

research, oceanography, pollution, etc. In all of those fields, I suggest there should be some over-all government policy, or at least guidelines, before departments and agencies are allowed to embark on ad hoc expenditures which may often determine, but not follow government policies.

The future policy of the government very often is determined by the activities and expenditures of government departments, without any reference to government over-all policy. This may not have been so wrong in the past and there was little complaint in the early days, but it should not be acceptable today.

There is little doubt that the early research in agriculture—that did so much for western Canada, which would be a desert were it not for the development of rust resistant wheat—was probably started as departmental scientific policy rather than broad government policy. But the expenditures were small and the work was done by real experts and no one could object, but today in all such fields there should be some over-all policy.

I would like to emphasize another facet with which broad government policy must be concerned. Today the opportunities for important research projects far exceed our available research manpower. This raises one of the most urgent and difficult questions—priorities—how to evaluate the relative importance to our own country, of the competing areas for research. I do not underestimate the value of dollars by any means, but the most important thing in promoting research is not dollars: it is qualified people. One thing we must always keep in mind is that if more dollars are provided than are required by available qualified people, the returns proportionally will be less in quality and quantity.

Determining priorities, of course, must involve matured scientists in establishing criteria for evaluating projects, but as the central concern is the good of the country the final broad decisions are matters for national policy. This is not something easy to achieve. People in all specialties are naturally crusaders and rightfully terribly enthused about their own specialties. As an example, medical scientists feel extension of medical research is the most important and urgent need of our country. A similar situation exists in all other broad areas such as welfare, space research, atomic energy and all other broad fields of scientific activity. They all feel Canada is fall-

ing behind in the parade if their specialties are not greatly extended. This makes it difficult. How do you write criteria? How do you establish relative importance and how do you read the future? There is no quick easy answer but this type of problem should, in my view, be of primary concern to your committee.

I would now like to speak briefly about the way in which Canadian science has developed. Up until the beginning of World War II, which is not very long ago, scientific research and development was treated very much like art, poetry and music. It was very much respected but meagrely supported. It was not generally considered to have much real impact on our material or social economy. However, World War II changed all that and did so very rapidly. Today few, if any, will deny that the material and economic strength in peace, as well as in war, is a direct reflection of a country's technological competence. The fantastic pace of the growth and applications of science, particularly during the past two decades has aggravated if not created a central problem which is before your committee. That is, how do we fit this new phenomenon—new in quality and more particularly in size—into a Victorian type of government policy-making apparatus? This is what we have been contending with for some time.

During the war there was in Canada a proliferation of crown companies. Why? Because the original Government organization was not set up to handle war of a scientific, technological nature. However, we are now getting into the same sort of position in our peacetime activities. This is a big problem but is not a new one, nor is it one which has not received much thought. On the contrary people in many countries have been grappling with this problem for many years, but I suggest that no nation has yet found the ideal solution.

I would now like to get away from philosophy and present some factual aspects to illustrate how scientific and industrial research has developed quantitatively in Canada. There is no question about the fact that the first step in involvement of a Canadian government in organization of science was taken on June 6, 1916. On that date a subcommittee of the Privy Council on scientific and industrial research was established, and in November members of the first National Research