

Conversation

with Ken Davey

The chairman of York's Biology Dept., Dr. Ken Davey, is an internationally-known insect physiologist. A fellow of the Royal Society of Canada, he is an acknowledged leader in the Canadian scientific community. Dr. Davey agreed to speak to James Carlisle about Canadian science policy and about being a scientist.

Does Canada have a science policy?

In the past ten years or so, since people have become interested in science policy, it has been popular to say that Canada doesn't have one. I think that is demonstrably false. Canada has had a science policy; it just hasn't been a very good one.

What has the Government's science policy been with respect to universities?

The whole question of a science policy is a very difficult one to tackle if you subscribe to the view, as I do, that the appropriate sort of science for university people to undertake, is so-called pure research. Since universities are set up to do pure research, defined as that research which is impelled by the investigator's curiosity, there is only one important question of science policy: how much money is available?

Someone made the decision in 1969 that the rate of increase in monies going to universities was too great, and halted the increase. There has been a moderate increase in real dollars since 1969 which, if one now views them in inflated dollars, means that there has been a de facto decrease in real funding.

Hasn't a policy of encouraging 'goal-oriented' research been announced recently?

There has been a feeling generated within the Government generally, that the universities are not doing enough 'relevant' research. That's not a statement which I can even pretend to understand. 'Relevant' research, I presume, means research-oriented towards Canada's national social goals. That means applied research by my definition.

Isn't "applied research" just another way of saying "technology"?

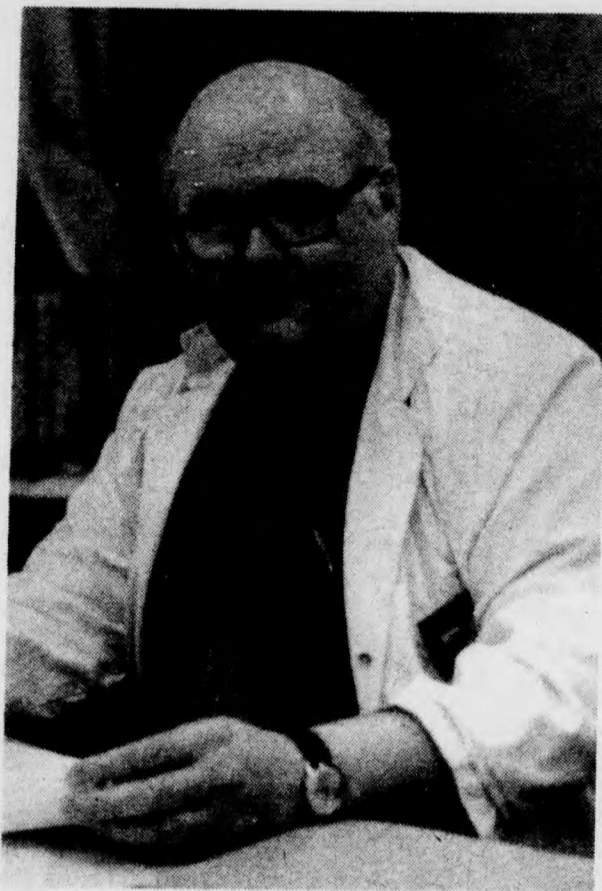
Yes. I have some real difficulties with that. You see, I don't think that any university professor really wants to do research which is irrelevant. I think that we have to recognize that all applied research rests firmly on a base of pure research. This was demonstrated in an article published in *Science* two years ago by Comroe and Dripps. They were a couple of investigators in medicine in the United States who tried to quantify the relationship between pure and applied research. They took ten major advances in medicine and traced back the developments which led to them. Upon examining the research papers announcing these developments, Comroe and Dripps found that about half of them involved pure research with no thought of application at all. So the payoff from pure research is really quite good.

After the Government decides how much money is to be spent on research, they give it to the Natural Sciences and Engineering Research Council (NSERC). Then who decides what specific projects are going to be funded?

Increasingly, it looks as if officials within NSERC are beginning to develop policy. The decision to expand the strategic grants programme has been the result of negotiations between NSERC and the Treasury Board. It seems that the Treasury Board sees that this is potentially contributing to Canada's national and social objectives and they find it easier to open the coffers because of this. That is the attitude which frightens me. I would much prefer that the Treasury Board be educated about the intrinsic value of pure research.

What is the 'Strategic Grants' programme?

NSERC and the National Research Council before them have developed the concept of designating areas of national importance. In a separate grant competition relevance of research in these areas is considered in assessing grant applications. This has been stated to be funding of pure research, but, what concerns me is that they are perceived of as funds for applied research. However, the small amount given to these programmes and the way they are administered assures that no more usable results will



Bryon Johnson

come from this programme than from the regular operating grants.

How is the money for normal operating grants to scientists distributed?

The distribution of money among the various disciplines within the operating grants scheme is a decision which is made by the allocations committee of NSERC which is made up of members of the council who are either academics or non-academics. They distribute money among the committees representing each subject area. For example, there are four committees for life sciences - animal biology, plant biology, population biology and cell biology and genetics. These committees are composed of distinguished, working scientists who try to fund an individual scientist's efforts rather than giving money for specific projects. The committee takes several factors into account when reviewing applications. One of their chief considerations is the general standing of the scientist as revealed by his publications. The turn-down rate for the biology committees is about 25 to 35 per cent. I think we can safely say that there aren't any bad scientists doing bad research in Canada at the present time.

How well has York's Biology Dept. done in the grant competition?

There's no doubt that, for its size, York's Biology Dept. is doing astonishingly well. We have a very research-oriented department. In terms of attracting funds, we have had very dramatic increases. Remember this is at a time when merely to maintain oneself is regarded as successful. In the 1978-79 year, we received \$992,540.00.

How do you assess York's output of good Biological research?

If you have any faith in the granting system, research quality must be related to funding. I think York does rather well there too. To my knowledge, York has received the three largest grants to the life sciences by NSERC. That can't be just an accident. The size of our graduate programme has been maintained at a time when graduates are hard to come by which shows that they find it an interesting place to come. Post-doctoral fellows are scarce but according to last year's figures although York is only one of 90 non-medical life science faculties in Canada we employed 15 per cent of the post-docs in the country.

What are the prospects for a student graduating from York with an MSc. or a Ph.D.?

That's very hard to say. There we are in the hands of science policy. I have taken a long-range view of the situation. If one looks at the places which have traditionally employed Ph.D.'s and anyone who gets a Ph.D. has only one model—a professor—there are no, or at least very few, jobs. It must also be added that those places which do hire Ph.D.'s also have some difficulty

in finding them. Having said that you must understand that we have an underfinanced system of research and development. Canada spends 0.9 per cent of its Gross National Product on research and development. That's less than India spends; it's probably about the same as Ireland. Other civilized western nations spend about 2½ times that. The present Government has committed itself to increasing our spending on research to 2.5 per cent of the GNP by 1985. A second important fact is that in the ten years starting in about 1992 fifty per cent of all the Biology professors in Canada will retire. It takes about nine years of University training and at least three years as a post-doctoral fellow to produce a good academic scientist. With graduate enrollments plummeting and undergraduates turning away from science it is already too late to produce enough scientists for the 1990's.

Yes, but what do we do for the intervening twelve years?

Putting aside for the moment the promised 2.5 per cent of the present government, if we were to go to 1.5 per cent of the GNP by 1983 as promised by the former government, that would represent an enormous increase of 60 per cent over our present funding. After we refurbish and replace equipment which is running down, we could afford to hire more people. What many of us have been arguing for is a system of five-year appointments administered and paid for nationally by NSERC. They would also include operation grants and salaries which would go up into the range of assistant professor. If these were made attractive enough, we might well find that some people who are presently occupying University posts might move into these positions. This programme would provide a cadre of well-trained people available here. The problem is that if we were to create five hundred of these positions now, we could not find enough Ph.D.'s to fill them.

It seems that we have spoken about many disadvantages in becoming a scientist. Why would anyone want to become a Biology Professor?

I can tell you a number of motives that people shouldn't have. They shouldn't be interested in money. While the salaries offered to academics are comfortable they are not, even in the upper range outrageous. I think that you become a scientist because you can't help it. Anyone who goes into it because they regard it as a suitable job is fooling themselves. You have to really like a life of research. Particularly as an academic scientist you have to look forward to fifty hours a week as an absolute minimum. For the people in this department that is very much a lower figure. It helps awfully to be intelligent and imaginative. Without those you are not going to go very far but, particularly in biology, hard work can substitute a little bit for those qualities. Of course, if you like it, it isn't viewed as hard work.

Why do you study insects instead of working on a cure for cancer?

I could be very noble and say that insects kill more people in a year than cancer does in ten. Until DDT started to control malaria, half of the world had that disease and the incidence of that disease is creeping up again. That is not the reason for studying insects at all. Insects hold an enormous fascination for those people who are interested in them. What gets people into science is very peculiar and highly personal.

What was your motivation?

What moved me into biology was a book which I read many years ago, when I was a very young teenager. I knew from that instant that biology was for me. It was Joseph Needham's *Chemical Embryology*. I even found Darwin's *Origin of the Species* interesting while I was a high school student which shows a degree of perversity since it is an extremely dull book. For me the decision came very early in life.

Why should society then subsidize your interest?

I subscribe to the view that science is part of the culture of any civilized society but the answer requires more than that. The sufficient answer brings us back to the beginning of our conversation and the work of Comroe and Dripps. We cannot predict what the timing and precise nature of any applied advance will be but we do know that any such advance will arise from the pure research motivated solely by the investigator's curiosity.