ring  
 Editor (*Boreus*) I. Otvos  
 Regional Director to ESC T. Shore

*ENTOMOLOGICAL SOCIETY of ALBERTA*

President R.A. Butts  
 Vice-President A.S. McClay  
 Past-President J.R. Spence  
 Secretary M. Goettel  
 Agriculture Canada  
 PO Box 3000 Main  
 Lethbridge, Alberta  
 T1J 4B1  
 Treasurer D. Williams  
 Editor (Proceedings) D.W. Langor  
 Regional Director to ESC B.K. Mitchell  
 Directors-at-Large M. Okuda  
 T.J. Lysyk  
 R.G. Holmberg

*ENTOMOLOGICAL SOCIETY of SASKATCHEWAN*

President P. Harris  
 President-Elect P. Kusters  
 Secretary O. Olfert  
 Agriculture Canada  
 107 Science Crescent  
 Saskatoon, Sask.  
 S7N 0X2  
 Treasurer D. Murrell  
 Editor (Proceedings) K. Roney  
 Regional Director to ESC J. Soroka

*THE ENTOMOLOGICAL SOCIETY of MANITOBA*

President R. Gadawski  
 President-Elect R. Roughley  
 Past-President N.D.G. White  
 Secretary L. Manaire  
 5 Alderwood Rd.  
 Winnipeg, Manitoba  
 R2J 2K7  
 Treasurer L. Grenkow  
 Editor (Proceedings) R. West  
 Regional Director to ESC P.G. Fields  
 Member-at-Large A. Weins

*ENTOMOLOGICAL SOCIETY of ONTARIO*

President D. Wallace  
 Past-President S. Marshall  
 Secretary S.M. Smith  
 33 Willcocks St.  
 Faculty of Forestry  
 University of Toronto  
 Toronto, Ontario  
 M5S 3B3  
 Treasurer R.S. MacDonald  
 Editor (Proceedings) P.G. Kevan  
 Regional Director to ESC R.S. MacDonald  
 Librarian D. Hull

*SOCIÉTÉ D'ENTOMOLOGIE DU QUÉBEC*

Président G. Boivin  
 Vice-président R-M Duchesne  
 Secrétaire M. Mailloux  
 472, rue Maissoneuve  
 St-Jean-sur-Richelieu  
 Québec, J3B 1G2  
 Trésorier C. Bouchard  
 Présidente sortante M. Roy  
 Editeur (Rev. d'ent. du Qué.) D.J. Lewis  
 Rédacteur (Bull. de la SEQ) C. Hebert  
 Délégué à la S.E.C. D. Coderre

*ACADIAN ENTOMOLOGICAL SOCIETY*

President J. Stewart  
 Vice-President B. Craig  
 Past President G. Boiteau  
 Secretary/Treasurer L. Hale  
 University of P.E.I.  
 550 University Ave  
 Charlottetown, P.E.I.  
 C1A 4P3  
 Editors (Proceedings) L. Hale & J. Stewart  
 Regional Director to ESC J. Sweeney

Bulletin Editor: F.F. Hunter  
 Cover Design: R. Thiebaut  
 Published by: The Entomological  
 Society of Canada / La Société  
 d'entomologie du Canada