

including areas such as Byelorussia where it could not be expected to ripen (Khrushchev suggested that in such areas unripe maize could be used as fodder). Even in more southern areas, the crop was introduced without proper arrangements being made for its harvesting, and on one occasion, when Khrushchev was to make a winter tour of Ukraine, the local organisers had no alternative but to flatten with large rollers the ungathered maize cobs that were protruding through the snow!

The ecological problems involved in such centralised planning may also be not fully understood. The forestry conservation measures introduced in the Carpathians last May were intended not only to conserve the diminishing timber resources of the area, but also to restore the water-table of the agricultural areas of western Ukraine. The horizon-to-horizon culti-

vation of the virgin lands, without wind-breaks or chequering of fields, has led to considerable erosion.

Another problem is that of crop-rotation. At the Twenty-Fourth Party Congress in 1971, the Minister of Agriculture, Vladimir Matskevich, stated that "correct" crop rotation had now been introduced on about 87% of arable land, but no details are available on the patterns of rotation involved. Unofficial reports, however, indicate a general tendency away from traditional patterns, and although the use of leguminous plants for nitrogen fixation is highly esteemed, it is chemical fertilisers that are seen as the basis of Soviet agriculture. In his report to the Twenty-Fourth Congress, Matskevich spoke of "mechanization, electrification and chemicalisation" as the basis for the intensification of agriculture, and "popular" articles appear in

the Soviet press on the advantages of chemical fertilisers.

From time to time, the Soviet press reports the triumph of small agricultural teams, working in virtually small-holding conditions, who have been able to increase the output of the land at their disposal by impressive percentages. This can, of course, only be an experimental scheme—its large-scale implementation would undermine the basic theory of Soviet agriculture, collectivisation.

● In the article *Soviet meetings, great and small* (Nature, 256, July 17, 1975, page 160), paragraph 6 should have begun: "The case of Dr Gluzman, whose incarceration in a prison camp seems to have been the direct result of his preparation of a report on psychiatric malpractice in the case of General Grigorenko, was raised at last year's Annual Meeting."

In these days of world-wide food shortages and rising food prices, it is hard to believe that a nation whose prairie provinces are often thought of as the breadbasket of the world neglects its agricultural and veterinary medicine schools. Yet that, according to the deans of Canada's 11 faculties of agriculture and veterinary medicine, is exactly what is happening.

Through the Science Council of Canada, they recently published a statement saying the faculties "find themselves chronically underfinanced despite widespread government and public lip-service to the essential importance of food production and the need to apply education and research to its increase."

The "national statement" by the 11 deans went on to say the schools "lack funds for current activities other than teaching students; they do not have enough staff to achieve appropriately small class-sizes; and they have neither the time nor the money to undertake research that is needed and of which they are otherwise capable."

As a result, the deans declared, the faculties are intellectual resources that are being exploited to only a fraction of their potential.

It is not the first time the problems of science in agriculture in Canada have been made public. Two previous Science Council publications identified a lack of coordination in research, particularly between the federal government and the universities. (*Agricultural Science in Canada*, Background Study No. 10, 1970; and *Two Blades of Grass*, Report No. 12, 1971, Information Canada.) Roger Gaudry, recently-retired chairman of the Council, also drew attention to the problems in his Annual Report for 1972-73.

Nor does the neglect of the agriculture and veterinary faculties mean that agricultural research *per se* is neglected in Canada. On the contrary, in 1972-73, Agriculture Canada (the federal government department) spent \$90 million on research and development alone. But by contrast, the 11 agriculture and veterinary medicine faculties received total funding in that year of less than \$50 million—only

## Agricultural research at risk

from David Spurgeon, Ottawa

\$15.5 million of which was for research.

And despite the inauguration in 1972 by the Ministry of State for Science and Technology of a "make-or-buy" policy—under which federal government departments were directed to contract out research where possible—Agriculture Canada remains the only department that spends about 99 per cent of its research budget in-house.

The neglect of agricultural science lies chiefly in the small proportion of total R & D funds spent on agricultural research, and the lack of national planning, in addition to the over-emphasis on in-house governmental research.

"Out of about \$1.5 billion a year spent on scientific and technological research in Canada, agriculture and its related sciences get much less than 10 per cent," says the dean's statement. "For want of staff or funds, needed research projects that promise high 'payoff' simply do not get started."

What makes the situation worse, they continued, is that what agricultural and food research is done is neither planned nor evaluated on a national scale in terms of its need and productivity.

Canada's three veterinary colleges have to turn away highly-qualified applicants for lack of space, the deans said. The four Atlantic provinces together are rarely permitted to place more than six students a year at the only English-speaking institution in eastern Canada, the Ontario Veterinary College.

"The shortage of livestock veterinarians is a national problem for which every Canadian consumer is ultimately paying in increased meat prices."

In certain agricultural disciplines, professionals are also in short supply, to such an extent that government agencies have had to hire a significant proportion of their professional staffs outside Canada.

The deans' report was addressed primarily to the federal government, the provincial governments, and the food industries, according to Dr. Gaudry, who wrote the introduction. But it obviously is hoped many ordinary Canadians will read it as well.

It constitutes a direct challenge to the governments: "We can choose programmed ignorance and increasing risk in our food-production system, resulting from science policy by accident and a failure to understand the relationship between teaching, research and public service in the universities. Or we can choose to develop a fully-articulated set of national agricultural policies and support strategies, in which each sector's distinctive advantages are used efficiently."