that future students have broadened, non-entomological training, especially to include exposure to and communication with non-entomologists including professionals in other fields and with the public. Please bear in mind that this is this morning's discussion, however.

I hope that I have done reasonable justice to thoughts given by those involved in the preparation of the product and will now turn this over to Martin Chance whose responsibility will be to summarize views of the users of the product.

Afternoon Session

Rapporteur – M. A. C. Chance
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Bill Mason began with what he hoped was a pessimistic view of the future of the great systematic biology collections in Canada and the U. S. With static financial support, systematists will be expected to cope with an ever-increasing inflow of new specimens and an ever-increasing number of requests for identification. Eventually, conditions will become such that identification will become slow or impossible. Large portions of valuable collections may be destroyed because they were neglected and large amounts of data will become unretrievable. Dr. Mason points out that to avoid this dismal future those of us interested in the maintenance of museums must agitate for increased museum support. The second problem, he tells us, is the conservative nature of the taxonomists themselves. They retain old, time-consuming nomenclatural and information retrieval methods which could be replaced by a fast, computerized validating service. As well, with the help of computers, much of the routine identification could be carried out by technicians. Will the computer replace the scientist? Dr. Mason thinks not. The computer cannot extract new data from unworked specimens nor can it replace the research brain. Is the taxonomist likely to run out of material? The Insecta are not only the most numerous of all living creatures but are also the least known. Largely due to expansion of Canadian facilities in the 1960's, the production of Canadian Ph.D.'s now far exceeds the demand for them. Continued overproduction is a disastrous policy. Dr. Mason suggested what he feels are two reasonable courses of action. First, lowering production and second, convincing employing agencies that more entomologists are needed. The first has been unsuccessful hitherto as can be seen by the present employment situation. The second involves salesmanship – the conversion of something thought to be a luxury into a necessity in the minds of those with enough money to pay for it. The popularity enjoyed by environmentalists and conservationists should be the key to this sales approach. Dr. Mason thinks the university should be in advertising but also that all entomologists should be involved. Our public image as a group must be improved.

Neil Holmes began by indicating that the CDA has, in the past, been the largest employer of entomologists in Canada and that, within the next eight to 13 years, it will require 60 to 80 new entomologists. This demand will be modified by the capacity of entomologists to explain the importance of their research, by additional dramatic outbreaks of pest species such as that of the Bertha armyworm last summer, and by public reaction to the use of insecticides. Dr. Holmes indicated that most entomologists in agricultural research are in applied fields. Those involved with relatively pure research are decreasing in numbers. There is a general trend towards programs with an interdisciplinary approach. Whatever the research, the agricultural entomologist becomes involved in a wide range of activities directed to the management of insect populations. How should an agricultural entomologist be

trained? Dr. Holmes says that of the 88 main branches of the seven major sciences, applied entomology has associated with it 32. A wide background is thus essential. The study of foreign languages should, perhaps, be replaced by increased emphasis on English composition and grammar. Theses should be written as scientific papers to be published in refereed journals. The skills of communication should be increasingly developed. The entomologist in the next two or three decades, Dr. Holmes feels, will carry on research similar to that of today. Our knowledge of behaviour and ecology of many pest insects is still inadequate. Many pest species remain to be identified. New techniques, such as the use of pheromones, must be adequately tested to avoid past mistakes. Entomologists will integrate their efforts more with those of other specialists. Dr. Holmes feels that the university entomology department should include staff members who have professional experience as entomologists. These members might better understand the needs of society. Students interested in research should be encouraged to seek work at research establishments during the summer. Those entering grad studies should work at such establishments for one or two years before proceeding to terminal degrees. Such experience might help the beginning student in choosing a research proposal.

George Cooper believes that there is a need to reintroduce the study of insects into public and high schools. Little is done at these levels to create a favourable image, or an understanding, of insects. There is probably even a tendency to create an adverse reaction to insects at this level. He believes that entomologists with different specialties have become far too fragmented – far too isolated from the activities of other biologists. Broad biological background no longer seems to be provided to the entomology student. The trend toward basic research is so extensive that applied entomologists are sometimes in short supply. Industry and government need applied entomologists. Dr. Cooper feels that there is a need for a long term survey to determine Canada's future needs for entomologists. With this as a guide, the universities should become more selective when taking on new students. On-the-job training for university students should be encouraged. Dr. Cooper believes that there is a need today and that there will be a need in the future in industry for entomologists with broad backgrounds in biology and chemistry. Today's graduates do not fulfill industry's needs. Advertisement and especially improved communication may overcome this problem. Dr. Cooper believes there is a need for some consideration of psychiatric problems caused by insects. There is also a very large need for the personal counselling of students by university staff. Dr. Cooper is also alarmed by the lack of interest, desire, enthusiasm and salesmanship evidenced by university staff themselves.

I will try and sum up what has transpired this afternoon in four points.

1. Both public and government should be made aware that entomologists are necessary and not a luxury. However, the activities of entomologists should not be directed solely towards solving entomological problems arising in a free enterprise economic system, since some of the assumptions supporting such a system are questionable.

2. A favourable view of insects should be encouraged at all levels of our school system.

3. Input should be provided for graduate schools so that their graduates are of use to those hiring entomologists. I hope, in the future, that we won't again have as much negative feedback from employers as we did today.

4. A narrow education in entomology should be avoided in this day of problems requiring multidisciplinary answers. If the languages of chemistry, physics and mathematics have too strong an industrial accent, then we should develop entomological dialects to fill our requirements.