identify seismic events with body-wave magnitude above 4.0. The thrust of their testimony in this regard was virtually indistinguishable from the conclusions contained in the original and repudiated summary of the Woods Hole report.

The most significant revelation, however, had to do with the utility of on-site inspections. After years of its being implied that on-site inspections would play a crucial role, the report now was that a determined violator could conduct a test in such a way as to prevent effects that might be uncovered by inspectors. In addition, certain of the proposed methods of carrying out violations (for example, testing in large cavities, in alluvium, or in the aftermath of an earthquake) would produce no seismic indication that an explosion had occurred; thus there would be no seismological evidence on which to base a demand for an inspection. (It has always been assumed that inspection requests would be grounded on ambiguous seismic data.) This pessimistic prognosis concerning the overall utility of inspections prompted Senator Pastore to ask where we were in light of the fact "that even with on-site inspection you cannot assuredly detect and identify." The Defense Department position was that on-site inspections would have a deterrent value because a violator would be aware that he might make a mistake which would allow the inspectors to obtain conclusive evidence of cheating. He would then have to choose between the undesirable alternatives of not allowing an inspection or running the risk of having incriminating evidence found. In response to this contention, it might be noted that a violator would, in any case, act with the knowledge that he might make a mistake which would be detected by other countries' detection systems operating solely outside his boundaries. The essential, but unasked question, is how much added deterrence would be derived from the threat of on-site inspections.

The third important piece of information developed at the joint committee hearings concerned the prevalence in Russia of dry alluvium. Because explosions detonated in this material produce seismic signals that are approximately 10 times smaller than the signals associated with explosions of equivalent size in more common materials, dry alluvium has been considered useful for concealing illicit nuclear explosions. The rub has

New Science Minister for Canada

Canada, in its most recent move toward developing a coherent national science policy, has established a new cabinet-level department, the Ministry of State for Science and Technology. The new minister is Alastair Gillespie, an economist and businessman who was elected to the Canadian House of Commons in 1968.

The creation of the ministry is the latest in a series of steps the Canadian government has taken over the past half-dozen years to develop a centralized science advisory structure. The first was the creation in 1964 of the Science Secretariat, a small office roughly equivalent to the U.S. Office of Science and Technology. Two years later came the Science Council, an independent advisory body appointed by the prime minister, which functions along the lines of the National Academy of Sciences Committee on Science and Public Policy (*Science*, 2 August 1968).

The Science Secretariat has been absorbed as the nucleus of the new ministry, and the Science Council now reports directly to the science minister instead of to the prime minister. The ministry has no operational or grant-giving functions—rather, it is a top-level policy-formulating body. Ultimately, the staff will be several dozen, with about half the professionals serving on a part-time contract basis.

Two primary issues confront Gillespie. Foremost is the need to stimulate more research and development within industry rather than government, which presently funds some 75 percent of the nation's total annual $1-billion R & D output. Science-based industry in Canada has been in a state of relative stagnation over the past decade, while manufacturing has increased steadily and service industries have flourished.

The Science Council in a report last fall (No. 15) expressed "alarm" over the deterioration of technology-based industry and warned that, unless Canada carves a place for itself in the world market, it is in danger of falling back into its old role of being primarily an exporter of raw materials.

The total rate of unemployment in Canada is over 6 percent, and the job situation for scientists and engineers is believed to be at least as bad as it is in the United States. The creation of new jobs is urgent, because the supply of technical manpower is increasing by 9 percent per year (augmented by steady immigration), while the demand over the past 3 years has been static.

Another issue the new ministry is concerned with is one that affects the entire Canadian economy. Since Canada is too small—its population is one-tenth that of the United States—to support large-scale technological ventures on its own, it has welcomed the subsidiaries of many foreign-based corporations, notably those from the United States. At this point, 50 to 75 percent of the Canadian manufacturing industry is foreign-owned, and the proportion is extremely high in the automobile, chemical, and petroleum industries, where much R & D is concentrated.

Now, with the new mood of nationalism prevailing in Canada, the government is looking for ways to develop more native capability and independence. Officialdom is well aware, though, that actions resulting in the loss of foreign R & D capability would be a staggering blow to the economy. (Thus they are acutely interested in the new initiatives William M. Magruder is cooking up, for fear that the United States may decide to entice some of its R & D back onto home ground.)

Canada is in the unique position of being the only industrialized country that is neither a major producer of technology nor part of a large trading bloc. Thus it has been forced to limit itself to areas of specialization that can be feasibly supported—such as the development of heavy water reactors fueled by natural uranium. Part of Canada's new industrial strategy will be to encourage the development of more Canadian-based multinational corporations to create a market large enough to support innovative R & D. This is related to the nation's new foreign policy which is aimed at expansion of world trade ties and decreased vulnerability to the fluctuations in the U.S. economy.—C.H.