

the contrary, I think this is an opportunity. Certainly we have had too few of those people in the past. Certainly, also, a lot of those will, I think, go into the other educational fields, such as community colleges and so on, and it may be even into high schools, which might be a good thing.

Also, in the past, there really has been no competition for a position. Every graduate during the past ten years was immediately offered perhaps half a dozen jobs to choose from. There has been no competition for any of those positions. Now, for the first time, there might be some competition, which may not be a bad thing.

By and large, I hope that some of these resourceful people, well-trained, will become scientist-entrepreneurs and perhaps start up their own industries.

I certainly would not regard the number as an embarrassment.

Also, as I have pointed out, there is quite a number of foreign students in this group. I do not think we are anywhere near producing too many Canadian Ph.D.'s. Of course, in the past, we have had to rely very largely on the supply of foreign-trained scientists, through immigration and recruiting abroad. We have gained tremendously by this, and I suppose it is reasonable that we are prepared not to train some foreign students in Canadian universities.

By and large, the number of Canadian Ph.D. graduates is not an oversupply and, of course, this varies in different disciplines.

I agree with you that the NRC will certainly be taking initiatives to try to find ways and means as to how these directions I have indicated might be promoted and encouraged, and we certainly will be coming up with proposals.

**Senator Lang:** If I may still have your attention, Mr. Chairman, I would like to direct a few questions to Dr. Schneider, and I hope I am not labouring a point.

I would like to revert to my reference to the article in *Minerva*, written by Dr. Rudd, where it is strongly suggested that expenditures on pure science are not in the best interests of at least the economic development of any country and, in this case, he is specifically referring to Great Britain. However, I imagine this applies even more to Canada.

Dr. Rudd in his article states:

(1) Those figures which have so far been published for the research and

development expenditure of industrial countries show no relationship between the level of research and development expenditure and the rate of economic growth.

(2) Discoveries in pure science do not necessarily stimulate the production of inventions...

(3) The purchase of "knowhow" by a firm or even a country can play a more important part in technological advance than the firm's or the country's own research and development.

I suggest, Dr. Schneider, if there is any merit whatsoever in these observations, that perhaps the course the NRC has been following in connection with the expenditure of public funds on pure science, either in house research or universities, may very well have been a misapplication of funds. May I have your reaction to that?

**Dr. Schneider:** First of all, I think this question has been studied a great deal, as you know, by OECD—the Organization for Economic Co-operation and Development—in recent years. The difference, for example, between industrial development and industrial innovation in Europe and in the United States is that Europe did not really perform as well in the application of industrial exploitation, even though it is true there is a very competent fundamental science in Europe. Now, I believe it would be inaccurate to say that you could have a strong industrial science without also having some basic science, or what we have called a strong indigenous science. If you look at any advanced industrial country you will see that they have this. If you do not have this strong indigenous science and some good scientists who are in contact with front-line science who know what is going on elsewhere then, of course, you cannot have the other either. They would not be able to assimilate the science that is being developed elsewhere to exploit it for their own purposes. That is one side of the story. On the other side, the question of industrial innovation raises other problems. I do not feel that you can have a strong industrial country without having a strong indigenous science as well, because they go together. However, you could have a strong science without having industrial exploitation and this, of course, is what European countries, as well as Canada, are worried about. There are many other problems