

I still maintain what all experts since Aristotle have asserted, that the two intellectual processes leading to a scientific discovery and to a technological innovation are quite different. Moreover, the distinction between the two in my view, and I think in the view of the members of the committee, is basic to a proper formulation of a realistic science policy. The purpose of science and the task of the scientist are to take reality as it is and to discover the laws which explain the behaviour of man and nature. This explains why the scientist must be passive and contemplative if he is to observe and explain new phenomena, but this methodological attitude does not make basic research inferior as a human activity, as Dr. Gunning apparently believes we consider it to be. On the contrary, in my view, basic research and scientific discovery is the noblest human endeavour which requires freedom to attain excellence. At the other end of the spectrum of science activities, the search for new technology is based on man's innovative genius and its purpose is to change reality. It is creative and active because it is essentially an agent of change and it cannot be left uncontrolled because it can have, as we all realize now, great beneficial effects but also a tremendous negative impact on man, society and nature.

I hope that, on reflection, Dr. Gunning will accept these distinctions as meaningful and will understand the important implications they have for science policy. The Government, as the guardian of the public interest, cannot accept the application of the premises of the Republic of Science to the search for new technology and innovation. On the other hand, if it were to apply a strategy appropriate for the development of new technology to basic research, it would be the end of the Republic of Science so cherished by Dr. Gunning.

If these distinctions made in our report had been more seriously considered by our critics, a good deal of misunderstanding could have been avoided. It is not our fault if internationally accepted definitions of science policy cover basic science, technology and innovation. These definitions are justified because these three different types of activity are more or less related to each other, but even politicians can understand that they should not be subjected to the same government strategy and the same kind of supervision. Thus the approach that we recommend to sustain our whole science effort is pluralistic, not simplistic as Dr. Gunning contends.

At the beginning of our inquiry there was much confusion about this broad concept of science policy. Engineers told us, for instance, that they were not scientists and therefore they were not concerned with science policy. When scientists heard about science policy, they immediately thought that "the Russians are coming" and that if such a policy were to be formulated systematically they would inevitably be subjected to regimentation and lose their freedom. I was under the impression that these confusions had disappeared after the views that several members of the committee expressed in public and as a result of the publication of Volume I.

In the report, for instance, we did not express any opposition to the freedom that the concept of the Republic of Science implies for the pure scientist. But we said:

"It is when the concept of the Republic of Science is proposed as a general strategy for the organization of the national R & D effort that it becomes completely unacceptable."

We also referred to Polanyi's description of the Republic of Science as a system in which "each scientist keeps making the best contribution of which he is capable and on which no one can improve," and we stated that when such a condition is met, "most people would agree that the scientist should be left completely free, within certain financial limits, to determine his own activities." We went on to say: "Excellence is so rare that it must remain free." In other words, while we are opposed to uncontrolled grantsmanship, we firmly believe in the freedom for real scholarship.

To me, this is a clear and straightforward statement. Yet, Dr. Herzberg, who is a very distinguished scientist, after having read the report, had this to say:

It is the thought of a centralized structure... that so frightens the scientists, since they are only too aware that no country in the world has been able to reconcile successfully a vital and creative science with bureaucratic centralization... If the senators think that politicians should have a hand in scientific decisions and the control of scientific laboratories, they only invite disaster as far as the development of science in Canada is concerned.

How can Dr. Herzberg raise this false issue after he had read what I have just quoted from the report: "Excellence is so rare that it must remain free."

Dr. Herzberg also quotes the British Council for Scientific Policy which stated in its first report:

Science policy does not direct the advance of scientific knowledge, though it may well be concerned to encourage or to direct the application of the results of scientific advances. The tasks of science policy are of another kind: to maintain the environment necessary for scientific discovery; to ensure the provision of a sufficient share of the total national resources; to ensure that there is balance between fields and that others are not avoidably neglected; to provide opportunities for interfertilization between fields and between the scientific programs of nations.

Dr. Herzberg approves this quotation but then adds: "I fear that the senators would not agree with this definition." I do not really know what is the basis for his fear. Personally, and I am sure that I speak for all members of the committee, I fully agree with the definition given by the British Council for Scientific Policy. In addition, I share Dr. Herzberg's concern about the fashionable search for major science programs and his faith in what is usually called "little science".

We made it clear in our report that such major programs had not been too successful in Canada in the past. Thus, I fail to see any real disagreement between the committee and Dr. Herzberg on how pure scientists and basic research should be treated within the framework of a pluralistic strategy for science, technology and innovation. Perhaps, on reflection, he might come to the conclusion that senators do understand science better than he