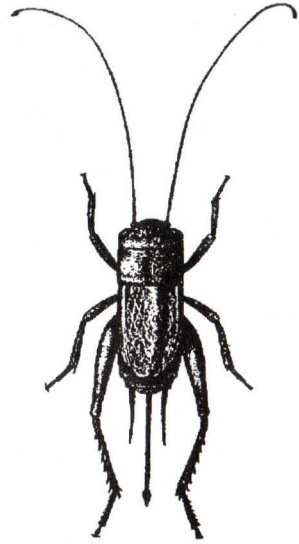
VOL. 24 September - septembre, 1992 No. 3

BULLETIN



ENTOMOLOGICAL SOCIETY OF CANADA
LA SOCIÉTÉ D'ENTOMOLOGIE DU CANADA

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BULLETIN

VOL 24(3) - September / septembre, 1992

Contributions and correspondence regarding the *Bulletin* should be sent to the *Bulletin* Editor.
Faites parvenir vos contributions au *Bulletin* ou votre correspondance à l'Editeur du *Bulletin*.

Inquiries about subscriptions and back issues should be sent to the E.S.C. at:
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

JOINT ANNUAL MEETING of
THE ENTOMOLOGICAL SOCIETY OF CANADA and
THE ENTOMOLOGICAL SOCIETY OF SASKATCHEWAN

Saskatoon, 27 - 30 September 1992
Delta Bessborough

ADDENDUM

Please note that the following has been added to the program:

Sunday, 27 September 1992

13:00 - 17:00	Workshop: "IPM with Entomopathogenic Nematodes in a Cold Climate" - D. Eidt
15:00 - 17:00	Fun Run

Persons interested in the nematode workshop should contact:

Dr. Doug Eidt, Forestry Canada, P.O. Box 4000, Fredericton,
New Brunswick, E3B 5P7
Tel: (506) 452-3535, Fax: (506) 452-3525

The deadline for submissions to be included in the next issue
(Vol. **24(4)**) is **November 1, 1992**

La date limite pour recevoir vos contributions pour le prochain numéro
(Vol. **24(4)**) est le **1 novembre 1992**

Please send all correspondence concerning the *Bulletin* to:

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

Tel. (416) 688-5550 Ext. 3394
Fax. (416) 682-9020

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

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

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

GUEST EDITORIAL

Ladies and Gentlemen: the *Biodome*

So you enjoyed what you saw on the evening of October 21, 1991 during the ESC-SEQ-ESO joint meeting: the Montreal *Insectarium*. Many of you were thrilled by the concept and some told me (in private, of course) that they envied the Institution. Well, you ain't seen nothing yet!

A few days after the Rio summit, on Friday June 19th, 1992, Premier Robert Bourassa, Montreal Mayor Jean Doré and Mr. Pierre Bourque officially opened Montreal's *Biodome*. The *Biodome* is built within the former Olympic velodrome, close to the Olympic Stadium. It was funded by a special contribution (ca. $58 million) from the Quebec government to celebrate Montreal's 350th anniversary.

The concept is new and bold: four artificial quasi-ecosystems densely packed onto a few hectares. Four ecosystems have been created: the Laurentian forest, the tropical forest, the St. Lawrence marine ecosystem and the polar ecosystem. Within these ecosystems live 218 animal and 350 plant species. I do not know how many insect species are expected to live in the *Biodome*. However, one position for an entomologist is likely to be created - to design biological control programs.

Formidable technical challenges had to be overcome: including the containment of a large volume of ocean water and the production of snow year round. Disney-type tricks have been used to give the impression that the different animal species are living together.

The objective is urban eco-tourism. The *Biodome* follows the trend made by past efforts. It is just next to the Montreal *Botanical Gardens* (the second largest in the world after Kew in London) where, among other attractions, are located the *Insectarium*, the *Chinese Garden* and the largest collection of bonsai trees outside Asia.

The expected number of visitors per year is one million people. During the very first weekend, 12,000 visitors were expected; 45,000 came.

I hear many questions from the crowd. How many research projects could have been financed with $58 million? With that amount of money, how many biological scientists could have been employed over the next ten years? However, I also hear other types of questions. Why are the Japanese, among others, so eagerly interested in the concept of the *Biodome*? What is $58 million to properly educate urban children?

Whatever the angle, there is one sure thing: NATURE is celebrated. But make your own opinion. See the *Biodome* for yourself next time you're in town.

Charles Vincent
Agriculture Canada
Saint-Jean-sur-Richelieu
Quebec

The Worsening Crisis in Biology

Over the past 20 years, universities and governments have failed to recognize a crisis in biology. Positions and support for professionals in systematics, behavior and ecology continue to decline. Students are being turned off "whole organism" biology, not just because of lack of recognition, but also because of a lack of job prospects.

Current funding strategies are geared toward support of technological fields - those that generate patents or profits. Currently, there are not enough scientists available to address environmental crises, even on a knee-jerk basis, let alone to tackle problems over the long term.

For example, on this planet there are about 1.4 million described species of organisms. About 750,000 of these are insects, 41,000 are vertebrates and 250,000 are plants. Conservative estimates for insect species run between five and 30 million. Thus, at best, we can identify only about 28 per cent of all insect species. In Canada alone, there are more than 34,000 described species of insects and mites and an estimated 33,000 undescribed species. Of the known species, little has been learned of their biology or the importance of their interactions in the environment. We can make few predictions as to which species are crucial in maintaining diverse and healthy ecosystems.

At current rates of extinction, we could lose more than 25 per cent of all species over the next 20 years due to deforestation and environmental change. Over the past 20 years the number of professionals employed in Canada by the federal government to identify and name insects and mites dropped by almost 50 per cent to only 21 individuals - a minimum responsibility of 3,190 Canadian arthropod species per professional.

Considering that those professionals also have to understand insects from around the world to answer questions of declining bio-diversity, deal with exotic introductions of pest insects, identify biological control agents, or track the movement of species during environmental changes, the available expertise is spread even more thinly.

Universities are not faring any better. At current attrition levels, in two years there will be only seven faculty positions for insect systematics across Canada, only three more positions, for example, than at one U.S. university (Texas A&M). We continue to spend large sums of money on particle accelerators, astrophysics, space exploration and other endeavors that are not of direct relevance to the changing conditions of our planet today. These disciplines deserve funding, but we need to recognize that properties of the physical universe will still be the same in 50 years. With a projected species loss of more than 25 per cent our environment will be radically different after that same number of years.

Priorities should be established for our research needs. Our planet demands attention now. Cutbacks to universities and an announced cut of 10 per cent to Agriculture Canada (which employs most of the entomologists referred to above) are not the correct steps. The solution is for governments and universities to find ways to increase the number of positions, funding levels and recognition for whole organism biology. We will gain the chance to better understand and keep what we have now.

John Heraty
NSERC Post-doctoral Fellow
Carleton University
(Published July 24, 1992 in *The Ottawa Citizen*;
reprinted with permission)

SOCIETY BUSINESS / AFFAIRES DE LA SOCIÉTÉ

President's Update

I am writing this update a few days before leaving for my summer field season in the Arctic, so the Fall update is actually being written in early July. I am sure many of you are also in the field at this very moment and I wish you every success in your work. Same to the stay-at-home laboratory types!

Last month I attended the CFBS meetings in Victoria on behalf of Jeremy McNeil, our regular representative on the Board of Directors. I also attended the meeting of the Program Committee as Jeremy's alternate. Thus, while he was "winging his way to China" I spent several days, including Fathers' Day, in a window-less conference room. However, those experiences gave me a much better appreciation of the sort of work that CFBS does on our behalf.

I was particularly impressed with the activities of the Science Policy Committee led by Dr. Clement Gauthier which is, for instance, actively involved in bringing to fruition a Canadian Long-Term Ecological Research Program (CLERP) similar to the LTER program established in the U.S. several years ago. Other areas in which CFBS is involved that are very relevant to us surround topics such as public awareness of science in general and the use of animals in experimentation — now that it has been discovered that insects are animals too. Of course, the activities of the CFBS are myriad and these will be reported to you in due course.

The scientific meetings were also very successful, with comments such as "among the best scientific meetings I have ever attended" being heard in the foyer of the Victoria Convention Centre. ESC input is expected for the 1994 meetings in Montreal where symposia on (1) Biological Signals and (2) Evolution are being organized. Symposia on (1) Chemical Ecology and (2) Neurobiology are slated for 1995 in Saskatoon.

The continuing saga of the book on "Diseases and Pests of Vegetable Crops in Canada" is worthy of brief mention. The publication date for the English version is now October 1992. The French version translation is underway by C. Thériault and should be completed some time this Fall. The quality and accuracy of the translation of the entomology section is being monitored by Guy Boivin, and details of page format, captions for colour plates, and designs for front and back covers are being finalized.

The Organizing Committee for the Annual Joint Meeting in Saskatoon has been working hard to bring you a varied and interesting program. I hope that as many of you as possible can attend these meetings since they provide such an ideal forum for discussions on recent events in our discipline.

I am particularly looking forward to hearing reports on the International Congress of Entomology held in Beijing as well as the Workshop on Insect Systematics organized by the Centre for Land and Biological Resources Research (CLBRR, formerly BRD) in Ottawa on 16-17 June, 1992. I look forward to seeing you in Saskatoon — and remember to bring your running shoes.

Richard A. Ring
President

Joint Meeting of the Entomological Societies of Ontario and Canada

26-29 September 1993 in Sault Ste Marie, Ontario

CONTACT: Dr. J. Turgeon, Forestry Canada, FPMI, P.O. Box 490,
Sault Ste Marie, Ontario, P6A 5M7 Tel. (705) 949-9461 Fax. (705) 759-5700

Réunion conjointe des Sociétés d'entomologie de l'Ontario et du Canada

26-29 septembre 1993 à Sault Ste Marie, Ontario

CONTACTER: Dr. J. Turgeon, Forêts Canada, IRRF, C.P. 490,
Sault Ste Marie, Ontario, P6A 5M7 Tel. (705) 949-9461 Fax. (705) 759-5700

Call for Nominations - Honorary Membership

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

Nominations must be signed by at least five active members of the Society and are then reviewed by the Membership Committee, who will select two names to be placed on the ballot. Nominations should include a brief biography of the candidate and a statement of her/his contributions to the advancement of entomology. Nominations should be received by the Chairman of the Membership Committee by January 31 1993. They should be sent in an envelope marked "Confidential" to the following address: Dr. A.S. McClay, ESC Membership Committee, Alberta Environmental Centre, Bag 4000, Vegreville, Alberta T9C 1T4

A.S.McClay

Elections Committee / Le Comité des Elections

The committee was comprised of C.H. Craig, R.H. Elliott, and A.B. Ewen. The committee met on 15 July, 1992, at the Agriculture Canada Research Station, Saskatoon, Sask., and examined ballots for the 1992 election of officers. In total, 254 ballots 254 were received. The successful candidates were:

Le comité a compris C.H. Craig, R.H. Elliott, et A.B. Ewen. Le Comité a tenu une réunion le 15 juillet 1992 à la Station de Recherche d'Agriculture Canada, à Saskatoon, Sask., ðu il a examiné les bulletins de scrutin pour l'élection des officiers pour 1992. Un total de 254 bulletins ont été reçu. Les candidats élus sont:

Second Vice-President / Le deuxième vice-président:	Les Safranyik
Directors-at-large / Directeurs nationaux:	Hugh Danks Sandy Smith
Fellowship Selection Committee / Comité pour la sélection des compagnons de la société:	Ed Becker Doug Eidt

A.B. Ewen

C.F.B.S. Nominations

Each year C.F.B.S. asks for nominations for Vice-President and Directors-at-Large. As a member of C.F.B.S. our society has the right to nominate persons for these positions. If you have any suggestions for nominees or would like to serve C.F.B.S., please contact Dr. R. Ring or Dr. J. Laing.

J. Laing
Guelph, Ontario

Fellow of the Entomological Society of Canada

The Fellowship Selection Committee has nominated, and the Governing Board has approved the nomination of Dr. Ring Cardé, Distinguished University Professor as a Fellow of the Entomological Society of Canada. Professor Cardé, from the Department of Entomology at the University of Massachusetts, has been honored in recognition of his contributions to entomology as researcher, teacher and administrator.

J.N. McNeil
Ste Foy, Quebec

To the Student Members of the ESC

In early June a letter and questionnaire was sent out to all student members of ESC. Thanks to those of you who have already returned the questionnaire. We appreciate your input. Just in case anyone has misplaced their copy or didn't receive one, a copy of the questionnaire follows. Please fill it out and send it to me as soon as possible. I plan to report on the results to the Governing Board at the Annual Meeting of the ESC in September. Thanks again.

Kenna MacKenzie
Chair, Student Affairs Committee

Aux membres étudiants de la SEC

Au début juin, j'ai fait parvenir une lettre et un questionnaire à tous les membres étudiants de la SEC. Je remercie les étudiants qui ont déjà retourné leur questionnaire. Votre contribution est appréciée. Au cas où vous n'auriez pas reçu ou perdu le questionnaire, une copie est reproduite ci-après. J'apprécierais que vous le complétiez et me le postiez le plus tôt possible. Je planifie de présenter la compilation de ces résultats en septembre à l'assemblée du Conseil d'administration lors de l'assemblée annuelle de la SEC. Je vous remercie.

Kenna MacKenzie
Présidente du Comité des affaires étudiantes

QUESTIONNAIRE SUR LES AFFAIRES ÉTUDIANTES 1992

1. J'assisterais à un symposium d'aptitudes à l'emploi sur :
(choisir deux éléments)

   a) Comment rédiger un article scientifique et une demande de bourse
   b) Les séminaires et autres présentations
   c) La façon de préparer une carrière en entomologie
   d) L'entomologie dans l'enseignement
   e) Autres : .....

   Commentaires et suggestions pour le Symposium sur les aptitudes à l'emploi :

2. Seriez-vous admissible au prix de bourse de voyage offert présentement par la Société?

   Non Oui Ne sais pas

3. Autres commentaires ou suggestions sur les affaires étudiantes

4. J'aimerais me joindre au Comité des affaires étudiantes. Mon nom, mon adresse et mon numéro de téléphone (y compris pour le courrier électronique, s'il y a lieu) sont les suivants :

Veuillez retourner le présent questionnaire à :

Kenna MacKenzie, Présidente, Comité des affaires étudiantes
Département d'entomologie, Comstock Hall
Cornell University
Ithaca, NY 14853-0999
É.-U.

STUDENT AFFAIRS QUESTIONNAIRE 1992

1. I would attend a job skills symposium on:
(Choose best two)

    a. How to write a scientific paper and grants
    b. Seminars and other presentations
    c. Preparations for a Career in Entomology
    d. Entomology in teaching
    e. Other:_____

    Comments or Suggestions on Job Skill Symposium:

2. Would you qualify for the Travel Grant Award currently offered by the ESC?

    No Yes Don't know

3. Other comments/suggestions on anything associated with Student issues:

4. I would like to become a member of the Student Affairs Committee. My name, address and phone number (and E-mail address if you have one) are:

Please return to:

Kenna MacKenzie, Chair, Student Affairs Committee
Department of Entomology, Comstock Hall
Cornell University
Ithaca, NY 14853-0999
USA

Call for Nominations
Achievement Awards Committee

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

Members of the Society are invited to nominate individuals whom they regard as eligible for these awards (for the year **1993**). Nominations should be sent in an envelope marked "Confidential" to the following address:

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

and should comprise: (1) the name and address of the nominee(s); (2) a statement of relevant achievements; and (3) the name of the nominator and at least one seconder. To be considered by the Achievement Awards Committee, nominations must bear a postmark no later than **November 30 1992.**

The following conditions govern these awards:

1. Outstanding contributions should be judged on the basis of

(a) superior research accomplishment either as a single contribution or as a series of associated endeavours and which may be either in entomology or a related field where the results obtained are of great consequence;

or

(b) dedicated and fruitful service in the fields of Society affairs, research administration or education.

2. No more than one of each award shall be granted per year but, where circumstances warrant, more than one individual may be mentioned in a single award.

3. Recipients need not be members of the Society providing their contribution is judged to have a major impact on entomology in Canada.

4. The award may be granted on different occasions to the same recipient but for different contributions to entomology in Canada.

5. Nominees for the C. Gordon Hewitt Award must be less than 40 years of age throughout the calendar year in which the award is both announced and awarded.

Comité des décorations

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

La Société invite les membres à lui faire parvenir les noms des personnes qu'ils considèrent éligibles à ces deux prix. Veuillez envoyer vos nominations (pour l'année **1993**) au:

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

dans une enveloppe portant la mention "Confidentiel". La nomination doit contenir: (1) le nom ainsi que l'adresse du (ou des) candidat(s) désigné(s); (2) un compte rendu des réalisations pertinentes; et (3) le nom du parrain et celui d'au moins une deuxième personne appuyant la mise en nomination. Pour être acceptées par le Comité les nominations devront porter un sceau postal d'au plus tard le **30 novembre 1992**.

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

1. Les contributions exceptionelles devraient être jugées dans le contexte

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

ou

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

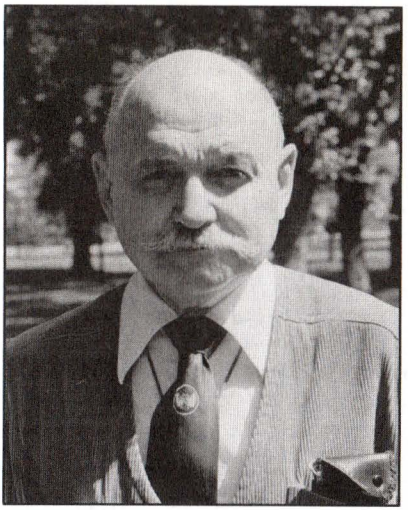
2. Chaque prix ne sera décerné qu'une seule fois annuellement, quoique, les circonstances le justifiant, plus d'une personne pourront collectivement devenir récipiendaires d'un prix.

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

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

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

MEMBERS IN THE NEWS



Professor George E. Ball Retires.

On or about December 30, 1991 George E. Ball retired as Professor of Entomology at the University of Alberta. However this event was almost unnoticed because he continued his 37-year habit of arriving in the Department at some ridiculously early hour and leaving the Department after most other people had gone, and because he continued to teach insect systematics, and attend committee meetings, seminars and certain functions at the Faculty Club.

George received his formal education at Cornell University (A.B. and Ph. D.) and University of Alabama (M.S.) and served two years in the United States Marine Corps before being appointed as an Assistant Professor in the Department of Entomology, in 1954. George became an Associate Professor in 1958 and Professor of Entomology in 1965, and served as Chairman of the Department from 1974 to 1984. During his career at the University of Alberta he taught courses in general entomology, insect morphology and physiology, insect toxicology, applied entomology, invertebrate zoology and insect systematics. It was in the latter field, as a supervisor of graduate students and as a member of many supervisory committees, that he made his greatest teaching contributions. Fourteen students received their M. Sc., and 23 students their Ph. D. degrees under George's supervision, guidance and inspiration. Many of these students have gone on to important and influential positions in such institutions as the Biosystematics Research Centre, the (British) Natural History Museum, the California Academy of Sciences and the Smithsonian Institute, to name just four institutions that are famous for their taxonomic studies.

Professor Ball is a member of numerous entomological and zoological societies and has served these societies in a number of capacities, including membership on many important committees and as President of the Entomological Society of Alberta (1957/58), the Coleopterists Society (1972/73) and the Entomological Society of Canada (1982/83). He was elected a Fellow of the Entomological Society of Canada in 1976 and received the Entomological Society of Canada's Gold Medal for Outstanding Achievement in 1980. George has served as a member of committees reviewing six departments or programs (outside of the University of Alberta) and as a member and chairman of the NSERC Population Biology Grants Selection Committee.

His meticulous and extensive studies of the systematics, phylogeny and zoogeography of the New World Carabidae, have earned George an enviable international reputation. To date, George has authored or co-authored more than 45, often book-length, publications in numerous refereed journals, 12 book chapters, and has edited, or co-edited four major books in Carabid systematics and biology. Among his more notable recent publications are: S. L. Straneo and G. E. Ball. 1989. Synopsis of the genera and subgenera of the Tribe Peleciini and revision of the Oriental and Neotropical species.

(Coleoptera: Carabidae). *Insecta Mundi*, **3**: 73-178; G. E. Ball and D. R. Maddison. 1987. Classification and evolutionary aspects of the species of the New World genus *Amblygnathus* Dejean, with description of *Platymetopsis*, new genus, and notes about selected species of *Selenophorus* Dejean (Coleoptera: Carabidae: Harpalini). *Trans. Amer. Ent. Soc.* **113**: 189-307. George has served on the editorial board of the *Canadian Journal of Zoology* and, for more than 16 years, was editor of *Quaestiones Entomologicae*.

To honor George Ball on the occasion of his retirement, and as a recognition of his many contributions to systematic biology, the Department of Entomology is organizing a Symposium on systematics and biodiversity, to be held in Edmonton November 6 - 8, 1992.

To date, more than 30 entomologists (from North America, Europe and Australia) have indicated their intention of attending. Anyone interested in attending the symposium is asked to contact: Dr. R. H. Gooding, Department of Entomology, University of Alberta, Edmonton, Alberta, Canada T6G 2E3 (Telephone 403-492-0451; Fax 403-492-1767).

R.H. Gooding
Chair, Department of Entomology
University of Alberta

Dr. P. Kanagaratnam Moves to Lethbridge

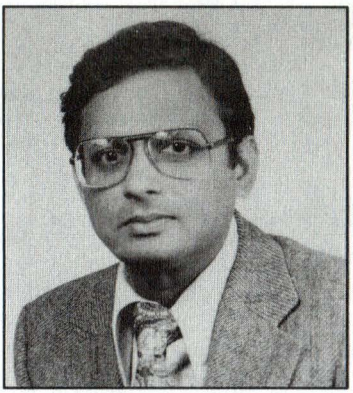
Dr. P. Kanagaratnam (Kanags) joined the Lethbridge Research Station in May as a Research Associate working with Dr. Dan Johnson and Dr. Mark Goettel on a microbial control of grasshoppers project. Kanags came from the Winnipeg Research Station where he was a Research Associate working with Dr. O. N. Morris on an IDRC sponsored project "Microbial Control of Pests of Oilseed Crops with Special Reference to the Use of *Bacillus thuringiensis* Against Lepidopterous Pests of Cruciferous Crops".

Kanags received his doctorate in 1980 from Imperial College, University of London where he conducted research on the development of *Verticillium lecanii* as a microbial control agent of whiteflies under the supervision of Dr. Dennis Burges at the Glasshouse Crops Research Institute, Littlehampton, West Sussex, England. Until his immigration to Canada in 1988, Kanags was Head of Crop Protection at the Coconut Research Institute in Sri Lanka.

His new address is:

Agriculture Canada Research Station
P.O. Box 3000, Main
Lethbridge, Alberta
Canada TIJ 4Bl
Telephone (403) 327-4561
FAX (403) 382-3156.

IN MEMORY



Dr. Mukul K. Mukerji (1938-1992)

On June 23, 1992, we were saddened to hear of the death of our friend and colleague, Dr. Mukul K. Mukerji, who passed away after a brief but intense struggle with bone cancer.

Mukul received a B.Sc. (1957) and M.Sc. (1959) from the University of Calcutta. He began his entomological career as a lecturer at Ripon College in Calcutta and then entered the field of research at the Agricultural Research Institute, New Delhi. He then decided to pursue further graduate work in Canada and obtained his doctorate from Macdonald College, McGill University in 1965. A postdoctoral year at the federal Forest Research Laboratory in Victoria, B.C. focussed on the dynamics of insect predation.

In 1967, Mukul began his career with Agriculture Canada as a Research Scientist reporting first to the Chatham, Ont., lab and later to the station at London, Ont., where he investigated the population dynamics of cruciferous root maggots. He continued this work from 1968 to 1970 after he moved to the Entomology Research Institute in Ottawa, Ontario. In 1970, he transferred to the Ottawa Research Station to investigate sampling techniques and population dynamics of forage pests.

Mukul moved to Saskatoon, Sask. in 1973, where he accepted a position at the Research Station to develop modelling systems for grasshopper dynamics and management. He made substantial contributions to many aspects of grasshopper management and forecasting. His development of computerized weekly updates to the annual grasshopper forecast was extremely valuable to farmers and the agricultural industry. His work on grasshopper pest management contributed to the development and registration of insecticide baits, thereby reducing the need for liquid insecticide application.

Mukul had many co-operative projects with other scientists at the Station and at other research establishments. He approached his own work in a dedicated and tireless manner but at the same time he was always willing to share his expertise and time to assist in projects of colleagues and students. He sought only the truth and did so with great dignity.

Mukul Mukerji authored or co-authored 56 scientific publications and many technical transfer articles. He was a long time member of the Entomological Society of Canada and in 1978 became an Associate Editor and later an Assistant Editor of *The Canadian Entomologist*. He was one of the original Canadian members of the Pan-American Acridological Society (now the Orthopterists' Society) and he was involved with organizing the fourth triennial meeting of that Society in Saskatoon.

Mukul retired in September 1989 and moved to Victoria, B.C. where he resided at the time of his death. We miss him very much, as a colleague and friend. Our condolences are extended to his wife, Dr. Srimathie Mukerji.

John F. Doane, Saskatoon, Sask.
Al B. Ewen, Dalmeny, Sask.

NEWS OF ORGANIZATIONS

International Commission on Zoological Nomenclature

Applications published in the *Bulletin of Zoological Nomenclature*

The following applications were published on 25 June 1992 in Vol. 49, Part 2 of the *Bulletin of Zoological Nomenclature*. Comment or advice on these applications is invited for publication in the *Bulletin of Zoological Nomenclature* and should be sent to the Executive Secretary, I.C.Z.N., c/o The Natural History Museum, Cromwell Road, London SW7 5BD.

Case 2794 ***Gerris paludum* Fabricius, 1794 (currently *Aquarius paludum*; Insecta, Heteroptera): proposed conservation of the specific name**

N. Møller Andersen
Zoologisk Museum, University of Copenhagen, Universitetsparken 15, DK-2100 Copenhagen, Denmark

Abstract. The purpose of this application is to conserve the specific name of the water-strider *Gerris paludum* Fabricius, 1794 by the suppression of the virtually unused senior subjective synonym *alatus* Retzius, 1783, originally published for a "variety" of *Aquarius najas* (De Geer, 1773).

Case 2772 ***Chrysobothris* Eschscholtz, 1829 and *Dicerca* Eschscholtz, 1829 (Insecta, Coleoptera): proposed conservation as the correct original spellings**

G.H. Nelson
College of Osteopathic Medicine of the Pacific, 309 East College Plaza, Pomona, California 91766-1889, U.S.A.

Abstract. The purpose of this application is the conservation of the buprestid generic names *Chrysobothris* and *Dicerca* Eschscholtz, 1829. The names originally appeared as *Chrysobotris* and *Dicerea*, but those spellings have not been used.

Case 2786 **TACHINIDAE Fleming, 1821 (Insecta, Coleoptera) and TACHINIDAE Robineau-Desvoidy, 1830 (Insecta, Diptera): proposed removal of homonymy, and TACHYPORIDAE MacLeay, 1825 (Insecta, Coleoptera): proposed precedence over TACHINUSIDAE Fleming, 1821**

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Abstract. The name TACHINIDAE Robineau-Desvoidy, 1830 is in universal use for a very large family of Diptera, but is a junior homonym of the staphylinid beetle family-group name TACHINIDAE Fleming, 1821 (based on *Tachinus* Gravenhorst, 1802). Fleming's name is a senior synonym of TACHYPORINAE MacLeay, 1825 but is not in current use at any rank. It is proposed that the entire

name of *Tachinus* be taken as the stem to remove homonymy with TACHINIDAE Robineau-Desvoidy, and that the usage of TACHYPORINAE MacLeay be conserved.

Case 2803 ***Copromyza limosa* Fallén, 1820 (currently *Leptocera (Rachispoda) limosa*; Insecta, Diptera): proposed replacement of lectotype, so conserving usage of the specific name and also that of *Leptocera (Rachispoda) lutosa* (Stenhammer, 1855)**

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Abstract. The purpose of this application is to conserve the specific name of the common Holarctic saprophagous sphaerocerid fly *Leptocera limosa* (Fallén, 1820) in its current usage. In 1972 one of the female syntypes was designated as the lectotype, but this has now been identified as *Leptocera lutosa* (Stenhammer, 1855). It is proposed that a male syntype should be designated as replacement lectotype.

Case 2804 ***Drosophila putrida* Sturtevant, 1916 (Insecta, Diptera): proposed replacement of the holotype by a neotype**

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Abstract. The purpose of this application is to designate a neotype in accordance with current usage for the nominal species *Drosophila putrida* Sturtevant, 1916. Examination of the holotype shows that it belongs to an un-named species which has been consistently misidentified as *Drosophila testacea* von Roser, 1840. *D. putrida* is widely used in ecological, genetic and evolutionary studies and is restricted to the eastern U.S.A.

Case 2706 **EPHYDRIDAE Zetterstedt, 1837 (Insecta, Diptera): proposed precedence over GYMNOMYZIDAE Latreille, 1829**

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Abstract. The purpose of this application is to conserve the long and universally used name EPHYDRIDAE Zetterstedt, 1837 for shore flies, despite the existence of the older family-group name "Gymnomyzides" Latreille, 1829, based on *Gymnomyza* Fallén, 1810 (a junior subjective synonym of *Mosillus* Latreille, 1804). The authors advocate usage of subfamily and tribe names based on *Gymnomyza*, but retention of EPHYDRIDAE for the family.

The following Opinions were published on 25 June 1992 in Vol. 49, Part 2 of the *Bulletin of Zoological Nomenclature:*

Opinion 1680. *Buthus vittatus* Say, 1821 (currently *Centruroides vittatus*), *Centrurus hentzi* Banks, 1904 (currently *Centruroides hentzi*) and *Buthus vittatus* Guérin Méneville, [1838] (currently *Bothriurus vittatus*) (Arachnida, Scorpionida): specific names conserved.

Opinion 1681. *Vatellus* [Aubé], 1837 (Insecta, Coleoptera): conserved.

Opinion 1682. *Plusia falcifera* Kirby, 1837 (currently *Anagrapha falcifera*; Insecta, Lepidoptera): specific name conserved.

Opinion 1683. *Simulium (Nevermannia) juxtacrenobium* (Insecta, Diptera): specific name first available from the intended original description by Bass & Brockhouse, 1990.

Biological Survey of Canada (Terrestrial Arthropods) Survey Report

The Scientific Committee met in Ottawa on 23-24 April 1992. A fuller account of the meeting appears in the fall 1992 issue of the *Newsletter of the Biological Survey of Canada (Terrestrial Arthropods).*

Notes on Selected Scientific Projects

1. *Arthropods of Peatlands in Canada*

Manuscripts for a published proceedings of the 1991 symposium on arthropods of peatlands have been reviewed.

2. *Arthropod fauna of the Yukon*

Progress continues to be made in the preparation and editing of manuscripts for this major volume, especially the systematics contributions.

3. *Arctic invertebrate biology*

A second issue of the newsletter *Arctic Insect News* has appeared. Reciprocal visits to Russia will likely be made in 1993 rather than 1992. Field studies continue in the Canadian Arctic. A paper on arctic insects as indicators of environmental change was published after the meeting.

4. *Arthropods of Canadian grasslands*

Contributions were invited by Dr. G.G.E. Scudder to support production of another Grasslands newsletter. A proposal for funding has been made by Dr. A.T. Finnamore to carry out extensive work on the arid grasslands of western Canada.

5. *Arthropods of the boreal zone*

Dr. R.G. Foottit is investigating the possibility of holding a broadly based symposium on boreal entomology at a future ESC meeting.

Other Scientific Priorities

1. *Brief on biodiversity*

A proposed brief on the techniques and context for studies of biodiversity was discussed, and will be developed more fully.

2. *Old-growth forests*

The Committee endorsed the idea of developing a BSC old-growth forest project through an outside grant proposal endorsed by a relevant federal government department. Dr. S.A. Marshall, with others, will develop the proposal further.

3. *Invasions and reductions*

The Committee discussed whether a project on invasions and reductions in the Canadian insect fauna is feasible through information on individual species histories, or through a focus on habitats and their suitability.

4. *Large rivers*

Dr. D.M. Rosenberg presented the orientation for such a project, which was endorsed by the Committee.

5. *Research collections*

The Survey's brief on research collections of terrestrial arthropods (*Bull. ent Soc. Can.* 23(2), Suppl.) had been widely distributed to relevant government officials and universities, and notices had appeared in bulletins and newsletters.

6. *General initiatives in systematics and entomology*

A synopsis of major themes in systematics and entomology, prepared by Dr. H.V. Danks, was discussed. The Committee agreed in principle to follow up these ideas by developing short scripts pertaining to education and to communication with others, and by possible future "marketing" of this information.

Secretariat Activities

The 1991 round of visits by Dr. H.V. Danks to entomological centres in Canada permitted informal discussions about the Survey and its projects with many entomologists and other biologists. Formal seminars on several subjects also were presented.

Liaison and Exchange of Information with Other Organizations

1. *Canadian Museum of Nature*

Mr. G. Fitzgerald, Chief, Collections Division, distributed a report by Dr. P. Colgan, Associate Director, about the re-organization of the Museum. A recent report from the Task Force on Research is favourable toward research. Mr. Fitzgerald answered enquiries from members of the Committee. A collections assistant will provide care to the parasitology collection until a researcher is brought on staff. The Museum does not have a policy of blanket acceptance of orphan collections, but each one is reviewed on an individual basis. The separate Collections and Research Divisions now work together in four departments (organized by taxonomic discipline); researchers have the responsibility to direct the intellectual development and organization of the collections, but responsibility for the actual care and conservation of specimens now belongs to the Collections Division instead of to researchers.

Dr. M. Poulin, Chief, Research Division, answered enquiries. The Museum is contributing to the resolution of some environmental issues and problems, especially through its systematics expertise and knowledge of the country's fauna and flora. Researchers will contribute to wider research projects (e.g., biodiversity), but at the same time continue to do taxonomic/systematic research, the fundamental work

of the institution. The Museum continues to play its role as a reservoir of knowledge in natural sciences through its collections.

2. *Biological Resources Division*

Dr. R. Asselin, Director, Centre for Land and Biological Resources Research, outlined progress in the development of ideas for a consortium between Agriculture Canada, the Canadian Museum of Nature, and Forestry Canada. A Memorandum of Understanding is being developed. Other partners (e.g., Environment Canada, provincial museums, universities) could also be provided for. The main purpose of the consortium is to ensure the preservation of the national assets (at the BRD, CMN and Forestry) of collections and the people associated with them.

Dr. P. Marriage, Executive Deputy Director, BRD, noted that a workshop on systematics, to be held on June 16-17 at the University of Ottawa, broadens this consortium initiative. What form the proposed consortium needs to take in order to accommodate the recommendations of the workshop can be seen. Dr. Marriage reported that entomological programmes within BRD now are based on systematic entomology disciplines. In addition, various teams deal with "applications" aspects. This approach helps BRD to support the broad base of systematics in Canada, while the teams allow a focus on the application of the work to Agriculture and elsewhere.

3. *Entomological Society of Canada*

Dr. R.A. Ring, President, summarized recent developments, including responses to letters that had been sent to various officials, ministers, and universities in order to draw attention to the 1991 ESC resolutions about systematics.

4. *Canadian Wildlife Service*

Mr. T. Lash, Chief, Endangered Species, noted some national initiatives leading to a greater potential on invertebrates, and sought the advice of the Committee as to how invertebrate conservation initiatives can be developed from a national standpoint.

5. *Forestry Canada*

Dr. J. Huber, on behalf of Dr. B. Moody, Forest Insect and Disease Survey, reported that considerable resources currently are being devoted to the Asian Gypsy Moth, and emphasized the value of the large forestry collections.

6. *Canadian Society of Zoologists*

Dr. D. Cone, Chairman, steering committee for a parasitology survey, outline initiatives of that committee, including publication of a directory of Canadian parasitologists, liaison with the CMN, and expansion of a project on parasites of yellow perch.

7. *Other Organizations*

Dr. A. Telka (Geological Survey of Canada) and Dr. C.S. Rodrigues (Conservation and Protection, Environment Canada) also attended the meeting. Interactions continue with the Canadian Parks Service and other agencies and individuals.

Other Items

1. *Regional Developments*

Members of the Committee presented information about relevant developments in various parts of the country. Among many other items, increasing tendencies were noted in government to require that

the support of research projects, and of students, is obtained through outside funding.

2. *Entomological Research in Parks*

A draft commentary and recommendations about guidelines for entomological research in national Parks was considered and approved in principle by the Committee for submission to Parks under the existing Memorandum of Understanding.

3. *Other Matters*

The Committee also discussed the Biological Survey Foundation, the Survey's draft Annual Report to the CMN, a possible workshop on Coleoptera, recent information about long-term research and climatic change, and letters of support for the BRD handbook series, arctic studies, and collections at the University of Lund, Sweden.

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PUBLICATIONS
BOOK NOTICES

Williams, D.H. and M. Cristina Granara de Willink. 1992. *Mealybugs of Central and South America.* C·A·B International, Wallingford, Oxon, U.K. 640 pp. Hardcover $(U.S.)147.25.

This book provides a taxonomic revision of the mealybugs for the entire Neotropical region, including 49 genera and 282 species from all countries in the Western Hemisphere south of the U.S.A. Keys to the genera and species are provided, accompanied by 281 illustrations of 269 species. Brief accounts are given of economic importance, morphology, distribution and host plant records, with reviews of the relevant literature. In addition to contributing to knowledge of the taxonomy of mealybugs, the work is aimed at providing essential background information for those concerned with quarantine inspection or the search for natural enemies for the biological control of economically significant species of mealybugs.

Valentine, E.W. and A.K. Walker. 1991. *Annotated Catalogue of New Zealand Hymenoptera.* Department of Scientific and Industrial Research [DSIR], Plant Protection, Auckland, New Zealand. 84 pp. Softcover, purchase price not given.

This list is an account of Hymenoptera recorded and known to be established in New Zealand up until 1988. The sequence of taxa follows the *Catalogue of Hymenoptera in America North of Mexico* (Krombein, K.V., Hurd, P.D., Smith, D.R., and B.D. Burkes. 1979. 3 vols., 2735 pp.) down to family level and thereafter alphabetical. Valid names are presented in bold-face type followed by a list of any synonomy with its type data and deposition; subspecies are not recognized. Following this is a list of all invalid or alternative names pertaining to the New Zealand fauna, including subspecies. Annotations include identities of New Zealand host species, dates when species were introduced, a summary of world distributions, and other references and notes on biology and taxonomy.

BOOK REVIEWS

Harley, K.L.S. and I.W. Forno. 1992. *Biological Control of Weeds: A Handbook for Practitioners and Students.* Inkata Press, Melbourne, Australia. 74 pp. Softcover $(Aus.)39.95.

Biological weed control has been practiced since the 1920s with many notable successes. During this time it has developed an extensive body of principles and methods, but, surprisingly, no comprehensive textbook on these exists. Those becoming involved in the field have therefore had to learn their trade from experience, from a widely scattered scientific literature, and from personal contact with experienced researchers. Ken Harley and Wendy Forno, two of the most experienced researchers in biological control of weeds, have now written the only concise guide available to the principles and practice of biological weed control in all its stages.

The authors discuss the basic principles and rationale of biological weed control, the selection of target weeds, the steps followed in a classical biological control program, exploration for biological control agents, selection and screening of candidate agents, shipping methods and quarantine procedures, propagation, release and evaluation of biological control agents, and transfer projects using agents already established in other parts of the weed's introduced range. An appendix discusses the design and operation of quarantine facilities for biological control. The illustrations include a spectacular pair of before-and-after photographs showing the effects of the weevil *Cyrtobagous salviniae* in clearing the floating fern *Salvinia molesta* from a lake in Sri Lanka. The emphasis throughout is on the practical details of biological control operations, reflecting the authors' extensive field experience. Seven pages of references are provided.

Their examples are drawn largely from Australian projects, and focus mainly on classical biological control using insects as biocontrol agents. The use of plant pathogens, particularly as mycoherbicides, is considered very briefly. While this might be considered personal bias on the authors' part, it could also be seen as a fair reflection of Australia's leading role in weed biocontrol and the predominance of successful projects using insects.

The book is clearly written and takes a step-by-step approach through the various stages of a biological control program. A concise summary of the main points covered is provided at the end of each chapter. My only criticism of the text is the abundance of superfluous commas, some of which alter the intended meaning of sentences.

Many researchers in the field will wish that this book had been available when they were starting their careers. I recommend it to new researchers and extension personnel becoming involved in biological control of weeds, to students in entomology and weed science courses, and to anyone wishing to learn more about the availability of alternatives to chemical weed control. It is also concise enough to serve as a guide for administrators and regulators who deal with weed management and biological control. I hope that it will help to focus more attention on the potential of this means of weed control, still neglected and underfunded despite its long record of success.

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Commonwealth Scientific and Industrial Research Organization, Division of Entomology (ed.). 1991. *The Insects of Australia: A textbook for students and research workers*, second edition. Melbourne University Press, Melbourne, Australia and Cornell University Press, Ithaca, New York, U.S.A. Vol. I xvii + 542 pp., Vol. II vi + pp. 543 - 1137. Hardcover $(U.S.)215.00.

In the last twenty years the insect fauna of Australia has increased from 54,071 to 85,920 species, plate tectonics and vicariance events have become dominant processes in shaping the fauna, and a rich record of fossil hexapods has become exposed. No - there has not been an orogenic upheaval in the antipodes that has been overlooked by a world preoccupied with its economic and political problems! Rather, there has been a quiet but dramatic revolution in entomological thought which has been well-captured by the publication of the second edition of *The Insects of Australia.*

This two-volume work claims in its title to be a textbook of entomology but in fact is somewhat more. It, in conjunction with the first edition, is also an historical document of the first order. Each edition represents a milestone in the development of the science. Each presents an up-to-date review of the discipline of entomology and in this way a comparison of the two editions provides a measure of the changes in knowledge and the conceptual developments that have occurred between the two publication dates.

Edition 2 overtly has an historical component. Chapter 6 by J. Kukalova-Peck reviews the fossil record of hexapods, not just for Australia, although this is treated in a summary way, but globally. She develops ground plans for the hexapod leg, head, wing articulation and venation, and genitalia, and from this and fossil material, an historical outline of the major hexapod lineages is proposed. From another perspective, that of cladistic inference from the study of extant hexapods, K.P. Kristensen (Chapter 5) presents a similar classification. That these classifications are complementary provides a significant test for each and increases confidence in them.

These chapters are not just isolated contributions to a multiauthored book. Rather, they contribute some of the primary organizing themes along which relevant sections of the work are developed. For example, J.F. Lawrence and E.B. Britton (Chapter 35, "Coleoptera") interpret Coleoptera wing venation in light of the Kukalova-Peck ground plan. J. Watson and A. O'Farrell (Chapter 17, "Odonata") do the same but hold back from replacing the familiar Tillyard-Fraser with a new set of names in order to maintain continuity with previous work.

This points out the major problem authors have had to grapple with. That is, how current should a chapter of a basic textbook be? Between the publication of the two editions, cladistic methodology has been widely embraced. This, used in conjunction with enlarging suites of characters and reinterpretation of previously used characters, has resulted in revisions, sometimes radical, to the classification of many groups of insects. Which of these revised classifications should be accepted? The authors were often torn between new, incompletely tested theory and old and perhaps flawed but familiar classifications. E.S. Nielsen and I.F.B. Common (Chapter 41, "Lepidoptera") introduced a classification so up to the moment that justification for certain parts was still in press. Other authors recognized that new work has demonstrated that aspects of older classifications are flawed but felt that either the new classifications have not been adequately verified or that continuity and utility outweigh adoption of as yet unstable changes. For example, D.H. Colless and D.K. McAlpine (Chapter 39, "Diptera") and I.D. Naumann (Chapter 42, "Hymenoptera") recognized that some of their higher taxa are paraphyletic yet opted for maintenance of these traditional groups to maintain continuity rather than adopting one of the

competing newer classifications that has not yet been shown to be definitive. These examples are given to show there is a dynamics to the book due to its being so current.

With a new edition of a book one asks: Is it sufficiently changed or improved to justify buying? With modification, things are lost and things are gained. In this instance, physiological topics have been downplayed; previous chapters on cytogenetics and reproduction and metamorphosis have been dropped. The book has become more focused on morphology and systematics and biology as these relate to the Australian fauna. Chapters not specifically entomological, but providing background to this new focus, have been added, namely Chapter 4, "Principles and Practice of Systematics" by P.S. Cranston, P.J. Gullan, and R.W. Taylor and Chapter 7, "Biogeography" by P.S. Cranston and I.D. Naumann. Three new chapters that add a human dimension to entomology are: Chapter 8, "Biographical History" by E.N. Marks; Chapter 9, "Insects and Humans in Australia" by D.F. Waterhouse; and Chapter 10, "Australian Insects in Scientific Research" by M.J. Whitten. Each of these three chapters contributes a distinctive Australian perspective and flavour to the publication.

The bulk of the work consists of 32 chapters, each treating an order. Some of these chapters have been only slightly changed and updated from the earlier edition while others have been totally rewritten, often by new authors. The most frequent changes are modification of classification, inclusion of newly recognized taxa, and modifications of keys. All recognized orders are treated, even the three not represented in Australia (Grylloblattodea, Zoraptera, Raphidioptera). For each order, the following topics are covered: anatomy of adult and immature stages, biology, special features of the Australian fauna, and classification. Family and subfamily keys and discussions are for Australian groups only; however, as many families, especially the larger ones, are widely distributed, these keys would work well for a majority of the fauna in all zoogeographic regions. A new feature is a key to hexapod orders that includes both larval and adult stages.

Most of the original high quality illustrations have been retained, including the eight color plates. These have been augmented by many new illustrations, the numerous scanning electron micrographs being of especially fine quality.

In summary, although my first edition of *The Insects of Australia* is not worn out despite a great deal of use, I would choose also to acquire the second edition. Like the first, it is attractively organized, well-bound, and by distributing the material in two volumes of larger format, each is more manageable than the massive first edition. All entomologists with an interest in general insect biology, morphology, and faunistics will find this book invaluable although students especially will find the price very high. However, if I were to choose a single book for an overview of the world insect fauna, this would be it.

Like in a fine Persian carpet, I could find a few trivial errors: letters missing on a figure, brackets not closed, and a spelling mistake - but nothing that impairs meaning or detracts from the overall quality. Similarly, specialists will find problems with various aspects of the classification, but for the majority of us, this contemporary treatment of the higher taxa of the world insect fauna and the more specific insights into the wonderful Australian fauna is a boon. To all involved in the project - Good on you mates!

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Dent, D. 1991. *Insect Pest Management*. C·A·B International, Wallingford, Oxon, U.K. xviii + 604 pp. 122 line drawings. Softcover $(U.S.)46.50; hardcover $(U.S.)95.00.

The cover proclaims that, "This book will serve as a major textbook for advanced undergraduate and graduate students taking courses in applied entomology or crop protection." As an instructor in three such courses, all of which lack textbooks because I can find none suitable, I was interested!

The author interprets the "Insect Pest Management" of the title as (p. 2) "a pest management strategy that, in the socio-economic context of farming systems, the associated environment and the population dynamics of the pest species, utilizes all suitable techniques and methods in as compatible a manner as possible, and maintains the pest population levels below those causing economic injury." Thus, the book is not an all encompassing work on control of insect pests, but deals with integrated insect pest management.

The first chapter after the introduction is "Sampling, Monitoring and Forecasting", and focuses on the strategies of sampling, rather than sampling methods *per se*. Reasons for monitoring, absolute and relative population estimates, and designs for sample schemes are outlined, and there are detailed treatments of distribution and abundance surveys, field based monitoring, and fixed position monitoring.

The next chapter deals with yield loss assessment, and emphasizes the methodology of assessing yield loss, including an overview of statistical designs for field trials. The treatment of plant growth models is useful, and covers an important area that is absent from many insect control texts. The chapter concludes with a brief account of the economic threshold concept.

Insecticides are next, and the treatment includes sections on active ingredients, types of formulation, microbial insecticides, spray application, environmental effects of insecticides, insecticide resistance, insecticide safety, and rational insecticide use. The four main groups of chemical insecticides are dealt with in less than two pages; in contrast, there are 14 pages on microbial insecticides. The sections on application of insecticides emphasize hand-held equipment in tropical countries. There is only a brief treatment of the mechanisms and evolution of insecticide resistance, and the discussion of ways of managing resistance is far from complete. The section on pesticide safety has some interesting comments on safety equipment and container disposal in tropical situations, but the tabulation of insecticide hazard ratings is about 20 years out of date.

The chapter on host plant resistance de-emphasizes mechanisms of resistance, such as antibiosis and antixenosis, and emphasizes plant breeding and the genetic basis of resistance. The most pervasive theme is the contrast of vertical and horizontal resistance within the pathosystem; these concepts originated with plant pathologists, and most of the examples deal with pathogens, rather than insects.

The chapter on natural enemies begins with a general account of the types of natural enemies and the four approaches to biological control. There are about 20 pages of population dynamics including various elaborations of the Nicholson-Bailey model, life table analysis, and the local extinction ideas of Murdoch et al. (1985. *Am. Nat.* **125**: 344-366.). Following a section on evaluation of natural enemies, the remainder of the chapter deals with the implementation of classical biological control, augmentation and inoculation, and conservation of natural enemies.

The chapter on cultural control is quite short, but Dent has very effectively organized this rather

diffuse topic. The next chapter deals with semiochemicals, sterile insect techniques, and genetic engineering. Dent observes that these three control methods share the characteristic that they were the subject of great expectations which, at least in the case of the first two, were not fully met. The chapter entitled "Quarantine, Legislation and Politics" contains some familiar items on quarantine and pesticide legislation. The influence of politics on pest management is less familiar in insect control texts, and its inclusion is particularly valuable.

In the final chapter, almost 100 pages are devoted to integrated insect pest management. Dent considers whether r-strategist and K-strategist pests require different control methods, then introduces modelling and systems analysis before discussing the influence of socio-economic factors on pest management. This is followed by a section on methods of decision making in pest management; I found the examples in this section confusing. In the example of linear programming, the equation for the objective function appears unrelated to the written description of the circumstances, and in that on goal programming, the claimed optimal solution point is demonstrably sub-optimal. The chapter concludes with a discussion of how research should be organized to bring about integration of pest management.

There is an extensive bibliography; about 50% of the references date from 1980 or later. Throughout the text there are sections identified with the words "An example"; these contain a detailed account of an example from the literature and are often reinforced with a number of figures and tables. These sections bring a touch of realism to a text that often conveys little about what real insect pests do in real agro-ecosystems.

Is this a text I could use in one of my courses? I think not. I did not find this an easy book to read; the prose is often turgid and imprecise, and the organization of some chapters has one wondering where one is going. The book is unbalanced in its treatment of the subject matter. It is strongest in the areas not found in most economic entomology texts, such as socio-economics and plant-breeding systems. Its treatment of chemical insecticides is weāk; it vēntures into considerable dētail on experimental design and modelling of predator-prey interactions yet its coverage cannot compete with readily available specialist texts in those areas. The coverage of host-parasitoid models would overwhelm many undergraduate students of pest management, but there is no reference to the models of control by sterile insect release.

Dent has a casual attitude to terminology and definitions. In a course text, I expect definitions to be clear and terminology to be used consistently; this helps students understand the material. The most unfortunate example of inconsistent use of terms is the treatment of Stern et al.'s (1959. *Hilgardia* **29**: 81-101.) "economic damage", "economic injury level", and "economic threshold". The three terms are correctly defined, but immediately following the definitions is the statement (p. 129), "The term action threshold is used here instead of economic threshold because it seems less ambiguous, economic threshold is used here as a general term encompassing all three definitions..." This type of treatment robs the terminology of its precision and makes the clear transmission of ideas virtually impossible. Another example of unusual use of terms is a section headed "sequential sampling". Rather than the expected topic of reducing sampling intensity when population density is clearly different from a decision threshold, the section describes how samples taken on successive occasions can be used to predict a future population peak.

The book focusses on crop systems: of the detailed examples, 22 refer to crops, two to forestry, three to livestock, and one to medical entomology. A second emphasis, which is not surprising for a book

from this publisher, is on developing countries. So there are detailed discussions of back-pack sprayers and hand-held electrostatic sprayers, but nothing on aerial application and little on tractor-mounted spray equipment. Sociological topics have a similar focus: there is a discussion of how the lack of credit in developing countries influences pest management, but none on how pest management decisions on large-scale mechanized farms are influenced by large debt loads and low commodity prices.

I found a fair number of inaccuracies. These include several on chemical pesticides; for example, it is stated that cholinesterase is a respiratory enzyme (p. 145) and that few carbamates possess systemic activity (p. 146). There is lack of precision about nomenclature. For example, cattle grubs are referred to as *Boophilus* spp. (p. 408); *Phytophthora infestans*, the pathogen causing late blight of potatoes, is referred to as "an insect pest" (p. 263); and the diamondback moth, *Plutella xylostella* is described as "a cutworm" (p. 87). Some of the figures and tables are poorly integrated with the text, and many tables lack a clear indication of the units in which tabulated values are expressed.

Although I would not use this book is as a course text, I have referred to it considerably during development of course material. Its insights into sociological issues are thought provoking, and it provides convenient access to topics ignored by other insect control texts. To nearctic applied entomologists it provides a window on tropical and palearctic issues. Pest management researchers and instructors may find it useful as a supplement to other texts.

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Weismann, L., Országh, I., and A.C. Pont (eds.). 1991. *Proceedings of the Second International Congress of Dipterology*. SPB Academic Publishing bv, The Hague, The Netherlands. 367 pp. Hardcover $(U.S.)82.00.

This publication is a collection of the keynote addresses and various other papers presented at the second meeting of world dipterists in Bratislava, Czechoslovakia in 1990. As might be expected, such a collection will have something of interest for everybody, but overall will satisfy none. The topics covered range from control of pest species to phylogenetic significance of genitalic musculature, with the following distribution of subject areas: systematics and morphology - 10 papers; applied studies or pest management - 7 papers; basic ecology - 4 papers; combination of all the above - 1 paper. The aim of this publication is to present the most up-to-date information about Diptera, a goal accomplished by some, but not all, authors.

More than many such multiauthored volumes, this book suffers from inconsistencies in style, English proficiency (English was the official language of the conference), and quality of information. Some papers apparently consist of unmodified text of the author's talks; many are crippled by the lack of figures to illustrate various structural characters or biogeographical scenarios dealt with in the text. Much more editing is needed, as typographical errors abound, references are missing, and so on. To a large extent, these errors are no fault of the authors, who apparently did not receive page proofs after

submitting their manuscripts. At least one truly astonishingly inaccurate statement was introduced (p. 163): cladists (Hennig is given as an example) are said to base their classifications only on adult characters. This is a ludicrous claim, especially when one considers that Hennig wrote a three-volume tome examining phylogenetically important characters of larval Diptera.

Of greatest interest to me were the chapters dealing with higher phylogeny of flies, among which was probably the most important paper in this book: "Homology and phylogenetic implications of male genitalia in Diptera: the ground plan" by D.M. Wood. Unlike some others in this volume, Wood's study contains much original research, and is lavishly illustrated with color-coded, Ralph Idema drawings of male genitalia. It is unfortunate that the format of this book, attempting to provide a sampler of the various topics covered at the Congress, did not allow the complementary papers by Jeff Cumming and Brad Sinclair to be published with Wood's work.

There are other meritorious offerings in this volume, but most serve mainly as topic summaries and guides to the literature. As a consequence, institutional libraries will want to have this book, but I am hard pressed to imagine an individual needing more than a handful of the contained papers.

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Goodman, L.G. and R.C. Fisher (eds.). 1991. *The Behaviour and Physiology of Bees.* C·A·B International, Wallingford, Oxon, U.K. 380 pp. Hardcover £(U.K.)49.50.

This book is published from the proceedings of a colloquium held in July, 1990, organized by the Royal Entomological Society and International Bee Research Association.

The book has 22 chapters which, with the exception of a single chapter on "Constraints on Foraging by Solitary Bees", focus on various aspects of honeybee behaviour and physiology. The book is loosely grouped into four parts: **Part One: The Environment Within the Hive** ("Honeybees: Research and Life in the Wild" - Ruttner; "Hormonal and Genetic Control of Honeybee Division of Labour" - Robinson; "The Colony as a Thermoregulation Superorganism" - Southwick; "Kin Recognition in Honeybees: Experimental Artefact or Biological Reality" - Moritz; "Odour Perception as Related to Kin Recognition" - Brückner and Getz; "Semiochemicals Involved in the Honeybee" - Le Conte et al.), **Part Two: Communication and Foraging** ("The Dance Language of Honeybees - New Findings, New Perspective" - Michelsen et al.; "Thermographic Monitoring of the Thermal Behaviour of Dancing Bees" - Stabentheiner; "Selection of High-quality Nectar Sources by Honeybee Colonies: A Self-organizing System" - Sneyd and Camazine; "How Honeybees Make Choices" - Couvillon and Bitterman; "Constraints on Foraging by Solitary Bees" - Willmer; "Patterns of Body Temperatures of Foraging Honeybees" - Schmaranzer), **Part Three: Vision and Olfaction** ("Allelochemicals Mediating Foraging Behaviour: The Bee-Sunflower Model" - Pham-Delègue et al.; "Locomotion Does More than Bring the Bee to New Places" - Lehrer; "Spatial, Temporal and Directional Properties of Motion-sensitive Visual Neurons in the Honeybee" - Goodman et al.; "Cellular Analysis of Odour Integration in the Honeybee Antennal Lobe" - Fonta et al.; "Neural Plasticity in the Developing Olfactory System

of the Honeybee" - Gascuel and Masson; "Applications of Silicon Engineering to the Electrophysiological Study of Mushroom Bodies in the Honeybee Brain" - Pickard), and **Part Four: Learning Neuromodulation in the Honeybee** ("Autoradiography, Behaviour and Electrophysiology" - Erber et al.; "Failures to Find Evidence of Adaptive Specialization in the Learning of Honeybees" - Bitterman and Couvillon; "The Ecology of Honeybee Learning" -Gould; "Neurobiology of Learning and Memory in Honeybees" - Menzel et al.).

A major weakness of the book is that the wide diversity of topics makes it difficult to find an underlying theme to connect the chapters. The individual chapters, however, are well-written and provide some fascinating insights into current topics on the physiology and ecology of honeybees. This book would be of interest to students and researchers in the fields of chemical ecology, population ecology and behavioural ecology, or physiology of social insects.

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Rosenthal, G.A. and M.R. Berenbaum (eds.). 1991. *Herbivores, Their Interaction with Secondary Plant Metabolites*, second edition. Volume I, The Chemical Participants. Academic Press, New York, U.S.A. 468 pp. Hardcover $(U.S.)99.00.

When the original edition of *Herbivores* was published in 1979, it was enthusiastically greeted, and in short order became a classic in the area of plant-animal interactions. With so much research activity in this discipline in the past decade, an update and expansion of this volume was clearly warranted. However, rather than create a single massive volume based on the 700-page first edition, the editors chose to follow the major division of the original volume (Part I, Ecological and Evolutionary Processes; Part II, The Chemical Participants) and create two complementary volumes for the second edition. However, this time around, "the phytochemical team" has been first to the finish line, and therefore Volume I of the second edition is subtitled "The Chemical Participants".

This new volume contains the same number of chapters (12) as the equivalent section of the original edition, but has been expanded (number of pages) by over 30%. Four chapter authors have returned from the first edition, and overall, nine of the 12 chapters in the new edition cover subject matter similar to the superseded edition. Lost from the first edition are chapters on toxic seed lipids, saponins and protease inhibitors, but new to this edition are chapters on iridoid glycosides, cardenolides and coumarins. Some toxic seed lipids are discussed in David Seigler's chapter on cyanogenic glycosides, and Gershenzon and Croteau provide some discussion of saponins in their chapter on terpenoids. The three new chapters will be especially useful for entomologists, as each of these classes of secondary metabolites has been well-studied with respect to insect-plant chemical interactions and the respective researchers have made important contributions to our overall understanding of the discipline from these studies.

Most of the chapters are rather comprehensive reviews of specific classes of ecologically important phytochemicals, and in addition to the expected treatment of nomenclature and chemical

structure, they include sections on their distributions among and within plants, their biological properties against a range of organisms (including insects in every case), and their ecological significance at the population and ecosystem levels.

How useful will this book be for entomologists? This volume should be an essential source for anyone actively engaged in studies of insect-plant interactions, from those interested in the basic aspects (host plant selection and utilization) to the applied ones (host plant resistance to pests). Approximately 30% (> 110 pages) of this book deals directly with insects, and the effects of plant secondary metabolites on insects are discussed in considerable detail in all but one chapter (Liener's chapter on lectins). Six of the 12 chapters are authored by entomologists.

The final chapter of the book, "Insect Hormones and Antihormones in Plants" by W.S. Bowers, provides a concise review of insect juvenile hormones and their actions, reviews hormone mimics from plants, then indicates how the knowledge of natural juvenoids has been utilized in the development of new, more potent insect growth regulators. Curiously missing from Bowers' chapter is any mention of azadirachtin, an ecdysone antagonist and the active ingredient in neem insecticides recently approved in the United States.

Two other chapters bear special mention. Gershenzon's and Croteau's chapter on terpenoids is a treat owing to its combination of breadth, clarity, and conciseness; in addition, almost every group of terpenoids mentioned includes reference to their effects on herbivorous insects. Readers will find Stephen Malcolm's chapter on "Cardenolide-mediated Interactions between Plants and Herbivores" incredibly rich in both chemistry and biological data. This might be the best single treatment of the chemical ecology of insect-plant interactions of less than 50 pages anywhere.

Overall, this volume serves as a comprehensive review of plant secondary chemistry, but the chemistry is well-placed within the context of plant-herbivore interactions, with the emphasis on insects as the herbivores. In keeping with the original edition, the publication is of extremely high quality, although in this age of computer-generated chemical structures, more consistency in that regard could have been achieved. In spite of the subtitle for this volume, this is a book entomologists will want to see if not own.

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Winston, M.L. 1992. *Killer Bees: The Africanized Honey Bee in the Americas*. Harvard University Press, Cambridge, Massachusetts, U.S.A. and London, England. 162 pp. Hardcover $(U.S.)19.95.

With this short book, Mark Winston has taken an insect about which there is now a large amount of information and condensed it to a short, highly readable account. The text is written from a very personal viewpoint resulting from his own experience with Africanized honey bees (AHB's). This has the effect of taking a fairly dry subject and bringing it to life. This was very enjoyable for me because I was doing research with Winston on many of the same hives of bees for my graduate research. I was

able to relive many of my early experiences with bees (all told factually I might add)!

The book does a good job of presenting the AHB: how the problem originated, the basic biology of AHB's as compared to temperate honey bees, and the processes by which this introduced race has been able to genetically swamp out European bees since their establishment in the Neotropics. In the second section of the book, Winston reviews the experiences of several Latin American countries in dealing with this new type of bee. He then goes on to outline some likely effects of AHB's in North America. The timing of the book is perfect: Africanized bees are now entrenched in southern Texas and have reached San Antonio, the first major city in their colonization of the United States.

This book will be a very useful addition to high school, university, and public libraries as well as beekeepers' reference materials. All will find the text easy to understand and the level of detail sufficient for most of their needs. As would perhaps be expected of a book so short, however, researchers will find the book much less useful. Many studies have not been described, and for those that are, only the major conclusions are generally presented. The lack of references or footnotes in the text irritated me because I could not ascertain the sources of information. (This was presumably done for the benefit of the general readership because it does make the text easier to read.)

This book creates the misimpression that a handful of researchers have obtained the majority of data on the AHB. The members of our "Killer Bee Team" from the University of Kansas are all prominently portrayed, whereas few other U.S. or Brazilian researchers are ever mentioned. I know several prominent researchers who will be incensed when they see how few of the results of their extensive research have been incorporated into the text. Fortunately, there is a brief section entitled "Selected Sources and Readings", which appropriately mentions the work of these many scientists and directs the reader to additional, more detailed information. This does not fully compensate for the omission of this information.

My greatest criticism is Winston's tendency to oversimplify complex situations. There is a great deal of controversy concerning the AHB and its anticipated impact on North American agriculture. Consequently, many topics should be presented in probabilities rather than definitive statements. I believe that more detailed presentations of some of these situations would have justified the slight increase in length of the text. For example, it is stated that African bees in their pure form have low worth for beekeeping. While this may be true for commercial beekeeping, it is far from true from a developmental standpoint. Small crops of honey are now readily available to large numbers of low income families throughout Latin America, and this has revitalized Brazilian beekeeping. Similarly, the process of Africanization is presented as a series of facts, where in reality our understanding of the process remains very unclear with substantial controversy. While I personally agree with Winston's conclusions, I would prefer that the reader be given a clearer impression of the bases for them.

Mark Winston's book on "killer bees" fills a niche and will provide very valuable information to a large, relatively non-technical audience. If you have an interest in bees and want an interesting account of a truly remarkable insect, you will find this book well worth its price.

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Smith, D.R. (ed.). 1991. *Diversity in the Genus Apis*. Westview Press, Boulder, Colorado, U.S.A. xiv + 265 pp. Hardcover $(U.S.)58.00.

The European honey bee, *Apis mellifera*, is the best studied insect species. However, the Asian species of *Apis* are comparatively little known, and the phylogenetic position of *Apis* among the bees is uncertain. This book summarizes current studies on the systematics, biogeography, and comparative behavior and ecology of all honey bees. Its stimulus was a 1989 symposium of the Entomological Society of America, expanded into 11 chapters by 14 contributors. The chapters fall into three categories: systematic studies of the Apidae, systematic and biogeographic studies of *Apis*, and comparative behavioral and ecological studies of Asian honey bees.

The family Apidae includes the honey bees, the stingless bees, bumble bees, and orchid bees. Prentice presents an excellent morphological analysis that confirms the close relationship of the honey bees and stingless bees, and places the orchid bees as the basal lineage of the family. In a fine example of the use of molecular data (mitochondrial DNA) for phylogenetic analysis, Cameron produces a conflicting phylogeny, with the stingless bees being most closely related to the bumble bees. This relationship is confirmed by Sheppard and McPheron, using ribosomal RNA. If their hypothesis is correct, advanced social behavior evolved independently in the honey bees and stingless bees.

Since the classic studies of Lindauer, four species (*mellifera*, *cerana*, *dorsata*, and *florea*) in the genus *Apis* have gained worldwide acceptance. Two additional Asian species are recognized in this book, *A. koschevnikovi* (allied with *A. cerana*), and *A. andreniformis* (allied with *A. florea*). The situation with *A. dorsata* is considered uncertain, with two island populations (*binghami* and *breviluga*) and a Himalayan population (*laboriosa*) deserving either subspecific or specific recognition. Otis reviews recent studies of the systematics of *Apis*, and Alexander's phylogenetic analysis (based on morphology) clearly establishes *florea* as the most primitive species, with *cerana* and *mellifera* forming the terminal group in the genus. Three chapters present molecular analyses of populations of *Apis*. Smith's studies based on mitochondrial DNA document three biogeographic lineages of *A. mellifera*, from eastern Mediterranean, western Europe, and Africa. Her studies also indicate that *A. binghami* is discrete from *A. dorsata*, in contrast to the allozymal studies of Gan *et al.* that show no difference in alleles.

The mating systems of the various species of *Apis* are compared by Koeniger. Dyer summarizes comparative studies of three sympatric species of *Apis* in Thailand concerning dance communication, colony design, and worker activity. He places these studies in an evolutionary framework, stressing the significance of nesting in cavities (with high worker "tempo") versus making exposed combs that must be covered by worker bodies.

This book should be read by a wide audience of evolutionary biologists, not just honey bee aficionados. The various molecular and phylogenetic approaches are clearly spelled out. The complementary and sometimes contradictory conclusions reached on the same taxa through different methods address important problems in modern systematic biology. Ecologists and behaviorists will see the benefits of applying phylogenetic analysis.

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Mitchell, P. and E. Prepas (eds.). 1990. *Atlas of Alberta Lakes*. University of Alberta Press, Edmonton, Alberta. 675pp. Hard cover, Can $75.00. Soft cover, Can $60.00.

Webster's New World Dictionary defines an atlas as a book of maps, tables, charts, or illustrations on a specific topic. This book is much more than your standard atlas, providing detailed descriptions of 100 lakes in the province of Alberta.

The atlas is divided into two parts. Part One is an introduction to lakes, with general information provided on drainage and lake basins, water quality, and the plant and animal life present within lakes. Examples from Alberta lakes are given for each of these features. Figure 1 and Table 1 list the 100 lakes and provide a quick summary of each lake. The authors present a very good introduction to Alberta lakes and how they fit within the geology and climate of the province.

Part Two contains the individual descriptions of each lake. Lakes were selected based on their recreational importance and availability of recent data. They are organized by the 13 drainage basins present within the province, and range from the province's largest lakes (Lake Athabasca and Lesser Slave Lake) to some of its smallest, and from freshwater to saline, alpine to prairie, and man-made reservoirs as well. A consistent format is provided for each description. Each introduction provides information on accessibility, including directions from the nearest major urban centre, and a short history of human activities around the lake. A map of the drainage basin is provided along with an extensive description of drainage basin characteristics. Bathymetry and shore line features also are illustrated in a map of the lake. Water quality information (i.e., nutrient status, water chemistry), as well as temperature and oxygen profiles are provided when the information is available. Biological characteristics mentioned include plants, invertebrates, fish and wildlife. A reference list is also provided for each lake.

The authors provide a clear and consistent account for each lake and have made excellent use of color graphics. They have consolidated information from many different sources to provide the most complete description of Alberta lakes to date. This book will be valued by those interested in Alberta geography and hydrology. For those interested in outdoor activities this atlas provides information on recreational facilities at each lake, as well as sport fishing opportunities. Information on the invertebrate populations within these lakes is very limited, an indication of the lack of sampling that has been done in Alberta lakes. I would recommend this book to anyone interested in Alberta and its lakes.

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Kuschel, G. 1990. *Beetles in a suburban environment: a New Zealand case study*. DSIR Plant Protection Report No. 3, New Zealand Department of Scientific and Industrial Research, Aukland. 118 pp., $(US)29.95.

The publisher's advertisement for this book begins with a statement that 'the importance of local biotic surveys cannot be overemphasised at a time when management decisions affecting the future of natural environments are being made at an all too rapid rate'. I believe that sound biological surveys are essential for responsible management of natural systems. If you believe that such surveys are simply species lists with cursory information about habitats and collection history, you may like Kushel's book. If you want more

from such surveys, you will be disappointed.

The book was enigmatic for me, at once thoroughly competent and frightfully trivial. Kuschel presents an exhaustive survey of the coleopterous fauna of Lynfield, N.Z., a suburb of Aukland, where urbanization is restricted because of local topography. The survey was carried out over a 15-year period and turned up 982 species, nearly 75% of them endemic. General information about the habitats available is provided and the habitats used by each species are tabulated. Exceptionally fine illustrations are provided for the common species, and some of the weevils are especially pleasing to look at. One general conclusion rings clear: the native fauna is almost completely dependent on the presence of 'native bush' habitats. Therefore, the astounding diversity that Kuschel documents reflects the persistance of these habitats in and around Lynfield, probably because the topographical relief has been daunting to developers. Simply put, unrestricted urbanization will eliminate interesting insect faunas, a relationship well understood before Kushel's survey. Although the survey is complete, the analysis is superficial, and by Kuschel's own admission 'does not seek to draw any comprehensive ecological conclusions or speculations, even though there is a basis for this implicit in the findings'.

The level of taxonomic detail developed varies without apparent pattern. For example, although the book is not meant to be used as a guide for identification, taxonomists may be distressed to find that Kuschel has described several species under 'Taxonomic Notes' at the end of this monograph. This approach will not make this specialized information especially accessible.

Even more perplexing is the problem of defining the audience. This book is not destined to be an international 'best seller'. Who should have it? The answer is purchase it if you live in the Aukland area and have a keen interest in beetles, or if you are a library charged to keep everything in print (I hope that there still are a few!). A dentist whose clients are exclusively Coleopterists or avid biological surveyors should have it for his waiting room. If you are a Coleopterist lucky enough to have such a dentist, peruse the book the next time you are waiting for the chair. It's less painful than a root canal.

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Emmet, A. Maitland. 1991. *The Scientific Names of the British Lepidoptera - their History and Meaning*. Harley Books, Colchester. 288 pp. Soft cover. £24.95, ISBN 0 946589 36 6.

Zoological Nomenclature is the common language of scientists. It ensures, as the International Code emphasizes, that the names are universal and restrictive.

At first, the treatment of the history and meaning of scientific names sounds like a boring subject. However, Colonel A. Maitland Emmet, who is well-known for his handbooks on British Microlepidoptera, has made it a highly inspiring and fruitful subject. As Professor Sir Richard Southwood states in his foreword, the book was written "with infinite care and a remarkable blend of entomological and classical scholarship". Colonel Emmet graduated in classic languages at Oxford and later taught Latin and Greek for many years, thus providing the necessary background for the present work.

Colonel Emmet's book is divided into four main sections: introduction, history of the scientific names of Lepidoptera, systematic section and appendices. The etymologies of the names are mostly arranged according to the Log Book numbers of Bradley & Fletcher (1986, *An indexed list of British butterflies and moths*) which are also, in a practical way, used in all cross references. When needed, the inflection of the Greek and Latin root word is given, and the Greek words are shown both in Greek and Roman letters. The book is a careful work: there are very few printing errors, which is a miracle in this kind of book.

Unfortunately Colonel Emmet followed Kloet & Hincks's (1972) *A check list of British insects: Lepidoptera* where adjective specific names do not (necessarily) agree in gender with the generic name. This is against the International Code. Agreement between the names is a basic feature of the Linnaean binary system. To interpret the generic names as genderless or the adjective specific names as nouns is entirely artificial. That most taxonomists have "small Latin and less Greek" does not justify the destruction of the beauty and logic of the Linnaean method.

The historical section is written in an attractive way. I found the parts dealing with the history of the generic names particularly interesting. Surprisingly, Colonel Emmet does not mention Anton Spannert's good book of 1888 (*Die wissenschaftliche Benennungen der Europäischen Grosschmetterlinge*. Berlin). However, Spannert's explanations acted as a source for Spuler (1903-1910), often referred to by Colonel Emmet.

The systematic section offers a great variety of readings from simple linguistic explanations through complicated detective stories, charming mythological accounts, to most pleasing essays (e.g. 1529 *Hesperia*). Entomologists whose names have been used for Latin names are well presented, and sometimes the scientists who gave the names are also discussed. Thus, I did not know that P.P. Pallas (1741-1811) was the first to record parthenogenesis (see 186 *casta*).

Often the explanations approach art rather than science. The results are not, of course, always correct. Thus 14 *Exoporia* is not derived from a projection of the wing but from the exoporian genital opening of the female (the root word is "opening", not "building-stone"). Colonel Emmet corrects no less than 360 explanations proposed by MacLeod (1959), some of them anachronisms. He seems to fall in the same trap in 2150 *nebulosa*: he attributes the name to occurrence of melanism, a phenomenon highly unlikely in 1766 when Hufnagel named the species.

In Appendix 3 Colonel Emmet lists 36 unresolved names. Of these, 2180 *crini* is derived from *Crinum* (Amaryllidaceae), *Pima* from the Indian tribe or the corresponding locality names in Arizona, 222 *yildizae* from a geographical name in Turkey. The sesiid 373 *salmachus* probably has the same mythological root as 1573 *salmacis*, and the noctuid genus *Spaelotis* supposedly comes from the behaviour of the aestivating moths to creep into hollows, buildings etc. 2465 *Tyta* might be a femininized form of Gr. *tyto* = owl (J.H. Marshall, *Antenna* **15**:154, 1991, presents the same view) because of the two white wing-patches that, in the resting posture, look like eyes.

The few failures form a minimal part of Colonel Emmet's book and, in fact, points of discussion and improvement belong to the nature of such a book. In North America, of course, it is a drawback that only the British species are included. However, knowledge of the species is by no way essential when leafing through this book.

Colonel Emmet's book is a giant work, written with humanistic and entomological sophistication. It is an inexhaustible source of reading. Simply, it is a treasure! I hope that many lepidopterists and other naturalists enjoy it and obtain from it a new perspective to the scientific nomenclature.

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Spencer, K. A. 1992. *Flycatcher. Memoirs of an Amateur Entomologist.* SPB Academic Publishing bv, The Hague, Netherlands. xvi + 414 pages with 27 illustrations. Clothbound ISBN 90 5103 072X. U.S. $105.00, Dutch guilders 190.00.

This is the most extensive set of personal memoirs published by a dipterist since Osten Sacken's (1903-1904) celebrated "Record of my Life-Work in Entomology". Ken Spencer, now 76 years old, has produced a steady stream of books and articles on the Agromyzidae and Chloropidae over the past 40 years. Now he has decided to retire from entomological work and to preserve the record of his outstanding entomological career for posterity in this book of memoirs.

The subtitle of this work ("Memoirs of an Amateur Entomologist") deserves comment, as it may be misunderstood. Ken Spencer first began working on Diptera as an amateur, while pursuing a sales career in the printing industry. But since about the time he was awarded his D. Sc. by London University in April 1970, he became a professional in the truest sense of the word devoting himself full-time to the study of Diptera and derived income from consultancy in this field. In his discussion of "amateurs and professionals" (chapter 12), he restricts the term professional to persons holding salaried positions at museums and other institutions, counting himself as a consultant among the "amateurs". I find this distinction perplexing, since in many fields it is normal for persons with the highest professional reputation to work independently. If I understand him correctly, Spencer claims amateur status because his primary motivation has always been enthusiasm for his work not income maximization. In this sense some professionals are also amateurs, so these terms should not be understood as mutually exclusive.

Ken Spencer's entomological career has been outstanding both for his high productivity (132 scientific papers and books) and for the worldwide extent of his collecting. The greater part of the present book (pages 57 - 332) is devoted to an account of his collecting visits throughout the world. The circumstances of his discovering many new species are explained in more detail than in his taxonomic publications. There is much biographical material on persons he met during the course of these visits, together with comment of a social and political nature. Particularly interesting is his insider account of the controversy within the United States administration over the need for quarantine measures against Colombian flower exports found to contain leaf mines. On this issue he acted as consultant for the Colombian exporters' association Asocoflores.

Like his predecessor Osten Sacken, Ken Spencer includes in his memoirs a good deal of commentary on other entomologists and their work. However, his comments contain much less venom than those of his predecessor. He tries to speak well of everybody's work and personality, only occasionally including some criticism in his comments. For instance, Michael von Tschirnhaus is criticized for failing to complete papers on account of "perfectionism", and the late Gilbert Nixon is

criticized for displaying "professional jealousy". In a few cases Spencer even protects the identity of the person criticized. Who, for instance, was the senior dipterist who opposed his working on the USDA Manual on nationalistic grounds? This may be carrying tactfulness too far, since readers may speculate wrongly about the identity of the offender.

Early chapters in this book deal with Ken Spencer's experiences as a student during the 'thirties and his service in military intelligence and diplomacy during the Second World War and immediate postwar years. At this time his entomological interests were restricted to butterfly collecting. His conversion to dipterology came as a result of his working with Erich Martin Hering on the translation of the latter's book entitled "Biology of the Leaf Miners" (1951). Hering merits a special chapter (no. 3) in the present book on account of his profound influence on Spencer's entomological career.

This work should find a place in all dipterological libraries, both for its information content regarding the development of dipterology over the last four decades and because, as is emphasized in the introduction, latter-day biologists often show interest in the lives of their predecessors as distinct from their works. I like the pen portraits of the personalities of entomologists and the accounts of the strange incidents which highlight many a collecting trip. Ken Spencer is to be congratulated for this fascinating work. Will it really be his last entomological work? This is difficult to believe, in view of his past record of almost obsessive research and publication.

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Applications are invited for a 3 year position available immediately at the Forest Pest Management Institute in Sault Ste. Marie, Ontario. Research involves the use of immunochemical techniques to study functional domains of *Bacillus thuringiensis* endotoxins, toxin mode of action, and toxin-receptor interactions in forest insects.

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Send CV and references to:

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Fax. (705) 759-5700.

SCHOLARSHIPS AND GRANTS

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

Preamble

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

Eligibility

To be eligible, a student must:

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

Format of the Application Form

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

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

Evaluation Procedure

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

Timetable and Application Procedure

Application forms, which may be obtained from the Secretary of the Society, must be completed and returned to the Secretary of the Society by **15 January 1993**. The committee will evaluate all applications by 30 April 1993 and determine if, and to whom, grants will be awarded. The successful applicants will be informed immediately, thereby providing sufficient time for students wishing to start in the fall to make necessary arrangements. Grants must be used in the 12 months following the award.

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

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

Appels pour Allocations

Préambule

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

Éligibilité

Afin d'être éligible, l'étudiant doit:

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

Format du Formulaire de Demande

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

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

Évaluation

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

Échéances et Procédures

Les formulaires de demande, qui peuvent être obtenus du Secrétaire de la Société, doivent être remplis et retournés pour **le 15 janvier 1993** au Secrétaire de la Société. Le comité évaluera toutes les demandes pour le 30 avril 1993 et déterminera si, et à qui, les bourses seront décernées. Les candidats choisis seront contactés immédiatement, cela afin d'allouer suffisamment de temps pour les préparatifs nécessaires à un départ possible à l'automne. La bourse doit être utilisée dans les 12 mois suivant l'octroi.

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

PESTCON GRADUATE SCHOLARSHIP

(Established 1987)

Support of Postgraduate Work in Pesticide Research

The Pestcon Graduate Scholarship has been established from the surplus funds generated by the VIth International Congress of Pesticide Chemistry held in Ottawa, Canada in August 1986.

The Scholarship is open to Canadian students (including landed immigrants) for graduate study in any area of pesticide research including alternative pest control strategies.

The Scholarship is tenable for a period of twelve months and has a value of approximately $3,000. One Scholarship is awarded each year and may be held simultaneously with other scholarships, fellowships or awards.

Applications must be submitted in writing before **March 1** of each year, along with a curriculum vitae and brief description (500 words or less) of the research project undertaken and the progress to date. Applications must also be accompanied by an official transcript of the academic record of the candidate.

Applicants must also include the name and address of their supervisor and one other person whom they have asked to provide a confidential assessment of their ability to conduct research.

The name of the Scholarship holder will be announced prior to June 1, unless the Selection Committee feels that no suitable candidate exists.

Payment of the Scholarship will be made in two instalments, October 1 and January 1, on notification from the supervisor that the student is making satisfactory progress.

The Scholarship is administered by The Chemical Institute of Canada. All applications should be submitted to:

Program Manager, Student Affairs, The Chemical Institute of Canada, Suite 550, 130 Slater Street, Ottawa, Ontario, K1P 6E2

NOTICE from the Department of National Defence

The Department of National Defence (DND) is accepting review proposals for research projects relevant to biocontrol and other environmentally responsible methods for the management of pests relevant to DND operations.

Pest management of primary concern to DND includes biting arthropods in the Canadian environment (including personal protective or repellent systems), stored product and structural pests, and vegetation management in training areas. As well, forest and landscape pests may be considered.

The receipt of application does not constitute an agreement for funding. Proposals and requests for information can be forwarded to:

Mr. Robert Cretain, Natural Resources Management, Director General Environment, National Defence Headquarters, 101 Colonel By Drive, Ottawa, Ontario, K1A 0K2

AVIS de la Ministère de la Défense Nationale (MDN)

La ministère de la Défense Nationale (MDN) accepte présentement pour fin d'examen des propositions de projets de recherche reliés à la lutte biologique et à d'autres méthodes de lutte contre les déprédateurs qui tiennent compte de la qualité de l'environnement, dans le cadre de ses opérations.

Les organismes nuisibles d'intérêt pour le MDN comprennent les insectes piqueurs (systèmes de protection personelle ou de répulsifs seront aussi considérés), les parasites des produits comestibles et de batiments, et la vegetation indésirable sur le térrain d'entraînement. Aussi, les programmes de lutte contre les déprédateurs en fôret et en térrain paysager peuvent être considéré.

Le fait de recevoir pour fin d'examen des propositions ne constitue pas une garantie de financement. Faire parvenir toute proposition ou demande de renseignements à l'adresse suivante:

M. Robert Cretain, Gestion des ressources naturelles, Direction général-environnement, Quartier général de la Défense nationale, 101, Promenade Colonel By, Ottawa, Ontario, K1A 0K2

UPCOMING MEETINGS / RÉUNIONS À VENIR

119e Réunion annuelle de la Société d'entomologie du Québec

15 et 16 octobre 1992
à l'Université du Québec à Chicoutimi

Cette année, le thème du colloque est *L'entomologie et l'informatique au service de la faunistique*. Les trois premiers conférenciers expliqueront le contenu de bases de données informatisées élaborées en Belgique, en France et au Québec. Destinés à plusiers types d'intervenants, ces outils performants rassemblent des données de diverses natures (écologiques, géographiques, etc.) qui permettent une meilleure connaissance de la faune et de la flore d'une région ou d'un pays. Les deux autres conférenciers expliqueront des contextes plus spécialisés d'utilisation de l'ordinateur en biologie. Le dépliant ci-joint précise la nature exacte de ces interventions.

Cette réunion annuelle de la SEQ sera également l'occasion de faire une première démonstration du prototype de la Base de données sur les insectes du Québec (BADIQ). Cette base de donées est développée au Centre de données faunistiques sur les invertébrés du Québec situé à l'UQAC.

Des stands de diverses compagnies (matériel informatique, appareils permettant l'analyse d'images, maison d'édition publiant des livres sur les sciences naturelles, etc.) seront sur les lieux pour présenter leur matériel aux participants. S'ajouteront quelques expositions à saveur entomologique.

Pour tout reseignement supplémentaire, communiquer avec le Professeur André Francoeur, Département des sciences fondamentales, Université du Québec à Chicoutimi, 555, boulevard de l'Université, Chicoutimi, Québec G7H 2B1.

The Third Annual H.R. MacCarthy Pest Management Lecture

October 23, 1992, 3:30-5:00 pm (PST).
Halpern Centre, Simon Fraser University, Burnaby, B.C.

Dr. Stan Finch, Research Entomologist, AFRC Horticultural Research Institute, Wellesbourne, Warwick, England, will present a lecture entitled: "Integrated Pest Management in Field Vegetable Crops - The Challenge Facing Research Scientists". The lecture will follow the Annual meeting of the Entomological Society of B.C., 8:00 am - 3:00 pm at the Halpern Centre, Simon Fraser University, Burnaby, B.C. A reception will follow the lecture.

CONTACT: Dr. Robert S. Vernon, Tel. (604) 224-4355 or Fax (604) 666-4994.

Annual Meeting of the Entomological Collections Network

December 5-6, 1992
USDA Beltsville Agricultural Research Station, Beltsville, Maryland

The meeting is hosted by the USDA-ARS Systematic Entomology Lab and Maryland Center for Systematic Entomology in cooperation with the Entomological Society of America. Planned sessions include: Materials conservation in entomological collections; Biodiversity sampling methods; Data security and ownership; Demonstrations of collections- & systematics-related software.

CONTACT: Margaret K. Thayer, Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, Chicago IL 60605-2496 (Tel. (312) 922-9410, ext. 404; Fax. (312) 922-2572 or (312) 427-7269; Internet: thayer@fmnh785.fmnh.org) OR Richard L. Brown, Department of Entomology, Drawer EM, Mississippi State University, Mississippi State MS 39762 (Tel. (601) 325-2085; Fax. (601) 325-8837)

First North-South International Meeting of Information Access - ONLINE '93

March 15-19, 1993
Palacio Nacional de las Ferias (World Fair Palace), Mexico City

The National Autonomous University of Mexico through its Science and Humanities Information Center (UNAM-CICH) and Learned Information, Ltd. announce ONLINE '93. This Conference and Exhibition is made possible by the growing interest in information seeking and use ... and the easier access to, and availability of, information brought about by computer networks and CD-Roms.

CONTACT: Rosa Martha Pérez Sandi López, Executive Secretary, Mexican ONLINE '93 Committee, Circuito Exterior, Area de la Inv. Cientifica, Apartado Postal 70-392, Cd. Universitaria, Mexico, D.F. 04510, Mexico. Bitnet address: CICH@UNAMVM1. Tel. (011 525) 622-39-51; Fax. (011 525) 548-08-48.

45th International Symposium on Crop Protection

May 4th 1993
Faculty of Agricultural Sciences, University of Ghent, Belgium

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

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

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

May 30 to June 3, 1993
University of Alberta, Edmonton, Alberta

The major theme of the conference is "Freshwater, Marine and Wetland Interfaces: Dynamics and Management". Call for papers will be sent to members in late September 1992. The deadline for abstracts is December 31, 1992.

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

MISCELLANEOUS

Brochures Now Available

The updated brochures "Entomology in Canada" and "L'Entomologie au Canada" are now available. This is a combined and updated version of what was originally two brochures on career opportunities and the ESC. The brochure was updated by the Public Education Committee at a cost of $2161.22 for 3000 English and 1000 French brochures. We are grateful for the assistance of Françoise Harper for translation, Karen Jamieson for proof-reading, and David Hull and the Entomological Society of Ontario for loan of pre-1900 illustrations. Special thanks goes to Victoria Mervyn for her excellent design and layout.

Copies of the brochures are available at the ESC office in Ottawa (Bob Foottit) or from either Vince Nealis or Jean Turgeon, Forestry Canada, P.O. Box 490, Sault Ste-Marie, Ontario, P6A 5M7.

Vince Nealis
Public Education Committee

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

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

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

Fax:

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

MEMBERSHIP DUES (includes *The Canadian Entomologist* and *Bulletin*)
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Total ..... $____

If you need an official receipt please check:
Si vous désirez un reçu officiel, indiquez, s'il vous plaît:

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

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

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