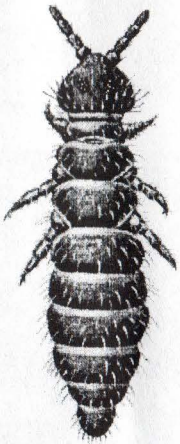
VOL 26 March - mars, 1994 No. 1

BULLETIN



ENTOMOLOGICAL SOCIETY OF CANADA

LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA

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BULLETIN
VOL 26(1) - March / mars, 1994

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'Editeur 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

For Your Enjoyment ...

A.B. Stevenson (Agriculture Canada, Vineland Station, Ontario) kindly submitted the following piece for your enjoyment ...

***THE COMPLEAT ACAROLOGIST** **

Under the spreading orchard trees
The Acarologist walks at ease
Assessing with keen and practiced eye
Abundance of Panonychus ulmi,
Nor overlooking on a tree
Some Tetranychus urticae,
And identifies by looking closer
Eggs of Bryobia praetiosa,
But though he looks in the proper places
He finds no Amblysius fallacis;
No Agistemus fleschneri;
Nor Balaustium putmani;
Though he searches twigs with practiced hands
No Typhlodromus caudiglans;
Zetzellia mali eggs are few
So now he knows what he must do.
Then to the grower he turns to say
"It looks as though you'll have to spray.
You have mites red, spotted and brown
But no predators are around.
To make right sure some leaves we'll clean
With a Henderson-McBurnie brushing machine.
We'll also test if your mite persistence
Is caused by miticide resistance".
A sample of leaves from here and there
Then is taken with utmost care,
Some from the outer canopy
Some from the inside of the tree,
Some from as high as one can pick
With scissors fastened on a stick
Artfully fashioned so as to hold
The severed leaf in a wire bowl.
The leaves are carefully packed in cans
With cotton tops and rubber bands
And to the laboratory are brung
Where counts and testing are begun.
The counts confirm the orchard assessment
That predators are non existent
And tests confirm that the mites' persistence
Was indeed owing to their resistance.
But by the time all this is done
The Summer and Fall their course has run
So the report to the grower was, "I fear
You are going to have to spray next year."

* This poem was written by the Late Dr. J.H.H. Phillips, an Honorary member of the Entomological Society of Canada, in 1983 to commemorate the retirement of Dr. D.H.C. Herne, himself a "compleat acarologist".

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 23, 1994.

44th Annual General Meeting

The Annual General Meeting of the Entomological Society of Canada will be held at the Delta Winnipeg Hotel in Winnipeg, Manitoba on October 18, 1994.

Governing Board Meeting

The Annual Meeting of the Governing Board will be held at the Delta Winnipeg Hotel in Winnipeg, Manitoba on October 15, 1994. If necessary, the meeting will continue on October 16.

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

Dr. Rick West
Canadian Forest Service, 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. (905) 688-5550 Ext. 3394
Fax. (905) 688-1855
Email: hunterf@spartan.ac.BrockU.ca

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

Dr. Hugh V. Danks
Biological Survey of Canada
(Terrestrial Arthropods)
Canadian Museum of Nature
Box 3443, Stn D
Ottawa, Ontario
K1P 6P4

Tel. (613) 954-2648
Fax. (613) 954-6439

The deadline for submissions to be included in the next issue (Vol. **26(2)**) is **May 1, 1994**

La date limite pour recevoir vos contributions pour le prochain numéro (Vol. **26(2)**) est le **1 mai 1994**

President's Message

The time has passed by quickly since the Annual Meeting in Sault Ste. Marie. However, several important issues concerning the Society have arisen since the Annual Meeting. I will now bring you up-to-date on these matters.

The book on ***"Diseases and Pests of Vegetable Crops in Canada"*** has now gone to press. The English version should be available for purchase by early March and the French version will follow in a few months. On behalf of the Society, I thank all Members of the Society who have submitted chapters to the book and those who have been involved in the compilation and publication. The book is very impressive and represents a cooperative effort that we all can be very proud of. Fliers advertising the book will appear in this issue of the Bulletin. I urge all members of the Society to purchase the book, as profits from this venture will help to maintain membership dues at current levels and to finance future activities of the Society. There will be discounts for bulk purchases of the book. I recommend that you do your Christmas shopping early for family members and friends by purchasing several copies of the book and taking advantage of the **big discounts!!!**

In September 1993, the Entomological Society of America approached the Society asking us whether we would like to hold a joint Annual Meeting with them in the year 2000. The Board indicated that it was in favour of participating in such a joint Annual Meeting. I met with the Government Board of the ESA in Indianapolis on December 12, 1993, at which time their Board approved the holding of a joint Annual Meeting in 2000. Thus, the two societies will be meeting jointly for the third time during that year. Four cities are being considered as the location for the meeting: Toronto, Montreal, Detroit and Chicago. This joint meeting will be an excellent way to kick off the next century.

At the Annual Meeting in September, Dr. A.B. Ewen indicated to the Governing Board of his intention to resign as the volunteer Scientific Editor of The Canadian Entomologist effective March 31, 1994. The Board accepted Dr. Ewen's resignation and appointed Dr. Peter Kevan, Department of Environmental Biology, University of Guelph, as the new Scientific Editor, effective January 1, 1994. Dr. Kevan will be in charge of all new manuscripts submitted after January 1, 1994. Dr. Ewen will look after most of manuscripts submitted before January, during the 3-month transition period. On behalf of the Society, I thank Dr. Ewen for the eight years of excellent service that he has given to the Journal and the Society. I hope that all Members will give Dr. Kevan their full cooperation as he assumes the position of Scientific Editor.

At Sault Ste. Marie, the Governing Board approved that manuscripts being submitted to The Canadian Entomologist be on electronic diskette. The Publications Committee and new Scientific Editor were instructed to develop procedures for the handling of diskettes. They agreed that diskettes will be required only for the final version of manuscripts sent to The Canadian Entomologist Office after scientific review and acceptance. This change in publication procedures will be implemented during 1994 and should reduce the publication costs of the Society substantially.

Have a happy and productive 1994.

George H. Gerber
President
January 1994

Committees of the Entomological Society of Canada Update - 1994

Endangered Species/Espèces menacées
H. Chiasson, SEQ, St-Charles-sur-Richelieu

Membership/Adhésion
P. Kusters, ESS, Saskatoon

Insect Common Names/Noms Communs d'Insectes
H. Chiasson, SEQ, St-Charles-sur-Richelieu

Scholarships/Bourses d'Étude
W. Chapco, ESS, Regina

Report of the Nominating Committee

The Nominating Committee invited the individuals whose names appear below to stand for election in 1994-1995, for the positions noted. In turn, these individuals have agreed to serve, and have so indicated in writing. A copy of this slate was sent to the Editor of the *E.S.C. Bulletin* on 20 January 1994, for publication in the March issue as notice to the members.

Slate of Candidates

Second Vice President

Dr. Steve A. Marshall

Dr. Juliana J. Soroka

Director-at-Large

Dr. Elspeth M. Belton

Dr. Alwyn B. Ewen

Dr. Yves H. Prevost

Fellowship Selection Committee

Dr. S. Cameron Jay

Dr. William J. Turnock

Dr. Glenn B. Wiggins

Submitted by: Nominating Committee
P.W. Riegert, Chair
J.A. Shemanchuck
B.S. Heming

The 1994 Joint Meeting
of the Entomological Society of Canada
and the Entomological Society of Manitoba

Winnipeg, October 15 - 19, 1994
Delta Winnipeg

TENTATIVE PROGRAM

Saturday, 15 October 1994

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

Sunday, 16 October 1994

10:00 - 15:00	Registration
13:00 - 17:00	Workshop: "Silvicultural Approaches to Integrated Insect Management", •Dave Maclean Workshop: "Employment Opportunities in Entomology: What You Should Know Before Graduation" •Rob Anderson Tour
19:00 - 20:00	Students meet the Board
19:00 - 23:00	Wine and cheese

Monday, 17 October 1994

08:00 - 10:00	Registration
08:30 - 10:00	Opening remarks, ESC Awards, Gold Medal Address
10:00 - 12:00	Plenary Symposium: "Insect Movement"
13:30 - 17:00	Submitted Papers: "Insect Movement" Submitted Papers: Graduate Student Papers (President's Prize)
19:00 - 21:00	Workshop: "Definitions and measurements of biodiverstiy" •Rob Roughley and Terry Galloway

Tuesday, 18 October 1994

09:00 - 12:00	Symposium: "Advances in Forest and Urban Tree Pest Management" •Richard Westwood Symposium:"Insect-Host Interactions and Insect Pest Management" •Palaniswamy Pachagounder
13:30 - 16:00	Submitted Papers: "Forest Entomology" Submitted Papers: "Insect-Host Interactions" Submitted Papers:
16:00 - 16:30	Heritage Lecture
16:30 - 17:30	Entomological Society of Canada Annual General Meeting
18:30 - 23:00	Banquet

Wednesday, 19 October 1994

09:00 - 12:00	Submitted Papers:

For additional information please contact

Don Dixon (Chair), Manitoba Agriculture, Agriculture Services Complex, 201-545 University Crescent, Winnipeg, Manitoba, telephone (204) 945-3861, Fax (204) 945-4327

or

Paul Fields (Program Chair), Agriculture Canada, 195 Dafoe Rd. Winnipeg, Manitoba, telephone (204) 983-1468, Fax (204) 983-4604, Email PFIELDS@MBRSWI.AGR.CA

David Maclean
(Workshop: "Silvicultural Approaches to Integrated Insect Management")
Canadian Forest Service
P.O. Box 4000, Fredericton, N.B.
E3B 5P7
Telephone: (506) 452-3580 Fax (506) 452-3525

Rob Anderson
(Workshop: "Employment Opportunities in Entomology: What You Should Know Before Graduation")
Dept. of Entomology
University of Manitoba
Winnipeg, Manitoba
R3T 2N2
Telephone (204) 474-9257 Fax (204) 275-0402
Email: RANDERSON@BLDGAGRIC.LAN1.UMANITOBA.CA

Robert Roughley and Terry Galloway
(Workshop: "Definitions and measurements of biodiversity")
Dept. of Entomology
University of Manitoba
Winnipeg, Manitoba
R3T 2N2
Telephone (204) 474-9257 Fax (204) 275-0402

La Réunion Conjointe de 1994
de la Société Entomologique du Canada
et de la Société Entomologique du Manitoba

Winnipeg, 15-19 octobre 1994
Delta Winnipeg

PROGRAMME PROVISOIRE

Samedi, 15 0ctobre 1994

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

Dimanche, 16 octobre 1994

10:00 - 15:00	Inscription
13:00 - 17:00	Atelier: "La Lutte contre les insectes nuisibles dans la forêt" •Dave Maclean Atelier: "Les Occasions d'Emploi a l'Entomolgie: Qu'On Doit Savoir Avant Que La Graduation" •Rob Anderson Visite guidée
19:00 - 20:00	Rencontre des étudiants avec le conseil d'administration
19:00 - 23:00	Vin et Fromage

Lundi, 17 octobre 1994

08:00 - 10:00	Inscription
08:30 - 10:00	Ouverture, Prix SEC, Allocution, Médaille d'Or
10:00 - 12:00	Symposium Plénier: "Déplacement chez les insectes"
13:30 - 17:00	Communications Scientifiques: "Déplacement chez les insectes" Communications Scientifiques: Communications Scientifiques des étudiants gradués (Prix du Président)
19:00 - 21:00	Atelier: "Les définitions et les measurages de la biodiversité" •Rob Roughley et Terry Galloway

Mardi, 18 Octobre 1994

09:00 - 12:00	Symposium: " Progrès dans la gestion des insectes nuisibles dans les forêts urbaines et rurales" •Richard Westwood Symposium:"Les Interactions insecte-hôte" •Palaniswamy Pachagounder
13:30 - 16:00	Communications Scientifiques: Entomologie Forestière" Communications Scientifiques: "Les Interactions insecte-hôte" Communications Scientifiques:
16:00 - 16:30	Allocution Héritage des Anciens
16:30 - 17:30	Société d'entomologie du Canada, Assemblée Générale Annuelle
18:30 - 23:00	Banquet

Mercredi, 19 Octobre 1994

09:00 - 12:00	Communications Scientifiques:

Pour de plus amples renseignements adressez-vous à

Don Dixon, Manitoba Agriculture, Agricultural Services Complex, 201-545 University Crescent, Winnipeg, Manitoba, téléphone (204) 945-3861, télécopieur (204) 945-4327

ou

Paul Fields, Agriculture Canada, 195 rue Dafoe, Winnipeg, Manitoba, R3T 2M9, téléphone (204) 983-1468 télécopieur (204) 983-4604, Email PFIELDS@MBRSWI.AGR.CA.

David Maclean
(Atelier:"La Lutte contre les insectes nuisibles dans la forêt")
Service Canadien des Forêts
P.O. Box 4000, Fredericton, N.B.
E3B 5P7
téléphone: (506) 452-3508 télécopieur: (506) 452-3525

Rob Anderson
(Atelier: "Les Occasions d'Emploi a l'Entomolgie: Qu'On Doit Savoir Avant Que La Graduation")
Dept. of Entomology
University of Manitoba
Winnipeg, Manitoba
R3T 2N2
Telephone (204) 474-9257 Fax (204) 275-0402
Email: RANDERSON@BLDGAGRIC.LAN1.UMANITOBA.CA

Robert Roughley *ou* Terry Galloway
(Atelier: ""Les définitions et les measurages de la biodiversité")
Dept. of Entomology
University of Manitoba
Winnipeg, Manitoba
R3T 2N2
téléphone (204) 474-9257 télécopieur (204) 275-0402

The 1994 Joint Meeting
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and the Entomological Society of Manitoba

Winnipeg, October 15 - 19, 1994
Delta Winnipeg

REGISTRATION FORM

Check one: Regular ☐ *or* Student ☐

Name: .....
Last *First* *Initial*
Title: .....
Address: .....
City: .....
Province/State: .....
Postal Code: .....Telephone: .....Fax: .....
Registration fees are in $ CDN (including banquet ticket and GST).
Late registration (after August 12, 1994) add $15.00 to each fee.
Please make cheque payable to *ESC/ESM Joint Meeting 1994*

Registration, *regular*	☐ $100
Registration, *student*	☐ $50
Registration, *accompanying*	☐ $50
.....	.....
Name of accompanying person	TOTAL

Tour: *A tour of the Ducks Unlimited Conservation Centre, the most important waterfowl staging area in Canada, is being planned for the afternoon of Sunday, October 16.* ***Maximum cost*** *will be $20. Please indicate interest* ☐.

Accommodations: *Single or double occupancy $75 plus GST and PST*

Please make your own reservations through:
Delta Winnipeg, 288 Portage Avenue,
Winnipeg, Manitoba, Canada, R3C 0B8
Telephone: (204) 956-0410 Fax: (204) 947-1129
Reservations: 1-800-268-1133 (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:
Ms. J.L. Buth
Joint Meeting 1994, ESC-ESM
Manitoba Agriculture, Box 1149, Carmen, Manitoba, Canada, R0G 0J0

La Réunion Conjointe de 1994
de la Société Entomologique du Canada
et de la Société Entomologique du Manitoba

Winnipeg, 15-19 octobre 1994
Delta Winnipeg

FORMULAIRE D'INSCRIPTION

Indiquez: Régulier ☐ *ou* Etudiant(e) ☐

Nom: . . . . . .
Nom de famille *prénom* *initiales*
Titre: . . . . . .
Adresse: . . . . . .
Ville: . . . . . .
Province\Etat: . . . . . .
Code Postal: . . . . . Téléphone: . . . . . Fax: . . . . . .
Frais d'inscription en $Can (incluant les frais de banquet et de la TPS).
Inscription tardive (après le 12 aout 1994) ajoutex $15.00.
Chèque ou mandat payable à *"ESC/ESM Joint Meeting 1994"*

Frais d'inscription, régulier	☐ $100
Frais d'inscription, étudiant	☐ $50
Frais d'inscription, conjoint	☐ $50

. . . .
Nom du conjoint TOTAL

Une visite guidée *au centre de conservation Ducks Unlimited, le centre d'arrêt le plus important au Canada pour les oiseaux migrateurs, est planifiée pour le 16 octobre. Le coût maximum sera $20. Indiquez votre intérêt içi* ☐

Hébergement: *Occupation simple ou double $75* (TVP et TPS en sus)

Prière d'effectuer vos réservations directment auprès de:
Delta Winnipeg, 288 Portage Avenue,
Winnipeg, Manitoba, Canada, R3C 0B8
Téléphone (204) 956-0410 Fax: (204)947-1129
Réservations:1-800-268-1133 (sans frais au Canada)
Note: Les personnes désirant partager une chambre sont priés de compléter et de retourner le formulaire *"Partage-Une-Chambre"*

Veuillez retourner ce formulaire ainsi que les frais d'inscription à:
Ms. J.L. Buth,
Réunion conjointe 1994, SEC-SEM
Manitoba Agriculture, Box 1149, Carmen, Manitoba, Canada, ROG OJO

The 1994 Joint Meeting of the Entomological Society of Canada and the Entomological Society of Manitoba

Winnipeg, October 15 - 19, 1994
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SUBMITTED PAPER, STUDENT PAPER AND POSTER PRESENTATION FORM

Please return to:
Dr. P. Fields
Joint Meeting 1994, ESC-ESM
Agriculture Canada
195 Dafoe Road, Winnipeg, Manitoba, Canada, R3T 2M9

Deadline: Postmarked on June 30, 1994

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:	☐	☐

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 chair 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; and*
3) *they must be the principal investigator and sole author of the paper.*

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FORMULAIRE D'INSCRIPTION: COMMUNICATIONS ORALES REGULIERES ET D'ETUDIANT(E)S, ET COMMUNICATIONS POSTERS

Veuillez retourner à:
Dr. P. Fields
Réunion conjointe 1994, SEC-SEM
Agriculture Canada,
195 rue Dafoe, Winnipeg, Manitoba, Canada, R3T 2M9

Date limite: 30 Juin 1994

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:	☐	☐

Equipement 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 additionel.*

* 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 précédent 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.*

The 1994 Joint Meeting of the Entomological Society of Canada and the Entomological Society of Manitoba

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SHARE-A-ROOM FORM

If you wish to share a room with a colleague at the ESC/ESM Joint Annual Meeting in Winnipeg, please supply the following information and we'll do our best to find you a roomate 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:
Ms. J.L. Buth
Joint Meeting 1994, ESC-ESM
Manitoba Agriculture, Box 1149, Carmen, Manitoba, Canada, R0G 0J0

.....

La Réunion Conjointe de 1994 de la Société Entomologique du Canada et de la Société Entomologique du Manitoba

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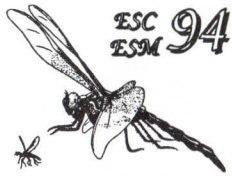

FORUMLAIRE: "PARTAGE-UNE-CHAMBRE"

Si vous désirez partager une chambre avec un collègue lors de la Réunion conjointe de la SEC et la SEM à Winnipeg, 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: .....
Retournex ce formulaire à:
Ms. J.L. Buth
Réunion conjointe 1994, SEC-SEM
Manitoba Agriculture, Box 1149, Carmen, Manitoba, Canada, R0G 0J0

MEMBERS IN THE NEWS

Thaddée Renault Retires

Thaddée R. Renault, for 20 years Forest Tree Pest Extension Officer with the Canadian Forest Service - Maritimes Region, retired the end of September 1993.

Thaddée graduated in forestry from the University of New Brunswick in 1957 and earned a Master's degree in 1959. He then set out on the first of two careers. In the context of the Green River Project, he was concerned with the spruce budworm, spider predation in particular. This stimulated a strong interest in spiders which soon earned him a reputation as the man to ask. With his remarkable ability to find answers and tailor them to his audiences, in two languages, he was a natural for his next career.

In 1973, Thaddée became the first Forest Tree Pest Extension Officer. He found himself having to field questions on a wide range of insect and disease questions. He met a need for answers that few imagined was as great as it turned out to be. On an average day during the growing season Thaddée personally advised an average of ten persons by letter, by phone, or by visits, on the care and protection of ornamental and shade trees. In twenty years this adds up to 20-25 thousand queries, many of them from people responsible for their community's tree programs.

Thaddée was interviewed every second day by television, radio or newspaper, reaching people all over the Maritimes. Every third day he was involved in lectures, tours, demonstrations, or field days, talking about trees, their pests, and what to do about them. Thaddée loved to work with school children because he felt that, if they learn early, they learn greater respect and appreciation for trees, particularly the urban forest. His forest tent caterpillar races were, for years, one of the favourite features of the CBC's tribute to Arbour Day.

Thaddée's weekly column, "Trouble With Trees" was carried by daily and weekly newspapers throughout the Maritimes. He wrote and continually updated some 90 widely distributed leaflets on tree pests (also used as source material for certification by the Atlantic Chapter of the International Arboriculture Society). Towns and municipalities were advised regularly on Dutch elm disease control, and those that listened still have elm trees. Christmas tree growers were taught pest identification and informed of the latest pest management procedures.

At his retirement, Thaddée was honoured by his colleagues and by the Forest Extension Services, New Brunswick Natural Resources, and the Bellisle Christmas Tree Association.

Thaddée contributes to the community at large in many ways. He is active in his church, Le Club Richelieu, le Choeur de Soulanges, and the Fredericton Choral Society. As a proud Acadian he is right there to defend the rights of francophones in New Brunswick against (fortunately diminishing) attacks.

Thaddée and his wife Estelle live at 225 Cambridge Crescent, Fredericton, N.B. E3B 4P1.

D.C. Eidt and L.P. Magasi

... More on Thaddée Renault

The week following the retirement of Thaddée Renault as Forest Tree Pest Extension Officer, Canadian Forest Service - Maritimes, yielded a number of interesting calls. In addition to the usual recurring queries about Dutch elm disease in Nova Scotia, sooty mould in Prince Edward Island, and Christmas tree problems in New Brunswick, Dr. Les Magasi recorded the following:

How do I remove tree stumps from the front lawn?

What are the blackish colored flies congregating on the sunny side of my house, and what do I do about them?

Is natural needle-shedding of conifers normal?

Will the neighbours be able to see me in the pool if the hedge between our properties dies? (There was even a photo of the scene - nobody in the pool.)

Are those big bees with dark behinds dangerous in the back yard?

Is it OK to take kindling into the house?

Should my nine-year-old be allowed to sleep with the dog? (The bed was full of fleas.)

I am sick because there is mould in the house and the doctor thinks I am crazy. I think he is. Who is right?

All this in one week!

D.C. Eidt
Fredericton, NB

IN MEMORY

David Alan Turnbull (1961 - 1993)

David Turnbull, an M.Sc. student at the University of Waterloo, died on 26 May 1993 following a lifelong battle with cystic fibrosis. David was born in Windsor, Ontario, where he was active in water polo during his high school career. He graduated in Honours Biology from the University of Waterloo in 1987 and then began post-graduate research, also at the University of Waterloo. He was interested in the biology of blood-sucking insects and spent some time in the laboratory of Dr. Jim Sutcliffe, investigating the feeding behaviours of female simuliids. However, for most of his career he was associated with the laboratory of Dr. S.M. Smith, where he studied the mating systems of several species of Tabanidae. In 1986 he traveled to central Ethiopia where he participated in studies of Tabanidae on the Gibe River, the first studies of Ethiopian tabanids in more than 20 years. His work there resulted in the description of a new species, *Tabanus gibensis* and an interesting contribution to mating and oviposition in an African *Tabanus*.

His M.Sc. studies dealt with the mating system of *Hybomita arpadi*, and involved two seasons of field work at Churchill, Manitoba, near the northern limit of the range of the family in eastern Canada. His thesis was approved shortly before his death.

In spite of his enervating illness, David was impressively energetic, irreverently enthusiastic, and resolutely uncomplaining. He made a host of friends of remarkable diversity in Canada, Europe and Africa, all of whom will miss him deeply.

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Stephen M. Smith
Department of Biology
University of Waterloo

NEWS OF ORGANIZATIONS

Fourth Edition of the International Code of Zoological Nomenclature

The International Commission on Zoological Nomenclature proposes to publish a new edition of the Code, taking into account the large number of possible amendments which have been received. It is planned that the Fourth Edition will be published during 1995 and that on 1 January 1996 its provisions will supersede those in the current (1985) edition.

The Commission's Editorial Committee met in Hamburg from 12-16 October 1993 to prepare a discussion draft for the new edition of the Code. Copies of this draft will be sent without charge to all subscribers to the Bulletin of Zoological Nomenclature and to members of the American and European Associations for Zoological Nomenclature. Any other institution or individual may order a copy from the Executive Secretary, I.C.Z.N., c/o The Natural History Museum, Cromwell Road, London, England, SW7 5BD. Bank charges on currency exchange make it uneconomic to charge the cost of printing and postage (£3 or US$5) except for payment in sterling or US dollars. The draft will therefore be sent free of charge, but those able to pay in sterling or US dollars are asked to enclose a cheque for £3 or US$5 to cover the cost.

Before completing the definitive text of the Fourth Edition, the Commission will (in accordance with Article 16 of its Constitution) carefully consider all comments and suggestions on the draft. Zoologists and others are asked to send these to the Executive Secretary of the Commission at the above mentioned address as soon as convenient, and in any event not later than February 1995.

Biological Survey of Canada (Terrestrial Arthropods) - Survey Report

The Scientific Committee met in Ottawa on 21 to 22 October 1993.

-Scientific Projects-

1. *Arthropods of peatlands in Canada*

A memoir of the Entomological Society of Canada on arthropods of peatlands in Canada is proceeding toward publication in 1994.

2. *Arctic invertebrate biology*

Studies in the arctic by Canadian entomologists continue at a modest level, and there is considerable international interest. Another issue of *Arctic Insect News* was published after the meeting.

3. *Arthropod fauna of the Yukon*

Most of the core chapters for the proposed Yukon book, dealing with particular taxonomic groups, are at an advanced stage of preparation.

4. *Old-growth forests*

A major submission for NSERC strategic grant funding to work in old-growth forests was not successful, but several individual efforts continue.

5. *Invasions and reductions in the Canadian insect fauna*

A very successful workshop on invasions and reductions was held at the 1993 Entomological Societies meetings in Sault Ste. Marie, and plans are being made for future activities in this area.

-Other Scientific Priorities-

1. *Arthropod fauna of soils*

Several items of interest were reported: *a Journal of Applied Soil Ecology* has just been begun by the Soil Ecology Society; interest in soil arthropods in Canada appears to be increasing; and work on soil organisms in an agricultural context, linked especially to their potential as environmental indicators, has been funded.

2. *Brief on biodiversity*

The Committee discussed the second draft of a brief on biodiversity, dealing especially with sampling requirements but also providing a wider context (see Supplement in this issue).

3. *Workshop on Coleoptera*

A workshop on Coleoptera will be held in Ottawa in May 1995. Details of logistics, funding and participation are being considered further.

4. *Requirements for involvements in the Biodiversity Convention*

An article emphasizing that a proper systematics infrastructure, including systematists, is required to make any government agreements on biodiversity feasible, was developed and published on behalf of the Survey [*Alternatives* 20(1): 21 (1993)].

5. *Support for collections*

The Committee agreed to send a letter to various recipients to point out that biodiversity studies require collections support, both through general infrastructure such as museums, and through specific project-associated funds for curation of material collected as part of a particular study.

6. *Availability of systematists*

An analysis of the availability of systematists in Canada able to identify the various groups of insects will be undertaken by a subcommittee chaired by Dr. R. E. Roughley.

7. *Endangered species*

Dr. Marshall undertook to develop a proposal to assess whether sufficient information exists to identify rare and potentially endangered species of insects.

-Liaison and exchange of information with other organizations-

1. *Canadian Museum of Nature*

Dr. P. Colgan, Executive Vice-President, CMN, reported that the Museum recently undertook a process of transition, dictated by reduced budgets and the Trustees' requirements for fairly rapid change in both scientific and educational activities. This process included lay-offs [51 of about 250 staff], necessary to establish a reasonable salary:non-salary ratio in the budget.

Dr. Colgan reported that the Board of Trustees is pleased with the first year's progress on the action plan for research, and that budgets for research have been increased. He added that apart from hosting the Biological Survey, the Museum has a very active Centre for Biodiversity, and activities in the Federal Biosystematics Group and the Task Force on Canadian Biosystematics. The first report of the Task Force should soon be released, and comments will be sought from scientific societies and others.

2. *Biological Resources Division, Centre for Land and Biological Resources Research*

Dr. R. Asselin, Director, CLBRR, reported that recently the Research Branch had assigned first priority in research programmes to health and safety of the agrifood system, with a first priority to programmes that include areas of interest to the Committee.

Dr. R. G. Foottit, acting Executive Deputy Director, BRD, reported that conditions at BRD are relatively stable. Two senior technicians and one research scientist recently have retired or will soon retire; internal adjustments allow them not to be replaced. A facility for molecular systematics work is now complete, and is to be staffed by a technical position.

Other recent highlights include appearance of the Hymenoptera manual, and the operation of another Hymenoptera training course. A variety of initiatives for liaisons elsewhere are underway, including a planned 1994 workshop on insect molecular systematics, the Federal Biosystematics Group, and several joint goals with the Systematic Entomology Laboratory of the United States Department of Agriculture.

Problems associated with the handbook series had been noted at earlier Scientific Committee meetings; support for the series was received from the ESC for example. Ways appear to have been found to solve most of the problems.

4. *Entomological Society of Canada*

Dr. R. West, Secretary of the ESC, reported on the recent very successful annual meeting held in Sault Ste. Marie, including several associated symposia and workshops. 5.*Canadian Forestry Service*

Dr. J. Huber, on behalf of Dr. B. Moodie, Coordinator, Biological Control, noted that the organization is now called the Canadian Forestry Service, within the new department of Natural Resources Canada.

Dr. West reminded the Committee about the potential value of the Forest Insect and Disease Survey to cooperators.

5. *Canadian Society of Zoologists*

Dr. D. Marcogliese, Parasitology Section, CSZ, reported that the incipient parasitology module is proceeding well, and a proposal for a parasitology module will soon be submitted by the CSZ group to the Museum.

6. *Natural Sciences and Engineering Research Council*

Dr. R. Snell, NSERC, reviewed the sources of NSERC funds available.

7. *Systematic Entomology Laboratory, United States Department of Agriculture*

Dr. M. Stoetzel, Leader, SEL, Beltsville, Maryland, noted that the SEL's staff and budget problems mirror those of Canadian organizations; budget requirements have forced savings by attrition or by staff cuts.

Dr. Stoetzel stated that long-standing initiatives for a national biological survey have been usurped by the Secretary of the Interior, Mr. Bruce Babbit, who has reorganized the systematic resources within his department to form "National Biological Survey". This inadequate survey may jeopardize the legislation currently before Congress.

Dr. Stoetzel noted that a Consortium for Systematics and Biodiversity has been set-up by the Systematic Entomology Laboratory, the Museum of Natural History (Smithsonian Institution), the University of Maryland and others. An open house to demonstrate recent major SEL products to local politicians and others had been very successful.

-Other items-

1. *Regional Developments*

Information of potential interest to the Survey from different regions of the country was reviewed, for example: in British Columbia, the only ecology reserve in the Osoyoos Arid region was completely burned during the summer, destroying the vegetation; the Provincial Museum of Alberta continues to have success with its Bug Room and other popular initiatives; in Manitoba, increasing attention is being paid to grasslands by some jurisdictions; Dr. S. A. Marshall reviewed some personnel changes in Ontario, including the appointment of Dr. Y. Alarie at Laurentian University, Sudbury, and Dr. D. Currie at the Royal Ontario Museum, Toronto; in Quebec, the Société d'entomologie du Québec has decided to end publication of their *Revue d'entomologie du Québec* because of a shortage of good submissions; in Newfoundland, studies on biodiversity, and popular interest in entomology (in the form of an entomology weekend organized by Dr. P. Dixon, and plans for the insectarium), continue; Dr. Ring

reported that arctic studies are increasingly more difficult because of limitations of funding, and the need for many permissions or licenses to work in the north.

2. *Other matters*

The Committee also considered endangered collections, lay-offs at the CMN, membership of the Scientific Committee, information on Secretariat activities, and international liaisons.

H.V. Danks
Ottawa, Ontario

PUBLICATIONS
BOOK NOTICE

Leech, Robin. 1993. *Report Writing Manual: organisation, format and style guide for the preparation, writing and presentation of reports.* 2nd edition, revised. Published by the author, Edmonton, Alberta xiv + 173 pp., 8 figs., 4 tables. $19.95 + shipping in Canada.

In the *ESC Bulletin* of March 1991, I reviewed the 1990 revision of this manual and awarded it a slightly qualified thumbs up. My offer to exchange my edited, proof-read copy for a clean one was accepted at once. This came with a 2½ page letter of thanks, explanations, news and some argument. Now (July 1993) comes the 4th revised and updated version of the 2nd edition. By this time it is a really good, usable manual, paper-backed and plastic bound to lie open and flat, pitched at the level of an inexperienced writer who has term papers or research reports to write.

The typeface and headings are new and much more easily read. Wider margins and better spacing make the total of 117 pages longer by 19 without significant change in reading matter. Based on the author's teaching experience at the Northern Alberta Institute of Technology in Edmonton, the manual assumes that the user starts with little or no knowledge of writing for publication. It comes across as a complete how-to-guide, on outlines, formats, style conventions and citation, with a sample report of 17 pages appended. Twenty-four pages are given to annotated lists of useful references and dictionaries, on basic English, special interests, grammar and scientific nomenclature.

H.R. MacCarthy
Vancouver, B.C.

BOOK REVIEWS

Heinrich, Bernd. 1993. *The Hot-Blooded Insects: Strategies and Mechanisms of Thermoregulation.* Harvard University Press. 601 pp. $75.00

As winter chills even southern Ontario, I take solace in reading how to keep warm. This book is an encyclopaedic account of the tricks insects use to thermoregulate wherever they live. I have long admired Heinrich's work. This study is no exception to my appreciation for his contributions to entomology, comparative physiology, and physiological ecology. Nevertheless, despite its strength, the book contains serious flaws.

Heinrich, at the outset, states that he has "disagreed at one point or another with almost everyone who has made significant and lasting contributions to the field" (p.8). I am dismayed that some of his criticisms are incompletely, and sometimes, misleadingly and erroneously argued.

Heinrich's useful prologue starts with units of measurements, definitions, and general methodology. The main chapters are well organised, being subdivided into topics such as morphology, physiology, and behaviour and into specific examples. Each chapter ends in a summary and a set of challenging "Remaining Problems".

Chapter 1 on night-flying moths is an excellent treatise. The of information is on sphingids, winter moths, and cold-active geometrids. Lepidoptera continue centre-stage in Chapter 2, "Butterflies and Wings" mostly on sun-basking. Shivering thermogenesis in skippers is also discussed.

In "Dragonflies Now and Then" (Chapter 3), elegant experiments on physiology and behaviour are described and differences between "flyers" and "perchers" explained. Flyers remain in more or less continuous flight and cool by passing excess heat to the abdomen. Soaring also allows convective/ radiative heat loss. They shiver to warm up for flight. Perchers, more phylogenetically advanced, warm by basking.

Chapter 4 on Grasshoppers and other Orthoptera reviews sun-basking, especially by locusts. The importance of warmth for flight, singing, and mating is interesting reading. Equally fascinating is "Beetles Large and Small" (Chapter 5) describing the coleopteran repertoire of thermoregulatory activities from shivering thermogenesis, to shade seeking, stilting over hot desert sands, and diurnal versus nocturnal activity.

The next five chapters are almost exclusively on social insects, also discussed as a group, in Chapter 16. My discussion of these 6 chapters comes later.

Chapter 11, "Flies of All Kinds" demonstrates diversity in Diptera for temperature regimes and thermoregulation. Locomotion on glaciers and snow is discussed along with endothermy in the Syrphidae. Flower basking is misrepresented and the denigration wrong (p. 349-351). Kevan's experiments were done mostly on flowers of Arctic Avens (where flies are frequent) and not of Arctic Poppy with few insect visitors. Kevan reported on thoracic temperatures of arctic flies in sunshine "basking" in A) entire flowers, B) flowers without petals, and C) without sporophylls. Experiments on shaded insects in insolated flowers were not made (good idea), but differences between thoracic temperatures in A and C were nil, and between A or C and B were large. The conclusion that petals contribute to the warmth of the insects can not be discounted. Heinrich neglects botanical implications of diaheliotropic turning of flowers and elevated temperatures in their corollas (or other aspects of heat accumulation by plants) and later (p.411) states that "with the possible exceptions of ... flowering spathes ... plants have no control over their body temperature".

To suggest that endothermy is less likely to be important to Diptera because "flies are not transport machines designed to ferry large loads to a nest" (p.357) is misleading. Some flies ferry large loads, e.g. blood-fed female biting flies, gift-bearing dance-flies, gravid females of many taxa, etc. The idea that wing-loading, overall lower mass, and low take-off and flight temperatures are inter-linked may not hold.

In Chapter 12, "Sweating Cicadas" the importance of sucking plant juices and allowing body evaporation of excess water to stem overheating while singing in the heat of the sun is described marvellously. I wonder, though if insects (cicadas) lost motor control would they fall off their perches? (See p. 370). Perhaps some insects lose motor control so that leg muscles contract and clamp them on (like some roosting birds)!

Chapter 13, "Warm Caterpillars and Hot Maggots" is about growth rates, sun-basking and shade seeking, the value of silken tents and other domiciles (ant-lion pits, turrets built by tiger beetles), parasols, setae, and comportment. The synthesis of this diverse array of thermoregulatory devices is fascinating reading. However, the chapter is not well balanced and I take issue with some of its content. Sherman and Watt (1973) were not the first to analyse the thermal ecology of caterpillars (p. 383). Their intrageneric comparison on *Colias* was novel, but their study parallels many others on economically important insects. Wellington's pioneering work on micrometeorology and forest pests is inadequately recognized. The circumnavigating behaviour of arctic and subarctic mosquito larvae in ponds and the oviposition sites used by the adults are poorly discussed. Research on phytophagous beetle larvae is not mentioned. Hairy caterpillars are more thoroughly treated, but there are holes in citation and discussion. The discussion of thermoregulation in arctic lymantriids, *Gynaephora* spp. raises valid points for debate.

In Chapter 14, "Fever" we learn that insects infected with pathogens use heat for defence, endogenously (real fever) or by changing temperature preferenda. Balls of the Asiatic hive bee, *Apis cerana japonica* cook wasp predators to death. This interesting chapter illustrates how little is known.

Chapter 15, "Cold Jumpers" is about flea beetles, click beetles, springtails, jumping Homoptera, grasshoppers, and other body flexers. In these, potential energy for jumping is stored in muscles and chitin under tension or compression or torsion but little is known of the thermal needs of such mostly small insects that move effectively and fast without having to warm up. Wing click mechanisms in flight are also discussed.

The arrangement of Chapters 6 to 10, and 16 lends itself to redundancy, but each reads well as a stand-alone review. The same sorts of phenomena as in the previous chapters are discussed along with the important issues of sociality and brood incubation.

In "Bumblebees out in the Cold", "Non-shivering thermogenesis" (NST) is debated. Heinrich's conclusion is that 'futile' biochemical pathways are not involved with thermogenesis (p. 238) and there is no evidence for NST (p.244). He suggests that the futile pathways invoked for NST are in fact for the opposite; means for conserving energy by shutting substrate out of the Kreb's cycle (p.246). Heinrich also discusses the pile on bumblebees' bodies for insulation and mimicry, but questions evidence for biogeographic variation in its length, density or coloration. "Tropical Bees" (Chapter 7) is interesting but weak. The statement that bees in moist lowland tropical environments (which are not centres for bee diversity) do not face overheating because they live in a relatively benign temperature environment (p. 290) is incorrect.

"Hot-Headed Honeybees" (Chapter 8) is generally excellent. It should be read with relevant parts of Chapter 16 on "Social Thermoregulation". There are small problems. Taxonomy for *Apis mellifera* is in error. It is incorrect to assert that most of the thousands of bee species are "honey" bees in the sense that most make and eat honey (p. 228). Most bees feed on nectar, they use nectar with pollen to make brood food. That is not honey! Heinrich repeatedly refers to studies on *A. m. mellifera* which were made on other races of European honeybees, and consistently refers to the African(ized) honeybee as *A. m. adansonii* instead of *A. m. scutellata*. The scientific name of the Himalayan honeybee is *A. cerana* on p.496 but *A. laboriosa* p.497. The latter is correct. It is misleading to indicate that *A. mellifera* invaded North America in the sense that it may have invaded Europe (p.497). It was introduced to the former and naturally spread and evolved in the latter. The statement that hive bees "get a head start over non-social bees, since bees without a hive would have been physiologically incapable of initiating flight because

the muscles are incapable of shivering when they are cooled to below 15 C (Esch, 1988)." (p.310) does not pass un-noticed. Why can't non-social bees be warm alone in their nests? For example, *Peponapis pruinosa* flies just before dawn, well before honeybees are active.

Chapters 9 (The Tolerance of Ants) and 10 (Wasps and the Heat of Battle) are short, reflecting the paucity of information about these groups.

In Chapter 16, "Social Thermoregulation", Heinrich returns to ants and a discussion of ant hills. He remarks on insolation, insulation, basking, and decomposition heat in keeping colonies warm. The statement that "Most mounds have faces sloping to the south and southeast, thus increasing the amount of sunlight intercepted ..." is meaningless. Only mounds at the North and South poles would not have SE facing sides and the latter would lack S facing sides too. He continues with more on social wasps and colonial thermoregulation. In considering termites Heinrich argues poorly on issues of evolution to sociality (p. 499 on).

In returning to honeybees, Heinrich takes harsh aim at the idea of a colony as a "superorganism". The main basis for his scepticism is summarized by "Superorganism concepts apply sociobiologically ... .But with respect to the mechanism of a *specific* function, such as thermoregulation, it would apply only if that function is accomplished through communication." (p.489). He contends that all thermoregulatory heating in a honeybee colony can be explained by individual bee's activities. He does not deny that thermoregulation for cooling requires highly co-ordinated social responses and communication (p.495). To invoke the superorganism idea, Heinrich insists that a "centrally located thermostat" be involved. The counter-argument is that "centrally located" is not a requirement, that the whole colony is its own thermostat and that individual bees have temperature sensors. Most of the data presented derive from studies on swarms and broodless clusters. In these, temperature regulation can be quite sloppy. Once brood is present, the situation is different. Worker bees' attraction to brood, and their regulated body temperature near to it, is well known. However, body temperature regulation there occurring "in the same way as an electric blanket remains at a set temperature independent of what lies under it" (p.319) is unproven, probably untrue, and simplistic. Extrapolating the energy consumption of clusters of bees at various environmental temperatures (down to -80°C) to intersect the temperature axis at some constant temperature (core temperature) is correct procedure (p.484-486) for true homeotherms, but often not observed and is influenced by scaling of the graphs. More important for homeotherms is a thermoneutral zone of minimal metabolic rate (as in Southwick's original work). The data in Figure 16.17 ("fitted by eye") are hardly rigorous. Heinrich's salvo includes the following shot (p.489) "The idea that temperatures of groups of bees are the result of superorganism responses is either an assumption or an admission of ignorance about the mechanisms that cause the observed behavior in the group." Fighting words, indeed.

At the finale is a "Summary", which I found disappointing. Like the book, it is written with an organismal and physiological bent. The Summary could have introduced some overarching concepts. The evolution of insect wings as thermoregulatory appendages would have made a good start. The ideas that wings evolved primarily in response to selection for rapid and distance locomotion are well presented in Chapter 2 (p. 104 - 113). Arguments about thermoregulation and flight are contradictory. On p.512, Heinrich writes "Endothermy is not only an immediate consequence of flight but it is now also an evolved necessity for it." This seems to be hyperbole. He might as well have written 'Endothermy is not only an immediate consequence of muscle contraction (or even 'most animal life') but it is now also an evolved necessity for it'. The statement "No butterfly, nor any other of the millions of extant flying insects, warms

up by basking or shivering *except to fly*" (p.108) is wrong as many examples attest. His writing "Smaller insect that are endothermic can warm up faster than larger ones, but the need for endothermy decreases with decreasing size. The smallest insect don't warm up at all, and they therefore cannot be expected to warm up at the fastest rate of all!" (p.357) begs combining the topics of body size, endothermy, thermoregulation, development and locomotion as a splendid synthesis.

The importance of Hamilton's theory of "maxithermy" should have been explored in a general sense, rather than dismissed through imprecise argument about desert tenebrionids (p. 199). The fact that poikilotherms increase their rates of activity after a threshold temperature has been reached, and that after a thermal maximum is reached, rates of activity decline more rapidly per unit change in temperature is a crucial concept to understanding the importance of exacting maxima of body temperatures. This idea would seem central to thermoregulatory theory in general. Growth rates at different temperatures are hardly touched upon (but see p. 383) and the importance of heat units (as augmented by thermoregulation) in insects' bionomics is barely discussed but is of great use in applied insect ecology.

The discussion of evolution and thermoregulation with eusociality are generally weak. Often, the question of 'why' insects have evolved to regulate body temperature would have been better worder with 'how'. Asking why, if a beneficial phenomenon occurs in one species, does it not occur in others is always difficult. Such questions, to be meanigful, must be posed carefully.

The Index of General topics is incomplete. No names of organisms are included. Given that problem, a book of this size should have the chapter subdivisions in the table of contents. An index of authors cited is useful for some cross-referencing.

Throughout the book, there are many annoyances which can not blamed on Heinrich alone, but on the publishers as well. Stylistic inconsistency and poor preparation (some look like rough draft) of figures and tables and the frequently broken type-face detract from the quality of publication. The editing is bad. There are some parenthetical side-remarks, seemingly left-over notes from the author to himself. The book was written for academic readership (p. 8), but some so very basic statements are made (e.g. water's freezing point is 0 C). Immature grasshoppers are called larvae (p. 146), haemolymph is pumped in the dorsal aorta in a bolus (p. 270) instead of a gout. Cavity nesting honeybees are referred to as "hole-nesters" (p. 318) which does not distinguish them from most solitary bees. We are told the home institutions of some scientists once or more, for others no information is given. The rationale is not explained.

All in all, Heinrich has written a highly useful compendium and a major contribution to insect eco-physiology. I caution readers to check primary sources for all studies cited before accepting any conclusions. Appropriately, Heinrich takes issue with a number of generalisations, but then introduces others which are as invalid as those he sought to correct. The book has many shortcomings and would have been vastly improved by critical editing and more careful printing. I urge those with interest in insect physiology, ecophysiology, and behaviour to read it, but, *caveat lector.*

P. Kevan
Department of Environmental Biology
University of Guelph
Guelph, Ontario

Food and Agriculture Organization of the United Nations. 1992. *The New World Screwworm Eradication Programme, North Africa 1988-1992.* 192 pp. Softcover $(U.S.)45 from: Unipub 4611-F Assembly Dr., Lanham, MD 20706-4391.

This book describes a four-year effort culminating in the eradication of the New World Screwworm (NWS), *Cochliomyia hominivorax* (Coquerel), from North Africa. This species, whose Latin name literally means "man-eater", was thought to be restricted to the tropical and subtropical regions of the Americas, until it was discovered in 1988 infesting livestock in the Libyan Arab Jamahiriya. The history of this insect's devastating impact on livestock and wildlife populations in the Americas, coupled with the very real danger of it spreading from the coastal regions of Libya to neighbouring countries, subSaharan Africa, the Near East and Mediterranean Europe, initiated an immediate response by the international community.

Larvae of *C. hominivorax* (Diptera: Calliphoridae) are obligate parasites on the living tissues of their animal hosts. Females oviposit on the edges of open sores, where larval feeding subsequently forms deep cavities of up to 10 cm. Secondary bacterial infections and the extreme amount of tissue damage frequently kill the host. NWS attack any warm-blooded animal; e.g., infestations in Libya were reported on sheep, goats, cattle, camels, a monkey in the Tripoli zoo, and on humans.

Chapter 1 describes the history, biology, distribution, and control of NWS in the United States and Mexico. The chapter reviews the success in eliminating NWS from these countries using the sterile insect technique (SIT), in which millions of sterilized males are released to breed with wild females. Matings do not produce offspring, and releases continue until the target population is extinct. One of the highlights is a description of the NWS production facility in Mexico, which provided flies for the program in North Africa.

Chapter 2 describes the potential impact of NWS infestations in Northern Africa, and the initial steps taken to contain and control the outbreak. These steps included organizing inspection teams to monitor livestock for NWS, obtaining international funding for the eradication program, and testing the compatibility of NWS from Libya and Mexico, to see if SIT could be successful. A preliminary field test of this method is described in Chapter 3, with mention of quality control tests for sterile NWS and procedures for monitoring the impact of SIT on wild populations of NWS.

Chapter 4 describes the implementation of the full-scale SIT program, including the shipping of 40 million flies from Mexico to Libya each week, their storage at controlled temperatures, and their ultimate dispersal from air over Libya. Laboratory tests of the quality of sterile flies are described, as is the monitoring of NWS in the field.

The remainder of the book describes the logistics which played a central role in the success of the NWS eradication program. Chapter 5 reviews the structure of the Libyan national NWS program and the organization of the Screwworm Emergency Centre for North Africa (SECNA), which directed the eradication program. Sources of funding for the approximately $80 million project, and the economic benefits arising from NWS eradication, are described in Chapter 6. Chapter 7 discusses the importance of informing the public on NWS, and their role in contributing to the success of the eradication program. Chapters 8 and 9 review activities in neighbouring countries during the NWS outbreak in Libya, and the support provided by other organizations. The book concludes with a six-page chronological list of events, beginning with the discovery of NWS in Libya, in March of 1988, and ending with the disbanding of SECNA in December of 1992.

This book succeeds on two levels. It does a superb job of presenting an overview of the eradication program from beginning to end. Every step of the process is discussed, beginning with the identification of NWS by the British Museum of Natural History and the response by the international community, to the establishment of SECNA, the successful application of SIT, and subsequent completion of the program.

At the same time, insight is provided into the individuals involved in the project and the problems encountered. Pilots releasing sterilized male NWS from planes had to deal with the thousands of "escapees" that became trapped in the cockpits during flight. One pilot recounts that the flies were "very sticky", and "once one landed on your face, you couldn't get rid of it and we didn't want to kill them because they cost a lot of money." Mention is made of the cartoonist hired to illustrate posters, and the T-shirts, ashtrays, hats, and keychains distributed to increase public awareness of NWS.

Despite the complexity of the project (22 countries and agencies provided funding, eight countries were at immediate risk, four UN agencies and several private contractors were involved), the book is very easy to read, and follows a logical sequence of events. The book is filled with illustrations, and almost every step of the eradication program is photographed. Readers can see the facilities used in the campaign, the individuals that took part, and can view, with morbid fascination, infestations of NWS in humans and livestock.

The book is a tribute to the organizations, individuals, and planning that made the eradication program of NWS in North Africa a success. It is not a scientific text, but will provide several hours of enjoyable reading for both professional and amateur entomologists. It also teaches a few lessons about the value of planning and luck in any large scale endeavour. Individuals may not want their own copy, but this book will be a worthwhile acquistion for larger libraries.

Given the current climate of reduced government funding in the sciences, researchers are under increasing pressure to justify the long-term value of their programs. I suspect that Drs. Knipling and Bushland, who initiated research on SIT in the 1930s, take great pride in their 50-year involvement in this technology, which has eradicated NWS from North America, Mexico, and Africa with savings estimated in the $billions.

Kevin Floate
Insect Biocontrol, Livestock Sciences
Agriculture and Agri-Food Canada
Lethbridge, Alberta

Ward, J.V. 1992. *Aquatic Insect Ecology 1. Biology and Habitat.* John Wiley and Sons, Inc., New York, NY, U.S.A. xi + 438 pp. Hardcover $(Can.)125.95; $(U.S.)89.00.

In *Aquatic Insect Ecology*, Volume I, James Ward covers aquatic insects and the abiotic factors affecting their ecological distribution with some 438 pages, 122 figures, and 60 tables. The 1,347 references in this book are representative of the literature available on his subjects. We commend James Ward and the publishers for the production of this single-authorship book in an age when many technical books are edited collections. Inconsistencies in presentation and levels of treatment are not, thankfully, a concern with Ward's book.

Two items appeared in the Preface that we found significant. The first is a caveat emptor from the author that, "A challenging and intellectually stimulating treatment of aquatic insect ecology requires using a rather extensive technical vocabulary" (page viii). Indeed, by the end of the book, we had met with a term—sometimes more than one used indiscriminately—for virtually every category and subcategory of habitat, inhabitants, and adaptations imaginable. Many terms are defined in the text, but some are left undefined, and a glossary, unfortunately, is not to be found. The second item of pertinence (which may not be entirely unrelated to the first) is the acknowledgement of G. Evelyn Hutchinson, whose unpublished Volume IV of *A Treatise on Limnology* has considerably influenced Ward's writing.

The book has a strong international appeal. Over half the literature citations are from studies that deal with either fauna or aquatic environments of a regional nature. Some 321 of these are Eurasian (mainly European), 309 are North American, and 126 are from elsewhere.

Ward makes abundant use of figures and tables, but the print in our review copy was somewhat overexposed throughout, resulting in the distortion of some figures, especially stippled or half-tone habitus of insects, many of which were originals. Sometimes, structures meant to be emphasized are obscure (e.g., in Fig. 4.10 of a blepharicerid larva, the reader is asked to note the six suckers; these are almost entirely unrecognizable).

The introduction to aquatic insect orders in Chapter 1 requires a prerequisite knowledge of numerous terms (34 undefined) and concepts (many entomological) in order to be fully comprehended. Besides being somewhat cumbersome, the chapter contains a few imprecise statements. For example, caddisfly adults are said to have superficial resemblance to moths. This resemblance, however, is fundamental and reflects the sister relationship of the two orders.

In the first part of Chapter 2, the author briefly treats some theories of insect evolution; the remainder deals with respiration and osmoregulation. Explanations of physical and physiological processes related to respiration are thorough and cogent. The chapter does, however, contain minor errors and inconsistencies: The author agrees with Kukalova-Peck that, "the thoracic wings of mayfly adults are homologous with the abdominal gill lamellae of the nymphs" (page 33). He then states, "Vestiges of true venation often are present on the gill lamellae of modern mayflies" (page 33). We would argue that, given the idea that gills give rise to pro-wings (page 34), gill tracheation should hardly be thought of as vestigial, but instead rudimentary. The author states that, "The evidence is overwhelming that insects that now occupy aquatic habitats...evolved from terrestrial insects..." (page 35). Toms' (1984) rather convincing argument that the majority of current evidence is more compatible with the theory of an aquatic origin of insects is not cited. Ward indicates that the ancestral habitat of many aquatic groups was running water. His inclusion of Ephemeroptera among them is contentious because paleontological data (e.g., McCafferty 1990) and phylogenetic and behavioral data (Edmunds and McCafferty 1988) indicate that lentic waters were the primitive habitat, even though the majority of extant Ephemeroptera are lotic. We experienced some confusion with respect to the organization of physiological information. For example, the author treats plastron respiration and physical gills under separate headings. Although Plastron Respiration is taken up as a section, prior to this the author also discusses the subject under other headings, especially Physical Gills, where the plastron is referred to as the "air store." Later, it becomes clear that the author considers them equivalent: "elmid beetles...extract dissolved oxygen from the water with a permanent physical gill, the plastron" (page 31). The author indicates that the final ecdysis of mayfly "nymphs" is at the water surface or while submerged. Actually, all or some individuals of several families exit the water completely prior to this metamorphosis

(Edmunds and McCafferty 1988). Figure 2.3, which graphically depicts spiracles underwater and how their associated hydrofuge hairs break the water surface, is printed up-side-down. In Figure 2.4, a drawing of a rattailed maggot, the siphon is depicted in an unnatural state (fully extended but looping and relaxed). In our numerous observations of Syrphidae and Ptychopteridae in the field and in culture, their siphons are always extended straight to the surface. In Table 2.4, where occurrences of ion absorption sites are listed, the trichopteran families Hydropsychidae and Polycentropodidae should be added as having anal papillae (Wiggins 1977). These structures are also inconsistently referred to as "blood gills" in the previous discussion of respiration (pages 41 and 42).

The bulk of Ward's book, which extensively deals with the main subject of ecological distribution, is excellent. Chapter 3 concerns lentic freshwater habitats. Brief treatments of lake typology and communities are concise and informative. Neuston (as pleuston), plankton, nekton, and benthos are discussed. The author details adaptations related to these habitat orientation groups, such as methods of swimming, and gives a fine discussion of diel migratory habits of *Chaoborus*. Modifications of the foot complex of water-surface Collembola, contrary to what the author states, however, are not entirely adaptations for increasing the area of contact with the surface film because they do allow the unguis to penetrate the surface, hence anchoring the springtail while it walks on water (see Baudoin 1955, Christiansen 1965). The discussion of life in temporary ponds is excellent, as are the discussions of other habitats such as mountain lakes, bogs, marshes, and even tree holes and plant cups. *Systenus* and other Dolichopodidae that are often typical of tree-holes (Wirth 1952, Vaillant 1978) should have been included in the discussion of such communities.

A well-developed treatment of lotic habitats is given in Chapter 4. Discussions of stream order, stream link magnitude, longitudinal patterns, zonation and continuum concepts, thermal streams, intermittent streams, and subterranean waters are a source of useful summary information. Considerable attention is given to benthos and current relations, but neuston, plankton, nekton, madicoles, and hyporheos are also treated. Ward's considerable research expertise is most apparent here, and with few exceptions, we found discussions profound. The author's statement that the lotic psychodid fly *Maruina* is madicolous (page 133) is true, but only in part, since we have found *Maruina* larvae submerged at considerable depths in mountain streams of New Mexico, thus confirming the report of Vaillant (1963) from Colorado. The discussion of pleuston is somewhat disappointing: 1) We do not agree with the substitution of "pleuston" for the more generally used "neuston." 2) We would prefer to distinguish "micro-" and "macroneuston" (in the same way it is done for benthos) instead of restricting the concept to microorganisms. 3) The category is relatively poorly documented, omitting, for example, the works of Baudoin (1955, 1976) and Guthrie (1988), among others. 4) The Dixidae (also known as meniscus midges) can be major lotic hyponeuston (Wagner 1978, Thomas 1979), but unfortunately were not mentioned.

Chapter 5 deals with marine (intertidal, neritic, and oceanic), brackish, and inland salt waters. The discussion of marine midges is particularly good. Ward reviews the age-old question of why insects are poorly represented in marine water. This could have been enhanced with comparisons between Insecta and Crustacea (e.g., with respect to osmoregulatory constraints). One important consideration not explicitly mentioned is that the aerial/terrestrial adult stage of many aquatic insects itself is restrictive. Ward enumerates eight ecological factors that may limit the invasion of the ocean by insects. He did not include, however, the fact that lower surface tension caused by foaming (Idaka and Baudoin 1965; Baudoin 1971, 1980) is a most important factor limiting certain insects in marine habitats. For example, this would have helped explain Ward's observation that, "Species that require frequent excursions to the surface, a common respiratory adaptation among aquatic insects, are not found in the intertidal zone"

(page 170). This is because water, which normally does not enter an insect spiracle, may do so when surface tension is lowered. Furthermore, lower surface tension and the resultant effect on the integrity of the meniscus would help explain Ward's observation that, "the pleustonic community...while fairly well-developed in certain lentic habitats, is poorly represented in the sea" (page 69). Finally, in Table 5.1—dealing with insects of marine environments—the following fly families might have been added because of their marine associations: Anthomyiidae (Baudoin 1955); Ceratopogonidae (Merritt and Cummins 1978); Coelopidae, Culicidae, and Tabanidae (Séguy 1950); Ephydridae (Dahl 1958); and Tethinidae (McCafferty 1981).

Chapter 6 provides a fine treatment of the effects of temperature on distribution. The thermal equilibrium hypothesis is thoroughly explained, and even isolating mechanisms of temperature are discussed. Although stated as fact, the theory that cold stenotherms in southern Africa are Gondwanian has not been adequately tested; many of these so-called ancient faunal elements may instead have Palearctic affinities. Considerable attention is paid to fecundity, incubation, voltinism, and emergence. The author also provides a discussion of "dormancy", with regard to which the phenomena of quiescence and diapause might have been more explicitly delineated as, for example, in Danks (1987). The chapter ends with discussions of behavior and feeding dynamics affected by temperature.

Chapter 7, on substrate relations, is one the best treatments we have seen. After discussing physical measurements of substrate, the author treats lithophilous, psephophilous, psammophilous, pelophilous, xylophilous, and phytophilous fauna. We would add certain Athericidae (Thomas 1976), Limoniidae (Brindle 1967), and Tipulidae (Brindle 1956) as noteworthy psammophilous (sand dwelling) larvae. Also, insects that live among filamentous algae should have been mentioned with the other phytophilous insects (climbers among vegetation). These insects exhibit adaptations similar to those associated with aquatic mosses, such as the large dorsal spination of some stoneflies and mayflies (Hynes 1970, McShaffrey and McCafferty 1991).

Chapter 8 deals with effects of spatial and temporal variations in water level, current, and discharge. Extensive discussions of droughts and floods and their effects on insects of temporary and permanent waters as well as adaptations to such natural perturbations are included. The discussion of response to flow regime (mainly drift, microhabitat preference, catchnet building, and orientation) is well-developed. The important concept—that abiotic factors are the most important causation of community structure in variable and unpredictable stream habitats—is emphasized.

Chapter 9 reviews additional abiotic factors. These include suspended sediment; light, both solar and lunar; dissolved oxygen; acidity; and hardness. They are given attention roughly proportional to their importance as limiting factors.

In conclusion, we found the book to be a useful reference source for aquatic insect habitat ecology, full of extensive and generally well-organized information, with relatively few errors or omissions. It should become a standard piece of literature in aquatic entomology, and is one of the best single sources for aquatic ecological terms. Professionals working with freshwater macroinvertebrates need to add this volume to their reference set. Many graduate students will, unfortunately, find it too expensive.

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W.P. McCafferty
Department of Entomology
Purdue University
West Lafayette, Indiana
U.S.A.

A.G.B. Thomas
Laboratoire d'Hydrobiologie
Université Paul Sabatier
Toulouse, Cedex
France

Wood, S.L., and D.E. Bright. 1992. *A Catalog of Scolytidae and Platypodidae (Coleoptera), Part 2: Taxonomic Index*. Volumes A and B. Great Basin Naturalist Memoirs Number 13. Brigham Young University, Provo, Utah. 1553 pp. Hardcover $(U.S.)110.

These two impressive volumes are a continuation of Part 1 of the project, containing the bibliography to 1984 (Wood and Bright 1987). They catalog the world fauna of Scolytidae (2 subfamilies, 25 tribes, 225 genera, and 5,812 species) and of Platypodidae (3 subfamilies, 7 tribes, 32 genera, and 1,463 species). The higher categories are listed phylogenetically, the species within each genus are arranged alphabetically. The entries for higher taxa, as well as for species, include all information expected from a modern catalog. Three additional categories are included for each species: host distribution, notes, and references to all published literature from 1758 to 1989 (the references being divided into eight subject areas). An appendix to the catalog contains a host list and a supplement to the bibliography which updates it to the end of 1989; in fact, important taxonomic references are included beyond this date, in some cases (Wood) until 1992. An index of all Latin names used in the catalog concludes the publication.

As much as well-done catalogs are very important and useful tools, not only for taxonomists but also for all researchers in biology, they are also difficult to produce; only someone who ever tried to put one together can appreciate how much painstaking and often boring work goes into it. All this is particularly true for this catalog, considering the incredible amount of information that has been published on this economically and notoriously important group of beetles. I have great respect for both authors and admire their steadiness and perseverance in accumulating all the information and in passing it to the scientific community (I was able to follow the progress of the work over the past several years). The catalog will certainly become an indispensable tool for anybody interested in any aspect of research of bark and ambrosia beetles for a long time to come. Both authors are to be sincerely congratulated on their product and I just wish we had a similar catalog of the Staphylinidae (rove beetles) on which I work. Having said all this, I can proceed to offer some criticisms and suggestions for improvements in possible future supplements, without blemishing the very positive impression of this publication.

Coming originally from a small country in Middle Europe, I was taught several languages, including Latin and Greek, and was brought up to respect foreign languages. I believe that such background and approach is important, if not essential, for any cataloger, who must deal with a wide

spectrum of languages. Thus the disrespect of languages other than English in the catalog bothers me. It is not only the total disregard of all diacritical marks, such as various accents, umlauts, etc. (there is no excuse for it, since modern computers and printers do not have any problems with them any more, and diacritical marks appear in the French, German, and Spanish translations of the introduction), but also insufficient care (and ability?) to eliminate spelling mistakes. This is particularly true for both the bibliography published previously (Wood and Bright 1987) and the supplementary bibliography in the appendix. Sometimes the mistakes are particularly disturbing; e.g., on page 26 "Zoological Institut der Forsliche Hochschule" should read "Zoologisches Institut der Forstlichen Hochschule". Other times they are even amusing, as in the case of "nomen nudums" on pages 1 and 6 (apparently an attempt of plural form of *nomen nudum*); curiously enough, the correct plural form *nomina nuda* is used in the German translation of the introduction, but another spectacular form "nominae nudae" appears in the French (p. 12) and Spanish (p. 24) translations. A simple check of the glossary in the 1985 International Code of Zoological Nomenclature would have provided the correct form.

When citing the type species of genera, the term "monobasic" is consistently used for those established with only one originally included species. The term monobasic is not recognized by the Code and the proper term "monotypy" should have been used. There are also some minor problems in citing type localities, almost all arising from language problems, as it will be shown with a couple of examples. On page 76, the type locality for ***bicolor*** is given as "Prov. Valdivia invenit orn. Landbeck". The type locality is the province of Valdivia and it is not important that the specimen was collected by Landbeck. On page 371, the type locality for ***scolytus*** is given as "Angliae Dom. Lee". It should actually have been "Habitat Angliae"; Mr. Lee has nothing to do with the type locality.

In giving the information on deposition of the type material, quite often the museums are not properly named, resulting in inaccurate (and possibly useless) information. For example, what is "Colon Museum" (p. 371)? Names like "Prague Museum" (p. 611), or "Hamburg Museum" (pp. 611, 1239) do not really mean much, since there are numerous natural history museums in those cities. The Rey collection is not in "Lyons Museum" (p. 377), but in "Muséum d'Histoire Naturelle, Lyon". "Museum d'Histoire Naturelle Bukarest" is correctly "Museul de Istorie Naturala Grigore Antipa" and the name "Museum Royal du Congo Belgique" in Tervuren was changed a long time ago to "Musée Royal de l'Afrique Centrale", and even before the change the correct name was "Musée Royal du Congo Belge". It is also not helpful to say that the types are in "Pfeffer collection" (p. 557), unless the location is provided at the same time (Prague, Czech Republic, in this case); the same applies to other authors, e.g., Kalshoven or Solari. Also, the names of cities are given inconsistently, e.g., "Wien" (in German) or "Brussels" (English name for "Bruxelles").

The part dealing with the geographical distribution of each species also deserves some attention. First of all, by naming every country in which a particular species occurs, the authors open themselves up for incurring many omissions in Europe due to the enormous amount of faunistic literature published there. I concentrated, for obvious reasons, on former Czechoslovakia and found that the country is not listed for many species that are known to occur there, e.g., *Hylastes opacus* (p. 57), *Hylastinus obscurus* (p. 64), and *Pityogenes chalcographus* (p. 445). There are numerous strictly geographical inaccuracies and problems, some of which will be randomly mentioned. Darjeeling (p. 115) is not in Bengal, but in West Bengal (India). Northern Borneo (p. 90) and Sarawak (p. 405, 1094, etc.) are not in Indonesia, but in Malaysia; the attempt to introduce the inaccurate concept of "Indonesia" (p. 6) is entirely unjustified and unacceptable. Tonkin (p. 91) is a region in North Vietnam, not an "Island in Vietnam". Ukraine (p. 338) most definitely is in Europe, not in Asia. "Turkmenien" (p. 545), on the other hand, is definitely in Asia, not in Europe. "Cayenne" (p. 98, etc.) is wrongly used for the country known as French Guiana and the term should not have been used, despite the dubious attempt to justify this usage (p. 1440).

There are some nomenclatorial problems that could have been avoided. For example, although I sympathize with the authors and despite the elaborate justification on page 651 which really is not relevant, the junior homonyms in the genus *Premnobius* (p. 651) that were replaced by Schedl (1957), when he put *Premnobius* in synonymy with *Xyleborus*, cannot be reinstated. Article 59(b) of the Code clearly states: "A junior secondary homonym replaced before 1961 is permanently invalid."

The treatment of replacement names (*nomina nova*) is consistently unacceptable and misleading, as I will show using the case of *Hylastes plumbeus* (p. 59). The entry reads: "***plumbeus* Blandford** 1894d:57. Syntypes, sex?; Nagasaki et a Hiogo, Japan; IRSNB, Brussels, automatic". The word "automatic" caught my attention because it did not make sense. Further checking established the fact that Blandford's name actually is a replacement name for *obscurus* Chapuis, 1875 (nec Marsham, 1802) and that the type material information is a repetition of that given for *obscurus*. By this practice the user is not aware, as he immediately should be, that the name is a replacement name, especially since information on "type material" is included. A replacement name is just a name and no type material, type locality, or anything else is attached to it. The term "automatic" is not recognized by the Code, has no meaning, and just adds to the confusion. The entry should correctly read: ***plumbeus* Blandford** 1894d:57, replacement name [or *nomen novum*] for *obscurus* Chapuis, 1875, nec Marsham, 1802.

Another serious problem concerns *nomina nuda*, as I will show with a few examples. On pages 321 and 322 six names by Butovitsch (1929) appear as synonyms of *Scolytus*: *Ruguloscolytus*, *Archaeoscolytus*, *Spinuloscolytus*, *Tubuloscolytus*, *Pygmaeoscolytus*, and *Pinetoscolytus*. The name *Ruguloscolytus* is listed as a simple synonym, with the type species subsequently designated by Wood, which is fine. But the remaining names, for which type-species are listed (!) (although without sufficient information for *Archaeoscolytus* and *Pinetoscolytus*), bear the following comment: "Nomen nudum, no status (originally presented as a species group name, no generic standing)." Since it appeared highly irregular to have a type species designated for a *nomen nudum*, I checked Butovitsch's paper only to find out that all Butovitsch's names are valid names, even though they were proposed for "Artengruppen" (species groups), as specifically stated in Art. 10(e) of the Code. So although they may be synonyms of *Scolytus*, they certainly are not *nomina nuda*. - On page 364, under Notes following *rugulosus* we find the following: ("*pomorius* Bedel, nomen nudum, synonymy)". The name cannot be a synonym and *nomen nudum* at the same time, and if it is a *nomen nudum*, it should not have been even mentioned. The same applies to Schedl's *nomen nudum*, mentioned on page 193 under *Acacacis* (Note). *Nomina nuda* do not actually exist and to carry them over in publications, especially catalogs, is highly undesirable. It is particularly upsetting that they even appear in the index.

The requirement of the Code [Article 31(b)] that a species-group name must agree in gender with the generic name with which it is at any time combined (paragraph shortened here), is often not observed. For example, the gender of the genus *Phrixosoma* (p. 189) is undoubtedly neuter, yet, with the exception of the type species *P. rude*, all specific names have feminine endings. In the genus *Trypodendron* (p. 632), which again is of neuter gender, some of the specific names have masculine endings (e.g., *pulchellus* on p. 644).

Lastly, I mention just a few of the curiosities I had difficulty to figure out. On p. 30, left column, the reference to Wood is without initials on line 15 and with initials S.L. on line 16, yet both obviously refer to the same paper; this is repeated many times. - On p. 1205 a note under *C. schedli* reads: "This series had been previously misidentified as *cincinnatus* by Schedl 1935n: 639"; but under *C. cincinnatus* (p. 1197) the same Schedl's reference is given for a description of the male of *C. cincinnatus*. Which is correct? - On p. 1214 a note under *N. quadrilobus* reads: "This species does not belong to this genus (SLW)". What is the purpose of this statement, if the user is not told where the species really belongs?

And why not transfer it to the proper genus and thus avoid a note like this?

In concluding my review, I would like to emphasize that, despite my criticisms, the book is an enormous achievement and an indispensable contribution to the knowledge of the two beetle families.

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A. Smetana
Agriculture Canada, Research Branch
Centre for Land and Biological Resources Research
Biological Resources Division
Ottawa, Ontario

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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 is 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
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Société d'Entomologie du Canada Bourse pour Étudiants post-gradues 1994

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 1993 et le 31 décembre 1994, 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'incrit 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 **10 Juin 1994.**

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 1994.

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:

Dr. R. West, secrétaire SEC
Canadian Forest Service, Newfoundland and Labrador Region
P.O. Box 6028
St. John's, Newfoundland A1C 5X8
Télécopie: 709-772-2576

UPCOMING MEETINGS / RÉUNIONS À VENIR

Eastern Spruce Budworm Research Work Conference
April 14-16, 1994, St. John's, Newfoundland
A comprehensive review of on-going spruce budworm research and showcase of possible research avenues with respect to sustained development, integrated resource management, and environmental concerns.
CONTACT: Arthur Raske, Canadian Forest Service, P.O. Box 6028, St. John's NF, Canada A1C 5X8; Tel. (709) 772-4826; Fax. (709) 772-2576; Internet: araske@vax1.nefc.forestry.ca

North American Benthological Society 42nd Annual Meeting
May 24-27, 1994, Centroplex Convention Center, Orlando, Florida.
The plenary session will focus on benthic aspects of Subtropical Lakes. Field trips, social events and the transaction of society business will also be part of the meeting.
CONTACT: Rob Mattson, Program Chair, Tel. (904) 362-1001. For information on local arrangements, contact Jim Hulbert (407) 894-7555 or Bill Mason (904) 378-8181.

86th Annual Meeting of Quebec Society for the Protection of Plants
June 9-10, 1994, Hôtel l'Estérel, ville l'Estérel (north of Montreal)
The theme of the meeting is "Improvement of Biocontrol Agents Through Biotechnology". Biocontrol agents to be discussed include: *Gliocladium virens* G20, bioherbicides, and *Bacillus thuringiensis*.
CONTACT: Suha Jabaji-Hare or Timothy Paulitz, Dept. of Plant Science, Macdonald Campus of McGill University, Ste. Anne de Bellevue, Que. H9X 3V9, Canada. Fax. (514) 398-7897.

International Conference on Ecology and Environment
June 20-24, 1994, Drake Bay, PenInsula de Osa, Costa Rica
CONTACT: Celso Vargas, Departamento de Computacion, ITCR, Aptdo 159, Cartago, Costa Rica, Fax (506) 51 53 48, email: vargase@bitnet.ucrvm2 or vargase@earn.ucrvm2 or José Castro, Apartado 7137-1000 San José, Costa Rica.

Third International Congress of Dipterology
August 15-19, 1994, Guelph, Ontario, Canada
CONTACT: Dr. S.A. Marshall, Chair, ICD3, Department of Environmental Biology, University of Guelph, Guelph, Ontario, Canada, N1G 2W1.

5th European Congress of Entomology
August 29 - September 2, 1994, University of York, England
CONTACT: IFAB Communications, Institute for Applied Biology, University of York, York YO1 5DD, UK. Tel. +44 (0)904-432940; Fax. +44 (0)904-432917.

The A.J. Nicholson Centenary Meeting: On the Frontiers of Population Ecology
April 18-22, 1995, Canberra, Australia
CONTACT: Mrs. L. Lawrence, CSIRO Division of Entomology, GPO Box 1700, Canberra, ACT 2601, Australia

XX International Congress of Entomology
August 25-31, 1996, Palazzo dei Congressi, Florence, Italy
CONTACT: Organizing Secretariat, OIC, Via A. La Marmora, 24, 50121 Florence, Italy
Fax. ++39-55-5001912

MISCELLANEOUS

Entomology to merge with other biology departments at U. of A.

On February 4 1994 the President and Vice-Presidents of the University of Alberta released a document entitled "Quality First" in which 15 proposals were made for restructuring the University. Proposal #5 is that "effective July 1, 1994 the Departments of Botany, Entomology, Genetics, Microbiology, and Zoology be merged into a single Department of Biological Sciences within the Faculty of Science." The proposals are now being discussed within the University community and most of them, including Proposal #5, must be approved by several University committees, the Board of Governors and the Minister of Advanced Education before being implemented.

Proposal #5 is consistent with one, submitted by the Chairs of Entomology and Zoology in January 1993, to merge the two departments, and with proposals developed in the Faculty of Science to merge Botany, Genetics, Microbiology and Zoology. The proposal to merge Entomology with the other biology departments in the Faculty of Science has the unanimous support of the faculty and support staff in the Department of Entomology.

R. H. Gooding
Chair of Entomology
University of Alberta

BIOTA

BIOTA (Biosystematic Information on Terrestrial Arthropods) was developed as a project to create a nomenclatorial database of the insects of the world. It has since assumed a broader meaning and now serves as an umbrella to cover all of the computer-related information resources existing or under development within the Systematic Entomology Laboratory (SEL) of the United States Department of Agriculture.

The first project of *BIOTA* is a nomenclatorial database. A current database of all the scientific names (species-, genus-, and family- group names, including synonyms, homonyms, misspellings, and misidentifications) applied to insects and other terrestrial arthropods has the highest priority because it is the backbone of all information services. The nomenclatorial database is an SEL-wide project and is under the supervision of Ronald W. Hodges (Chair), Robert W. Poole, and F. Christian Thompson.

The nomenclatorial database is divided into four data tables: species, genera, families, and ranges (biogeographic regions). A data entry program has been developed for the use of specialists and other contributors. A manual, which provides full documentation on the nomenclatorial database, accompanies the program.

Each individual contributing to the nomenclatorial database and his/her institutional affiliation will be fully acknowledged. First, there will be an introductory acknowledgement screen in the finished product. Second, each record of each database contains a memo field. If data are based on the unpublished resources of a contributor, this fact will be noted.

The first two years of the nomenclatorial database project will be spent assembling all of the names for the North American fauna. Data entry will not be restricted to North American species because this is a global project; however, the emphasis will be on the North American fauna. A date for completion of the nomenclatorial database on a world level cannot be estimated accurately because it depends on the collaboration and cooperation of our colleagues throughout the world. Similarly, no accurate estimates of the final size of the project are available. Probably, well over two million names are involved.

The database will be available on Internet and on CD-ROM.

For further information, please contact Dr. Ronald W. Hodges (Chair), Systematic Entomology Laboratory, USDA; @NMNH, MRC-168, Washington, DC 20560, USA. Tel. (202) 382-1778; Fax (202) 786-9422.

Immigrant Insects and Arachnids: Fauna, Pathways and Impact

Dear Colleagues:

I would like to invite you to participate in a project seeking to gather information on the immigrant arthropods of North America. We would like to obtain documented information, specimens or published records, on immigrant species of insects or arachnids that you have worked on. In order to best accomplish our task we seek participation of all entomologists.

The goals of this project are: 1) to determine the current status of non-indigenous insects and arachnids in North America; 2) to determine distribution, pathways, and economic/environmental impacts caused by the introduction and spread of non-indigenous arthropods in North America; 3) to compile information on immigrant insects and arachnids and develop a database compatible with the NAIAD.

The development of this database is funded by the National Biological Control Institute (NBCI), USDA/APHIS. The database will be merged with the North American Immigrant Arthropod Database/ Western Hemisphere Immigrant Arthropod Database (NAIAD/WHIAD). When completed, it will be available to researchers and the scientific community and will be useful for many applications. We are also planning to have a symposium on immigrant insects and arachnids based on the results of this project in 1995.

K.C. Kim, Professor
Project Manager
The Pennsylvania State University

If interested in participating in this project or the conference please contact:

J. Slusark (NBCI Project)
The Pennsylvania State University
Department of Entomology
501 ASI Building
University Park, PA 16802 USA
Tel (814) 863-2854; Fax (814) 865-3048

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Please copy and distribute to interested non-members. Thank you.

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Scientific Editors/Editeur Scientifique

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P. Kevan
Dept of Environmental Biology
University of Guelph
Guelph, Ontario N1G 2W1
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* A.B. Ewen until 31 March 1994

Memoirs

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

Bulletin Editor

F.F. Hunter
Department of Biological Sciences
Brock University
St. Catharines, Ontario L2S 3A1
Tel. 905-688-5550 Ext. 3394
Fax 905-688-1855

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