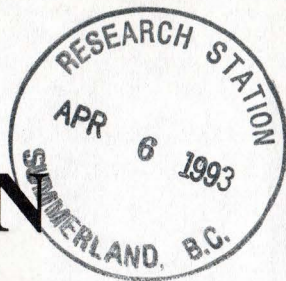
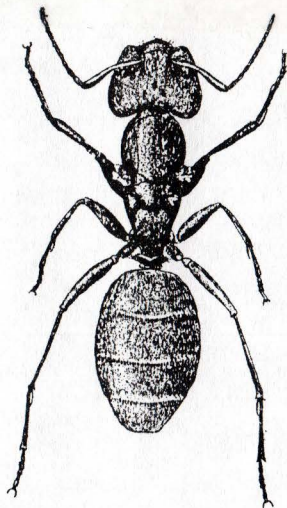

VOL 25

March - mars, 1993

No. 1



BULLETIN



ENTOMOLOGICAL SOCIETY OF CANADA
LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA

ENTOMOLOGICAL SOCIETY OF CANADA LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA

BULLETIN

VOL 25(1) - March / mars, 1993

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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 renseignement 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

SOCIETY BUSINESS / AFFAIRES DE LA SOCIÉTÉ

Notice of Executive Council Meeting

The mid-term meeting of the Executive Council will be held at the Entomological Society of Canada Office in Ottawa on April 21, 1993.

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.

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 any of the above meetings should be sent to the Secretary at the address below:

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) 682-9020
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

The deadline for submissions to be included in the next issue (Vol. 25(2)) is **May 1, 1993**

La date limite pour recevoir vos contributions pour le prochain numéro (Vol. 25(2)) est le **1 mai 1993**

The Entomological Society of Canada and The Canadian Federation of Biological Societies

In 1990 the ESC Board proposed that our Society join the CFBS and that for the first three years the annual membership fee for ESC members residing in Canada (foreign members are exempt) would be paid by Society funds rather than by individual members. This proposition was accepted at the 1990 Annual General Meeting, on the understanding that the situation would be re-evaluated in 1993 to determine:

- (i) if we should remain a member of the Federation, and
- (ii) if so, how the annual fees should be covered. (Presently these are \$50 and \$25, for full and student members, respectively.)

In the June 1993 *Bulletin* you will receive a mail ballot asking you to vote on the Board's recommendation concerning our future in CFBS. If we are to remain active within the Federation there will obviously be a financial cost to the membership. Whether this will be the full annual fee or a portion thereof has yet to be resolved by the Board. For the sake of argument I will assume the worst case scenario, with each Canadian member being asked to pay his/her entire annual CFBS fee. Thus, the cost would be \$25 or \$50 (plus tax!). This is not a negligible sum of money and one could reasonably ask "what am I getting for my money?" The Board is concerned that many members would consider this an unacceptable expense and leave the ESC, something that we obviously do not want.

However, before you vote I would ask that you look beyond your pocket book and consider the question from the perspective of science in Canada. The reasons for joining CFBS three years ago were two-fold: to be part of a coordinated lobby for Canadian Science at the political level (I believe the recent cutbacks in the budgets of government research laboratories and the granting agencies exemplify the need to be active in the political arena), and to increase the public awareness of science in this country. On the lobbying front, CFBS has been active, presenting briefs to Ministers and committees of the House of Commons and Senate on subjects as diverse as post secondary education, sustainable agriculture, pharmaceutical research, changes in the tax laws with respect to industrial expenditures on basic research in Canadian Universities, and the plight of federal scientists. CFBS has also initiated action towards the establishment of its long term ecological programme (CLERP). This initiative has been approved by the Royal Society of Canada and funds have been obtained from industry so that the first phase may be started this year. In 1992 CFBS raised \$60,000 for public awareness of science projects. A survey of media reporters dealing with biological sciences was commissioned and generated important information on reporters' perspectives of scientists, what they considered newsworthy items and how to get stories covered by the media. CFBS also published and distributed 1700 copies of *Science Sources* (a guide providing the names and addresses of Canadian experts in different biological and biomedical sciences) to reporters, science writers and government representatives. This initiative has been very well received and new editions will be prepared in future years. If you wish to be included, contact Clement Gauthier at the CFBS office.

The ex-Minister of Science, Winegard, when addressing the MRC Planning Conference, noted that "I cannot stress how important it is that the leadership in this area come from you. If it doesn't come from you, of necessity, then it will come from me, and that is not the way I like to see it — but I have a responsibility and I wish to live up to that responsibility. Take us over the hump in the next few years". Thus, we have two choices. Get involved and try to influence policy and public perception of the

importance of our activities, or leave the decisions that could affect both the current and future national scientific climate in the hands of others. Before voting in June I would ask you to consider which option you believe to be the most appropriate. You could save yourself \$50 a year or you could invest in Canadian science through an effective and credible organization. The choice is yours.

Jeremy McNeil
Université Laval

Science Policy Committee: Request for Information

Since the Entomological Society of Canada joined the Canadian Federation of Biological Societies, the ESC Science Policy Committee has not been actively dealing with science policy matters. These largely have been handled by the CFBS Science Policy Committee. I would like to see the ESC Science Policy Committee become active again in matters dealing with new issues and projects related to science and to entomology in particular. The purpose of this notice is to encourage Members of the Society to send the ESC Science Policy Committee any suggestions that they have for science related activities and issues that this committee may take on during the next few years. Please send your ideas to:

Dr. George H. Gerber
1993 Chairman
ESC Science Policy Committee
Research Station, Agriculture Canada
195 Dafoe Road
Winnipeg, Manitoba, R3T 2M9

1992 Science Policy Committee Report ¹

No contacts were made, nor lobbying conducted for increased R.&D. funding for entomologists; it was considered a waste of time during the current economic recession. Selected members were involved in the preparation, establishment, and expansion of legislation pertaining to the formulations of regulations controlling the use of non-insect biocontrol agents; "BioMal" was registered for use. Further monitoring of significant future aspects of bio-control policies is being maintained.

P.W. Riegert
1992 Chairman
ESC Science Policy Committee

¹ Please note that this first appeared in the December 1992 *Bulletin* Vol 24(4):150

Attention ESC Members

CFBS & the question of "science policy" is probably *the most contentious issue* in the Entomological Society of Canada this year. Don't be apathetic! Ask questions and/or offer your opinions. Let others know what *you* think! I am accepting items now for the June *Bulletin*.

Fiona F. Hunter



JOINT ANNUAL MEETING
of THE ENTOMOLOGICAL SOCIETY of CANADA
and THE ENTOMOLOGICAL SOCIETY of ONTARIO

Sault Ste. Marie, 26-29 September 1993
Water Tower Inn

Tentative Program

Saturday, 25 September 1993

09:00 - 17:00 Entomological Society of Canada, Governing Board Meeting
15:00 - 20:00 Registration

Sunday, 26 September 1993

10:00 - 15:00 Registration
13:00 - 17:00 Workshop: *"Writing grant applications"* • K. McKenzie
Workshop: *"Insect invasions and reductions"* • D. Larson
18:00 - 20:00 Entomological Society of Ontario, Governing Board Meeting
19:00 - 20:00 Students meet the Board
20:00 - 23:00 Wine and cheese

Monday, 27 September 1993

08:00 - 10:00 Registration
08:30 - 09:00 Welcome
09:00 - 09:15 ESC Awards
09:15 - 09:45 Gold Medal Address
10:00 - 12:00 Symposium: *"Graduate training in entomology"* • M. Isman
13:15 - 17:00 Graduate student papers (President's Prize)
Scientific communications
17:00 - 18:00 Entomological Society of Ontario, Annual General Meeting
19:00 - 21:00 Workshop: *"Gypsy moth"* • J. Witter
21:00 - 24:00 President's reception for the Board (by invitation)

Tuesday, 28 September 1993

08:30 - 12:00 Symposium: *"Natural products and insecticide development"* • R. Downer
Symposium: *"Ecology of natural populations"* • V. Nealis
13:00 - 15:00 Scientific communications
Workshop: *"Natural products for insect pest management strategies"* • B. Helson
15:30 - 16:00 Heritage lecture
16:00 - 17:30 Entomological Society of Canada, Annual General Meeting
18:30 - 19:30 Cocktails (cash bar)
19:30 - 23:00 Banquet

Wednesday, 29 September 1993

08:00 - 12:00 Scientific communications
Symposium: *"Application of recombinant DNA technology for insect control"* • A. Retnakaran, S.R. Palli
Workshop: *"Insect pest management in seed orchards"* • J. Turgeon
12:00 - 15:00 Entomological Society of Canada, Governing Board Luncheon Meeting

For additional information please contact:

Jean J. Turgeon (Chair) *or* Vince Nealis (Program Chair)
1219 Queen St. East, P.O. Box 490
Sault Ste Marie, Ontario, Canada P6A 5M7
Tel: (705) 949-9461 /Fax: (705) 759-5700

• **David Larson and Steve Marshall**

(Workshop: "*Insect invasions and reductions*")
Department of Biology
Memorial University
St. John's, Nfld, Canada A1B 3X9
Tel: (709) 737-4573/Fax: (709) 737-3018

• **Blair Helson**

(Workshop: "*Natural products for insect pest management strategies*")
1219 Queen St. East., P.O. Box 490
Sault Ste Marie, Ontario, Canada P6A 5M7
Tel: (705) 949-9461/Fax (705) 759-5700

• **Kenna McKenzie**

(Workshop: "*Writing grant applications*")
Department of Entomology
Cornell University
Comstock Hall
Ithaca, NY 14853-0999 USA
Tel: (607) 255-2096/Fax: (607) 255-0939/E-mail: SU3@cornella.cit.cornell.edu

• **John Witter**

(Workshop: "*Gypsy moth*")
School of Natural Resources
Dana Bldg
University of Michigan
Ann Arbor, MI 48109-1115 USA
Tel: (313) 764-2249/Fax: (313) 763-0415

• **Jean J. Turgeon and Peter de Groot**

(Workshop: "*Insect pest management in seed orchards*")
1219 Queen St. East, P.O. Box 490
Sault Ste Marie, Ontario, Canada P6A 5M7
Tel: (705) 949-9461 /Fax (705) 759-5700



E.S.C. Bulletin S.E.C.
REUNION CONJOINTE
de LA SOCIÉTÉ D'ENTOMOLOGIE du CANADA
et de LA SOCIÉTÉ D'ENTOMOLOGIE de l'ONTARIO

Sault Ste-Marie, 26-29 septembre 1993
Water Tower Inn

Samedi, 25 septembre 1993

09:00 - 17:00 Société d'entomologie du Canada, réunion d'affaires du conseil
d'administration
15:00 - 20:00 Inscription

Dimanche, 26 septembre 1993

10:00 - 15:00 Inscription
13:00 - 17:00 Atelier: "*Comment écrire des demandes de subventions*" • K. McKenzie
Atelier: "*Invasions et réductions d'insectes*" • D. Larson
18:00 - 20:00 Société d'entomologie de l'Ontario, réunion d'affaires du conseil
d'administration
19:00 - 20:00 Rencontre des étudiants avec le conseil d'administration
20:00 - 23:00 Vin et fromage

Lundi, 27 septembre 1993

08:00 - 10:00 Inscription
08:30 - 09:00 Mots de bienvenue
09:00 - 09:15 Décorations de la S.E.C.
09:15 - 09:45 Allocution, Médaille d'Or
10:00 - 12:00 Symposium: "*Les études gradués en entomologie*" • M. Isman
13:15 - 17:00 Communications scientifiques des étudiants gradués (Prix du Président)
Communications scientifiques
17:00 - 18:00 Société d'entomologie de l'Ontario, Assemblée générale annuelle
19:00 - 21:00 Atelier: "*La spongieuse*" • J. Witter
21:00 - 24:00 Réception du conseil d'administration par le Président
(invitation seulement)

Mardi, 28 septembre 1993

08:00 - 12:00 Symposium: "*Produits naturels et le développement des insecticides*"
• R. Downer
Symposium: "*L'écologie des populations naturelles*" • V. Nealis
13:00 - 15:00 Communications scientifiques
Atelier: "*Produits naturels pour la lutte contre les insectes nuisibles*"
• B. Helson
15:30 - 16:00 Allocution, Héritage
16:00 - 17:30 Société d'entomologie du Canada, assemblée générale annuelle
18:30 - 19:30 Cocktail (Bar payant)
19:30 - 23:00 Banquet

Mercredi, 29 septembre 1993

08:00 - 12:00 Communications scientifiques
Symposium: "*Utilisation de la technologie sur les recombinants
de l'ADN pour le contrôle des insectes*" • A. Retnakaran, S.R. Palli
Atelier: "*Protection des vergers à graines contre les insectes*"
• J. Turgeon
12:00 - 15:00 Société d'entomologie du Canada, réunion-dîner du conseil
d'administration

Pour de plus amples informations veuillez entrer en contact avec:

Jean J. Turgeon (Président) ou Vince Nealis (Programme)

1219 Queen St. East., C.P. 490

Sault Ste Marie, Ontario, Canada P6A 5M7

Tel: (705) 949-9461 /Fax: (705) 759-5700

• **David Larson et Steve Marshall**

(Atelier: *"Invasions et réductions d'insectes"*)

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Tel: (709) 737-4573/Fax: (709) 737-3018

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Tel: (705) 949-9461 /Fax (705) 759-5700

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(Atelier: *"Comment écrire des demandes de subventions"*)

Department of Entomology

Cornell University

Comstock Hall

Ithaca, NY 14853-0999 USA

Tel: (607) 255-2096/Fax: (607) 255-0939/E-mail: SU3@cornella.cit.cornell.edu

• **John Witter**

(Atelier: *"La spongieuse"*)

School of Natural Resources

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University of Michigan

Ann Arbor, MI 48109-1115 USA

Tel: (313) 764-2249/Fax: (313) 763-0415

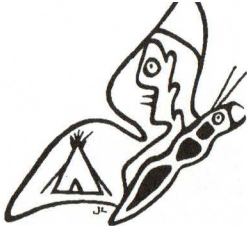
• **Jean J. Turgeon et Peter de Groot**

(Atelier: *"Protection des vergers à graines contre les insectes"*)

1219 Queen St. East., C.P. 490

Sault Ste Marie, Ontario, Canada P6A 5M7

Tel: (705) 949-9461 /Fax (705) 759-5700



JOINT ANNUAL MEETING
of THE ENTOMOLOGICAL SOCIETY of CANADA
and THE ENTOMOLOGICAL SOCIETY of ONTARIO

Sault Ste. Marie, 26-29 September 1993
Water Tower Inn

REGISTRATION FORM

Check one: Regular ☐ or Student ☐

Name: _____
Last First Initial

Title: _____

Address: _____

City: _____

Province/State: _____

Postal code: _____ Tel: _____ Fax: _____

Registration fees are in \$ Cdn (including banquet ticket and GST).

Late registration (after 15 August 1993) add \$15.00 to each fee.

Please make cheque payable to "Entomological Society of Canada 1993".

Registration, <i>regular</i>	<input type="checkbox"/>	\$100
Registration, <i>student</i>	<input type="checkbox"/>	\$50
Registration, <i>accompanying</i>	<input type="checkbox"/>	\$50

_____	_____
Name of accompanying person	TOTAL

Accommodations:

*A limited number of rooms have been set aside at the Water Tower Inn for this meeting.
Rates for those making reservation prior to 25 August 1993 are as follows:
single occupancy \$75, double \$90.*

Please make your own reservations through:

Water Tower Inn, 360 Great Northern Road, P.O. Box 787,
Sault Ste. Marie, Ontario, Canada P6A 5N3.

Telephone (705) 949-8111 Fax: (705) 949-1912

Reservations: 1-800- 461-0800 (toll free within Canada)

Note: Persons wishing to share a room, fill out and mail the "Share -A- Room Form"

Please return this form and registration fees to:

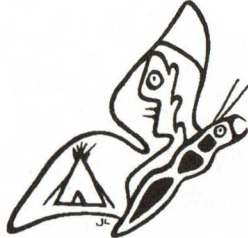
Dr. J. C. Cunningham

Joint Meeting 1993, E.S.C. - E.S.O.

1219 Queen St. East., P.O. Box 490

Sault Ste. Marie, Ontario

Canada P6A 5M7



JOINT ANNUAL MEETING
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Sault Ste. Marie, 26-29 September 1993
Water Tower Inn

**SUBMITTED PAPER, STUDENT PAPER
AND POSTER PRESENTATION FORM**

Please return to:

Dr. V. Nealis
Joint Meeting 1993, ESC-ESO
1219 Queen St. East., P.O. Box 490
Sault Ste. Marie, Ontario
Canada P6A 5M7

Deadline: Postmarked on June 30, 1993

Title (not to exceed 15 words): _____
Author's Name: _____
Institution and Address: _____
To be presented by: _____
Abstract (not to exceed 50 words): _____

Form of presentation desired (check one):

Regular

President's Prize*

Oral presentation: 12 min + 3 min discussion

☐

Poster presentation:

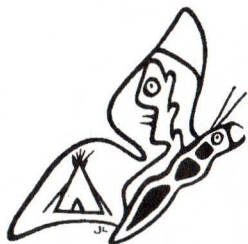
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Projection equipment:

*A Kodak carousel projector and an overhead projector will be available for each session.
Slides should be provided in a carousel. Please contact the program chairman if
additional equipment is required.*

* Students are eligible for the President's Prize if they meet the following criteria:

- 1) they must be enrolled in a graduate degree program or have graduated from the program less than six (6) months prior to the Meeting;
- 2) they must be registered at the Meeting;
- 3) they must be the principal investigator and sole author of the paper.



REUNION CONJOINTE
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Sault Ste-Marie, 26-29 septembre 1993
Water Tower Inn

**FORMULAIRE D'INSCRIPTION: COMMUNICATIONS ORALES
RÉGULIÈRES ET D'ÉTUDIANT(E)S, ET COMMUNICATIONS POSTERS**

Veillez retourner à:

Dr. V. Nealis

Réunion conjointe 1993, SEC-SEO

1219 Queen St. East., P.O. Box 490

Sault Ste. Marie, Ontario

Canada P6A 5M7

Date limite: 30 Juin 1993

Titre (maximum de 15 mots): _____

Auteur(s): _____

Organisme et adresse: _____

Présenté par: _____

Résumé (maximum de 50 mots) _____

Format de présentation (ne cocher qu'un choix)

Régulier

Le Prix du Président*

Communication orale: 12 min + 3 min de discussion

☐
☐☐
☐

Présentation d'un Poster:

Équipement audio-visuel: *un projecteur Kodak pour diapositives de 35 mm et un rétroprojecteur seront disponibles à chaque session. Veuillez contacter le responsable du programme si vous avez besoin d'équipement additionnel.*

* Les étudiants sont éligibles pour le Prix du Président s'ils satisfont les critères suivants:

1) ils doivent être inscrits dans un programme d'études post-graduée ou avoir gradué d'un tel programme dans les six (6) mois précédant la Réunion conjointe;

2) ils doivent être inscrits à la Réunion conjointe; et,

3) ils doivent être le chercheur principal et le seul auteur de la communication.



E.S.C. Bulletin S.E.C.
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and THE ENTOMOLOGICAL SOCIETY of ONTARIO

Sault Ste. Marie, 26-29 September 1993
Water Tower Inn

SHARE-A-ROOM FORM

If you wish to share a room with a colleague at the ESC/ESO Joint Annual Meeting in Sault Ste. Marie please supply the following information and we'll do our best to find you a roommate to share the cost.

Male ☐ Female ☐ Smoking ☐ Non-smoking ☐

Date of Arrival _____ Departure _____

Share with one person _____ or more _____

Name: _____

Address: _____

Telephone (Daytime): _____ Fax: _____

Please send this card to:

Dr. J. C. Cunningham

Joint Meeting 1993, E.S.C. - E.S.O.

1219 Queen St. East., P.O. Box 490 Sault Ste. Marie, Ontario Canada P6A 5M7



REUNION CONJOINTE
de LA SOCIETE D'ENTOMOLOGIE du CANADA
et de LA SOCIETE D'ENTOMOLOGIE de l'ONTARIO

Sault Ste-Marie, 26-29 septembre 1993
Water Tower Inn

FORMULAIRE : "PARTAGE-UNE-CHAMBRE"

Si vous désirez partager une chambre avec un collègue lors de la Réunion conjointe de la SEC/SEO à Sault Ste-Marie, prière de nous faire parvenir l'information suivante. Nous nous efforcerons de vous trouver une collègue pour partager les frais d'hébergement.

M. ☐ F. ☐ Fumeur ☐ Non Fumeur ☐

Arrivée _____ Départ _____

Partager avec 1 personne _____ ou plus _____

Nom: _____

Adresse: _____

Téléphone: _____ Fax: _____

Retournez ce formulaire à:

Dr. J. C. Cunningham

Réunion conjointe 1993, SEC-SEO

1219 Queen St. East., P.O. Box 490 Sault Ste. Marie, Ontario Canada P6A 5M7

Committees and Representatives for 1993

Standing Committees/Comités permanents

Nominations/Nominations

R.A. Ring, Chair, Victoria
(Tel. 604-721-7104)

Two members selected by the Chair

CFBS Representative/Représentant au CFBS

T.B.A.

Elections/Elections

T.D. Galloway, Chair, Winnipeg
(Tel. 204-474-6024)

Dave Rosenberg

Steve Pernal

President, *ex officio*

Fellowships/Compagnons

J.A. Shemanchuk, Chair, Lethbridge
(Tel. 403-327-4561)

J. McNeil (1994), Quebec

S. Marshall (1994), Guelph

L. Safranyik (1993), Victoria

E.E. Lindquist (1993), Ottawa

President, *ex officio*

Continuing Committees/Comités en cour

Achievement Awards/Pris d'excellence

L. Safranyik, Chair, Victoria
(Tel. 604-388-0600)

John McLean

Tara Sahota

President, *ex officio*

First Vice-President, *ex officio*

Annual Meeting/Réunion annuelle

1993 - Sault Ste. Marie - J. Turgeon

1994 - Winnipeg - D.P. Dixon

1995 - British Columbia - R.A. Ring

Bilingualism/Bilinguisme

J. Delisle, Chair, Saint-Foy
(Tel. 418-648-2526)

M. Cusson

J. Brodeur

Bylaws, Rules & Regulations/Règlements

D. Quiring, Chair, Fredericton
(Tel. 506-453-4501)

Member selected by the Chair

President, *ex officio*

Endangered Species/Espèces menacées

T. Pike, Chair, Calgary, ESA
representative (Tel. 403-220-6791)

S. Cannings, ESBC representative

B. Landry, Ottawa

M. Erlandson, Saskatoon, ESS
representative

W.B. Preston, Winnipeg, ESM
representative

H. Goulet, Ottawa, ESO representative

M. O'c. Guibord, Quebec, SEQ
representative

A.W. Thomas, Fredericton, AES
representative

Finance/Finance

G. Gibson, Chair, Ottawa
(Tel. 613-996-1665)

I. Smith, Ottawa

S. Marshall, Guelph

E. Becker, Ottawa

M. Isman, Vancouver

President, *ex officio*

Treasurer, *ex officio*

Heritage/Héritage

P.W. Riegert, Regina
(Tel. 306-584-4224)

Insect Common Names/Noms communs d'Insectes et Élevages

E.M. Belton, Co-Chair, Burnaby
(Tel. 604-420-3181)

D.C. Eidt, Co-Chair, Fredericton
(Tel. 506-452-3551)

J.S. Kelleher, Cultures List, Ottawa
(Tel. 613-996-1665)

A. McClay, Vegreville, ESA
representative

K. Moore, Saskatoon, ESS representative

R. Roughley, Winnipeg, ESM
representative

P. Syme, Sault Ste-Marie, ESO
representative

H. Chiasson, SEQ representative

D. Finnamore, Fredericton, AES
representative

Membership/Adhésion

A.S. McClay, Chair, Vegreville
(Tel. 403-632-8207)
P.J. Albert, SEQ representative

Public Education/Éducation publique

I.S. Otvos, Chair, Victoria
(Tel. 604-363-0600)

Publications/Publications

L.M. Dosdall (1993), Chair, Vegreville
(Tel. 403-632-8225; Fax 403-632-8379)
R. Anderson (1993), Ottawa
S. Smith (1994), Toronto
P. Kevan (1994), Guelph
A. Keddie (1995), Edmonton
P. Mason (1995), Saskatoon
President, *ex officio*
Scientific Editor, *The Canadian Entomologist*, *ex officio*
Scientific Editor, *Memoirs*, *ex officio*
Bulletin Editor, *ex officio*
Managing Editor, *ex officio*

Scholarships/Bourses d'étude

P. Fields, Chair, Winnipeg
(Tel. 204-983-1468; Fax 204-983-4604)
L. Safranyik, Victoria, ESBC representative
A. McClay, Vegreville, ESA representative
B. Chapco, Regina, ESS representative
J. Conroy, Winnipeg, ESM representative
D. Coderre, SEQ representative
W. Seabrook, Fredericton, AES representative
J. Corrigan, Guelph

Research-Travel Grants/Octrois pour la Recherche et les Déplacements

G. Boivin, Chair, St.-Jean-sur-Richelieu
(Tel. 514-346-4494)
P. Martel
D. Coderre
P.L. Dixon

Science Policy/Politique scientifique

G.H. Gerber, Chair, Winnipeg
(Tel. 204-983-1460)
L. Safranyik, Vice-Chairman
P.L. Dixon

N.J. Holliday
D.L. Johnson
President, *ex officio*

Student Affairs/Affaires étudiantes

K. MacKenzie, Chair, Ithaca N.Y.
(Tel. 607-225-2096)
Members selected by the Chair
President, *ex officio*

Ad Hoc Committees/Comités Ad Hoc

Diseases & Insects of Vegetables/Maladies et Insectes des Légumes

J.A. Garland, Chair, Entomology Content, Ottawa (Tel. 613-995-7900)
G. Boivin, St.-Jean-sur-Richelieu
R.P. Jaques, Harrow
L. Thompson, Charlottetown
W. Turnock, Winnipeg
R. Vernon, Vancouver

Headquarters/Siege social

J. Cumming, Chair, Ottawa
(Tel. 613-996-1665)
G. Gibson, Ottawa
R. Footitt, Ottawa

Marketing Committee/Comité du marketing

J.D. Shorthouse, Chair, Sudbury
(Tel. 705-675-1151)
G. Surgeoner
A. Finnermore

Systematics Enhancement Committee/Comité pour accroître l'utilisation de la systématique

S.A. Marshall, Chair, Guelph
(Tel. 519-824-4120)

Insect Rights/Droits des Insectes

T.B.A.

(Note: The year given after a committee member's name indicates the year in which s/he steps down from the committee.)

Nominations Committee Report

The following list of nominees for the offices in the Entomological Society of Canada has been received from the Nominating Committee.

Le Comité des nominations a soumis la liste des candidats suivants pour des postes de la Société d'Entomologie du Canada.

Second Vice President/Deuxième Vice Président

Guy Boivin
David Rosenberg

Director-at-Large/Directeur

Cedric Gillott
Felix Sperling
Howard Thistlewood

Fellowships Committee

Peter Harris
Geoffrey Scudder
William Seabrook

Additional nominations must be signed by three members in good standing and received by **30 April 1993** by the Secretary, Dr. Rick West.

S'il y a d'autres mise en candidature pour ces memes postes, celles-ci doivent être signée par trois membres de la Société et envoyée avant le **30 avril 1993** au secrétaire Dr. Rick West.

Biographical Notes

Candidate for Second Vice-President

Guy Boivin

Le Dr Guy Boivin a obtenu son doctorat de l'Université McGill en 1981 et il occupe depuis un poste de chercheur en entomologie à la Station de Recherches d'Agriculture Canada à St.-Jean-sur-Richelieu. Il est également Professeur auxiliaire au Département d'Entomologie du Collège Macdonald de l'Université McGill depuis 1984. Le Dr Boivin a publié environ 70 articles scientifiques et quelques chapîtres de livres. Il a reçu en 1985 le Prix Léon Provancher de la Société d'Entomologie du Québec en reconnaissance de ses contributions à l'avancement des Sciences Entomologiques et en 1988 le Prix C. Gordon Hewitt de la Société d'Entomologie du Canada en reconnaissance de sa contribution exceptionnelle à l'entomologie canadienne. Le Dr Boivin s'est impliqué dans les sociétés d'entomologie provinciale et canadienne en étant vice-président (1992) puis président (1993) de la Société d'Entomologie du Québec et Directeur National de la Société d'Entomologie du Canada (1991-93).

Dr. Guy Boivin obtained his Ph.D. from McGill University in 1981 and has since been with the Agriculture Canada Research Station at St-Jean-sur-Richelieu as a research scientist. He is also Auxiliary Professor at the Department of Entomology at Macdonald College of McGill University. Dr. Boivin has published about 70 scientific papers and several book chapters. In 1985 he received the Prix Leon Provancher from the Entomological Society of Quebec in recognition of his contributions to Entomol-

ogy. In 1988 he received the C. Gordon Hewitt Award from the Entomological Society of Canada for outstanding achievement in Canadian Entomology. Dr. Boivin has also worked at the provincial and national levels in entomological societies. He was the Vice-President (1992) and President (1993) of the Entomological Society of Quebec; from 1991-93 he was Director-at-Large for the Entomological Society of Canada.

Candidate for Second Vice-President

David M. Rosenberg

Dr. David Rosenberg obtained his B.Sc. (Hons.) (1965) and Ph.D. (1973) from the Department of Entomology, University of Alberta. He joined the Freshwater Institute in 1971 to work on the Mackenzie Valley Pipeline Project, and has been involved in a succession of environmental impact studies since then. His recent research interests include the ecology of Chironomidae, aquatic insects of Canadian wetlands, and the use of aquatic invertebrates in biomonitoring. Together with Vince Resh, he has edited two books (*The Ecology of Aquatic Insects*, and *Freshwater Biomonitoring and Benthic Macroinvertebrates*) and authored an invited paper for the C.P. Alexander Fund (Spatial-Temporal Variability and the Study of Aquatic Insects). In addition to his duties as a Research Scientist at the Freshwater Institute, Winnipeg, Manitoba, he is an Adjunct Professor in the Department of Entomology, University of Manitoba.

Dr. Rosenberg has been a member of the ESC since his student days, was a member of the Entomological Society of Alberta, and is currently a member of the Entomological Society of Manitoba. He has served two terms as a member of the Scientific Committee of the Biological Survey of Canada (Terrestrial Arthropods). He is a Past-President of the North American Benthological Society and currently serves as Chairman of the Constitutional Revision Committee of NABS. He is a Fellow of the Rawson Academy of Aquatic Science and is on the Science Advisory Board of the Aquatic Resources Centre (Franklin, TN). He has served on the Editorial Board of the *Canadian Journal of Fisheries and Aquatic Sciences* and has been as Associate Editor for the *Journal of the North American Benthological Society*. He is currently as Associate Editor for the *Journal of Aquatic Ecosystem Health*. In 1991, he was the Thienemann Lecturer at the Xth International Symposium on Chironomidae in Amsterdam.

Candidate for Director-at-Large

Cedric Gillott

Dr. Cedric Gillott received his B.Sc., Ph.D. and D.Sc. from the University of Nottingham. Twenty-eight years ago he joined the Department of Biology at the University of Saskatchewan as an Assistant Professor. He remains at the same institution today, as a Full Professor. Throughout his academic career, Dr. Gillott has been interested in the development, reproduction and endocrinology of insects. He has been involved in integrated pest management research of Prairie insects. He is the author of the senior undergraduate textbook, *Entomology*, which is currently being revised. Dr. Gillott has served as President of the Entomological Society of Saskatchewan (1982-83) and Council Member of the Canadian Society of Zoologists (1976-79). He also belongs to the Royal Entomological Society of London, Orthopterist's Society and the International Society for Invertebrate Reproduction. From 1983 to 1986 he was a Member of the NSERC Animal Biology Grants Committee. Twice he has served on the Editorial Advisory Board of the *Canadian Journal of Zoology* (1976-82 and 1992-present). Since the early eighties he has been actively involved in the Entomological Society of Canada (Scholarships Committee, 1982-84; Nominations Committee, 1989-90; Achievement Awards Committee, 1990-91).

**Candidate for Director-at-Large
Felix Sperling**

Dr. Felix Sperling received his B.Sc. in Zoology and his M.Sc. in Entomology from the University of Alberta. He completed his Ph.D. at Cornell University in 1991, on the genetics and molecular systematics of papilionid butterflies. Since then he has been a postdoctoral fellow with Insect Biotech Canada at the University of Ottawa, working on DNA-based diagnostics and molecular systematics of the spruce budworm species group. His research interests include the influence of population structure and genome structure on speciation in insects. He has ongoing projects on weevils, and a variety of lepidopterans, and he is particularly interested in providing cost-effective, simple means of identification in complexes of pest insects. He has been an enthusiastic naturalist since childhood. Dr. Sperling has been a member of the Entomological Societies of Canada and Alberta since 1980.

**Candidate for Director-at-Large
Howard M.A. Thistlewood**

Dr. Howard Thistlewood was born in England, brought up in western Canada and Europe, and studied at the University of Southampton (B.Sc. Hons., Zoology 1977), Simon Fraser University (M.P.M. 1979, Ph.D. 1986) and Ohio State University (Summer Acarology Program 1986). In graduate studies, he received Commonwealth and NSERC Postgraduate Scholarships, and a B.C. GREAT award. Early interests in arthropods and ecology led to studies of ants in Spain, leaf-cutter ants in Brazil, and Ph.D. research on mullein bug in the Okanagan Valley under John Borden. Between studies, he volunteered in wildlife conservation in West Germany, and was Pest Management Specialist for the University of Guelph and the Ontario Ministry of Agriculture and Food. Since 1986, Dr. Thistlewood has been a Research Scientist with Agriculture Canada at Vineland Research Station, Ontario, working in the areas of biological control and pest management on fruit and protected crops. He is a member of five entomological and acarological societies, I.O.B.C., and a Director of the Entomological Society of Ontario. His aims as a Director of E.S.C. would be to further cooperation between E.S.C. and other scientific societies, amateur entomologists, and school systems, and to represent government entomologists.

Page Charge Increase Approved by the Governing Board

At the Governing Board Meetings in September 1992, the Finance Committee made the following recommendations to the Governing Board:

- (1) Page charges for *The Canadian Entomologist* be established at \$30.00
- (2) Page charges for the *Memoirs* be established at \$45.00
- (3) Current rates for author reprints be increased by 10%.

The Governing Board referred these recommendations to the Finance and Publications Committees for further consideration. These committees now are recommending that the Society implement these increases as quickly as possible to cover the deficit in our current budgets. The Executive Council has

drafted three new standing rules in order to carry out the recommendations of these committees and these **were approved** in a ballot vote by the Governing Board in February. The rules read as follows:

- (1) The charge for publication in *The Canadian Entomologist* shall be thirty dollars (\$30.00) for each page, effective for all manuscripts received after 1 March, 1993.
- (2) The charge for publication in the *Memoirs* of the Entomological Society of Canada shall be forty-five dollars (\$45.00) for each page published after 1 January 1994.
- (3) The cost of reprints from *The Canadian Entomologist* and from the *Bulletin*, effective for manuscripts received after 1 March 1993, shall be as follows:

Pages	1-4	5-8	9-12	13-16	17-20	21-24	25-28
First 100	\$66	\$95	\$127	\$164	\$212	\$262	\$321
Additional 100s	\$22	\$29	\$35	\$43	\$48	\$56	\$64

Before the above increases can take effect, they must be approved by the general membership of the Society. The vote to allow page charges to be increased will be held at the Annual General Meeting in Sault Ste. Marie on September 28th 1993.

Rick West
Secretary

MEMBERS IN THE NEWS

Entomological Journalism Wins Bronze Award

Owen Roberts, of the University of Guelph, received a bronze award in the 1992 Canadian Farm Writers' Federation annual awards for press releases in Calgary in September. His press release spawned over 60 newspaper articles nationally and is based on the work by **Peter Kevan**, also at the University of Guelph, on the problems facing pollination, bees, and beekeeping in Canada. These articles resulted in a number of interviews on radio on the same subject.

This award, for an entomological and environmental story is noteworthy. It acknowledges the importance of the agricultural press corps and the value of research communication. Perhaps more significant is the biological/environmental recognition given by Farm Writers' Federation of a generally unappreciated area of science, i.e., entomology.

Reference: Kevan, P.G., E.A. Clark, and V.G. Thomas. 1990. Insect pollinators and sustainable agriculture. *American Journal of Sustainable Agriculture* 5: 13-22.

Neal L. Evenhuis - Recipient of Thomas Say Award

Bishop Museum Entomologist, Neal L. Evenhuis, has been named the 1992 recipient of the Thomas Say Award. This award is given annually by the Entomological Society of America for "significant and outstanding work in the fields of insect systematics, morphology, or evolution." The award recognizes Dr. Evenhuis' recent publication of the *Catalog of the Diptera of the Australasian and Oceanian Regions*.

Active in the classification and evolution of Diptera for more than 20 years, Dr. Evenhuis has published three books and more than 130 scientific articles. Internationally known for his work in fly classification, he currently chairs the International Congress of Dipterology's committee working to establish a consistent world system for fly classification. This classification is vital to understanding the biology of flies and is useful to the fields of agriculture, forestry and public health.

Evenhuis earned his B.S. and M.S. degrees at California State Polytechnic University, Pomona, and his Ph.D. at the University of Hawaii at Manoa. He has previously been honoured with the Oberly Award from the American Library Association for his 1983 reference book, *An Indexed Bibliography of Bombyliidae*.

Ken Davey - Recipient of the 1992 CCUBC Distinguished Biologist Award

The Canadian Council of University Biology Chairs awarded Dr. Ken Davey, Biology Department, York University its 1992 Distinguished Biologist Award at its Annual General Meeting held in Winnipeg, November 5-7, 1992. This annual award is presented to a biologist who has made a significant contribution to academic biology service, especially in the area of administration, while maintaining a high profile as a teacher and researcher.

Dr. Davey has served as: Director, Institute of Parasitology (McGill University); Chair, Department of Biology; Dean, Faculty of Science; and Vice-President (Academic Affairs) at York University. At the same time, he has maintained an internationally recognized research program in insect endocrine physiology. His commitments to Canadian institutions including the Natural Sciences and Engineering Research Council, the Huntsman Marine Laboratory, the Biological Council of Canada, the Canadian Society of Zoologists, and the Royal Society of Canada have been and continue to be extensive. CCUBC clearly has selected an outstanding academic biologist to receive this award.

T.W. Moon, Past-President CCUBC
University of Ottawa

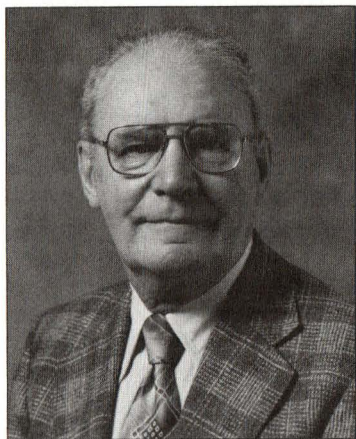
David Finnamore - Recipient of Agrologist of the Year Award (NBFA)

David Finnamore, a retired extension entomologist from the Plant Industry Branch of the Agriculture Department, has been awarded the James Robb Agrologist of the Year Award from the New Brunswick Federation of Agriculture. He recently retired (in June of 1991) following 41 years of service in plant and potato protection and promotion. He worked on "everything from apple maggots to corn earworm", and cooperated with the Beekeepers Association and with forestry entomologists working on the gypsy moth problem.

The Robb Award is presented annually to recognize the contributions of individuals who serve the farming community above and "beyond the normal call of duty". David Finnamore was presented with this award to honour his service to the farming community.

from *The Daily Gleaner*

IN MEMORY



Arthur Grant Robinson (1916-1992): A Tribute

Grant Robinson, Professor Emeritus of Entomology at the University of Manitoba, died on 21 October 1992 at the age of 76 years. Grant was born in Wadena, Saskatchewan. His father was a school master, whose job required him to move frequently, and so Grant spent his youth in a succession of small towns in Saskatchewan. Grant obtained his Senior Matriculation at Langham High School in 1933, the height of the Great Depression. Of those times, two of Grant's recollections come to mind. One, how as a school boy, armed with tin can and wooden spoon, he walked the fields for pennies an hour, spreading bait for grasshopper control. The second, of how he, like many others, rode the rails in search of work.

In 1938, he joined the Princess Patricia Canadian Light Infantry. During the Second World War, he served overseas for five and a half years, and saw action in campaigns from North Africa to Germany. He was awarded the Military Cross for his service in Italy. Although he retired to civilian life in 1946, he served with the University of Manitoba contingent of the Canadian Officer Training Corps from 1953-1967, and retired at the rank of Lieutenant-Colonel after 7 years as Commanding Officer of the unit. In 1961, he received the Canadian Forces Decoration for service to the Canadian Armed Forces and Canada.

While in England during the war, he met and married Rose, his wife of almost 50 years, and in 1946 they moved to Winnipeg, where Grant began his university education. In 1950, he graduated from the University of Manitoba with a B.S.A. degree and the H.W. Kennedy Prize in Horticulture and Forestry. He earned his M.Sc. from McGill University in 1952, and his Ph.D. from the University of Manitoba in 1961. He gained experience in entomology during summer work at the Agriculture Canada Research Stations at Morden (1948) and Brandon (1949-52), Manitoba. After his M.Sc., he was a Research Officer at the Agriculture Canada Research Station in Vineland Station, Ontario, until, in 1953, he joined the Department of Entomology, University of Manitoba as an Assistant Professor. He became an Associate Professor in 1957, was promoted to Professor in 1966, and was Head of the Department from 1977 until his retirement in 1981. Then, the title "Professor Emeritus" was conferred upon him. For a decade following his retirement he continued to participate in the Department's activities, and to hold research grants and be active in research.

Grant taught undergraduate courses in the areas of introductory entomology, insect control and insect taxonomy; he also taught graduate courses in taxonomy and economic entomology. His lecture style was not flamboyant, but it was effective. He was a kindly teacher who extracted the best from his graduate and undergraduate students. He supervised six Ph.D. and 13 M.Sc. students, all of whom remember him as an outstanding supervisor and teacher. He strongly believed that research should be approached methodically and with discipline. Most of his students worked on applied or basic aspects of Homoptera. Topics included the biology of the leafhopper, *Macrostelus fascifrons*, and aster yellows disease; effects of plant growth regulators and chemosterilants on aphids; interactions of aphids and their

host plants; natural enemies of aphids; ant - aphid associations; and a series of taxonomic studies of aphids.

Grant was a key figure in the Department's extension activities on insect control. His name appeared on over 100 extension publications relating to insects of fruit, vegetables, field crops, trees and livestock. He also wrote the entomology section in all five editions of "Principles and Practices of Commercial Farming" produced by the Faculty of Agriculture. His breadth of taxonomic knowledge, and his long experience, enabled him to deal effectively with the numerous requests from the public and extension workers for insect identification and control recommendations. After his retirement, when his colleagues assumed this load, he remained an invaluable, willing, and frequently-consulted source of information.

Grant believed strongly in service and duty and this was evident when, as its head, he guided the Department of Entomology through some difficult times. His leadership benefited the discipline of Entomology far beyond the University of Manitoba. He served effectively on numerous university, professional society, and church committees, and was President of the Entomological Society of Manitoba for two terms. He was member of the Canadian Colombo Plan Team at Khon Kaen University, Thailand 1969-1970. He served the Manitoba Institute of Agrologists in several capacities, and in 1981 the Institute awarded him a 25 year pin. He was a long-standing member of the Entomological Society of America, and regularly attended E.S.A. annual meetings. For his outstanding contributions to entomology, he was elected an Honorary Member of both the Entomological Society of Manitoba and the Entomological Society of Canada. In 1980, in recognition of his excellence in teaching, research and service, he was elected a Fellow of the Entomological Society of Canada.

Grant's greatest research love was aphid taxonomy, and in this area he had an international reputation. He and his graduate students collected aphids across Canada, but particularly in the North. He amassed one of the largest aphid collections in Canada, containing almost 100,000 specimens. He was sole author of papers describing 56 new species and three new genera of aphids, and co-author of papers describing an additional seven aphid species. Of the species he described, only one has since been synonymized. He published 69 scientific papers and was a participant and invited speaker in a number of international symposia dealing with aphids. He looked upon retirement as an opportunity to concentrate on his taxonomic research; for a full 10 years, he was to be found at his microscope almost every morning, and he produced a steady stream of research papers.

Grant Robinson demanded of himself great self-discipline and high standards of behaviour, and expected the same of those around him. At first contact, he did not reveal much of his inner self, and he could appear gruff and forbidding. Beneath this rather austere surface, was a kind, unselfish man with a quiet sense of humour, a man who was a true friend. His wise counsel was sought after by students and colleagues alike. He was, to use a currently fashionable word, a mentor; he had a ready ear, offered sound advice, and displayed the utmost discretion and integrity.

He was a loving husband, and a doting father and grandfather. He is survived by his wife, Rose, whom he married in England in 1942, their daughter Shirley and her husband Jim, and two granddaughters Jodi and Dana. To his family, we extend our sympathy. To those of us who knew Grant well, he will be remembered as an officer, a gentleman, a splendid teacher, administrator and researcher - but most of all, as a dear friend. In early 1992, the Department of Entomology presented Grant with a plaque, to recognize a decade of post-retirement contribution to the Department. The plaque's inscription perhaps

best encapsulates the esteem with which Grant was held by his colleagues and friends; it reads, in part, "... an inspiration to us all."

To ensure that the results of Grant's work are available to those who need them, his colleagues are preparing lists of his scientific publications, of the taxa he described, and of the aphids in his collection, including current depositions in the J.B. Wallis Museum of Entomology, University of Manitoba, the Canadian National Collection, and the United States National Museum. These will be published in the *Proceedings of the Entomological Society of Manitoba*, Volume 48. A scholarship fund has been set up to honour the memory of Grant Robinson, and to reward academic excellence in undergraduate students of Entomology at the University of Manitoba. For further details of this fund, please contact Dr R.A. Brust, Head, Department of Entomology, University of Manitoba, Winnipeg, Manitoba, R3T 2N2, Canada.

N. J. Holliday and S. C. Jay
Department of Entomology
University of Manitoba

Dr. Richard Handford

Dr. Richard (Dick) H. Handford passed away in hospital in Victoria, B.C. on December 17 1992. He was 87 years old. Dr. Handford began his service with Agriculture Canada at the Brandon Research Station in Brandon, Manitoba. In his research he specialized in grasshoppers. He continued in this line of research when he moved to the Kamloops Research Station in 1946. He is well-known for documenting "year-hopping grasshoppers" at their northern range, where at least some individuals took more than one year to complete their life cycle.

In 1949 he assumed the Directorship of the *Field Crops Insects Laboratory* and in 1955, when this amalgamated with the *Veterinary and Medical Insects Laboratories*, Richard Handford was placed in charge of the new unit of the Science Service, known simply as *The Entomology Laboratory*. At this time the laboratory was located on 13 ha of land, 5 km west of Kamloops.

While at Kamloops, Richard and his wife, Sandra, were very active in figure skating. He was a member of the Kamloops Rotary Club and local Chess Club. He retained membership in the Agricultural Institute of Canada and the B.C. Institute of Agrologists until his death. Mrs. Sandra Handford still lives in Victoria.

NEWS OF ORGANIZATIONS

International Commission on Zoological Nomenclature

Applications published in the *Bulletin of Zoological Nomenclature*

The following applications were published on 17 December 1992 in Vol. 49, Part 4 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 2825. *Pachyrhynchus* Germar, 1824, *Somatodes* Schönherr, 1840 and the specific name of *Pachyrhynchus moniliferus* Germar, 1824 (Insecta, Coleoptera): proposed conservation.

R.T. Thompson

c/o Department of Entomology, The Natural History Museum, Cromwell Road, London,
SW7 5BD, U.K.

Abstract. The purpose of this application is to conserve the names *Pachyrhynchus* Germar, 1824, and *Somatodes* Schönherr, 1840 for two genera of weevils (CURCULIONIDAE) occurring in southwest Asia and South Africa respectively. Both names are threatened by the long-overlooked name *Somatodes* Schönherr, 1823 which is a senior subjective synonym of *Pachyrhynchus* and a senior homonym of *Somatodes* Schönherr, 1840. The conservation is also proposed of *P. moniliferus* Germar, 1824, the type species of *Pachyrhynchus*.

The following **Opinions** were published on 17 December 1992 in Vol. 49, Part 4, of the *Bulletin of Zoological Nomenclature*:

Opinion 1697. *Chelifer museorum* Leach, 1817 (currently *Cheiridium museorum*; Arachnida, Pseudoscorpionida): specific name conserved.

Opinion 1698. *Brahmaea* Walker, 1855 (Insecta, Lepidoptera): *Bombyx certhia* Fabricius, 1793 confirmed as the type species.

Canadian Museum of Nature

The Canadian Museum of Nature has announced the formation of a Task Force on Canadian Biosystematics. This Task Force will have a broad regional and taxonomic representation to plan a national network for biosystematics.

The Task Force will review available information and views on issues such as:

- (1) the adequacy of existing personnel, recruitment needs, and programmes for training
- (2) the levels of care and development of collections
- (3) the scope and significance of current research and services
- (4) resources in terms of physical and support facilities, libraries, and funding
- (5) collaboration among institutions with biosystematic strength and/or needs

Information and views will be sought from governmental agencies, museums, universities, scientific societies, and other groups. The Task Force will develop the structure and function of a national network to coordinate biosystematics scientifically and as applied to social priorities.

The inaugural meeting of the Task Force on Canadian Biosystematics was held on December 16, 1992. Ten members of the Task Force, and seven observers were present. The meeting was chaired by Dr. Patrick Colgan (Associate Director, Canadian Museum of Nature).

The following list provides names of individuals who are members of the Task Force, and their respective areas of responsibility: D. Lafontaine (Federal), D. McAlpine (Maritimes), P. Brunel (Quebec), R. Winterbottom (Ontario), B. McKillop (Manitoba & Territories), V. Harms (Saskatchewan), P. Stepney (Alberta), G. Scudder (British Columbia), and S. Peck (Universities).

Report on The First International Workshop on Non-*Apis* Bees and Their Role as Crop Pollinators, Logan, Utah, August 10-13, 1992.

Honey bees were originally cultivated for their honey and wax production, quite understandable to those with a sweet tooth or a romantic disposition. Their roles as pollinators have, historically, perhaps been more secondary. With the increase in size of the average monoculture plot, native pollinator species (non-*Apis* bees and other insects) had greater difficulty in maintaining nest sites throughout the areas requiring pollination and massive transportation of honey bee colonies became necessary. As a result of africanisation and particularly bee mites and diseases, the mobility of honey bee hives is being reduced and searches for alternative pollinators are intensifying. Thus, this workshop was timely.

Non-*Apis* bees have been managed in North America since the early 1950's with first the alkali bee (*Nomia melanderi*) and then the alfalfa leaf cutting bee (*Megachile rotundata*) being used for alfalfa pollination. The first day of the workshop was primarily devoted to the biology and management of the alfalfa leafcutting bee. The use of this species is growing both geographically and in terms of the variety of crops it is used to pollinate. Careful management has enabled this species to be used as a pollinator in northern Canada (Fairey and Lefkovich), Eastern Europe (Krunic et al., abstract only), New Zealand and Australia (Woodward), China (Zhang et al.) and Mongolia (Seidelman and Dorn) in addition to Western North America where it was first used. Under this wide range of conditions it is not surprising that a diversity of natural enemies need to be dealt with in leafcutter bee management. In Asia, conopid flies cause major losses and control measures remain to be developed against these internal parasites of adult bees. In North America, chalkbrood and various parasitoid Hymenoptera remain the most important pests and several talks and poster presentations dealt with methods for combatting these enemies. Canadian leafcutter bee management is particularly effective in reducing mortality and as a result, Canadian stock is exported worldwide with between 150 and 300 million bees being exported to the US alone annually (Richards) and at 0.5 cents per bee they are a bargain!

The range of crops being pollinated by this one species is growing fast. Many legumes other than alfalfa have improved seed set when exposed to *M. rotundata* although annual species do not benefit much (Richards). Preliminary trials suggest that the species may even be useful as a pollinator of blueberries (Javorek and Fisher). The effectiveness of various nesting material for this species was the topic of most of the remainder of the first day's presentations.

The morning session of the second day was devoted to non-social, non-alfalfa leafcutting bee pollinators. Suzanne Batra started the session with a detailed history of observations of the utility of such bees as pollinators. As the subtitle to her talk indicated - much is known but little has been done! Most of the remaining talks concentrated upon the use of *Osmia* species as pollinators for crops such as blueberries (Drummond et al., Stubbs et al.), almonds (Bosch), strawberries (Pinzaui) and apples (Sekita and Yamada). Clearly these trap nesting species have great potential for pollinating a wide variety of crops. Of particular interest were the calculations made by Jim Cane concerning the effectiveness of different pollinators of blueberry in the southeastern United States. Although honey bees are often imported for blueberry pollination, less than one one-hundredth of one percent of the pollen they collect comes from blueberries and single honey bee visits to virgin flowers resulted in no detectable increase in fruit set! In contrast, with *Bombus* and *Habropoda laboriosa*, single visits to bagged flowers were almost as effective in eliciting fruit set as were uncounted visits to unbagged flowers in an open field situation.

The first afternoon session concentrated upon the use of bumblebees as crop pollinators. Business operations on several continents have been established to produce bumble bee colonies for commercial pollination particularly in greenhouse situations (de Ruijter et al., Wyborn and Matteoni). Pomeroy and Fisher presented some calculations of the cost-effectiveness of these social pollinators which require fairly labour intensive methods of mass production. At an estimated cost of \$5.00 per bee (established colonies typically sell for around \$500), *Bombus* is an extremely valuable pollinator of greenhouse tomatoes but remains marginal for some other crops such as kiwi fruit and blueberries. Quality control in bumble bee colony production is thus of particular concern. This was assessed by Duchateau who demonstrated convincingly the utility of basic sociobiological research to practical problems in crop pollination.

The rest of the afternoon was taken up by more basic bee biology with talks ranging from the biology of ground-nesting megachilids (Thorpe) to computer simulations or relatedness in communal bees (Danforth).

The third day began with a session on foraging and nesting behaviour of non-*Apis* bees. Of particular interest were the findings of Dobson on the cues used by bees in flower selection. Such research is a prerequisite for field manipulations involving spraying various attractants over fields requiring pollination which might coerce bees into pollinating plants that they might not visit under normal circumstances. Another particularly illuminating talk was given by Thomson and Wilson who showed that depending upon pollen removal and deposition rates, different pollinators may have very different effects on fruit set in the plants they visit. Interactive effects of different pollinators were shown to be quite complex. In some circumstances, the introduction of large numbers of particular pollinator species may result in a reduction in the amount of seed or fruit set over that which may have been obtained under natural conditions. Under some circumstances the bad bees are *Apis*, although to be fair it should be pointed out that in other situations native pollinators may hinder the pollinating efficiency of the honey bee. Detailed comparative studies are required in each case rather than the simple assumption that just because lots of pollen is being brought back to the hive the honey bees must be doing a good job of pollinating the crop which surrounds their colony. The afternoon session dealt with bee-plant interactions dealing with the ecology of a variety of bees with stingless bees of the American tropics predominating.

The last day of the workshop was more systematic in outlook. The morning session started with phylogenetic analyses of long-tongued bees (Roig-Alsina and Michener). As a result of painstaking phylogenetic analyses it is now clear that separation of the Apidae and Anthophoridae renders the latter paraphyletic. Consequently, long tongued bees that are not megachilids should be referred to the family Apidae as Michener first suggested in 1944! The importance of phylogenetic studies to other areas of bee biology was made clear in other talks in this session: with studies of foraging (Eickworth), social evolution (Richards et al.), origins of cleptoparasitism (Reyes presented by Yanega), mating systems (Minckley) and internal anatomy (Alexander and Minckley) all being made in a more rigorous manner by using the results of cladistic analysis.

The final session of the workshop dealt with bee biodiversity and conservation. Frankie noted the frightening drop in bee numbers in dry tropical forests in Costa Rica with bee numbers down to as much as 5% of their previous levels 20 years ago in some samples. Roubik documented the effects of El Nino in hastening the spread of the africanised bee and causing general increases in bee numbers. With fourteen years of data from light trap catches (these traps are kept on for 24 hours a day) his data probably represent one of the best long term studies of any invertebrate community. Rust discussed a diversity of case studies of problems with bee conservation and showed how mining stake markers may serve as

a hitherto unrecognised method for trapping bees but perhaps one with devastating effects upon some natural populations. Gordon made an effective appeal for more habitat and community level studies of bees. He pointed out that most autecological research provides data of limited utility to those interested in habitat quality assessment and conservation but that even single species studies could be made more useful if the species' habitat were mentioned in the papers' title or as a key word. This is good advice which we all should follow. The last talk of the workshop dealt with studies of the diversity of bees in prairie ecosystems (Reed). It was pointed out that with present attempts at reconstructing prairie plant communities, it will be necessary to find out more about native pollinators to ensure the long term success of the plant populations - botanists can no longer afford to ignore the complexities of bee systematics and basic biology.

This conference was well attended with almost 120 participants from all continents. The diversity of topics dealt with ably documented the utility of non-*Apis* bees as pollinators. Estimates of the dollar value of such species are difficult to obtain because much of the pollination thought to be brought about by honey bees is actually done by their less obvious relatives. Nonetheless, the value of non-*Apis* pollinators to the U.S. economy is clearly in the multi-billion dollar range. Although some non-*Apis* pollinators are economically marginal at present, it is clear that simple changes in bee production methodologies could tilt the economic balance in favour of other pollinators. Likewise, small changes in consumer demand or other aspects of the economics of food production could also result in a much greater need for non-*Apis* pollinators. With continued problems dogging the honey bee, scientists interested in non-*Apis* bees will be sorely needed in the future. It is clear that the potential for application of non-*Apis* pollinators is great and much remains to be discovered about the basic biology and applicability of many potentially useful species. Workshops like this one provide inspiration and guidance as to future developments in pollination biology and the need for "basic" bee research is clear. Nonetheless, non-*Apis* bee researchers face a credibility gap. Our organisms are (mostly) gentle, usually small and generally go unnoticed by all but the most careful observers of nature. Even the name given to them - non-*Apis* bees, leaves much to be desired. Alternatives were discussed at the meeting including "pollen bees" and "native bees" - the latter being fine in the New World but is unlikely to be seen as accurate in areas where *Apis* is native!

The people at the USDA bee biology lab in Logan are to be commended for organising such a fine meeting bringing together so many interested parties at such an opportune time and envied for living in such beautiful surroundings. It is hoped that this was the first of many such gatherings.

Laurence Packer
York University

Nato Advanced Study Institute - Advances in Morphometrics

Analysis of Size and Shape of Organisms Using Geometric Morphometrics
Il Ciocco, Tuscany, Italy (July 18-30, 1993)

There is a revolution in morphometrics. Emphasis is changing from traditional measurements evaluated in abstract high dimensional feature space, to geometric considerations in three dimensional organism space based on landmarks and coordinate data.

Since 1988, four workshops (two in the United States and two in Europe) have taught various aspects of the new methodology, emphasizing data acquisition, multivariate data analysis, graphical

representation of findings, and applications to problems in zoology and botany.

The ASI will assess the "state of the art" of the newer methods suitable for biologists using quantitative methods. Because much of the foundation for these methods is new, the ASI will provide tutorials on their theory and computation. Participants will also be encouraged to collect and analyze data during the ASI, using 2 and 3D digitizing equipment and desktop computers. Applications to be discussed include systematics, and evolution, growth and development, biogeography, paleontology and phylogenetic analysis.

Organizing Committee: Leslie F. Marcus, Queens College of CUNY, Director; Michel Baylac, Natural History Museum, Paris; Marco Corti and Anna Loy, University of Rome "La Sapienza"; and Antonio Valdecasas, Natural History Museum, Madrid.

Additional faculty: Fred Bookstein, The University of Michigan; David Dean, New York University Medical School; Gavin Naylor, The University of Michigan; Richard Reymont, Uppsala University; F. James Rohlf and Dennis Slice, SUNY at Stony Brook.

Topics include:

Multivariate statistics for morphometrics

Analysis of coordinate data (distances, shape spaces, shape coordinates, Procrustes methods, thin-plate splines and warps)

Graphical displays of morphometric findings

Applications to systematics: including the vertebrate skull in moles and other groups

Applications in studies of allometry

Relation of the new morphometrics to other branches of quantitative biology: Phylogenetics; Genetics; Biogeography

Analysis of outlines and analysis of ridge curves on surfaces

Comparison of traditional and geometric morphometrics; comparisons among geometric methods

Participants and faculty are required to remain for the entire ASI. Applicants will submit brief abstracts of completed morphometric applications, work in progress, or problems and questions for morphometric analysis. Final abstracts will be due after notification of acceptance. A poster session for all participants will be held, and selected papers will be incorporated into the program and published in the ASI proceedings volume. Posters will be published as well.

There is very limited support available for some participants. You will be able to indicate the level of award required, with justification on the application.

Il Ciocco is a semi-isolated resort complex in the hills of Tuscany about 60 km north of Pisa. Full board accommodation including transportation to and from Pisa will be provided for 12 days at 99,500 Liras per day double occupancy and 131,500 Liras per day for a single room.

Applications will be sent on request (Airmail or E-Mail). 60 participants will be accepted from NATO and eastern European countries. **Deadline** for receipt of applications is **April 1, 1993**.

Request for Applications should be sent to: Leslie F. Marcus, Dept. Invertebrates, American Museum of Natural History, CPW at 79th, New York, New York 10024. Tel 212-769-5721 ; Fax 212-769-5495 or 5233; E-mail: LAMQC@CUNYVM.BITNET or @CUNYVM.CUNY.EDU

Biological Survey of Canada (Terrestrial Arthropods) Survey Report

The Scientific Committee met in Ottawa on 22-23 October 1992. A fuller account of the meeting appears in the spring 1993 issue of the *Newsletter of the Biological Survey of Canada (Terrestrial Arthropods)*.

Notes on Selected Scientific Projects

1. *Arthropods of peatlands in Canada*

The proceedings of the 1991 symposium on arthropods of peatlands have been submitted for publication as a *Memoir* of the Entomological Society of Canada.

2. *Arctic invertebrate biology*

Field studies continued on Ellesmere Island and at Tuktoyaktuk. A third *Arctic Newsletter* was published after the Scientific Committee meeting.

3. *Old-growth forests*

A major project on the biodiversity of old-growth forests has been developed further, with wide support, and funding is being sought.

4. *Invasions and reductions*

A workshop on this topic is being organized for the 1993 entomological societies meeting in Sault Ste. Marie.

Other scientific priorities

1. *Systematics and entomology*

The Committee discussed a range of general ideas related to the future and marketing of systematics. Groups chaired by Dr. S.A. Marshall undertook to develop related ideas. Information about marketing was presented to the meeting by Dr. W. Lowe, Director, Professional Services, Canadian Museum of Nature.

2. *Biodiversity*

A brief outlining methods for biodiversity studies continues to be developed. A resolution confirming the systematics requirements for biodiversity studies was carried by the Committee, for transmission to appropriate bodies. Possible nominations from the Committee to relevant biodiversity advisory groups were discussed.

3. *Other developments*

The Committee received updated information about the Canadian Long-term Ecosystem Research Program, and the Canadian Global Change Program. Ideas were also developed for a workshop on Coleoptera, and for possible consideration of biomonitoring using aquatic invertebrates.

Liaison and exchange of information

1. *Canadian Museum of Nature*

Dr. P. Colgan, Associate Director, Programmes Branch, stated that the Museum's senior management has been trimmed and the Museum is implementing a matrix organization in which the priorities of the Museum are being carried out through 8 major programmes, assembling teams drawn from the various divisions. The Museum has published a national statement about its commitment to collections. An action plan for research has been prepared by the Director in response to the Board of Trustee's task force on research, and is being finalized with the development of thematic research groups. The Museum continues to pursue research liaisons with other groups and agencies.

The Committee expressed its concern about the delay in setting up a task force to establish a systematics network, a responsibility accepted by the Canadian Museum of Nature at the June 1992 systematics workshop.

2. *Biological Resources Division, CLBRR*

Dr. P. Marriage, Executive Deputy Director for BRD, reported that a committee has been set up to develop a plan for effective continuation of the BRD Handbook Series. Submissions from outside authors will be considered. The BRD is examining the best means for computer technology transfer, emphasizing expert systems. A review of the mission and mandate of the Central Experimental Farm is underway.

A draft action plan has been developed from the systematics workshop and is awaiting final approval, so that the Agriculture Canada/Canadian Museum of Nature/Forestry Canada Memorandum of Understanding for cooperation in systematics can be approved. Detailed annexes to the MOU will define how to address particular areas.

3. *Entomological Society of Canada*

Dr. R.G. Footitt, Treasurer, ESC, reported on some information and developments from the recent Annual Meeting of the Society in Saskatoon, including consideration of the Society's involvement in the Canadian Federation of Biological Societies, and a review of the financial state of the Society, including publication and marketing aspects.

4. *Forestry Canada*

Dr. J. Huber, Forestry Canada, mentioned some current activities in forestry, including possible realignment of the Ministry, a move of headquarters staff, a project on budworm hyperparasitoids and a 1993 course at BRD on Hymenoptera.

5. *Long-term forest sites*

Dr. T. Boyle, Coordinator, Genetics and Biodiversity, Science and Sustainable Development Directorate, Forestry Canada, reported that he is trying to start a programme within Forestry Canada, related to biodiversity interests, for a series of long-term, large-scale research plots (including Petawawa), and would welcome expressions of interest from individuals.

6. *Canadian Society of Zoologists*

Dr. M. Beverley-Burton, Parasitology Section, CSZ, will be encouraging the Parasitology section to prepare a formal brief incorporating and solidifying ideas for the future parasitology module. Related comments led to further discussion about the scope of Survey modules.

7. *Other Organizations*

Recommendations about possible ways to modify Parks guidelines, in order to encourage entomological research for mutual benefit, had been submitted to the Canadian Parks Service under the auspices of an existing MOU. Comments on endangered species and habitats as they pertain to invertebrates had been transmitted to the Canadian Wildlife Service on behalf of the Committee. The Survey remains in touch with other individuals and organizations in Canada and elsewhere.

Other items

1. *Regional Developments*

Information from different areas of the country, relevant to the Survey and its activities, was reviewed. Among many other items noted was the rapid increase in work on old-growth forests and on biodiversity. Members of the Committee concluded that, just as the needs for systematics expertise and for maintaining reference material are increasing, many agencies paradoxically appear to be reducing their capabilities for systematists and the presence of collections.

2. *Other matters*

The Committee discussed membership of the Scientific Committee, responses to earlier correspondence sent by the Committee, and several other topics.

Hugh V. Danks
Canadian Museum of Nature
Ottawa, Ontario

News from the Society for Invertebrate Pathology

1) Society for Invertebrate Pathology seeks new members

The Society for Invertebrate Pathology was founded in 1967 as an international organization that would draw together members from diverse scientific backgrounds under the unified discipline of invertebrate pathology. Today the Society's membership of 1,000 is involved in research projects from basic science to applied aspects of using pathogens for pest control, and from the study of terrestrial insects and invertebrate diseases to the study of economic pathogens of shellfish and other aquatic invertebrates. Academic institutions, government laboratories and industries throughout the world are represented.

A major bonus of membership is the enjoyable and personal nature of the annual scientific meetings which have developed their own character and at which it is possible to know a large portion of the participants. Members receive the SIP Newsletter which is published quarterly as well as other publications such as the Directory of Invertebrate Pathologists and the Directory of Industries Involved in the Development of Microbial Control Products which are published periodically. Recently, the Society's Division on Microbial control has put together a 200 Color Slide Atlas of Microbial Control which is available for a nominal charge.

Membership fees are US \$30.00 for regular members, \$15.00 for students and an extra \$2.00 each for membership in either the Division on Microsporidia or Division on Microbial Control. Information and membership application forms can be obtained from Debbie Stoutamire, Society for Invertebrate Pathology, 9650 Rockville Pike, Bethesda, MD 20814, USA. Tel. 301-530-7003.

2) Meeting Announcement

The 26th Annual Meeting of the Society for Invertebrate Pathology will be held at the Great Smokies Hilton Golf Resort and Conference Center in Asheville, North Carolina, August 1-6, 1993. For more information contact Dr. Wayne Brooks (919-515-3771) or Dr. Jim Harper (919-515-2746), Department of Entomology, Box 7613, North Carolina State University, Raleigh, NC 27695-7613.

3) Directory of Industries Involved in the Development of Microbial Control Products

In December, 1991, The Division on Microbial Control of the Society for Invertebrate Pathology published the Directory of Industries Involved in the Development of Microbial Control Products. The Directory contains 35 pages of information with indexes of pathogens, target hosts, crops and habitats, companies and addresses, and trade names. Over 40 companies and 60 products are listed. Copies are available from Dr. Michael McGuire, USDA-ARS, 1815 North University, Peoria, Ill, 61604, USA at a cost of US \$5.00 (includes postage) (Fax. 309-360-4222; Bitnet mmcguire@asrr.arsusda.gov). Yearly supplements are planned. Therefore if you wish your company to be included in the next supplement (January, 1994) contact Mark Goettel, Agriculture Canada Research Station, P.O. Box 3000, Lethbridge, AB Canada, T1J 4B1 (Fax. 403-382-3156; internet goettel@abrsle.agr.ca).

4) Color Slide Atlas of Microbial Control

The Division on Microbial Control of the Society for Invertebrate Pathology has made available a 200 slide atlas on various aspects of microbial control products, application techniques, bioassay, production and formulation. The 200 slides come in a box and each slide is cross referenced to a 28-page legend. It should be especially of value to those teaching biological control.

The slide atlas can be ordered by sending a cheque, money order or international bank draft (drawable on a US bank) in the amount of US \$50.00 (add \$5.00 for overseas orders) to Dr. Ann Hajek, Boyce Thompson Institute, Tower Road, Ithaca, NY 14853-1801, USA (Fax. 607-254-1242; internet Ann_Hajek@qmrelay.mail.cornell.edu).

5) National Biological Control Institute

In 1990, the Animal and Plant Health Inspection Service (APHIS) of the U.S. Department of Agriculture (USDA) formed the National Biological Control Institute (NBCI) to promote, facilitate, and provide leadership for biological control. Its staff include Dr. Ernest Delfosse, Director; Dr. Michael Orazé, Technical Coordinator; Dr. Robert Flanders, Technical Consultant; and Drs. Cliff Moran and Dan Girling, Visiting Scientists.

The NBCI has established a 12-member User Advisory Panel composed of representatives from private enterprise, administrators and renowned scientists. The panel ensures feedback from client groups and maximises representation from Government, University and Industry.

NBCI promotes biological control by bringing biological control to the attention of the media, environmental groups, scientists, administrators, elected representatives, and the general public. It acts as an objective advocate for biological control. NBCI facilitates biological control by providing technical advice and information, developing computerized data bases and communication networks, initiating, coordinating and monitoring projects and supporting the needs of cooperators.

NBCI provides leadership for biological control. Major recent thrusts include developing a Biological Control Philosophy for APHIS (see below), building a national and international biological control network, revising regulatory guidelines in conjunction with biological control scientists, resolving conflicts, and participating in strategic planning at all scientific and administrative levels.

The strategic goals of NBCI are to protect and improve agriculture and the environment through implementation of biological control, often as the key strategy of IPM programs.

For more information on NBCI or about biological control contact:

National Biological Control Institute
USDA, APHIS, Office of the Administrator
Room 538, Federal Building
6505 Belcrest Road
Hyattsville, MD 20782, U.S.A.
Tel. 301-436-4329
Fax. 301-436-7823

6) APHIS Adopts a Biological Control Philosophy

The United States Department of Agriculture Animal and Plant Health Inspection Service (APHIS) believes that modern biological control, appropriately applied and monitored, is an environmentally safe and desirable form of long-term management of pest species. It is neither a panacea nor a solution for all past problems. APHIS believes that biological control is preferable when applicable; however, we also recognize that biological control has limited application to emergency eradication programs. Whenever possible, biological control should replace chemical control as the base strategy for integrated pest management.

In support of this philosophy, APHIS will develop regulations that facilitate the release of safe biological control agents, while maintaining adequate protection for American agriculture and the environment. The regulations will give clear and appropriate guidance to permit applicants, including specific types of data needed for review and environmental analysis and specific time limits for Agency review. They will be updated as the science progresses. APHIS believes that public input on procedures to approve the release of biological control agents is a desirable and necessary step, and will strive to gather input from scientists, industry, and the public.

M. Goettel
Lethbridge, Alberta

PUBLICATIONS

BOOK NOTICES

Hall, B.K. 1992. *Evolutionary Developmental Biology*. Chapman and Hall, New York, NY, U.S.A. xii + 275 pp. Softcover \$(U.S.)47.50; hardcover \$(U.S.)59.50.

This book focuses on the relationship between embryonic development and evolution with an emphasis on vertebrates, although not to the exclusion of invertebrates. The author identifies key events, ideas, and discoveries that established evolutionary developmental biology as a distinct subdiscipline. A description of the fossils of the Burgess Shale is used to introduce the variety of organisms now living, and those that have lived in the past. Discussion of the importance of the establishment of the basic body plan and adaptive form and function leads to recognition that constraint plays a minor role and selection and chance mutations play major roles in the generation of features of adaptive form and function. The organization of embryonic development is discussed, and the mechanisms by which change occurs in development and evolution are also treated. An integration of genetic, epigenetic, and environmental regulation of development and evolution is considered, and in a treatment of homology, the author proposes that homology is a statement about patterns, not processes, and that equivalent or nonequivalent developmental processes can produce homologous structures. The issue of variability in timing of development and evolution is discussed and the book concludes with an overview of the principles and processes, scope and prospects, encompassed by evolutionary developmental biology.

Morales, C.R. 1991. Margarodidae (Insecta: Hemiptera). *Fauna of New Zealand / Ko te Aitanga Pepeke o Aotearoa*, No. 21. Department of Scientific and Industrial Research [DSIR], Plant Protection, Mt. Albert Research Centre, Auckland, N.Z. 124 pp. Softcover \$(N.Z.)34.95 in New Zealand and Australia; elsewhere \$(U.S.)34.95.

Two subfamilies of margarodids occur in New Zealand - the Monophlebinae represented by a single introduced species, the cottony cushion scale (*Icerya purchasi* Maskell), and the Coelostomidiinae or giant scales represented by 10 native species. In this book, Morales provides a review of previous research done on this group in New Zealand and a revision of the endemic coccoid genera *Coelostomidia*, *Platycoelostoma*, and *Ultracoelostoma*. Four new species are described, six species are redescribed, and the immature female life stages of all species and the male stages of five species are described and illustrated. Keys are provided to all life stages of endemic genera. Brief summaries are given of the classification of Margarodidae, their economic importance, life history, and host-plant associations. Detailed life history information is given for *Coelostomidia wairoensis* (Maskell) and *Ultracoelostoma brittini* Morales.

Harris, K.M. 1992. *Busseola fusca* Fuller (The African Maize Stalk Borer): A Handbook of Information. C·A·B International, Wallingford, Oxon, U.K. 84 pp. £(U.K.)35.00; \$(U.S.)66.50.

This joint publication of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and C·A·B International provides a comprehensive review of the biology and management of *Busseola fusca*, the African maize stalk borer. This insect is a major pest, especially on maize and

sorghum, throughout Africa south of the Sahara. In the first chapters, information is presented on pest status and crop loss assessment, taxonomic descriptions, biology and ecology, and pest management. Pest management practices involving a range of options - cultural, plant resistance, biological, legislative, and chemical methods - are reviewed. The second and major part of the book consists of an annotated bibliography of 447 references published between 1901 and 1990. References are presented under broad subject headings to facilitate easy cross reference to the first part of the book.

BOOK REVIEWS

Williams, D.D., and B.W. Feltmate. 1992. *Aquatic Insects*. C·A·B International, Wallingford, Oxon, U.K. xiii + 358 pp. Softcover \$(U.S.)46.50.

The authors' stated objective "...is to try to give the reader a taste of...exciting new findings in the study of aquatic entomology, together with some of the basic background information necessary to comprehend them, and to provide references to more detailed studies in the primary literature" (pp. ix-x). Overall, I think the authors have achieved their objective, although to cover the whole field of aquatic entomology in 350 pages meant a loss of sometimes critical detail. More of this later.

The authors did not identify their expected audience, but the book would be of most interest to intelligent lay persons, professional biologists (not necessarily having entomological training), senior undergraduate, and novice graduate students. However, some parts of the book would appeal to a more highly trained audience.

The book has 11 chapters, which follow a logical sequence. Three introductory chapters (Chapter 1: "Introduction"; Chapter 2: "The aquatic insect orders"; Chapter 3: "Keys to the aquatic insect orders") are followed by a series of ecologically-oriented topics (Chapter 5: "Life history and habitat"; Chapter 6: "Morphological and physiological adaptations"; Chapter 7: "Population biology and dynamics"; Chapter 8: "Trophic relationships"; Chapter 9: "Predation and its consequences"). Chapter 10 deals with methods ("Experimental design and sampling techniques") and Chapter 11 is a catch-all labelled "Relationships with man".

The authors used two expository techniques that I thought were very effective: (1) opening each chapter with a statement of objectives, and (2) the presentation of historical antecedents for a subject. For example, did you know that fly fishing dates back to the ancient Greeks but that the first treatise on the subject was published in 1496? On the other hand, I thought that the abrupt ending of many chapters detracted from the presentation.

There will always be information gaps and questions of balance in any book whose coverage is wide rather than deep; *Aquatic Insects* is no exception. For example, in Chapter 3, reference to Hilsenhoff's chapter on insects in Thorp and Covich (1991) would have provided detailed access to the literature for identification of the North American fauna. (To be fair, this information may not have been available to the authors.) In Chapter 4, large rivers (i.e. >350 m²-sec⁻¹ flow), especially northern ones, and non-traditional reservoirs (i.e. other than drawdown reservoirs formed in river valleys) could have been considered. In Chapter 5, the section entitled "The influence of temperature" should have included the effects of thermal pollution. (Neither is this topic included in Chapter 11 on environmental

perturbations.) In Chapter 6, "Dealing with currents" should have mentioned Steven Vogel's classic book *Life in Moving Fluids* (Vogel 1981). Chapter 8 could have been enhanced by citing the valuable role of stable isotopes in determining trophic relationships. In Chapter 10, the section on "Spatial and temporal scale" needed to emphasize the importance of matching the spatial and temporal scales of experimental approaches to the questions being asked, and the section on "Sampling techniques" could have profitably directed the reader to review articles on sampling (e.g. Chapter 3 of Merritt and Cummins 1984). However, it was Chapter 11 that really drew my interest. It is a collection of disparate topics involving aquatic insects: pollution, global warming, disease vectors, paleoecology, and fly fishing. Under the first section, "Pollution", the important role played by aquatic insects in the "reservoir paradigm" should have been noted. The consideration of morphological abnormalities under the subsection "Industrial pollutants" should have mentioned the Chironomidae, the taxon that has been most intensively studied in this regard. (Incidentally, under the "Acid deposition" subsection, on p. 282, *Orthocladius riparius* should be *Orthocladius consobrinus*.) The discussion of "Biodiversity indices" could have been broadened to include rapid assessment approaches in general. The subsection on "Environmental impact assessment" (EIA) is a welcome addition to a book like this, but the role of aquatic insects in EIA could have been amplified (e.g. the role of sentinel organisms as early-warning indicators of stress). It is interesting to note that the "Pollution" section of Chapter 11 is about the same length as the chapter on "Predation and its consequences", perhaps showing the authors' biases. Under the global warming section of Chapter 11, the authors recommend large-scale field manipulations to study the effects of global warming on aquatic insects, but much can be learned from past and present distributions of aquatic insects in countries like Canada; unfortunately this approach is currently unfashionable. The section on paleoecology could have been linked more closely to the earlier consideration of environmental perturbations by suggesting that fossil insects are a way to establish baselines for EIA. Also, the paleoecology section devotes much more space to Trichoptera than Chironomidae, although the preponderance of paleoecological work with aquatic insects has been done on the latter.

These comments on gaps and balance aside, I found several parts of the book to be very stimulating. For example, the format for treating each order of aquatic insects in Chapter 2 was excellent. In Chapter 4 (and again in Chapter 8) the discussion on deviations from the River Continuum Concept sent me to the bibliography to check the titles of references I had not read. In the same chapter, clues to the mystery of why insects never radiated into the sea are examined and an exciting denouement is reached. [Incidentally, what is a "water butt" (p. 156)?] I felt tantalized by the all-too-short glimpse into the tremendous diversity of adaptations to life in water exhibited by the Chironomidae and Ephydriidae (Chapter 6). The section on interference and exploitative competition in Chapter 7 was very informative. Finally, the section in Chapter 8 on "Spatial and temporal variation in the structure of freshwater food webs" was the best one in a very good chapter (even given my comments above about the omission of stable isotopes).

The book has been handsomely produced, although my copy developed dog-eared corners shortly after I began carrying it around during the review process. In general, the figures and tables are well done; however, some of the figures in Chapter 8 are too small given their complexity, and the labelling of Figs. 10.3 and 10.4 is confused or inadequate. I found only a few typos in the text, none of which interfered with meaning; however, the diacritics have been left off a number of author names. I constantly referred to the reference section at the back without any problem. I used the index less frequently but it, too, seemed quite adequate.

Although I wouldn't characterize myself as being part of the primary audience for this book, I benefitted mightily from reviewing it. I have not been exposed to some areas of aquatic entomology for a long time (fossils, phylogeny, and taxonomic relationships), so the book served to re-educate me to the latest developments in those areas. Congratulations to the authors for producing a fine overview of aquatic entomology!

References

- Merritt, R.W., and K.W. Cummins (Eds.). 1984. *An Introduction to the Aquatic Insects of North America*. 2nd ed. Kendall/Hunt Publishing Co., Dubuque, IA. 722 pp.
- Thorp, J.H., and A.P. Covich (Eds.). 1991. *Ecology and Classification of North American Freshwater Invertebrates*. Academic Press, New York, NY. 911 pp.
- Vogel, S. 1981. *Life in Moving Fluids: The Physical Biology of Flow*. Willard Grant Press, Boston, MA. 352 pp.

David M. Rosenberg
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Vockeroth, J.R. 1992. *The Flower Flies of the Subfamily Syrphinae of Canada, Alaska, and Greenland (Diptera: Syrphidae)*. *The Insects and Arachnids of Canada, Part 18*. Minister of Supply and Services Canada. 456 pp. \$(Can.)22.95 in Canada; elsewhere \$(U.S.)27.55.

The author brings three decades of experience to this treatment of the Syrphinae, having already published a major generic revision of the Syrphini in 1969 (*Mem. Ent. Soc. Can.* 62, 176 pp.). The present publication treats the 166 species known from Alaska, Canada, and Greenland. It is illustrated with 119 maps and 271 morphological line drawings of the adults. Keys to adults are given both in French and English. Otherwise the text is in English only. The immature stages are not described, but readers will be able to trace such descriptions (if available) and other biological information from the references provided.

In accordance with editorial policy, this publication does not include the first proposal of Vockeroth's new species and new synonymy. All such proposals arising from the project were published in advance in several papers in *The Canadian Entomologist*. Many of the illustrations in the present publication were also thus published in advance.

I am not an expert on Syrphidae, so cannot comment on the validity of particular taxonomic decisions. Vockeroth recognizes his subfamily Syrphinae as including the four tribes Bacchini, Paragini, Toxomerini, and Syrphini, but excludes the Pipizini whose larvae are also aphid predators. The genera *Chrysotoxum* and *Ocyptamus* are here included in the Syrphini, contrary to his earlier works.

In general I have confidence in this author in view of his long experience and good reputation. The line drawings illustrating the work are excellent. Most were prepared by the professional illustrators at the Land and Biological Resources Centre, Ralph Idema and Barry Flahey; those of *Sphaerophoria* were copied with permission from a work by Dr. Lloyd V. Knutson.

All researchers within the relevant geographical area who need to identify Syrphidae should obtain a copy of this modestly priced publication. It will be useful not only to systematists and those conducting biological surveys, but also to workers in the fields of pollination ecology and biological control (especially of aphids, the preferred prey of most syrphine larvae). Workers in the United States may prefer to consult treatments of the whole Nearctic fauna in the case of genera for which such treatments are available. For instance, Vockeroth's revision of Nearctic *Platycheirus* (1990. *Can. Ent.* 122: 659-766) contains all the information in the present publication and more. However, in the case of genera for which a recent Nearctic revision is not available, workers in the United States may also find the present publication useful.

I wish Dr. Richard Vockeroth well in his retirement, and hope that this will not be his last major work.

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McLellan, I.D. 1991. Notonemouridae (Insecta: Plecoptera). *Fauna of New Zealand / Ko te Aitanga Pepeke o Aotearoa*, No. 22. Department of Scientific and Industrial Research [DSIR], Plant Protection, Mt. Albert Research Centre, Auckland, N.Z. 64 pp. Softcover \$(N.Z.)24.95 in New Zealand and Australia; elsewhere \$(U.S.)24.95.

This is the twenty-second volume published since 1982 in the *Fauna of New Zealand*, a series of occasional publications created to give "comprehensive accounts" of the non-marine invertebrates of that country. Previous volumes have dealt with various taxa of insects and arachnids, but this is only the second (after No. 6 on Hydraeninae) to cover an aquatic group.

The Notonemouridae are one of the four families of Plecoptera known from New Zealand. They are particularly intriguing in that they are thought to have originated in the Northern Hemisphere (suborder Arctoperlaria), but are now confined to lands that have arisen from the fragmentation of Gondwana. The remaining three families are all of Southern Hemisphere origin (suborder Antarctoperlaria).

The Notonemouridae are the largest family and contain 26 of the 55 stonefly species recorded in the country. They are small (< 8 mm adult body length) secretive insects collected near the running waters and seepages in which the nymphs live. The group has been neglected and this revision is most timely. Indeed, nine new species are described, bringing to 19 the number of New Zealand species described in this family by the author.

The Introduction gives a short account of the biology, nomenclature and phylogeny of the family, with notes on methods of collection, conservation, and preparation. Habitus drawings of the nymphs of five of the genera are provided as well as sketches of adult genitalia "in copula" showing the position of the characteristic but unusual ovipositor. There is also an interesting short "Popular summary" in both English and Maori.

The book provides a checklist of species, keys to the taxa, descriptions and illustrations of all known stages (males, females, and nymphs), habitat notes, and distribution maps. While the females are known in all the species, four of the males and nine of the nymphs (some of which are probably hyporheic) still remain to be discovered. Further discoveries are more than likely, since large areas remain to be prospected.

The keys are simple and straightforward and the structures are well-illustrated, although a reference to specific drawings, rather than to text-section, would have made consultation easier.

The volume is nicely presented and organized. The printing is clear on quality glazed paper, which probably explains the price. The 129 line drawings are simple, informative and well-reproduced, with the exception of a few which are too pale.

This publication will be of interest to all students of Plecoptera and represents an important contribution to the knowledge of this family. Entomologists studying evolution and biogeography will appreciate the short comments on distribution, endemism and phylogeny. The booklet will prove indispensable to ecologists working in New Zealand running waters.

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Zunino, M., Belles, X., and M. Blas (eds.). 1991. *Advances in Coleopterology*. European Association of Coleopterology, Barcelona, 324 pp., 248 figs. (drawings, photographs and micrographs), 22 tables. ISBN: 84-604-0525-7. (7000 pesetas = approximately \$84.00 Can.)

This book, a "follow up" of the first "International Congress of Coleopterology" held in Barcelona in 1989, contains 20 contributions on Coleoptera (beetles) written by 36 authors. These, according to one advertisement, represent "a synthesis" or "state of the art" in their field. To merely list all of the titles and authors would occupy a full page and to try to group the miscellany of subjects is also not feasible. The twenty papers average 14.8 pages in length with the first page being mostly title and abstract and the last two pages references. Five contributions are less than 10 pages long and one on fossil Coleoptera covers a total of five pages. While there are some papers that would interest most Coleopterists, many of the papers are very specialized and many other "syntheses" are rather sketchy reviews or repeats of subjects recently treated more extensively in other papers, often by the same author.

Since I am academically inclined, I decided to grade the contributions: six papers rated B+ to A, eight C+ to B (very specialized with no broad application) and six D to C. The good papers include those by R.A. Crowson, Coleoptera and Cycads; S.A. Slipinski and J. Pakaluk, Problems in the Cerylonid series; S.B. Peck, Beetle faunas of the Galapagos; S.L. Chown, Ectemnorhini (weevils) of subantarctic Marion Island; G. Halfiter, Subsocial behaviour in three groups of Coleoptera; and M. Zunino, Food relocation behaviour. Of these six papers, at least the last four are partial repeats of more extensive papers. My C+ to B category includes papers on morphology: genitalia of *Sagrinae*; genitalia in *Rhizotrogina*; karyotypes of *Pterostichini*; stridulatory devices of leaf beetles and others; morphometrics of some Spanish tenebrionids; and mating behaviour of cave *Speonomus* (Catopidae). The D to C category mostly includes short (less than 10 pages) "review" articles. The bibliographies are probably the most useful part of these papers.

Notwithstanding the repetitive aspect of many of the papers and some unusual English, the book can serve as a "lead in" to a variety of subjects and hence deserves a place in entomological libraries. Also, it is well printed and illustrated. As for individuals, I expect the cost may exceed the value except for those with very broad interests or with no easy access to a good library.

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This book is available from: Asociacion Espanola de Coleopterologia, Departamento de Biologia Animal, Facultad de Biologia, Universidad de Barcelona, Diagonal 645, 08028 Barcelona, Spain

POSITIONS AVAILABLE

Graduate Research Opportunity - Spruce Cone Fly Research

We are currently seeking a graduate student to conduct behavioural studies on the role of visual and olfactory cues in the host selection and colonization process of spruce cone flies. The project involves 1) the observation of the behaviour of flies released on caged trees to identify cues that may be used by cone flies to locate mating and oviposition sites; and 2) the collection of cones and the preparation of cone extracts to study the behaviour of cone flies in the presence of cone volatiles in flight tunnels.

Students at the M.Sc. or Ph.D. level are invited to apply. The student should have a strong background/interest in behavioural/ecological sciences. The project has secure funding from April 1993 to March 1996 and the successful candidate would receive a stipend of \$13,000 per annum.

Those interested should contact either:

Dr. Sandy M. Smith, Faculty of Forestry, 33 Willcocks St., University of Toronto, Toronto, Ontario M5S 3B3 (416-978-5482); Smith@forestry.utoronto.ca or

Dr. Jean Turgeon, Forest Pest Management Institute, P.O. Box 490, Sault Ste. Marie, Ontario P6A 5M7 (705-949-9461).

Postdoctoral Position: Insect Pathology

An insect pathologist is required for a 2-year term to study the release of a marked recombinant baculovirus to obtain information on persistence in the environment. In this joint project of Insect Biotech Canada and Agriculture Canada, London, documentation will be developed for a research permit, a genetically modified marked baculovirus will be released on a field crop, the dispersal, persistence, and genetic stability will be monitored and a plan for public communication will be developed and implemented. Applicants should have strong interpersonal and communication skills together with experience in isolation, identification, culturing and bioassay of baculoviruses. The ability to recognize other organisms which might infect insects is also desirable.

In keeping with immigration requirements, preference will be given to Canadian citizens and permanent residents of Canada.

For additional information please contact: Dr. A.N. Starratt, London Research Centre, Agriculture Canada, 1400 Western Rd., London, Ontario, Canada N6G 2V4; Tel. (519)-645-4452; Fax (519)-645-5476; e-mail AG280ANNX@NCCCOT2.AGR.CA

Entomological Research Assistants Needed

Applications are currently being accepted for field assistants for the coming summer. Your responsibilities/opportunities will include helping in the search for five species of beetles, all of which are well-integrated hosts in the nests of ants of the genus *Liometopum* in Arizona, Colorado, New Mexico, Texas, and California. Additionally, we will carry out a number of behavioral experiments primarily concerned with understanding the integration mechanisms that the beetles use to gain entry into the ants' nests. In return, I will supply gas, transportation, lodging (tents), and a bountiful storehouse of entomological knowledge, as well as sharing with you some of the most breathtaking areas of the United States. I will be traveling from Lawrence, Kansas through these areas from May 6-20 and from June 2-28. If you are interested in participating in some or all of this project, email me directly and I will give you the details of the study as well as answer any questions you may have.

For further information, please contact: James Danoff-Burg, Snow Entomological Museum, University of Kansas, Lawrence, Kansas 66045; email: JIMDB@kuhub.cc.ukans.edu (internet), or JIMDB@UKANVAX (bitnet); 913-749-1034; 913-864-3309

Graduate Student Opportunity - Ixodid Ticks

Dr. Reuben Kaufmann, Department of Zoology, University of Alberta has opportunities in his lab for graduate students beginning in May or September. His research program centres on the physiology, endocrinology and pharmacology of ixodid ticks, with a major emphasis on salivary gland function and reproduction.

ROLE OF ECDYSTEROIDS IN SALIVARY GLAND DEGENERATION: Following engorgement of the female, the salivary glands atrophy, a process triggered by an ecdysteroid hormone. Topics of immediate interest are:

- (a) The biochemical and pharmacological properties of the ecdysteroid receptor recently identified in this tissue.

- (b) Determining the endocrine tissue which secretes the ecdysteroid hormone
- (c) Purification of a 'male factor' which we know influences the release of the ecdysteroid hormone.

CONTROL OF VITELLOGENESIS IN IXODID TICKS: Despite great progress in understanding control mechanisms of vitellogenesis/egg development in insects, we know woefully little about these processes in ixodid ticks. Although ecdysteroids may stimulate yolk synthesis, they are not sufficient on their own for promoting yolk uptake. Although extracts of ticks appear to have JH-like activity, no known JHs have been identified in these extracts. This field is wide open for anyone interested in studying a popular endocrinological system in an important arthropod vector.

PHARMACOLOGICAL CONTROL OF SALIVARY FLUID SECRETION: We know that at least 3 receptors control salivary fluid secretion (a dopamine receptor, ergot alkaloid receptor and a GABA receptor). Our understanding of the latter two lags far behind. There is much scope here for those interested in pharmacology.

THE EFFECT OF IVERMECTINS ON TICKS: The ivermectins (IVMs) are very potent, broad-spectrum anti-parasitic drugs that are effective against ticks. We have recently learned that they inhibit vitellogenesis (among other processes). The physiological mechanisms explaining these effects remain to be determined.

For further information contact Dr. R. Kaufmann, Department of Zoology, University of Alberta, Edmonton, Alberta, Canada T6G 2E9 (E-mail: USERKAUF@MTS.UALBERTA.UCS.CA; Fax. (403) 492-7033; Tel. (403) 492-1279)

Graduate Research Opportunity - Environmental Impact of Vegetation Management on Insect Diversity in Plantations

I invite applications from potential graduate students to study the impact of four vegetation management practices on the numbers and species diversity of insects in plantations. There are two positions available starting in May. One position will deal with insects above ground and the other with soil arthropods. This is part of a larger project where censusing for birds, mammals, reptiles and vegetation will occur simultaneously.

QUALIFICATIONS: H. B.Sc. in Biology with some background in entomology and statistics. At least a high B standing in the last two years of studies. Interest in entomology and environmental science.

FUNDING: Stipend of \$12,000.00 per year for two years plus Graduate Student Assistantship of \$6,000.00 per year for two years plus whatever Scholarships. Project is fully supported by The Ministry of Natural Resources and Lakehead University.

Please send information requests to: Dr. Yves Prevost, School of Forestry, Lakehead University, Thunder Bay, Ontario, P7B 5E1; Fax 807 343 8116; Tel. 807 343 8342; E-Mail FFOPREVOS@THINK1.LAKEHEADU.CA

Undergraduate and Graduate Research Opportunities

We have opportunities for both undergraduate and graduate students to work as part of a research team developing biological control strategies for use of the egg parasitoid, *Trichogramma minutum*. All positions are available in May 1993.

GRADUATE STUDENTS: We are seeking 2 M.Sc. students to work on the development of field-release methods for *Trichogramma* against the spruce budmoth. Research will be focused on the factors influencing host acceptance and host searching behaviour by *Trichogramma* and on the examination of field application strategies for the parasitoids. Qualifications for the positions include an interest in ecology and entomology, an ability to work independently and a B.Sc. in Biology, Forestry, Entomology or Zoology with at least a B standing in the last two years of study. Some background and experience in entomology and statistics is desirable.

SUMMER EMPLOYMENT: We are seeking a number of undergraduate students to work as research assistants for the summer of 1993. Work locations will be in either Northern Ontario or Northern New Brunswick as part of field crews or in Toronto and Sault Ste. Marie as lab assistants. Qualifications for these positions include an interest in ecology and entomology, experience doing field work and an ability to work as part of a team. Previous research experience is also asset.

If you are interested please send a CV to either: Dr. Rob Bouchier, Forestry Canada, P.O. Box 490, Sault Ste. Marie, Ontario, P6A 5M7 or Dr. Sandy Smith, Faculty of Forestry, 33 Willcocks St, University of Toronto, Toronto, Ontario, M5S 3B3

For further information contact Dr. Rob Bouchier at Tel. (705) 949-9461; Fax. (705) 759-5700; e-mail Rbouchier%SOO.dnet@cedar.pfc.forestry.ca

MSc and PhD Degrees in Insect Systematics

The Department of Entomology at the University of Pretoria has a long history of research and training in African insect systematics, albeit with a beetle bias. Over the past decade it has produced about 20 post-graduate (research) students, 150 research papers, several taxonomic monographs and one text book on [southern] African insects. Its international reputation is confirmed by the number of foreign students who have studied there and by the number of joint projects undertaken by its members and foreign colleagues. All aspects of modern systematics, including taxonomic revisions, phylogenetic studies and biogeography, are dealt with.

The MSc and PhD degrees presented in the Department are based on the successful completion of research projects (i.e., no course work is required of suitably qualified students). The degrees can be taken full- or part time, on or off campus.

For further particulars contact Professor C.H. Scholtz, Department of Entomology, University of Pretoria, Pretoria, South Africa.

Graduate Studies and Summer Assistantships Environmental Impact of Forestry Practices

SPONSORS: Ministry of Natural Resources Ontario & Lakehead University

MISSION: As part of developing technologies for dealing with competing vegetation, this study will be looking at the environmental impacts of herbicides and mechanical approaches of weed control in spruce plantations. This is the beginning of a long term project where insects, birds and mammals will be monitored.

GRADUATE STUDENTS: I am looking for two individuals who wish to obtain an M.Sc.F. evaluating the effects of the treatments on the diversity of foliage insects or on the diversity of soil arthropods in spruce plantations near Atikokan Ontario just north of Quetico Provincial Park. This study is a great opportunity for those who wish to increase their abilities at insect identification and apply this knowledge to an environmental issue.

QUALIFICATIONS: H.B.SC. or equivalent in biology or environmental sciences; at least an upper B standing; ability to work as part of a team

FUNDING: In each of two years we will provide field support, \$12,000.00 stipend plus \$6000.00 student assistantship plus whatever scholarships the individual is qualified for. Positions available May 1 1993.

SUMMER ASSISTANTSHIPS: We are looking for a number of summer assistants to sample insects and vegetation. Positions available May 1 1993 for 16 to 18 weeks. Salary dependant on qualifications.

Interested individuals please send applications to: Dr. Yves Prevost, School of Forestry, Lakehead University, Thunder Bay Ontario; Tel. (807) 343 8342; Fax. (807) 343 8116
E-Mail FFOPREVOS@THINK1.LAKEHEADU.CA

Position Available - Assistant Professor

POSITION: Assistant Professor in Arthropod Systematics (12-month, tenure-track appointment; 80% research, 20% teaching; earliest starting date 1 July 1993)

SALARY: Commensurate with training and experience.

QUALIFICATIONS: Ph.D. in entomology, evolutionary biology, or related field with specialization in arthropod systematics. Experience in the application of molecular &/or biochemical techniques to systematics or evolution and a strong background in cladistic theory are required.

RESPONSIBILITIES: The primary responsibility of the position will be to conduct research on the systematics/evolution of a group of insects, mites, or ticks, with an approach that includes molecular and numerical techniques. The successful applicant is also expected to develop an outstanding teaching program that includes a course in modern techniques of systematics. The appointee will advise graduate students and work with others to strengthen the overall program in systematics at North Carolina State University. Success in obtaining extramural funds is expected.

APPLICATION: Applications will be accepted until **1 April 1993** or until a suitable candidate is selected. Applicants should submit: a letter stating their research and teaching goals, curriculum vitae, reprints, and the names of at least 3 references to: Dr. James D. Harper, Head, Department of Entomology, Box 7613, North Carolina State University, Raleigh, NC 27695-7613, Phone 919-515-2746; FAX 919-515-7746

Proper documentation of identity and employability will be required before the hiring process can be finalized. North Carolina State University is an equal opportunity employer and operates under affirmative action policy. The University strongly encourages all qualified applicants.

Position Available - Lecturer/Associate Professor/Professor

The Department of Entomology, National Chung-Hsing University, Taichung, Taiwan, ROC, is seeking a faculty member (Lecturer/Associate Professor/Professor) in the area of molecular biology, biotech, behaviour, immunology, system ecology, or biodiversity. Applicants must be ROC citizens and have a Doctoral degree. Postdoctoral experience is preferred, but not necessary.

Applicants please send Curriculum Vitae and three letters of recommendation to Dr. T. H. Su, Chairman, Department of Entomology, National Chung-Hsing University, Republic of China. Or, e-mail to Hsinchi@twnmoe10.

SCHOLARSHIPS AND GRANTS/ BOURSES D'ÉTUDES ET SUBVENTIONS

The Wildlife Toxicology Fund supports high-calibre research in the field of wildlife toxicology

Applications are being received for practical and applied wildlife toxicology research which focuses on establishing the significance of impacts of toxic substances on wildlife and its habitat. Priority areas include research on:

- (1) pesticides and pest control practices
- (2) the impact of substances from controllable or site-specific sources in a manner which could lead to specific or generic remedial measures
- (3) identifying indirect impacts of toxic substances to wildlife and its habitat

Please read the "Guidelines for Applicants" before applying. Copies can be obtained through the Program Manager, Wildlife Toxicology Fund, c/o World Wildlife Fund, 90 Eglinton Avenue East, Suite 504, Toronto, Ontario, M4P 2Z7, Tel. 416-489-8800

Next deadline for applications: **April 15**

The Wildlife Toxicology Fund is a partnership of World Wildlife Fund Canada, Environment Canada (Canadian Wildlife Service), and the Natural Sciences and Engineering Council (NSERC).

Entomological Society of Canada Postgraduate Award

The Entomological Society of Canada will offer two graduate awards of \$2,000 each to assist students beginning graduate study and research leading to an advanced degree in entomology. The awards will be made on the basis of high scholastic achievement.

Invitation for applications

Eligibility - The successful applicants must be either Canadian citizens or landed immigrants with Bachelor's degrees from Canada universities. Applicants must begin their first year of postgraduate studies between 15 June 1992 and 31 December 1993. The studies and research must be carried out at a Canadian university. Each award is conditional upon certification by the Department Head that successful applicants have been accepted into the first year of a program of study and research for an advanced degree with full graduate status. A student who was unable to gain admission or enters graduate school as a qualifying candidate is not eligible to receive an award.

Method of Application - Applicants must submit a properly completed form, with support documents. Applications must be received by the Secretary of the Society no later than **11 June 1993**.

Process of Selection and Award Presentation - Applications will be reviewed by a committee of the Society. An announcement of the two winners will be made at the annual meeting of the Society and each winner will receive a certificate. Payment of the award will be made in October 1993.

Regulations

Earnings from Other Sources - Award holders are permitted, under normal circumstances, to demonstrate, instruct or assist in non-degree related research for a maximum of 200 hours per annum, provided that the Head of their Department considers it desirable and that it does not hinder the progress of their studies. Apart from these assistantships, award holders will devote their full time to study and research and will not undertake any paid work during the school term. They may hold other awards and scholarships.

Transfers - Awards are made on the condition that the winners engage in a program of graduate studies and research for an advanced degree in entomology in Canada. Students, who after receiving the award, wish to change their graduate program or transfer to a foreign university may be asked to decline the award. Any change in the course of study, department or university in which an award winner is registered requires prior approval of the Scholarship Committee. A request for permissions to transfer must be supported by statements from Heads of Departments.

Additional Allowances - The award stipends are all-inclusive. There is no provision for additional grants by the Society for any purpose. Additional grants, for example, to attend meetings, pay course fees, meet publications costs, etc., will not, under any circumstances, be authorized.

All communications regarding these awards, including requests for applications, should be addressed to:

Dr. R. West, ESC Secretary
Forestry Canada, Newfoundland and Labrador Region
P.O. Box 6028
St. John's, Nfld. A1C 5X8
Fax: 709-772-2576

Société d'Entomologie du Canada Bourse pour Étudiants post-gradués 1993

La Société d'entomologie du Canada offrira deux bourses d'un montant de \$2,000 chacun pour aider des étudiants qui entreprennent des études post-graduées et des recherches en vue de l'obtention d'un diplôme d'études supérieures en entomologie. Les bourses seront accordées aux étudiants ou étudiantes en raison des seuls critères de réussite académique.

Avis

Éligibilité - Les candidats doivent être canadiens ou résidents reconnus du Canada et détenir un baccalauréat d'une université canadienne. Les candidats doivent obligatoirement avoir débuté leur première année d'études post-graduées entre le 15 juin 1992 et le 31 décembre 1993, et effectuer leur étude et recherche dans une université canadienne. Les bourses ne seront accordées que lorsque les directeurs de Département auront certifié que les candidats choisis sont inscrits en première année d'un programme d'études supérieures, et ce avec tous les privilèges attachés au statut d'étudiant gradué. Un étudiant qui n'a pu être admis à l'École des Gradués, ou qui s'inscrit en vue de compléter l'obtention de crédits, n'est pas éligible à la bourse.

Procédure - Les candidats devront soumettre leur candidature à l'aide du formulaire approprié et y joindre tous les documents requis. Les demandes devront être reçues par la Secrétaire de la Société au plus tard le **11 Juin 1993**.

Sélection et remise des bourses - L'analyse des candidatures se fait par un comité de la Société, et l'annonce des récipiendaires se fera à la réunion annuelle de la Société où ils recevront un certificat. Le paiement de la bourse aura lieu en octobre 1993.

Règlement

Autres sources de revenus - Un boursier pourra normalement donner des séances de cours ou de démonstration et être auxiliaire de recherche jusqu'à un maximum de 200 heures par année, en autant que le Directeur de son département considère cela profitable et que ces tâches additionnelles ne nuisent pas au progrès de l'étudiant. Sauf pour ces assistances, un boursier devra consacrer tout son temps à ses études et recherches et n'accepter aucune autre rémunération. Il peut cependant jouir d'une autre bourse ou d'un prix.

Transferts - Les bourses sont accordées à condition que les boursiers entreprennent des études graduées en vue de l'obtention d'un diplôme en entomologie au Canada. Les boursiers qui décideront de changer de champ d'études, ou transférer dans une université hors du Canada peuvent se voir retirer leur bourse. Après acceptation de la bourse, tout changement de programme d'études, de département ou d'université devra recevoir au préalable l'approbation du Comité de la Bourse de la SEC. Une telle demande doit être accompagnée de documents provenant des Directeurs des départements concernés.

Frais supplémentaires - Une bourse consiste en une somme d'argent total. En aucun cas la Société n'accordera de montant supplémentaire. Des frais additionnelles, par exemple, pour assister aux réunions scientifiques, payer des frais de cours, défrayer des coûts de publications, etc., ne seront autorisés sous aucune considération. Toute correspondance relative aux bourses, incluant les demandes de formulaires doit être adressée à:

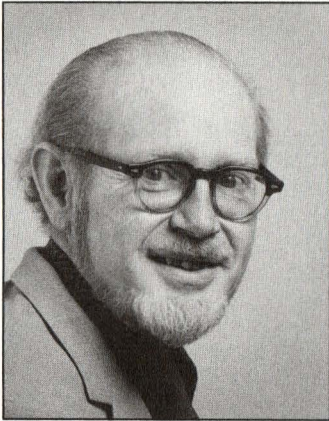
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Forestry Canada, Newfoundland and Labrador Region

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Keith Kevan Scholarship Invitation for Applications

The Entomological Society of Canada, in memory of Dr. D. Keith McE. Kevan, is offering one postgraduate award of \$1,000 to assist graduate students studying systematics in entomology. The awards will be made on the basis of high scholastic achievement and excellence in insect systematics.

Eligibility: The successful applicant must be a graduate student at the time of application, studying at a Canadian university or be a Canadian citizen studying abroad.

Method of Application: Applicants must submit a properly completed application form, with support documents, in accordance with the instructions printed on the application form.

Applications must be received by the Secretary of the Society no later than **11 June 1993**. Specify that you wish the forms for the Keith Kevan Award.

Process of Selection and Award Presentation: As in Postgraduate Award.

Regulations: As in Postgraduate Award.

All communications regarding the Keith Kevan Award, including requests for applications, should be addressed to: Dr. R. West, ESC Secretary, Forestry Canada, Newfoundland and Labrador Region, P.O. Box 6028, St. John's, Newfoundland, A1C 5X8, Fax 709-772-25-76

Bourse Keith Kevan - Avis

La Société d'entomologie du Canada, en mémoire de Dr. D. Keith McE. Kevan, offrira une bourse d'un montant de \$1,000 pour aider les étudiants qui entreprennent des études en taxonomie des insectes. Cette bourse est accordée en raison des critères d'excellence académique de la prééminence en taxonomie des insectes.

Éligibilité - Le(La) candidat(e) doit être étudiant(e) gradué(e), inscrit(e) à une université canadienne ou citoyen canadien étudiant à l'étranger.

Procédure - Les candidats devront soumettre leur candidature à l'aide du formulaire approprié et y joindre tous les documents requis. Les demandes devront être reçues par la Secrétaire de la Société au plus tard le **11 Juin 1993**. Préciser que vous voulez les formulaires pour la Bourse Keith Kevan.

Sélection et remise des bourses - Telles que la Bourse Post-graduée.

Règlement - Telle que la Bourse Post-graduée.

Toute correspondance relative à la Bourse Keith Kevan, y inclus les demandes de formulaires doit être adressée à: Dr. R. West, secrétaire SEC, Forestry Canada, Newfoundland and Labrador Region, P.O. Box 6028, St. John's, Newfoundland, A1C 5X8, Télécopie: 709-772-2576

UPCOMING MEETINGS / RÉUNIONS À VENIR

Beltsville Symposium XVIII

May 2-6, 1993

Administration Building #003, Beltsville Agricultural Research Center, Beltsville, MD

The theme for the Eighteenth Beltsville Symposium will be *Pest Management: Biologically Based Technologies*. The Symposium will address topics that deal with the application of biologically based technologies to the management of populations of insects, weeds, nematodes and plant pathogens that are problems in modern day agriculture. The Symposium will be co-chaired by Barbara A. Leonhardt and James L. Vaughn.

CONTACT: XVIII BARC Symposium, Attn: Virginia Hupfer, Friends of Agricultural Research - Beltsville, Rm. 128, Bldg. 001, USDA Beltsville Agricultural Research Center (West), Beltsville, MD 20705-2350. Tel. (301) 505-6108; Fax. (301) 504-6357.

45th International Symposium on Crop Protection

May 4th 1993

Faculty of Agricultural Sciences, University of Ghent, Belgium

The following topics will be treated: Insecticides, Entomology, Nematology, Applied Soil Zoology, Fungicides, Phytopathology, Phytovirology, Phytobacteriology, Herbicides, Herbology, Plant Growth Regulators, Biological & Integrated Control, Residues, Toxicology, Formulations, Application Techniques. The summaries of the papers will be made available to participants in English. The proceedings will be published in the "Mededelingen Faculteit Landbouwwetenschappen Universiteit Gent".

CONTACT: Dr. ir. L. Tirry, Faculty of Agricultural Sciences, Coupure links 653, B-9000 Gent, Belgium. Tel. 32 (0)91-64-61-52; Fax. 32 (0)91-64-62-39 or 64-62-49.

41st Annual Meeting - North American Benthological Society (NABS)

May 25-28, 1993

Calgary, Alberta, Canada

The theme of the conference and plenary session will be "*Biomonitoring of Ecosystem Health: An Ecological Research Agenda*". The scientific program will consist of special invited and contributed sessions, posters and workshops addressing not only this theme, but also other general topics related to the study of benthic organisms and environments.

CONTACT: Janice L. Akre, NABS Scientific Program, Science Liaison Division, National Hydrology Research Institute, 11 Innovation Boulevard, Saskatoon, Saskatchewan, S7N 3H5. Tel. (306) 975-5514; Fax. (306) 975-5143

First Joint Meeting of the American Society of Limnology & Oceanography (ASLO) and the Society of Wetland Scientists (SWS)

May 30 to June 3, 1993

University of Alberta, Edmonton, Alberta

CONTACT: (for further details and/or to put your name on the mailing list) ASLO/SWS 1993 Conference, Environmental Research & Studies Centre, University of Alberta, CW-401L Bio Sciences Building, Edmonton, Alberta, Canada, T6G 2E9. Fax. (403) 492-8160.

53rd Annual Meeting of the Acadian Entomological Society

June 21-23, 1993

Charlottetown, P.E.I.

The 53rd Annual Meeting of the Acadian Entomological Society will be held at the Best Western Hotel in Charlottetown, P.E.I.

CONTACT: Dr. Jeff Stewart, Agriculture Canada, Research Station, P.O. Box 1210, Charlottetown, P.E.I., C1A 7M8. Tel. (902) 566-6844; Fax. (902) 566-6821; email: jeff1@persch.agr.ca or Dr. Larry Hale, Department of Biology, University of P.E.I., 550 University Ave., Charlottetown, P.E.I., C1A 4P3. Tel. (902) 566-0301; Fax. (902) 566-0740.

24th Scientific Conference of the Australian Entomological Society

July 3-8, 1993

Cairns, Australia

The closing date for registration and abstracts of papers is **31st March 1993**. The conference will deal with a range of selected topics. A session on "Biological Control versus Conservation" will be introduced by Professor Michael Samways, University of Natal, Pietermaritzburg.

CONTACT: Ross Storey or Harry Fay Tel. (070) 921555; Fax. (070) 923593

Joint Meeting of the Lepidopterists' Society (44th Annual), the Pacific Slope Section (40th Annual) and the High Country Lepidopterists (4th Annual)

July 8-11, 1993

Fort Collins, Colorado

There will be a meeting of 200 or more lepidopterists at Colorado State University in Fort Collins, Colorado. In addition to the Lepidopterists' Society, their Pacific Slope Section and the High Country Lepidopterists, the Idalia Society will sponsor the meeting. The Xerces Society's Annual Meeting will be held concurrently. The C.S.U. Entomology Department will host the meeting.

CONTACT: Dr. Paul Opler or Dr. Boris Kondratieff, Department of Entomology, Colorado State University, Fort Collins, CO 80523.

International Symposium on Pollination in the Tropics

August 8-13, 1993

Bangalore, India

The **Nectar Working Group** of the International Commission for Plant-Bee Relationships will meet during the International Symposium on Pollination in the Tropics. The purpose of the meeting is to provide a forum for the presentation of scientific data relating to all aspects of nectaries and nectar secretion, such as nectar production in plant breeding programmes; techniques for nectar collection and analysis; physiology, anatomy and ultrastructure of nectaries; nectaries and plant taxonomy; chemical constituents of nectar.

CONTACT: Nectar Working Group: Dr. Arthur Davis, Department of Biology, University of Saskatchewan, Saskatoon, Saskatchewan, S7N 0W0. Tel. (306) 966-4404; Fax (306) 966-4461

CONTACT: International Symposium on Pollination in the Tropics: Dr. K.N. Ganeshaiah, Dept. of Genetics and Plant Breeding, University of Agricultural Sciences, G.K.V.K. Campus, Bangalore, 560 065, India.

1993 International Conference on Thysanoptera

September 28-30, 1993

Burlington, Vermont

The goal of the meeting is to assemble scientists, pest managers, and growers to discuss current information relevant to the integrated management of Thysanopteran pests of food and fiber. The program will highlight the biology, distribution, population dynamics, ecology and management of thrips. Keynote speakers of international standing will commence and lead sessions.

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.

MISCELLANEOUS

Amateur Entomologist Newsletter

The Metropolitan Toronto Zoo has taken on the task of producing the *Amateur Entomologist Newsletter* for the Entomological Society of Ontario. Anyone wishing to receive a copy of this newsletter, or contribute an article to the newsletter, please contact:

Tom Mason
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