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EDITORIAL

Nearly ten years ago, the Canadian scientific community was stunned by the Federal Government decision to lay off a fairly large number of scientists and technicians in the Forestry Service. Those who survived the hatchet of the minister then responsible for eliminating "dead wood" (to use the minister's own words) thought they would never have to re-live such an experience.

Apparently Canada has made it a specialty to make history repeat itself. The recent decisions concerning the Petawawa Research Station and the two research institutes (in Ottawa and Vancouver) is yet another example of the policy of our national government concerning forestry in particular and natural resources and science in general. Not only is history repeating itself, but those politicians responsible for it are not getting more intelligent.

A document which is currently circulating between labs and which seems to have originated somewhere in Ottawa says it all. "When all is said and done, it is obvious that one function stands out among all the others as being ill-at-ease, out-of-place, and generally difficult to reconcile. It will be clear to the reader that the research scientist level is the one in question. If it could be excised in some dignified and elegant way, the other elements of the Canadian Forestry Service and the Department of the environment could be truly free to fulfill their destinies."

Canada has often been described as an unmanageable confederation. So, our most enlightened decision makers seem to have made it a profession to give the country as many managers as possible. Faculties of administration in universities are, of course, caught in the process and are calling for more funds to be transferred from the faculties of arts and sciences to help train the administrators the nation apparently needs.

How much more and how much longer of this inanity? Soon we will be experiencing a quasi-exodus of scientists because so many of them are quickly reaching retirement age. Twenty-nine (29) entomologists and 17 plant pathologists would have reached the age of 65 in the 1973-83 interval at Agriculture Canada. To this one can add that (1) the same department lost about 60 men-years in Entomology in 1966-76 and (2) the Canadian Forestry Service saw its number of forest entomologists fall from a high of 106 in the mid-sixties to a current 1978 staffing of less than 90.

The federal government has decided to cut in the less "visible" sectors of activity, the sectors very little in the public eye. Industry and the university sector are supposed to fill the vacuum. The trouble is that industry is primarily controlled from outside of the country and that universities fall under provincial governments. There will be a lot for line managers, policy makers, policy analysts, program planners, program evaluators, coordinators, scientific and economic advisors, personnel managers and the other branches of administration to worry about in the immediate future. Meanwhile scientific research . . .

The Entomological Society of Canada has a responsibility to the profession. It is not anti-Canadian Forestry Service or anti-Agriculture Canada. But it will put up an honest fight to see that the renewable natural resources of this country are properly looked after.

TRANSFER OF NORTH AMERICAN CROP PROTECTION TECHNOLOGY TO THE THIRD WORLD^{1/}

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Over the past ten years there has been a general recognition in Canada and the United States of the great need to develop crop production systems which are less vulnerable to pest attack than our systems with a 1955 or 1960 vintage. For a number of important agricultural crops, considerable progress has been made in this direction in our two countries through the initiation of what have come to be called integrated pest management systems. These comparatively new pest-management strategies incorporate a variable number of components, including utilization of natural enemies, selective use of pesticides, pest monitoring and prediction procedures, and the use of resistant or tolerant crop varieties and cultural controls. The latter includes such things as stalk destruction after harvest, restricted planting time, and host-free periods. A number of relatively new alternative technologies, or some not so new but receiving renewed interest, show promise of providing additional assistance in the management of pests in the future. These include the sterile insect release method, chemosterilants, confusion by use of pheromones, use of lures of various kinds in combination with traps or toxicants, use of insect growth regulators, repellents, light traps, anti-feedant compounds, and genetic manipulations. This group of technologies and other potential ones of the future can not be viewed as substitutes for current pest control procedures, but rather they are the additional components which will be fitted into integrated pest management systems at some future time.

In most situations, it will not be practical to transfer these newly developed North American integrated pest-management systems, which have been designed with a high level of technology input within a temperate environment, directly *in toto* into the agricultural production systems of the developing countries. However, the individual components of the systems or certain groups of them often offer great potential for such transfer and can provide for increased food production through reduction in losses from pests. The potential for significant food increases in this way and without finding new agricultural land is indeed very great. The Crop Productivity Study Team of the recently published U.S. National Academy of Science World Food and Nutrition Study (1), while assuming only a 20 percent reduction in current losses from pests attacking major food crops, estimated that more than 476 million additional people could be fed per year by this saving.

Each of the candidate pest-management technical components to be considered for possible transfer to a developing country will need to be evaluated individually in terms of their potential for use under the many different and complex situations that will be encountered. It cannot be overstressed that the pest management system to be utilized, whatever the degree of its complexity, must be viewed as a part of the entire crop production process. The new components of the pest management system, or variations of old ones, must be compatible with whatever production practices prevail in the area where they are to be used. As production practices and environmental conditions vary widely from country to country and even within countries, this makes the transfer of crop protection technology most complicated.

In spite of the hopes of idealists and dreamers, the future of plant protection both in the developed and developing world will depend upon the continuation of existing pest control tactics and technology. This very definitely includes the use of those powerful tools — the pesticides. However, as has been stressed by so many elsewhere, these new management systems cannot depend on a single tactic but must take several of the available tactics and combine them into a multi-faceted ecologically-oriented integrated pest management system. This approach, known in the United States today as "integrated pest management," is widely accepted internationally. However, outside of the United States, the term "integrated pest control" is used in nearly all countries for this holistic approach to pest control instead of "integrated pest management". It is probably desirable that this dichotomy remain, so that people will not be confused at a time of widespread acceptance of the basic philosophy. Personally, I use the two terms synonymously.

^{1/} Keynote address in symposium on "International Endeavours in Entomology, The Canadian Contribution", Annual Meeting, Entomological Society of Canada, August 21, 1978, Ottawa, Canada.

Actually, considerable progress has been made in transferring the basic philosophy of integrated pest control to the developing world. For more than twenty years there has been an increasing international awareness of the importance of a holistic multidisciplinary approach to the problems of pest control. This has been fostered by FAO, WHO and certain bilateral assistance programs (especially those of Canada, France, the United Kingdom and the United States). More recently OECD, UNEP, the World Bank and the International Agricultural Research and Training Network of the CGIAR have become involved. However, the problem of actually implementing pest management systems in the developing world is not simply a matter of transfer of the basic concept or philosophy. Considerable adaptive research on the potential component tactics of pest management and the development of entirely new systems adapted to local socio-economic and ecological conditions will be required. To emphasize again, in most situations in the developing world, the solution to a pest control problem will not come from the simple transfer of a perfected technology from our socio-economic milieu to that of the developing world. Rather the solution will come about by the impact of transferred integrated pest control *philosophy* on the local situation which results in change in attitudes and perhaps the renovation of an old local practice in a new context. The end product is a pest control procedure which is well adapted ecologically to the local agro-ecosystem and is socially and economically acceptable as well.

Even where a reasonable and sound pest control program has been designed for a developing country, it may still be extremely difficult to obtain wide-scale implementation of this program no matter how well conceived. This emphasizes the importance of having a strong extension program coupled with adaptive innovative research. The two, research and extension, must be developed together.

Current Level of Pest Control Technology in the Developing World

A very uneven pattern of utilization of pest control technology exists in the developing world with huge differences between countries in the same geographic region and great differences among crop production systems within the same country. Furthermore, the magnitude and characteristics of pest problems tend to be very location-specific. The ecological environment, social customs, political events, and the economic milieu can all interact to set the magnitude of a particular pest problem and further to constrain feasible solutions (2). Every situation must therefore be evaluated and developed on a case-by-case basis.

In a similar way, the level of dependence on pesticides varies from country to country. In general, the more developed the country, the greater the level of pesticide used; but there are often large differences between crops in the same country. A few years ago, surveys by FAO indicated that the entire developing world used only about 7 percent of the global consumption of pesticides. Lack of financial resources to purchase pesticides is not the only reason for the low use of pesticides in the developing world. The present marketing system stresses certain crops and certain countries and, thus, produces an uneven supply situation. In times of crisis resulting from a pest outbreak, the pesticides often are not available or are in the wrong place or arrive in the right place too late. Furthermore, the inadequate transportation network in many countries does not provide a way for the pesticides to move from the capital city to the rural areas where they are needed. Finally very few developing countries have adequate equipment for the application of pesticides and even fewer have a pest monitoring system for detection of pest infestations at still manageable levels.

The situation in The Philippines is perhaps typical of pesticide usage in many developing countries of the tropics. In that country, 25% of the pineapple acreage is treated with pesticides, 10% of the bananas, 50% of the sugarcane, 20% of the tobacco, 10% of the mangoes, 35% of the rice, and 10% of the vegetables (mainly on beans, cabbage and potatoes). In the Third World, the large estate crops such as rubber, cotton, sugarcane, tend to get a heavier use of pesticides than do the plots of small farmers. In many cotton-producing countries in the developing world, two-thirds or more of the pesticide use is on this single crop. In some developing countries, use of insecticides to protect stored products is also of considerable importance. Overall, there is a slight trend for increased use of pesticides in these countries but the percentage of the world's total use is not increasing.

Insecticides remain the dominant class of pesticides used in the Third World. This is in contrast to the developed world where herbicides now represent the major category of pesticide use. The use of insecticides in developing countries is still increasing at a rate that would appear to maintain their dominant position for some time to come. In some developing countries, chlorinated hydrocarbon insecticides, e.g., DDT, BHC, adrin and endrin,

continue to be used on agricultural crops because of their effectiveness, low cost, safety and ease of manufacture. In the tropical and semi-tropical countries, persistence of these chemicals is not nearly the problem that it is in the temperate regions. In most developing countries, the local ecological and economic situation dictates that the pest management strategy be based on resistant crop varieties, cultural controls, and manipulation of natural enemies, with little or no high level capital inputs to the system such as use of pesticides.

The IMP Dilemma in Developing Countries

Integrated pest management systems do not just happen. They come about through the careful ecological analysis of pest problems as they exist in the growing crops. Programs of research for the development of integrated pest management systems must relate to the entire pest problem and the full complexity of the field situation. No amount of sophisticated laboratory research will produce an integrated pest management system unless the research is intimately related to real field problems and has an effective and continuing feedback from the field. It is important to realize that research on field problems can be extremely complicated as it must deal with establishing the complex relationships that exist in the agroecosystem, such as those between the pest and the crop; among pests and non-crop plants; pest and natural enemies of the pest; the pest, its natural enemies and plant diversity; and all of these considered together with other crops and the climate, and the economic and political aspects. It often appears overwhelmingly complex. Herein lies the dilemma facing the isolated crop-protection specialist in a developing country.

How can that individual in an isolated research station in a remote area of a developing country attempt to tackle these complex pest problems with his limited equipment, laboratory facilities, library, vehicles, and other resources? Furthermore, there is often a lack of extension personnel or other paraprofessionals to train and encourage farmers to adopt new practices. In many cases, the crop protection man serves in both an extension and research capacity. He may also find that the farmers are often incapable or unwilling to adopt a new practice because they lack the financial resources or proper motivation. He may in fact have difficulties in communicating with the farmer because of language barriers or illiteracy, or even in reaching the farmer because of lack of roads or transport.

It is not surprising that the isolated and frustrated pest control specialist with this overwhelming responsibility often opts for an easy short term solution. His "easy" short-term solution may be the recommendation for the use of some pesticide; a recommendation made with little or no opportunity for consideration of the complications of undesirable side-effects on people, important natural enemies or the general environment, and without consideration of long-term effects of the pesticide use. Or this pest control specialist may not recommend a pesticide, but instead he evades the difficult pest control problem completely and moves on to another less difficult and less risky problem. There is little reward in his local system for doing anything else, and the chances of failure in the difficult task of designing an integrated pest management system are great.

There is no easy answer to this dilemma. However, in spite of the difficult odds, sound integrated pest management systems have been developed under such circumstances. Indeed, every operational integrated pest management system I know of has in fact had a relatively simple yet effective beginning. The first step in these programs was to develop an ecological perspective and then to design the best possible action based on the then available knowledge. This design was, at best, an approximation of an ideal system. This first approximation was then tested in the field, and where difficulties were encountered, these difficulties were posed as questions for the parallel solution-seeking research. In this way, even where resources may be quite limited, an effective integrated pest management system can often be developed and adapted to the local situation. This has been accomplished in Peru, Nicaragua, Malaysia, and many other parts of the world with very modest financial inputs for the development of the programs. The basic strategy of the more sophisticated pest management systems is to manage the pest populations at noneconomic densities so as to optimize economic returns consistent with minimal environmental damage. This also should be the strategy of simplest pest management systems where it is not possible to bring to bear large "high-powered" research teams.

Problems Associated with Technology Transfer to Developing Countries

Pest management systems developed for the temperate part of the world, as stressed earlier in this discussion, may be completely inappropriate to tropical and subtropical conditions of the developing world. This is the result of not only the greatly contrasting physical and biotic conditions, but also the contrasting problems of modern intensive high-input agriculture and those of traditional subsistence agriculture involving multiple cropping and mixed cropping (12).

In ecological terms, the agroecosystem represented by modern temperate agriculture is biologically less complex than that represented by traditional agriculture, especially in the tropics. Tropical traditional agriculture has greater genetic diversity and greater natural adaptation to its environment than modern streamlined agriculture. In general, the potential for pest exploitation of an agroecosystem is inversely proportional to diversity. The pest response to changes in the agroecosystem follows the pattern of the "domino theory"; viz., the introduction of a new (or substituted) factor into the system which will prompt a series of readjustment changes. This does not dictate against the introduction of new practices of crop production but does stress the need for an enhanced crop protection response capability in most developing nations (3).

In the absence of adequate crop protection programs in many developing nations, there is an over-reliance on the reactive use of pesticides for pest control. There are numerous well-documented examples of the inadequacy of this approach in both developed and developing countries. Unless pest management or integrated pest control programs are initiated, additional "pesticide abuse" situations will arise. Complete dependence on pesticides over a period of time not only fails to control the pests in question but may actually aggravate pest problems and endanger human health and environmental quality by the heavy pesticide burden on or in food products and in the general environment. Pesticide misuse also imposes an additional cost on production.

The developing world must deal with an array of crops and pests which are hardly grown in the temperate world. These crops include avocados, bananas, breadfruit, cacao, cassava, coconuts, coffee, guava, mango, papaya, pineapple, millet, plantains, sweet potatoes, sugarcane, taro, and yams. Many of these crops are of great importance in world commerce and contribute much to the world's food supply. As these crops are not widely grown in the developed temperate countries, a bank of technological knowledge on their culture and the management of their pests is not available there. It must be developed in place in the tropical developing world. Nevertheless, some component tactics from temperate IPM systems developed for other crops can be adapted to these tropical and subtropical crops.

In any attempt to transfer the latest developments in pest control technology to the developing world it will be very important to reach the decision makers in these countries. Many of the current decision-makers received whatever technological training they may have prior to the resurrection of the ecological approach to pest control. As a result considerable re-education will be necessary and new approaches to communication with the decision makers will be required to achieve satisfactory results. In addition, different social and economic values in the Third World, placed on the importance of food, environment, human life, individual rights, etc., require considerable adaptations of pest management systems proposed for the developing world. They also require considerable accommodation on the part of "expatriate" crop protection experts.

Finally, another great hindrance to effective technological transfer is what is sometimes called "static in the system." This is especially in evidence in the United States, but it occurs elsewhere. It is reflected conspicuously in polemic articles in newspapers, magazines and trade journals. A review of these articles makes it appear that everyone suddenly claims now to be an expert on integrated pest management and each has his own definition of IPM and a different scheme for what needs to be done. These articles usually are diatribes and are extremely divisive. Apparently, there is no practical and reasonable way to dampen the static, but its existence and the problems it creates must be taken into account when considering international technological transfer.

Potential Impact of Pest Control Technology Transfer

The losses of food crops to pests in the developing world is enormous. Estimates of losses generally run between 25 and 50 percent of the food produced (13), but we lack good data on the losses. In spite of detailed documentation on the exact nature of the losses, the potential still exists for recovering a large part of these losses which now are large. Conservatively, I believe we can recover at least 50 percent of the losses. At the same time, the need for enhanced protection from crop pests is further emphasized by the fact that other methods of crop improvement which result in an increased production of food will require additional protection in order for the gains to be fully realized.

However, another major methodological problem complicates any assessment of successful innovations. It is difficult to translate the savings in crop yields that would result from improved pest control into economic terms that reflect the probable distribution of that savings to the population of the country. If the supply of a particular commodity is increased in an area as the result of the adoption of improved pest control practices, the price of that commodity will probably fall, and the effect of the lower price on small farmers, especially in economies that are not centrally planned, would probably be severe. For example, nonadopters and late adopters of improved practices are particularly vulnerable because their production costs and yields will remain the same while the price they receive for their produce will decline. Unless additional concomitant measures are taken, the incomes and nutritional status of such farmers are likely to deteriorate. This prospect puts a special premium on selecting methods that are suited for adoption by small farmers (1).

Increases in yield are important, but improved pest control practices also result in more stable yields from year to year, which can be quite important. Without a sense of stability people are not likely to make investments in agriculture that require more than one growing season for amortization (1).

A related problem is associated with the level of commercial and industrial development in the country. In many tropical developing countries there is an enormous loss of foodstuff quite independent of damage from crop or stored product pests. These wastes occur because of lack of food processing industries or "home-canning" know-how, lack of a transportation network to move perishable commodities to consumer markets, lack of refrigeration facilities, or other non-pest reasons. To produce more, by whatever means, of perishable food products in such situations in the hope of improving the country's food supply really does not accomplish much in terms of efficiency of energy use, and the potential benefits of improved pest control will not be fully realized unless associated with other commercial and industrial developments.

A major question facing those who assess innovation is whether people living in different areas are likely to be affected differently by the development and adoption of new pest control practices. For example, differential effects will arise from the unsuitability of the new practices for particular areas. Regardless of the cause of such effects, planners must be aware of their existence. In general, differential effects on different regions must be regarded as one of the potentially negative effects of a new technology, although it is possible to ameliorate the undesirable features of such effects.

Biological control is likely to be most successful when it is designed for a specific region. Because most integrated control schemes includes biological control methods, integrated control schemes also are likely to be highly location-specific. Cultural controls generally involve creating microenvironments on the farm that are unfavorable to pest development. Thus it is likely that such manipulations, if identified, will be applicable over wider geographic regions, although some location-specific problems will occur. Genetic control and pesticides, as we know them, have been successful when adopted over wide geographic areas; hence large regional disparities are unlikely to arise from adoption. New varieties that show some resistance to pest species can be crossed with traditional varieties and thus adopted to many regions; hence large differences among regions are not likely to develop from their use (1).

The differential effects of successful innovation in pest control on different economic classes of agricultural people are the most difficult and yet perhaps the most important to analyze. New pesticides are likely to be adopted only by the wealthier and more progressive farmers because they have better access to credit for purchasing the necessary materials and machinery. Hence this technology tends to be biased toward the richer farmers. Cultural control and integrated control will have mixed types of differential class effects. If the new practices require more labor to be successful, then wealthy, capitalized farmers may be at a disadvantage compared to poorer farmers using labor-intensive methods. On the other hand, if the new practices require the purchase of new machinery or the acquisition of new skills, then the wealthier farmers may be at a relative advantage. Biological control, the breeding of resistant varieties, and genetic methods of control will be, in many cases, operations performed with a high degree of public sector effort, and each will require the farmer to contribute little in purchases above and beyond that which is normal for the crop he is raising. Hence these latter technologies, which depend on enlightened levels of government support, have less chance of favoring one class of agriculturalist over another (1).

When any proposed new technology is assessed a crucial question that must be asked is its effect on the labor requirements for agriculture. This question is particularly important in the nonindustrialized market economies in which unemployment and underemployment are frequently endemic and in which no alternative industrial employment possibilities exist.(1).

Biological control, the use of pest-resistant varieties, and genetic control are not likely to have immediate effects on labor requirements except for circumstances in which the controlled pest was formerly contained by labor-intensive means, such as handpicking. Cultural control is likely to require more labor as it may involve manipulating micro-habitats on the farm, a labor-intensive enterprise. The adoption of herbicides would probably reduce labor requirements because the chemicals would replace cultivation, a labor-intensive process. The adoption of improved insecticides would increase the labor requirements if the use of chemicals was a new practice; labor requirements would remain the same if improved chemicals were substituted for older materials (1).

The emergence of resistance to insecticides dramatizes the point that new technologies are not necessarily permanent additions to farmers' options in crop production. There are no theoretical reasons why resistance cannot and eventually will not emerge for any control practice directed against any pest on any crop. Thus a high premium should be given to improved technologies that offer the potential of longer use before resistance develops. Biological control, cultural control, and integrated control offer the best promise of long-term stability in their efficacies because each tends to rely on a number of different factors to reduce pests below economic thresholds. It is probably more difficult for a pest population to become resistant to a number of simultaneously controlling factors than to practices that rely on one factor. Genetic control techniques may have long-term stability, but recent setbacks in the control of screwworm (11) show that the sterile-male release method also may be subject to long-term failure and diminished effectiveness. Resistant cultivars will tend to have medium-term stabilities. The evolution of new biotypes of pests that attack formerly resistant plants will reduce the usefulness of resistant varieties over a long period of time. Insecticides, of course, have shown the most vulnerability to the development of resistance. New insecticides probably should not be relied on for long-term usefulness if they alone are effecting control. Resistance to fungicides and herbicides has been noted but has not generally become as severe as a problem as with insecticides. When pesticides are used in schemes of integrated control, their usefulness should be considerably more stable than when they are used alone (1).

It is seldom necessary for the overt pest control action to eliminate 90 to 100 percent of the offending organisms in order to achieve satisfactory control (i.e., reducing the local population below the economic threshold level). Often in most situations, of the total mortality required to achieve satisfactory control, the biological control from natural enemies may provide 50% or more, other natural factors may provide another 40% or more, and thus all that is needed by the overt pest control action is probably only 5% or even less. Useful control procedures should be flexible so that they can be modified as required to produce only the needed additional mortality, not the maximum possible mortality.

Innovations in biological control, breeding for resistant varieties, and genetic control are not likely to create any direct adverse environmental impacts. If resistant cultivars contain toxic substances in their edible portions, then problems might arise. Also, elimination of a pest like the tsetse fly from Central Africa might increase indirect environmental effects by opening up areas to crop agriculture or to grazing which until now have been unused.

Cultural control will, in general, have little adverse effect on the environment unless the particular practices involve cultivation. In such cases, soil erosion may result if the cultivation is improperly done. Pesticides are the most likely to have an adverse effect on the environment as their use involves introducing synthetic chemicals into the environment. Integrated control, because it relies on pesticides in addition to other means of control, is likely to have small or moderate adverse effects on the environment (1).

The developing world is on the threshold of a large increase in the use of pesticides. This will occur largely because of the well-established business framework to dispense as much pesticides as possible in the developing world. Only the rather limited financial resources of the developing countries keep the overall use at the current rather low levels. If these pesticide inputs are made unwisely, the pest problems can be greatly exacerbated. Furthermore, the impact on the environment and on agricultural workers could be severe. Properly developed pest management systems using pesticides as only one component of many can help to avoid such difficulties.

Improved crop protection in the developing world can improve the nutrition and general economic and social welfare of the people. As a consequence of improved health they will be more resistant to other forms of disease and more receptive to improved educational inputs.

Strategies in the Adaptation of Improved Pest Management Program in the Developing World.

Education and training must be a core element in any program to develop improved pest management in the Third World. Fundamental training will be required in all aspects of pest management and at all levels to create and strengthen an adequate infra-structure to receive and adapt pest management technology. This should involve the decision-making administrators as well as the lower level technicians. These educational inputs should be developed around an integrated pest management philosophy.

Research and extension, particularly adaptive research and on-the-farm demonstration, will be required at a significant level to develop the required knowledge base and to implement pest management systems successfully in the developing world.

A large number of agencies and institutions are involved in a great variety of ways in developing improved pest management in the developing world. These involve multilateral international agencies such as FAO, WHO, OECD, bilateral development assistance programs of many nations, and a number of other institutions. At times there has been an unfortunate lack of coordination and collaboration among these bodies. Recently steps have been taken by FAO and OECD to assure more coordination, and this should be reinforced and encouraged.

U.S. Programs

The U.S. Agency for International Development (AID) or its predecessors, have over the years had extensive and varied programs aimed at strengthening plant protection programs in developing countries. Many of these programs are developed in cooperation with U.S. universities, experiment stations, the U.S. Department of Agriculture and other U.S. institutions. Most of these programs are directed toward individual countries and are supported directly by the local USAID Missions. AID also provides more than 25 percent of the funding for the CGIAR Agricultural Research and Training Network whose programs contain considerable plant protection research.

For the past seven years AID has had a contract with the University of California for a global project in Pest Management and Related Environmental Protection. This is a general technical services contract intended to develop improved pest management in the developing countries. The objectives of the project are:

1. To backstop and provide research and technical assistance in the evaluation, procurement, and use of pesticides through pesticide management workshops, and other contacts.
2. To improve LDC regulations and pesticide monitoring capability through quality control programs with participating laboratories designed to assess the accuracy and precision of analytical procedures.
3. To develop country and international based, integrated pest management and environmental protection systems and relate these to an international cooperative research and technical assistance network.
4. To train competent LDC personnel to develop necessary scientific skills, and pest management expertise through training programs and workshops.
5. To help AID develop networks of institutions relating to pest management and environmental problems in LDC's.
6. To provide to developing countries up-to-date information on integrated pest management through various publications, including a newsletter.
7. To assist in the development of a series of coordinated research projects concerned with pest management.

In this project, the University of California is cooperating with Oregon State University, University of Hawaii, Texas A&M University, University of Florida, University of Miami, Cornell University, University of Minnesota and North Carolina State University to provide these services.

The 1975 Title XII Amendment to the Foreign Assistance Act established a Board for International Food and Agricultural Development (BIFAD). One of the basic objectives of BIFAD was to involve the U.S. universities with AID in sound long-term programs. Recently the Joint Research Committee of BIFAD identified "crop protection" as a priority area for a planning grant to develop plans for a Collaborative Research Support Program. The universities associated with the UC/AID Pest Management Project have incorporated as the Consortium for International Crop Protection (CICP) and have submitted a proposal for such a planning grant.

Any future pest management activities in the developing world should be done in concert with the international agencies involved in this area. These agencies include FAO, OECD, the World Bank, EPPO, OAS and WHO.

In the past three or four years a large number of documents have been developed by the United States National Academy of Science, U.S. Agency for International Development Organization for Economic Cooperation and Development, and others which give valuable background information on the subjects discussed in this paper (*Vide* references).

References Cited

- (1) Supporting Papers: World Food and Nutrition Study. Volume I. Table 5. pp. 102-105. (1977).
- (2) Supporting Papers: World Food and Nutrition Study. Volume I. pp. 76-82. (1977).

- (3) Apple, J.L. and R.F. Smith. A Preliminary Study of Crop Protection Problems in Selected Latin American Countries. UC/AID Pest Management Project (1972).
- (4) OECD Steering Group Report on Pest Control under Conditions of Small Farmer Food Crop Production in Developing Countries (1977).
- (5) Environmental Impact Statement on the AID Pest Management Program (1977).
- (6) FAO/UNEP Cooperative Global Programme for Development and Application of Integrated Pest Control in Agriculture (1974).
- (7) NAS World Food and Nutrition Study (1977).
- (8) NAS Pest Control: An Assessment of Present and Alternative Technologies. 5 volumes. (1975).
- (9) UC/AID Pest Management Project Multidisciplinary Study Teams.
- (10) Pest Control Strategies. E.H. Smith and D. Pimentel, eds., Academic Press, (1978).
- (11) Bush, G.L., R.W. Neck, and G.B. Kitto. Screwworm eradication: inadvertent selection for noncompetitive ecotypes during mass rearing. *Science* 193:491-493 (1976).
- (12) Glass, E.H. and H.D. Thurston. Traditional and Modern Crop Protection in Perspective. *BioScience*, 28(2):109-115, (1978).
- (13) Pimentel, D. (ed.). *World Food, Pest Losses, and the Environment*. AAAS Selected Symposium 13. 206 pp. Westview Press, Boulder, Colorado.



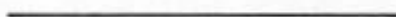
CORRESPONDANT(E) DEMANDE(E)

Entomologiste français spécialisé dans le genre *Carabus*, disposant de nombreuses espèces européennes, turques et marocaines, cherche correspondant canadien en vue d'échanges. Ecrire à l'adresse suivante: Dr. J.-P. DROUX, rue St-Martin, 56230 - Questembert, France.



RECENT DEATH

ROSS, Herbert H. Athens, Ga. On November 2, 1978, age 70. Honorary Member, ESC. Former Head, Faunistics Section, Illinois Natural History Survey and later Professor, University of Georgia.



So powerful!
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17.6 acres of cole crops



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COMMITTEE REPORTS (1977-78)

The 1979 Budget, prepared by the Treasurer and modified by the Governing Board, again forecasts a small deficit. Despite reduced costs for Board meetings and increased revenues from page charges, membership fees and other items, there are anticipated increased costs for publishing, mail, and salaried employees. The Committee is concerned that unexpected changes could jeopardise Society affairs and has undertaken a comprehensive study to prepare for alternative approaches both now and in the future. In the meantime austerity must continue and expenditures minimized.

Rising costs for printing the *Bulletin* have been partly offset by cover and format changes. The Committee is hopeful that advertising can be increased to a point where the *Bulletin* is more self-sustaining and is searching for an individual or firm who is willing and able to develop this scheme on a commission basis.

No changes in membership fees or subscriptions rates were recommended by the Committee, for 1979, but these important sources of revenue must be reviewed again soon and increased to meet mounting costs. (Subsequently the Governing Board presented a motion to raise memberships from \$25. to \$35. annually, in 1980. This was passed at the Annual meeting).

The Committee recommends a unified approach in the solicitation of financial support from industry and other external sources. Advertising, sustaining memberships, annual meeting financing, and other committees' solicitations can cause confusion and should be coordinated for effectiveness and donors' goodwill.

Each year one or more Committees request funds for meetings. The Finance Committee recommends that such meetings be held in conjunction with the Annual Meeting whenever possible. Telephone conferences should also be considered. If there is no other alternative then requests for funding meetings should give full details including location and duration of the meeting and names of members to attend.

In conclusion, the Finance Committee thanks the many members who offered encouragement and suggestions. The important role now enjoyed by the Entomological Society of Canada in the scientific community, the prestige of its publications, and its financial security are largely due to the *volunteer service* of many dedicated and interested individuals during the past. Let us not lose sight of this aspect of our success during the years ahead.

Ottawa: W. Forest
J.S. Kelleher
R. Macdonald
E.C. Becker (ex. Officio)

Sault Ste Marie: J.C. Cunningham
J.C. Edwards
P. Fast
G. House

R.F. DeBoo (Chairman)

GIFT SUBSCRIPTION PROGRAM

Since the 1977 Annual Report, there have not been any subscriptions of The Canadian Entomologist and The Memoirs donated to suitable recipients. Also, there have not been any subscriptions received from Members of the Society for the use of The Gift Subscription Program. At present, the total number of gifts in the Gift Subscription Program is 16.

Members of the Society are again reminded that it is primarily through you that The Gift Subscription Program learns of potential recipients. Keep this program in mind while you are making international contacts, as there are several subscriptions on hand waiting a suitable recipient.

George H. Gerber
(Chairman)

1978 ANNUAL REPORT

OF THE SECRETARY

The duties of the Secretary include the recording of the minutes of all meetings of the Governing Board and of the Society, the preparation of the ballots for the Society's annual elections, the notification of the Executive Council, Governing Board and Trustees of forthcoming meetings of the Society, and the distribution of minutes, reports and other materials and information as required. The Secretary also maintains and updates the files of the Society, handles much of the day-to-day tasks and business of the Society, and answers much of the correspondence received by the Society. One of the more important things, which the Secretary is required to do, is to provide the communications link between the Society and the Affiliates of the Society. This usually is done by notifying the Affiliates of the programs and activities of the Society which are of benefit to them as well as to the Society, by notifying them of the Committees of the Society to which they may appoint representatives, by notifying them of the Society's Postgraduate Scholarship Award and two Annual Achievement Awards, and through correspondence and the distribution of materials on matters of mutual interest.

The Secretary thanks the Executive Council, Governing Board Members, Trustees, and Executives of the Affiliates for the help, advice and support, which they have given during the past year. Without their assistance and cooperation, it would not have been possible for me to carry out the duties of the Secretary.

Since I will be stepping down as Secretary before the time of the 1979 Annual Meeting, I will take this opportunity to thank everyone who has helped me during the past three years. It has been a great pleasure serving the Society along with you.

George H. Gerber
Secretary

REPRESENTATIVE TO CANADIAN STANDARDS

ASSOCIATION COMMITTEE ON

COMMON NAMES FOR PEST CONTROL CHEMICALS

A meeting of the Canadian Standards Association Committee on Common Names for Pest Control Chemicals was held on September 30, 1977. Several new common names were discussed. Sixteen names were considered acceptable and will be included in a future addendum to the Standard.

Supplement No. 2-1977 to CSA Standard Z 143-1974 entitled "Common Names for Pest Control Chemicals" was published in January 1977. The supplement contains 23 new common names, copies may be obtained from the Canadian Standards Association, 178 Rexdale Boulevard, Rexdale, Ontario, M9W 1R3. The cost is \$3.75 per copy.

L. Roadhouse

BY-LAWS, RULES AND REGULATIONS COMMITTEE

The committee has been relatively inactive. Two minor tasks were undertaken: that of guiding amendments to the By-Laws to provide for a fourth Executive Officer, and incorporating new rules passed by the Board at its meetings during the year into the Standing rules and Committee Guidelines. In performing these minor tasks I have not found it necessary to consult the other committee members, Mr. N.V. Tonks, Dr. M. MacGillivray, and Dr. R. Martineau who have been always ready and willing to assist when called upon. Past-President MacGillivray and Secretary Gerber, having been actively involved in its activities have been invaluable in interpreting the intent of the Board.

Recommendation

We recommend that the By-Laws Committee be made a continuing or standing committee with an appointed chairman who has the power to add. Most years the work will be minimal and require only a few changes in the standing rules as a result of the actions of the Board. In view of recent experience, however, it will be necessary to incorporate changes in the By-Laws in both languages and have them approved from time to time. The Committee should be a constitutional authority that can make such changes. It should be remembered that the present committee guidelines were prepared with the intention that the various committees should try them, then return them to the By-Laws Committee with suggestions for improvement. This has not yet been done, and may be the principal task facing the Committee in 1978-79.

D.C. Eidt
(Chairman)

THE SCIENTIFIC COMMITTEE OF THE PILOT STUDY FOR A BIOLOGICAL SURVEY OF THE INSECTS OF CANADA

Previous reports have given details of the establishment of the Pilot Study, and the activities of the Secretariat and the Scientific Committee up to February 1978. This report therefore concentrates on the activities since then, and emphasizes that the project was successfully completed on schedule.

1. *Secretariat: Activities*

- 1.1. Preparation of Reports and Publications.
- 1.2. Preparation of Draft of Final Report.
- 1.3. Preparation of Final Report.
- 1.4. Preparation of New Unsolicited Proposal for Scientific Work.

2. *Scientific Committee: Meeting and Other Activities*

- 2.1. Third Meeting — Ottawa, March 16-17, 1978.
 - 2.1.1. Detailed consideration of the draft of the Final Report. Emphasis placed on format and substance of recommendations.
 - 2.1.2. Discussion on Computer Handling of Faunistic Information (I.M. Smith).
 - 2.1.3. Progress Report on the publication "Canada and its Insect Fauna" (H.V. Danks).
 - 2.1.4. Discussion of the plans for the Interim Period.
 - 2.1.5. Appointment of special committee for augmentation of the Impact of the Final Report.
 - 2.1.6. Discussion of E.S.C. Symposium.
 - 2.1.7. Arrangement for next meeting of the committee to coincide with the E.S.C. meeting (J.A. Downes to take the Chair).

On March 17, 1978, the Scientific Committee was joined by representatives of various government agencies interested in the Pilot Project, to review the Pilot Study recommendations.

On March 18, 1978, the ad-hoc "Emergency Study Group" met to discuss support for the Survey for the period July 1, 1978 - March 31, 1980.

- 2.2. Membership
 - 2.2.1. New member appointed — I.M. Smith
 - 2.2.2. Resignation — D.C. Eidt and J.J.R. McLintock
 - 2.2.3. Chairman — G.G.E. Scudder took over from G.E. Ball for 1 year on June 1, 1978.

- 2.3. Reports Received.
 2.3.1. From Secretariat
 — Monthly Progress Reports 12-16 (January-May)
 — Draft of Final Report (March 16, 1978)
 — Final Report (June 1978)

An early copy of the Final Report was submitted to the Scientific Authority for comment as required by the contract.

This report comprises XV + 94 pages of text and over 155 pp. of Tables, Figures and Appendices. Twenty-eight recommendations were made on the scope, form and roles of a continuing survey organization, including considerations of the potential of the National Parks of Canada as survey sites, and of data banking systems for Biological information.

2.4. Publicity.

- 2.4.1. A report on the panel discussion held at the National Museum of Natural Sciences, Ottawa, on 4 January 1978 was published by the Chairman, E.L. Bousfield in the Bull. Ent. Soc. Canada Vol. 10, No. 1: 20-22 in March 1978.

3. *Publications*

- 3.1. "Collections of Canadian Insects and Certain Related Groups" was published as a supplement to Bull. Ent. Soc. Can. Vol. 10, No. 1, March 1978.
 3.2. "Canada and its Insect Fauna". 44 of the 53 manuscripts were in final form by May 31, 1978 and complete manuscript is expected to be with the printer by the time of the E.S.C. meeting.

4. *Unsolicited Proposal for Scientific Work*

As the "interim proposal" for funding the Biological Survey past 1978 did not meet with support, the Secretariat prepared an unsolicited proposal for scientific work entitled "Review and Synthesis of Knowledge on Northern and Arctic Insects". This was submitted to D.S.S. and we anticipate funding shortly. In the meantime, a short 3-month contract has been signed with the National Museum.

G.E. Ball
 E.L. Bousfield
 K.G. Davey
 J.A. Downes
 A. Francoeur
 P.P. Harper
 D.K. McE. Kevan

J.V. Matthews
 R.F. Morris
 D.M. Rosenberg
 I.M. Smith
 A.D. Tomlin
 W.G. Wellington
 G.B. Wiggins

G.G.E. Scudder
 (Chairman)

**COMMITTEE ON FUNDING OF UNIVERSITY RESEARCH
 IN ENTOMOLOGY**

The Ad-hoc Committee on Funding of University Research in Entomology submitted its final report including recommendations to the President on 14 April 1978.

The Report was accepted and was published as a supplement to the Bulletin of the Entomological Society of Canada, Vol. 10, No. 2 (June 1978).

J.P.M. Mackauer (Chairman)
 R. Brust
 J. McNeil
 B.J.R. Philogène

**CANADIAN NATIONAL COMMITTEE
OF THE INTERNATIONAL ASSOCIATION ON
WATER POLLUTION RESEARCH**

The CNC is broadening its membership base to include representation from Canadian research institutes or organizations which undertake major programs of research in the field of water pollution abatement and control and water quality. This new thrust will make the CNC/IAWPR more relevant, provide a better balance in membership, and permit it to be more representative of Canadian engineers and scientists directly involved with research and its application in water pollution abatement and control.

The 10th International Conference of IAWPR will be held in Toronto in 1980. Among the Conference/Worship themes to be suggested to the IAWPR Program Committee and of interest to members of ESC are: (1) Studies of receiving waters — which could include environmental effects of broadcast use of substances such as the IGR, diflubenzuron; and (2) The Arctic — which may include (a) northern water pollution problems, and (b) differences and similarities of arctic and temperate ecosystems. Expressions of interest from ESC members who wish to participate in the 1980 program are welcome.

Information on the ESC's Biological Survey of the Insects of Canada was presented to members of the CNC/IAWPR at the Annual General Meeting (13 December 1977) and circulated to members in a 31 March 1978 mailing.

ESC members are reminded to consider using the two IAWPR journals "Water Research" and "Water Pollution Research in Canada" for publishing pertinent research.

David Rosenberg

INSECT COMMON NAMES AND CULTURES COMMITTEE

Committee members: C.R. MacLellan, Kentville, N.S.; D.B. Finnermore, Fredericton, N.B.; R.O. Paradis, St. Jean, Quebec.; D. Herne, Vineland, Ont.; A.G. Robinson, Winnipeg, Man.; H. Craig, Saskatoon, Sask.; G.E. Ball, Edmonton, Alta.; A.F. Hedlin, Victoria, B.C., J.S. Kelleher, Ottawa, Ont.; W.Y. Watson, Waterloo, Ont. (Chairman).

At present two lists of insect common names pertinent to Canada are being examined by members of the Insect Common Names and Cultures Committee. From the results of this examination a programme will be designed to compile a complete list of names acceptable to the entomologists of Canada. To accomplish this it will require the assistance of all the committee members and others as well.

The possibility of putting the list on the computer has been explored at Wilfrid Laurier University. To put the basic list (from Noms français d'Insectes au Canada) on the computer and to run a series of initial print-outs for revision purposes could probably be done for under \$200.00. Additions can be made periodically. Final copies of an approved list can also be produced by the computer for a reasonable price.

The common names submitted last year to the committee and approved are being held pending a decision regarding publication. The suggestion is made that these be published in the Bulletin so that they can be immediately available and that they also be incorporated in the proposed official list. In this way the notice of the accepted common name will be seen quickly and the official list will be up to date at all times.

A revised list of Laboratory Colonies of Insects and Other Arthropods in Canada was prepared and made available as announced in E.S.C. 9(4):143.

MEMBERSHIP COMMITTEE

The main effort of the 1977-78 Membership Committee was to reorganize and make the Committee more viable than in the past. This has been accomplished and the 1978-79 effort will be to produce results in terms of increased membership, both individual and sustaining.

1. *Membership*

The subcommittee R.W. Stark (Idaho), M. Tauber (New York), W. Foott (Ontario), P. Riegert (Saskatchewan), J.C. Tourneur (Quebec), and H.F. Madsen, (British Columbia) report that 20 new members have been recruited in the past 6 months. Most of the new members are from the U.S. and there seems to be a fair potential from this source, especially in universities. A new membership application form has been prepared and sent to each committee member. A copy is attached. Dr. Riegert has made the final revisions on the membership list which should now be available. (See current issues).

2. *Sustaining Membership*

This subcommittee, E. Hagley (Ontario), D. Bushell (Ontario) and A. Ashraff (Manitoba) have made a valiant effort to increase our sustaining members without immediate success but with a good potential for the future. Chairr..an Ashraff is preparing a form which will be sent to all chemical companies which outlines the advantages in becoming sustaining members and we hope the response will be favorable.

3. *Honorary Membership*

A report of the Honorary Membership Subcommittee is attached.

We will not change the membership of the various subcommittees for 1978-79 since the appointments were made late in 1977. An exception is the Honorary Membership Subcommittee as the Regional Societies appoint members each October.

Harold F. Madsen
(Chairman)

HONORARY MEMBERSHIP SUBCOMMITTEE

Only one nomination was received for the single vacancy in 1978 on the Honorary Membership list: Dr. J.J.R. McLintock. The Honorary Membership Committee unanimously agreed that the nomination was worthy of presentation to the general membership on the election ballot for 1978. Dr. Gerber, Secretary E.S.C., was informed of this by letter on April 11, 1978.

R.D. McMullen
(Chairman)

NOMINATING COMMITTEE

The Nominating Committee of the Entomological Society of Canada presented to the February Meeting of the Governing Board a report on activities and the Committee's nominations for offices to be filled by ballot in 1978. Since then the Chairman of the Committee submitted to the Secretary bibliographic data relating to each nominee.

M.E. MacGillivray (Chairman)
T.A. Angus
L. Jobin

SCHOLARSHIPS COMMITTEE

1. As of 31 July 1978, the Scholarship Fund was worth \$8,285.00. During the year, individual donors contributed \$1,028; Affiliate Societies, \$1,110; and industry, \$300. Our appeal by letter in April resulted in \$690 from 30 donors.
2. The committee is happy to report that seven people applied for the 1979 E.S.C. Post-Graduate Scholarship, all of whom were well qualified to receive the scholarship.

The Committee recommends that the 1979 E.S.C. Post-Graduate Scholarship be awarded to Mr. David Bernard Levin, University of Guelph.

3. The Committee recommends that as the scholarship fund is now approaching \$10,000, consideration be given to awarding an additional scholarship of \$500 to the applicant who places second from among those applying for the scholarship.
4. In the coming year, an effort will be made to list the scholarships in University Calendars.

Ray F. Morris (Chairman), B.S. Heming, A. Tomlin, J.H. Myers, E.F. Johnston

HERITAGE COMMITTEE

- (1) During the past year the situation regarding a permanent location for E.S.C. Archival material has been investigated as requested at the E.S.C. Board Meeting, August 1977. A detailed explanation of the offer of the Public Archives of Canada to provide a permanent home has been received from N. Ball, Science and Engineering Archivist, Manuscript Division, in writing. Briefly, that when archival material is given permanently to the Archives it is indexed and finding aids developed, making the material accessible in the archives and for photocopying. Arrangements are being made for Mr. Ball to outline the situation and answer questions at the Ottawa Board Meeting of August 1978. It is important that a decision be made regarding a permanent home for our archives.
- (2) Archival material can be added to the collection at any time, we are not restricted to the once each five years as previously stipulated.
- (3) We now have available the following items, which it is expected will be deposited in the Archives before August 78;
 - (a) Microfilms of the Proceedings of the Montreal Branch of the Entomological Society of Ontario covering the period 1873 to 1950.
 - (b) One bound copy of the Proceedings of the Entomological Society of Alberta covering Volumes 11 to 20, 1963-1972.
 - (c) A computer print-out of materials in entomology held at the University of Guelph library.

Cecil Morgan
Rudolph Paradis
Albert MacPhee (Chairman)

EMPLOYMENT COMMITTEE

The committee has had a limited amount of success since February. One entomologist was placed with an employer; three others seeking employment have not been successfully placed.

Canada's largest employer of entomologists, the federal government, will not use the services provided by our Society. In addition, it now appears that the Canadian Agricultural Chemical Association has a similar service available. In view of the above-mentioned points, your employment committee unanimously recommends that the employment committee be disbanded.

In order to provide a service to ESC members and to agencies who hire entomologists, the committee recommends that the Bulletin still maintain a 'Positions Wanted' and a 'Positions Available' page for individual submissions.

W.A. Charnetski, Chairman
D.A. Craig
L.A. Miller

FELLOWSHIP COMMITTEE

The Committee was pleased to learn that the Governing Board, at its meeting in February 1978, had ratified the Committee's selection of 6 members as Fellows of the Society.

Arrangements have been made for the presentation of the certificates to the six new Fellows with appropriate citations.

The Committee expresses its appreciation for the assistance it received from the Governing Board and members of the Society in meeting its responsibilities.

J.L. Auclair, (Chairman)
J.R. Blais,
D.A. Chant,

J.A. Downes,
F.L. McEwen
M.D. Proverbs.

ELECTIONS COMMITTEE

The Elections Committee of the Entomological Society of Canada met in Quebec City on July 17 to open and count those ballots received by the Chairman before midnight, July 15, 1977. A total of 983 ballots were mailed to members by the Secretary and 284 were returned. The following results were recorded:

<i>For First Vice-President:</i>	(no ballots spoiled)	Turnock, W.J.
<i>For Second Vice-President:</i>	(no ballots spoiled)	Loschiavo, S.R.
<i>For Directors-at-Large:</i>	(no ballots spoiled)	Burrage, R.H.
	(no ballots spoiled)	Shorthouse, J.D.
<i>For Fellowship Committee:</i>	(no ballots spoiled)	Bird, F.T.
	(no ballots spoiled)	Cooper, G.S.
<i>For Honorary Member:</i>	The great majority voted "yes" for J.J.R. McLintock.	

We hereby certify that the Elections Committee counted accurately all ballots received, as indicated above.

R.J. Finnegan, (Chairman)
J.A. Doyle
W.B. Smirnoff

PUBLICATIONS COMMITTEE

The principal activity of the Committee Chairpersons during the year has been supervision of book reviewing. The operation of the Canadian Entomologist has been generally running smoothly, although the time between receipt of manuscripts and publication has

continued to increase and there have been teething problems with the Scientific Notes. Bids from the University of Toronto Press and from Imperial Press revealed that Runge Press is charging the Society a fair and competitive price for printing the Canadian Entomologist.

S.A. Gage, H.R. MacCarthy, S.B. McIver (Chairman to 31 March, 1978), G. Pritchard (Chairman from 1 April 1978), E.H. Salkeld, C.R. Vickery.

ACHIEVEMENT AWARDS COMMITTEE

The announcement concerning achievement awards and procedures for nominations was published in the June issue of the Bulletin. The committee received several nominations of outstanding candidates for each award and after an extensive review, unanimously recommended to the Governing Board that Dr. Ronald W. Stark receive the 1978 Gold Medal Award and that the C. Gordon Hewitt award for 1978 be presented to Dr. Susan McIver.

Letters were sent to nominators of candidates unsuccessful in 1978 encouraging them to renominate their candidate, if eligible, in 1979 and reminding them that such renomination is necessary if they wish their candidate to be considered at that time.

F.L. McEwen
Chairman

ANNUAL MEETING COMMITTEE (1978)

Preparations were on schedule for the 28th Annual Meeting to be held at the University of Ottawa, August 20-23, 1978. The scientific programme highlights included; (1) a Symposium on International Endeavours in Entomology with participation by representatives of Canadian Government agencies, and entomologists with experience overseas; (2) special interest groups on: Urban Entomology, Environmental Toxicology, Pheromones and the Spruce budworm problem; (3) an assessment of the Biological Survey project followed by a symposium on "Temporal and spatial changes in the Canadian insect fauna."

Members of the ESC were sent a general announcement and registration papers the last week in May 1978. The final programme was available at the Board meeting on August 20-21.

Bernard J.R. Philogène
Chairman

ANNUAL MEETING COMMITTEE (1979)

The Entomological Society of British Columbia has completed preliminary arrangements for the 1979 Annual Meeting, which will be held jointly with the Entomological Society of Canada in Vancouver, British Columbia, on 3-5 October 1979.

Guest and meeting rooms have been reserved at the Harborside Holiday Inn, in downtown Vancouver, at a cost of \$33.00 single and \$37.00 double per night.

The Program Committee consisting of Dr. G.G.E. Scudder (Chairman), J. Myers and R. Elliot has submitted plans for two symposia and two afternoons of submitted papers and informal conferences. The suggested symposia topics are "Pest Control and the Public, with more on the Spruce Budworm" and "Insect Growth Regulators". In addition, poster sessions, exhibits as well as visits to Simon Fraser University and the University of British Columbia are planned for the two days.

Local arrangements will be handled by a committee consisting of Drs. A.L. Turnbull (Chairman), R. Costello, H. Gerber, B. Frazer and Prof. T. Finlayson.

Dr. P. Belton, who is the 1978/1979 President of the E.S.B.C. is general chairman of the organizing committee.

J.P.M. Mackauer
(Director from E.S.B.C.)

GIFT SUBSCRIPTION SUB-COMMITTEE

In 1970, the Society appointed a committee to organize and coordinate a program for the transfer of subscriptions of *The Canadian Entomologist* or *Memoirs* donated by members, to recommended recipients throughout the world. Many members have taken this worthy step in the past. Those wishing to donate their subscription may indicate their intention by writing to this committee, and their name will be placed on a potential donor list. Members may send names and addresses of deserving institutions that would like to receive our publications but cannot, for various reasons, take out a subscriptions. These names will be placed on a potential recipient list. Donors may designate specific recipients if they wish. Forms for transfer of subscriptions are available. Please contact the committee for further information.

S.R. Loschiavo
Chairman

SCIENTIFIC EDITOR

This seventh Editor's Report presents the activities of this office over a period of five months from January 1, 1978 to May 31, 1978 and compares the data of previous submissions.

TABLE I shows the monthly receipt of manuscripts and the number accepted. A total of seventy-three (73) manuscripts were accepted for publication; twenty-three (23) of this number were papers received during the 5-month period of this report; the remaining fifty (50) are from earlier submissions. An average of 23.2 manuscripts were received each month, compared to 16.1, 13.9 and 12.1 manuscripts per month in earlier reports (sixth, fifth and fourth).

Nine (9) manuscripts were rejected, only two (2) of these rejections applied to earlier submissions. The rejection rate was 6.04%, as compared to 6.2% in the previous report.

Only one (1) manuscript was withdrawn (submitted Sept. '77) and the author plans to resubmit at a later date.

TABLE II makes comparisons with three earlier reports presented at the Society's Board Meetings. Fewer pages per issue were published during this 5-month period: an average of 112 pages.

THE CANADIAN ENTOMOLOGIST

Manuscripts received Jan. 1/78 to May 31/78
and their status as of May 31/78

TABLE I

Month	Total No. MSS Received	Accepted	Rejected	Under Review	Under Revision	Withdrawn
Jan./78	27	10	2	5	10	
Feb./78	16	8	1	3	4	
Mar./78	23	5	-	4	14	
Apr./78	27	-	4	18	5	
May/78	23	-	-	22	1	
TOTAL	116	23	7	52	34	nil

THE CANADIAN ENTOMOLOGIST

TABLE II

Dates	No. of MSS submitted	French	English	Accepted	Rejected	Under Review	Under Revision	With-drawn	Total Journal Pages
Sept. 1/75 - Aug. 31/76 (12 months)	230	6	224	150	8	29	37	6	1331
					8	26	25	1	1311
Sept. 1/76 - May 31/77 (9 months)	125	5	120	65	7	32	31	0 Memoirs	851 444
June 1/77 - Dec. 31/77 (7 months)	113	1	112	43	7	52	34	0 Memoirs	559 441
Jan. 1/78 - May 31/78 (5 months)	116	3	113	23					

TOTAL JOURNAL PAGES June 1/77-May 31/78 1410

Our records show that Canadian authors submitted nearly two and one-half times (82) the number of papers compared to all other sources (34). Thirty (30) were from the U.S. and only four (4) foreign to this continent.

Over this 5-month period, eight (8) Scientific Notes were published.

P.E. Morrison (Scientific Editor)

ELECTION 1979

The Nominating Committee (W.G. Wellington, Chairman) will prepare the usual slate of nominations for Second Vice-President and two Directors-at-large.

Nominations from the membership may be submitted in writing over the signatures of at least three active members of the Society, with a signed statement from the nominee indicating his willingness to accept office if elected. Such nominations shall be submitted to the Secretary, Dr. J.E. Laing, Department of Environmental Biology, University of Guelph, Guelph, Ontario, N1G 2W1, **not later than 31 March 1979.**

Les nominations pour les postes de deuxième Vice-Président et deux Administrateurs-libres devront parvenir au Secrétaire de la Société à l'adresse ci-dessus, sous la signature d'au moins trois membres actifs de la Société, en plus d'une déclaration du candidat exprimant son acceptation d'une telle nomination, et le poste s'il est élu.

MINUTES
TWENTY-EIGHTH ANNUAL GENERAL MEETING
Morisset Hall, Room 224
University of Ottawa
Ottawa, Ontario
22 August 1978

The President, W.G. Wellington, called the meeting to order at 16:00 hours. There were approximately 70 persons in attendance.

1. *Notice of Meeting*

A notice of meeting was published in the Bulletin, 10(1):6 (March 1978) and 10(2):37 (June 1978).

2. *Proxies*

None were declared.

3. *Deceased members and other Canadian entomologists*

One minute of silence was observed in memory of J.F. Bronskill, B.E. Brown, P. Gardiner, G. Maheux and J.F. Sharp.

4. *Minutes of Twenty-Seventh Annual General Meeting(1977)*

The minutes were published in the Bulletin, 9(4): 123-125 (December 1977).

B.J.R. Philogène moved, G.T. Harvey seconded, that the minutes be adopted as published. Carried.

5. *Business arising from Minutes*

There was none.

6. *Report of Governing Board*

President Wellington read the report. The report is published in the Bulletin, 10(3) (September 1978).

D.C. Eidt moved, D.M. Davies seconded, that the report be received. Carried.

Dr. D.F. Mettrick, President, Biological Council of Canada, was present and reported on the activities of B.C.C. during the past year.

7. *Membership Dues*

J. McNeil moved, D.C. Eidt seconded, that the Student Membership Dues be \$10.00 effective 1 January 1979 and the Regular Membership Dues be \$35.00 effective 1 January 1980. Carried.

8. *Standing Rules*

President Wellington reported that the Governing Board had approved the creation of the position of Assistant Scientific Editor and had agreed the Assistant Scientific Editor be made a Trustee of the Society. He said that approval was required for making the Assistant Scientific Editor a Trustee of the Society.

D.M. Davies moved, J.A. Downes seconded, that the Assistant Scientific Editor be made a Trustee of the Society. Carried.

9. *Auditors' Report*

The Treasurer, E.C. Becker, reported that the auditor's report would be published in the Bulletin, 10(3) (September 1978).

E.C. Becker moved, P.W. Riegert seconded, that the auditor's report be received. Carried.

10. *Elections Committee Report*

Secretary, G.H. Gerber, reported that R.J. Finnegan, Chairman, Elections Committee, wrote on 18 July 1978 indicating (i) that the successful candidates were W.J. Turnock, First Vice-President; S.R. Loschiavo, Second Vice-President; and R.H. Burrage and J.D. Shorthouse, Directors-at-Large, (ii) that F.T. Bird and G.S. Cooper were elected members of the Fellowship Committee, and (iii) that J.J.R. McLintock was elected as an Honorary Member of the Society.



11. *Installation of New Officers*

W.G. Wellington passed the gavel to President F.L. McEwen. President McEwen requested Past-President W.G. Wellington to escort First-Vice-President W.J. Turnock to the dais.

President McEwen reported that the new Directors of the Society taking office at the time of this Annual Meeting were R.H. Burrage and J.D. Shorthouse, Directors-at-Large; J.C. Arrand, Entomological Society of British Columbia; and R.A. Ellis, Entomological Society of Manitoba.

12. *Presentation of Service Award Shields*

President McEwen paid tribute and presented a Service Award Shield to Past-President W.G. Wellington. President McEwen also presented Service Award Shields to P.E. Morrison (Scientific Editor) and G.H. Gerber (Secretary), who would be retiring before the time of the next Annual Meeting, and thanked them for the many things which they did for the Society.

President McEwen also thanked the Directors who were retiring at the time of this Annual Meeting. They were J.L. Auclair and S.B. McIver, Directors-at-Large; R. Brust, Entomological Society of Manitoba; and J.P.M. MacKauer, Entomological Society of British Columbia.

13. *Committees and Representatives*

President McEwen announced the names of the Executive Council Members and the Trustees, and reported that the members of the Standing Committees Continuing Committees and Ad Hoc Committees and the names of the Representatives would be published in the Bulletin, 10(4) (December 1978). He indicated that these names would be submitted to the Governing Board for approval on 23 August 1978.

14. *Election of Auditor for 1978*

E.C. Becker moved, W.G. Wellington seconded, that the Society appoint Geo. A. Welch and Co., Ottawa, as Auditor for 1978. Carried.

15. Resolutions

D.C. Read moved, R.F. DeBoo seconded, that the following resolutions prepared by the Resolutions Committee (D.C. Read, Chairman, and A.M. Harper) be adopted. Carried.

Whereas the Entomological Society of Canada has been hosted by the University of Ottawa for its 28th Annual Meeting, be it resolved that the Society extend its appreciation to Dr. Peter Morand, Dean, Faculty of Science and Engineering, for the excellent facilities provided in terms of accommodations, food services, scientific and other facilities and for the reception provided in our honour on 21 August.

Whereas the Research Branch, Agriculture Canada, provided a Wine and Cheese Party on 20 August for our membership and gave us the opportunity to meet informally in a most hospitable environment, be it resolved that the Society extend its sincere thanks to Dr. E.J. LeRoux, Assistant Deputy Minister (Research).

Whereas the Organizing Committee arranged for this Society an excellent Annual Meeting, be it resolved that the Society express its thanks to all of those involved in the planning and conduct of the meeting.

16. Notice of Twenty-ninth Annual General Meeting

Secretary Gerber announced that the 29th Annual Meeting will be held in Vancouver, British Columbia, on 3-5 October, 1979.

17. Other Business

There was none.

J. McNeil moved, J.A. McLean seconded, that the meeting be adjourned. Carried.

The meeting adjourned at 17:15 hours.

George H. Gerber
Secretary
11 October, 1978



CANADIAN RESEARCHERS ON INSECT PHEROMONES

As part of the background to the Special Interest Group on Insect Pheromones at the Ottawa ESC meetings, the participants compiled a list of Canadian researchers on insect pheromones. The list includes names, addresses and capsule research descriptions for active researchers in each province. Anyone wishing a copy of the list, please send a request card to:

Dr. J.H. Borden,
Pestology Centre,
Department of Biological Sciences,
Simon Fraser University,
Burnaby, B.C., V5A 1S6.

ACTIONS OF THE GOVERNING BOARD

19 - 20 August 1978

- N.R.C. Appointments:** (1) Announced that none of the people which the Society proposed to N.R.C. as nominations for membership on the 1978-1979 Grant Selection Committees were approved (see Bulletin 10 (2); 36).
- Assistant Scientific Editor :** (2) Agreed to recommend to the Membership at the 1978 Annual Meeting that the Assistant Scientific Editor be made a Trustee of the Society.
- Membership Dues:** (3) Agreed to recommend to the Membership at the 1978 Annual Meeting that the Regular Membership Dues be \$35.00 effective 1 January 1980.
- Future Annual Meetings:** (4) Noted the progress of plans for the 1979 Annual Meeting in Vancouver.
- (5) Approved that the Society hold a joint Annual Meeting with the Entomological Society of Quebec in 1980.
- (6) Agreed that the Society proceed with the setting up of the Photo Salon according to the rules, regulations and standards of the Photographic Society of America.
- Science Policy:** (7) Announced that the subcommittee studying "Funding of University Research in Entomology" had completed its report (see Bulletin 10 (2)).
- (8) Noted that the subcommittee studying "Research-Extension Flow of Entomological Information" had nearly completed its report.
- (9) Noted the progress of the subcommittee studying "the Status of Entomology in Government".
- Biological Survey:** (10) Noted that "the Pilot Study of a Biological Survey of Insects of Canada" had been completed on 30 June 1978.
- (11) Noted that the Secretariat was working on a 3-month contract (1 July 1978 to 30 September 1978) from the National Museum of Canada.
- By-Laws:** (12) Approved that the By-Laws, Rules and Regulations Committee be made a Continuing Committee of the Society.
- Public Education:** (13) Approved that the Society have a junior development award.
- Scholarships:** (14) Approved that the Society award a second Postgraduate Scholarship Award each year starting in 1980. It would be awarded only if there is a sufficient number of good candidates who have applied.
- Employment:** (15) Agreed that the Employment Committee should be retained.

ACTIONS OF THE GOVERNING BOARD

23 August 1978

- Executive Council:** (1) Approved the make-up of the Executive Council as submitted (F.L. McEwen, President; W.J. Turnock, First Vice-President; S.R. Loschiavo, Second Vice-President; W.G. Wellington, Past-President).
- Trustees:** (2) Approved the names of the Trustees as submitted (E.C. Becker, Treasurer; J.E. Laing, Secretary; D.C. Eidt, Scientific Editor; C.A. Miller, Assistant Scientific Editor; B.J.R. Philogène, Bulletin Editor).
- Committees and representatives:** (3) Approved the make-up of the Committees and the Representatives as submitted (the list is published elsewhere in the Bulletin).
- Employment:** (4) Approved that the Employment Committee produce a booklet containing the resumes of Graduate Students in Entomology in Canada who are looking for employment during 1978-1979 and distribute it to institutions in Canada which employ entomologists.
- Mid-term Governing Board Meeting:** (5) Agreed that the Mid-term Governing Board Meeting be replaced by an Executive Council Meeting during the 1978-1979 year.
- (6) Announced that the next meeting of the Governing Board will be held on 1-2 October 1979 in Vancouver, British Columbia.



ANNOUNCEMENT

The Xerces Society offers modest research grants to support scientific work which has some likelihood of contributing to the preservation of terrestrial arthropod populations as biological entities. XS is an international, non-profit organization dedicated to the conservation of terrestrial arthropod populations and their habitats. Awards will usually be a few hundred dollars but may be larger if funds are available. Knowledgeable young workers and those without formal professional affiliation are encouraged to apply. For details write to:

Dr. Francie Chew,
Xerces Grants Committee Chairman,
Department of Biology, Tufts University,
Medford, Massachusetts 02155,
U.S.A.

BIOLOGICAL SURVEY PROJECT

Review and Synthesis of Knowledge on Northern and Arctic Insects

The Society is pleased to report that its proposal for a "Review and Synthesis of Knowledge on Northern and Arctic Insects" has been funded and established for the period October 1, 1978 until June 30, 1980. This undertaking will provide a major review of the composition, distribution, function and environmental significance of northern insects, including a comprehensive bibliography.

The project is a logical development from the Society's Pilot Study for a Biological Survey of the Insects of Canada (see for example *Bull. ent. Soc. Can.* 10 (2): 70-73), which identified - among other needs - general lack of knowledge on the arthropods of northern areas.

The development of the Biological Survey of the Insects of Canada itself was affected by the fact that the findings of the Pilot Study could of course not lead at once to funding of a continuing survey. And a proposal to carry on the general work of the Biological Survey during an interim period pending evaluation of the findings was not successful. Despite widespread support of the survey idea, Agriculture Canada, lead department for the Pilot Study, was unable to contribute funds to such a proposal and sufficient funds were not available from other interested departments at short notice.

The more specific ("northern") proposal was therefore prepared by the Society. Technically a new proposal, this work consequently qualified for support by Supply and Services Canada, and now continues survey-related initiatives, within a more restricted sphere, until 1980.

The proposal responds to the need for synthesis of the extensive literature on the arthropod fauna of northern Canada, as a springboard for future work. Such a synthesis will enhance understanding of northern insects at a time of increasing concern with northern areas. This concern stems partly from the potential environmental impacts associated with development, especially of oil resources. Assessment of these impacts on both terrestrial and aquatic ecosystems requires a factual base of faunal knowledge. Yet the relevant information on arthropods, which are by far the richest component of the northern fauna, is widely scattered in the literature. Even the early explorers of the Canadian arctic and Greenland made some careful records and observations of insect species. Later the Canadian Northern Biting Fly Survey, and the Canadian Northern Insect Survey visited many sites, to be followed until the 1960s by "studies on Arctic Insects" at Lake Hazen, Ellesmere Island. Subsequent work in Canada has been sporadic, though studies have been carried out through several Universities and occasionally by agencies such as the Geological Survey, and in connection with the International Biological Program. Even so, no comprehensive synthesis of the diverse materials on arthropod distribution has been attempted (even from Canada), and some of the information is very scattered.

Again, a wealth of ecological observations exists (e.g. on activity, behaviour, seasonal occurrence, pollination, cold hardiness) especially from Lake Hazen and Alaska, but has not generally been viewed from a broad northern perspective, nor integrated with salient information from Europe and the U.S.S.R. Moreover, faunal dynamics can now be considered in the light of recently completed IBP programmes emphasizing energy flow and productivity in tundra ecosystems.

The unsolicited proposal to Supply and Services Canada that was funded, essentially unchanged, for the present contract, was submitted in mid-April 1978, and accepted in principle in June. Unforeseen delays in drafting the contract documents within Supply and Services Canada caused the start of the contract to be postponed from the proposed July 1 date, and finally until October 1; even so, the contract documents were not finalized until early November. As a result of the delays, funds for subsequent publication of the synthesis and bibliography will have to be arranged through other avenues.

The work is funded by Supply and Services Canada, National Museum of Natural Sciences, Department of National Defence, Department of Indian and Northern Affairs, and Geological Survey of Canada (Energy, Mines and Resources), to a total value of \$139,564 over the 21 months. The proposal was also supported by Agriculture Canada and Environment Canada. The National Museum of Natural Sciences, in view of its interest in biological inventory and natural history of the country, is lead department.

During the period leading to the signing of the contract, the Society acknowledges the particular help and interest of officials of these departments, and especially of the National Museum of Natural Sciences and the Ministry of State for Science and Technology. The interest of the latter stems especially from the conclusions of recent government science policy that professional societies such as the E.S.C. should play a greater role in the discussion and orientation of work within their disciplines.

The project is to be carried out by a small Secretariat together with a larger consultative Scientific Committee. This Committee comprises recognised scientists from a great variety of regions and organisations, permitting the synthesis to be developed with particular authority, and from a broad national standpoint. This concept has already proven effective in guiding the Pilot Study for a Biological Survey of the Insects of Canada. Provision is also made for consultation with a variety of scientists, and for purchase of some translation services.

The Secretariat, continuing from that of the Pilot Study, is staffed by Dr. H.V. Danks, and Mrs. M. Ridewood, Secretary, and is housed in the Biological Survey Project office at 202 - 1316 Carling Avenue, Ottawa K1Z 7L1 (Tel. (613)-722-8276), next door to the Society's main office. The Scientific Committee, which also retains responsibility for the wider Biological Survey, at present comprises: G.G.E. Scudder (Vancouver), Chairman; G.E. BALL (Edmonton); E.L. Bousfield (Ottawa); K.G. Davey (Toronto); J.A. Downes (Ottawa), Vice-Chairman; A. Francoeur (Chicoutimi); P.P. Harper (Montreal); D.K. McE. Kevan (Ste. Anne De Bellevue); J.V. Matthews (Ottawa); F.L. McEwen (Guelph); R.F. Morris (St. John's); D.M. Rosenberg (Winnipeg); I.M. Smith (Ottawa); A.D. Tomlin (London); G.B. Wiggins (Toronto). Two members are still to be appointed. A first meeting of the Scientific Committee has been arranged for December 14-15 1978, in Ottawa.

The Society believes that this most recent contract will be of real value not only in its own right, but also as a mirror of the Society's concern with the orientation of entomological science expressed through the longer-term Biological Survey Project.

Postscript to the Pilot Study

Canada and Its Insect Fauna is now in press and galley proofs of some sections are already available; the volume will be somewhat larger than originally anticipated. Copies of the *Final Report* of the Pilot Study, in addition to those held by members of the Scientific Committee and by interested government departments, have been deposited in the following libraries:

National Research Council, Ottawa, Ontario
Biosystematics Research Institute, Agriculture Canada, Ottawa, Ontario
University of British Columbia, Vancouver, British Columbia
Simon Fraser University, Burnaby, British Columbia
University of Alberta, Edmonton, Alberta
Agriculture Canada Research Station, Lethbridge, Alberta
Agriculture Canada Research Station, Saskatoon, Saskatchewan
University of Manitoba, Winnipeg, Manitoba
Forest Research Centre, Sault Ste. Marie, Ontario
University of Guelph, Ontario
University of Waterloo, Waterloo, Ontario
Memorial University of Newfoundland, St. John's, Newfoundland

SECOND INTERNATIONAL CONGRESS OF SYSTEMATIC AND EVOLUTIONARY BIOLOGY (ICSEB-II)

The second International Congress of Systematic and Evolutionary Biology (ICSEB-II) will be held at the University of British Columbia, Vancouver, Canada, 17-24 July 1980.

The provisional list of symposia topics include:

1. Arctic refugia and the evolution of arctic biota
2. Origins and evolution of the North Pacific marine biota
3. Evolution of reproductive strategies
4. Evolutionary epigenetics
5. Evolution of community structure
6. Green algae and land plant origins
7. Macromolecular mechanisms in evolution
8. Allozymes and evolution
9. Coevolution and foraging strategy
10. Evolution of colonizing species
11. Rare species and the maintenance of gene pools
12. Paleobiology of the Pacific rim

Additional symposia may be included.

Sessions for contributed papers and for papers in specialized fields, taxonomic as well as methodological will also be organized.

Those interested in receiving an information circular in the spring of 1979, should write to the following:

Dr. G.G.E. Scudder
Department of Zoology
The University of British Columbia
2075 Wesbrook Mall
Vancouver, B.C. V6T 1W5
CANADA.

THIRD EDITION OF INTERNATIONAL CODE OF ZOOLOGICAL NOMENCLATURE

In 1979 the International Commission of Zoological Nomenclature plans to have the third edition of the Code ratified at the meeting of the Zoological Section of the International Union of Biological Sciences in Helsinki.

Members of E.S.C. who wish to obtain a copy of the Draft Code and a separate paper on the changes should contact Mr. R.V. Melville, Secretary of I.C.Z.N., British Museum (Natural History), Cromwell Road, London, SW7 5BD, England.

Draft of Third Edition of Code — Ordinary post	—	£2.50
Airmail post	—	£5.00
Separate explaining changes		.50p
International Code of Zoological Nomenclature, Second Edition, 1964.		£2.00
Amendments to Second Edition.		£1.00

BOOK REVIEW

GUIDE TO THE STUDY OF ANIMAL POPULATIONS. James T. Tanner. The University of Tennessee Press: Knoxville. 186 pp. \$U.S. 8.95.

The age of environmental impact assessment is upon us and an increasing proportion of biology students are being employed after graduation to evaluate the status of animal populations. The important things we can teach them in their undergraduate training are (1) how to apply quantitative techniques to the study of populations (2) to be critical of the use and interpretation of these techniques and finally (3) to be sensitive to the influences of interactions between organisms. Tanner's recent book, *A Guide to the Study of Animal Populations*, makes a useful contribution to the achievement of the first two of these three goals.

What has been needed in the area of quantitative ecology is a book which introduces population techniques without overwhelming the student in a barrage of detail. In this relatively short book, sampling methods, methods of population estimation, and the study of population rates: mortality, survival and growth rates, are described. A final chapter briefly discusses computer simulations with the final warning that computer models are no better than the data which was used to construct them.

The book is readable. Examples are used to describe techniques and references are given to other works which provide more detail or further discussions. Therefore, it is a useful introduction to the techniques and a guide to other pertinent literature. The level of the book is appropriate for 3rd and 4th year students and would be a good starting place for a course on mathematics relevant to ecology. It also could be a helpful handbook for people whose biology background has been weak in quantitative techniques, but whose present jobs require familiarity with population studies.

Specific trapping or estimating techniques aren't covered by Tanner but the appropriateness of quantitative methods for different types of organisms is considered. For example growth rates of populations with repeated reproduction by adults and a short reproductive season as typical of many vertebrates is distinguished from continually reproducing organisms (humans) and those with only one reproductive period before death (insects). Approximately half the book is devoted to population rates and techniques for estimating survival rates, mortality rates, and population growth rates. Life tables are central to the discussions.

I felt that one weakness of the book was the chapter on measuring population dispersion. Although references were given to other works, a more extensive digestion of this problem would have been useful. Another useful addition to the guide to population techniques would have been the inclusion of problems so that the students could test and practice their newly gained knowledge of techniques. In general however, I think the book is a useful contribution to quantitative ecology.

Judith Myers
Institute of Animal Resource Ecology
University of British Columbia

BOOK NOTICE

Romberger, J.A. (Editor). 1978. *Biosystematics in agricultural research*. Beltsville Symposia in Agricultural Research No. 2. Wiley, New York. xii + 340 pp. \$US 24.00.

This book presents the invited papers given at a symposium held in May 1977 at the Beltsville Agricultural Research Center. There are 18 papers by 23 authors. Only 1 paper has insect systematics in the title (there is 1 on Protozoa, 1 on seeds, 2 on nematodes, and 2 on

fungi), but 11 papers are general and several of these reflect the entomological bias of their authors. However, those not written by entomologists could well be more useful to insect systematists than those that take an entomological perspective. The general papers range widely in their subject matter, from the old question "What is a species?" (A. Cronquist, a botanist), through Ecosystematics (J.A. Duke), Molecular Phylogenetics (L.H. Throckmorton), and Museums (R.H. Foote), to the ever-present question of a vital science, "Where do we go from here?" (J. Heslop-Harrison, E. Monroe).

BOOK RECEIVED

Smith, K.G.V. 1973. Insects and other arthropods of medical importance. xiv + 561 pp. British Museum (Natural History) (John Wiley).\$US 36.00.

Addendum

("COLLECTIONS OF CANADIAN INSECTS AND CERTAIN RELATED GROUPS")

Add to page 3:

British Columbia
Victoria

Biology Department, University of Victoria,
Victoria, B.C. V8W 2Y2

20,000 Insecta; mostly B.C., with special emphasis on Vancouver Island; space and equipment limited.

INSECT COMMON NAMES — NOMS COMMUNS DES INSECTES

The Committee for Common Names of Insects is waiting to receive proposals. Information required is outlined on the standard proposal form, available from the Committee at the address given below. Please answer each of the questions as fully as possible.

Dept. of Biology
Wilfrid Laurier University
Waterloo, Ontario N2L 3C5

W.Y. Watson
Chairman

Le Comité des noms communs des insectes aimerait recevoir des soumissions. L'information requise se trouve dans le formulaire disponible à l'adresse donnée ci-dessus. Veuillez répondre aux questions aussi complètement que possible.

ENTOMOLOGIST

The Museum of Zoology of The University of Michigan invites applications for a joint appointment with the Division of Biological Sciences as an Assistant Curator of Insects and Assistant Professor of Biology, beginning as early as July 1, 1979. Applicants must have a Ph.D and must have a demonstrated commitment to systematic and evolutionary studies of insects, and to teaching. Four letters of recommendation, curriculum vitae, and copies of publications should be sent to Dr. Thomas E. Moore, Museum of Zoology, The University of Michigan, Ann Arbor, Michigan 48109, *no later than February 15, 1979*. The University of Michigan is a non-discriminatory affirmative action employer.

A LA RECHERCHE D'UN EMPLOI?

Le Comité de placement de la S.E.C. se propose de compiler, publier et distribuer gratuitement une brochure donnant les c.v. des membres étudiants et réguliers de la société à la recherche d'un emploi. Cette brochure sera envoyée à tous les employeurs d'entomologistes au Canada. En consultant cette publication lorsqu'un emploi sera disponible, un employeur sera en mesure de contacter immédiatement les candidats appropriés dont les noms apparaissent dans la brochure.

Ceux qui désirent être inclus dans la brochure devront remplir le formulaire préparé à cette fin. Ce questionnaire sera aussi flexible que possible afin de satisfaire le plus grand nombre. Tous les étudiants membres de la SEC recevront ce questionnaire par la poste, tandis que les autres membres devront en faire la demande à l'adresse qui paraît plus bas.

The Chairman
Employment Committee
Entomological Society of Canada
c/ Dept. of Environmental Biology
University of Guelph
Guelph, Ontario N1G 2W1

Toutes les demandes à cette fin devront être reçues le 15 janvier 1979 et les questionnaires retournés le 30 janvier 1979.

LOOKING FOR A JOB?

The Entomological Society of Canada Employment Committee proposes to compile, publish and distribute, free of charge, a brochure containing resumés of Entomological Society of Canada student and regular members who are seeking employment. This brochure will be sent to all present employers of entomologists in Canada. By consulting this publication when a job becomes available, an employer will be able to immediately contact suitable candidates listed in the brochure.

Those who wish to be included in the brochure will be asked to submit resumés in a standard format by answering a questionnaire. This questionnaire will be made as flexible as possible to accommodate all. All present student members of the E.S.C. will receive these questionnaires through the mail while other members should request a questionnaire from:

The Chairman
Employment Committee
Entomological Society of Canada
c/o Dept. of Environmental Biology
University of Guelph
Guelph, Ontario N1G 2W1

All requests for questionnaires must be obtained by January 15, 1979 and questionnaires returned by January 30, 1979.

SIMON FRASER UNIVERSITY

BRITISH COLUMBIA, CANADA

DEPARTMENT OF BIOLOGICAL SCIENCES

ENTOMOLOGIST

The Department of Biological Sciences invites applications for a tenure track position in entomology. The successful applicant will be expected to develop a strong research programme and to participate in the teaching programme at both the undergraduate and graduate level including courses in the Master of Pest Management Programme. Candidate must have a Ph.D. degree in entomology or related subjects; preference may be given to individuals with teaching and research experience in agricultural pest management. The position is available, subject to budgetary constraints, from 1 September 1979. The initial appointment is for a period of 2 years, renewable. Salary will depend on experience; the base salary for the Assistant Professor rank currently is \$18,604 per annum.

* * * * *

POSITION AVAILABLE

Advertizing agent to work on a commission basis. Ideal for retired person. Contact R. DeBoo, F.P.M.I., P.O. Box 490, Sault Ste Marie, Ont. P6H 5M7.

Agent de publicité pour travailler à commission. Idéal pour personne retraitée. Contacter R. DeBoo à l'adresse ci-dessus.



MEETING ANNOUNCEMENTS

Third Eastern Spruce Budworm Research Work Conference
17-19 January 1979. University of Maine,
School of Forest Resources, Orono.

Contact: Dr. John Dimond,
313 Deering Hall,
University of Maine,
Orono, Maine 04473
(phone 207-581-7704)

for program and accommodation information.



ENTOMOLOGICAL SOCIETY OF CANADA

ENTOMOLOGICAL SOCIETY OF B.C.

October 1-4, 1979 — Holiday Inn, City Center — Vancouver, B.C.

SYMPOSIUM I — "Decision making and pest management"
SYMPOSIUM II — "Insect growth regulators"

Further information: Dr. P. Belton, Simon Fraser University, Burnaby, B.C. V5A 1B6.

ENTOMOLOGICAL SOCIETY OF CANADA
OFFICERS AND COMMITTEES
1978-1979

Executive Council

F.L. McEwen (President) W.J. Turnock (1st Vice-President), S.R. Loschiavo (2nd Vice-President), W.G. Wellington (Past President).

Trustees

E.C. Becker (Treasurer), J.E. Laing (Secretary), D.C. Eidt (Scientific Editor), C.A. Miller (Assistant Scientific Editor), B.J.R. Philogène (Bulletin Editor).

Committees

Achievement Awards Committee

W.J. Turnock (Chairman).

Annual Meeting Committee

J.C. Arrand (Chairman, 1979), J.N. McNeil (1980), J.A. Shemanchuk (1981), W. Preston (Photo Salon).

Elections

R.J. Finnegan (Chairman), J.A. Doyle, W.B. Smirnoff.

Employment

D.J. Madder (Chairman), L.A. Miller, D.G.R. McLeod.

Fellowship

J.R. Blais (Chairman, 1980), J.L. Auclair (1979), D.A. Chant (1979), M.D. Proverbs (1980), F.J. Bird (1981), G.C. Cooper (1981).

Finance Committee

R.F. DeBoo (Chairman), J.S. Kelleher, G. Howse, P. Fast, J.C. Edwards, J. Cunningham, D.H.C. Herne.

Heritage Committee

A.W. McPhee (Chairman), C.V. Morgan, R. Paradis.

Insect Common Names and Cultures Committee

W.Y. Watson (Co-Chairman), J.S. Kelleher (Co-Chairman).

Membership Committee

H.F. Madsen (Chairman), A.P. Arthur, J.C. Conroy, H.J. Herbert, R. Martineau, R.D. McMullen, L.A. Jacobsen, P.W. Riegert.

Subcommittee on Membership

R.W. Stark, M. Tauber, P.W. Riegert, W.H. Foott.

Subcommittee on Sustaining Memberships

A. Ashraft, E. Hagley, D. Bushell.

Subcommittee on Honorary Membership

R.D. McMullen, H.J. Herbert, R. Martineau, R.W. Fisher, J.C. Conroy, A.P. Arthur, J.A. Shemanchuk.

Nominating Committee

W.G. Wellington (Chairman), A.R. Forbes, G.G.E. Scudder.

Publications Committee

G. Pritchard (Chairman), J.M. McLeod, R.J. Lamb, R.P. Bodnaryk, J.D. Shorthouse, C.R. Ellis.

Scholarships Committee

R.A. Morris (Chairman), B.S. Heming, E.F. Johnson, A. Tomlin, J.H. Myers.

Science Policy and Public Education Committee

S.R. Loschiavo (Chairman), R.K. Stewart, J.N. McNeil, W.B. Friend, R.A. Ellis, T.D. Galloway, Robert Trottier.

Scientific Committee for Pilot Study of a Biological Survey of the Insects of Canada

G.G.E. Scudder (Chairman), J.A. Downes (Vice-Chairman).

Ad Hoc Committees

Committee on Entomology in Government

D.E. Bright (Chairman).

Committee on Funding University Research

J.P.M. MacKauer (Chairman).

Extension Study Committee

R.J. Witman (Chairman), R.F. DeBoo, H.G. Philip, W.J. Turnock.

By-Laws, Rules and Regulations Committee

M.E. MacGillivray (Chairman).

Representatives

SCITEC

S.A. Hill, W.N. Yule (alternate).

Canadian Committee on Water Pollution

D.M. Rosenberg.

Canadian Committee on Animal Care

A.E.R. Downe.

CSA Committee on Common Names for Pest Control Chemicals

L.R. Roadhouse.

Biological Council of Canada

F.L. McEwen, R.K. Stewart, J.A. Downes.

