Canada's nuclear visitor

"THERE are thousands of manmade objects in space. I suppose roughly half of them belong to the Russians and the other half to the Americans. . . . I know there are things up there. I know they are going to fall someday, but I don't want to hear about it until it looks as though they are going to fall in my country. When you hear that, call me again!"

Such was the breezy comment of Canadian Prime Minister Pierre Trudeau on the crash, or, to quote Montreal Radio, "unplanned re-entry" of Kosmos-954. This attitude seems typical of the understatement with which all parties concerned have treated the first cosmonuclear disaster, an attitude which *Pravda* described as "realistic" and "undoubtedly due to the climate of international detente".

Fortunately for the cheer-merchants, the errant satellite descended in an area where, according to Colonel Donald Davidson who led the search team "there is no specific indication" of people save "the odd trapper or trapline . . . a few solitary souls who normally work the area". The specific location of the debris "12.8 km north-west of the landing strip" about 300 km from Baker Lake and 1,500 km north-west of Edmonton brought home to the world at large that Canada had just abandoned the mile. Even the general vicinity of the impact was seized upon by the joke-makers ("Great Slave Lake, eh? Maybe it thought it was heading for the Gulag Archipelago!"). Even the fact that the satellite finally landed in an area with sufficient uranium deposits to give false readings on the search instruments was not without its special brand of irony.

But leaving aside both humour and grim speculation on the devastation which might have resulted had the

satellite fallen further south, a number of questions remain unanswered. Why did debris reach the ground at all, when, according to Tass, the nuclear power unit was designed to be fully destroyed and burnt on re-entry. And,

if the fail-safe construction of the craft was lacking in this respect, would such a burn-up have been, as claimed, without radiation hazard? How safe, indeed, is the debris? (The two members of the search team who found the impact crater have been removed to University Hospital, Edmonton, and the other members to the hospital in Yellowknife.)

More important, what is the procedure for notifying countries that a nuclear satellite may be about to fall? In spite of an opposition hammering, the Canadian Minister of Defence Danson and Secretary of State for External Affairs Jamieson seemed fairly content with the manner in which notification came largely through Washington. However, Canada

is a somewhat special case, being a participant in the US Space Detection and Tracking System via the optical facilities at Cold Lake, Alberta, and St Margarets, New Brunswick. (Canada is also associated with the USA in the NORAD early warning air defence system. Although this relates primarily to manned aircraft attack.) In return for this contribution to the tracking system, Canada automatically receives from the USA all relevant data on space objects. Hence the routing of the warning via Washington is at worst only a slight blow to Canada's *armour propre*. What, however, would have been the procedure if some other target country were involved? Would the message always go via "hotline" to Washington, or perhaps via the nearest "major" power? What then would be, for example, Dublin's reaction to such a warning being routed via London?

International agreements already provide for the search and disposal of crashed space-craft—the craft is to be returned to its owner, the target country reimbursed for damage and search costs. (Will the US participation in the Canadian search cause difficulties here?) What does seem to be lacking is a proper notification procedure, both of spacecraft in distress and spacecraft carrying potentially hazardous material. It would presumably not be impossible to extend the treaty banning nuclear weapons from orbit to nuclear fuel units, or failing an outright ban, to make all such "nuclear" launches notifiable to some central authority. Secretary of State Jamieson and Prime Minister Trudeau have already been discussing possible international talks on the problems arising from the aftermath of Kosmos-954. If these should be forthcoming and fruitful, one could well agree with *Pravda* that this unfortunate incident has, after all, turned out a triumph for detente.

Vera Rich

US agencies to study links between saccharin and cancer

SACCHARIN is to be investigated by the US Food and Drug Administration and the National Cancer Institute, who are to conduct an epidemiological study of 9,000 people in an attempt to determine whether there is a connection between saccharin and bladder cancer.

The dietary habits of 3,000 people diagnosed as having bladder cancer will be compared against those of a randomly-selected 6,000 controls. The study is expected to last 18 months, and to cost \$1.3 million.

Last November, Congress announced a moratorium on proposed legislation that would ban the use of saccharin

because of its suspected link with bladder cancer. Congress also agreed to allocate \$1 million for studies on the safety of saccharin, \$750,000 of which is for the epidemiological survey.

Congress's action followed the publication in October of a report on cancer testing technology and saccharin from its Office of Technology Assessment, which concluded that although there was evidence that saccharin is a potential cause of cancer in humans, there was no reliable quantitative estimates of the risk of saccharin to humans.

According to the OTA report, epidemiological studies of human experience carried out so far have not been sensitive enough to determine if saccharin is a carcinogen when injected. □

NSF encourages more university/industry collaboration

IN a move carefully timed to coincide with the opening of Congressional hearings on its budget application for the year 1979, Dr Richard Atkinson, director of the US National Science Foundation, announced last week that the foundation plans a major expansion of its support for research projects carried out by joint university/industry groups.

No new funds are to be allocated in the NSF budget for such projects: they will be required to compete for support with other regular grants' applications.

Dr Atkinson said, however, that joint projects would be given more active encouragement than in the past, including a major publicity campaign aimed at both industry and universities. Industry was less willing than in the past to risk money on basic research and long-term goals, and was increasingly focusing on product improvement. "Given these trends, the nation is becoming more dependent than ever on universities and colleges to provide the basic research for new technologies and products," he said.

Last week's move follows past criticism from Congress that industry has not been able to compete for research funds on the same basis as university research scientists, a point heavily stressed, for example, by Senator Edward Kennedy during last year's authorisation hearings.

One outcome has been a recent decision by the National Science Board to amend its language covering applications from industry for such grants. Previously it had stated that these would only be considered under certain circumstances, namely if the research was of national importance, or if industry was able to provide unusual expertise or instrumental capability. The new wording is more positive, indicating merely the type of applications that will not—rather than will—be considered.

A particular point stressed by NSF officials is that the delay before pay-off from basic research is a deterrent to industry investing in this area, and that NSF funding might help redress the situation, for example, allowing those scientists who have joined industry because of a lack of jobs in more academic settings to carry out basic science projects.

This argument is not likely to carry much weight with industry, which has recently been telling the government that basic research is a federal responsibility, while development activities should be left to the private sector (a message reflected in the proposed shape of R & D funding within the President's 1979 budget request to Congress).

The sector which is likely to respond much more to the NSF's rallying cry are the small, knowledge-intensive, high-technology firms—such as those distributed around Boston's famous Route 128—many of whom have been experiencing financial difficulties in recent years.

Such firms, however, are rarely interested in basic research as such, even in the long-term. Their main concern—for which there is at present a lack of money—is finding ways of turning a good idea into a marketable product. And this is where, in practice, NSF support will be in greatest demand.

David Dickson

Argentina: US National Academy of Sciences to send delegation

THE Human Rights Committee of the US National Academy of Sciences is to send a small delegation to Argentina next month to investigate charges of repression against scientists.

The delegation, which will also visit Uruguay, will consist of Dr Christian Anfinsen of the National Institution of Arthritis, Metabolic and Digestive Diseases, Nobel Prize Winner in 1972 for work on the structure of proteins, Dr Robert Perry, of the Institute of Cancer Research in Philadelphia, and a member of the NAS staff.

During a ten-day visit to Buenos Aires and Montevideo, the delegation will talk with both scientists and government officials about scientific co-operation with the US, and about the situation of scientists in the two South American countries.

The NAS delegation's visit follows a recent trip to Argentina by Mr Emilio Daddario, president of the American Association for the Advancement of Science, and until recently director of the Office of Technology Assessment.

Mr Daddario said in Washington last week that the actions of the security forces in Argentina had, with a few exceptions, "made a shambles" of scientific freedom, and that reports reaching the West of repression against individual scientists were not exaggerated.

Referring to moves by western scientists to boycott the International Union Against Cancer congress, due to take place in Buenos Aires in October, Mr Daddario said that many of the scientists he had spoken to in Argentina felt it important to maintain contact with their colleagues in other countries, particularly since many of them lacked funds to travel to conferences and meetings abroad.

However he also said that government officials had asked him about the attitude of foreign scientists to the cancer congress, and that he had the impression that they were concerned to appear to maintain normal international relations with the scientific community.

Meanwhile moves are gaining momentum in the US to boycott the congress in protest at the treatment of scientists in Argentina since the army came to power in March 1976. Since that date, many scientists have been reported to have been arrested or abducted without formal charges.

Last month at a meeting of American Cancer Society Research professors in Phoenix, Arizona, all 39 present found that they were unanimous in their individual decisions not to attend the congress if it is held in Argentina as planned.

David Dickson

France falls out with Pakistan over reprocessing

PAKISTAN'S reaction to the latest move of the French government to modify the accord of 1976 on building a nuclear reprocessing plant, has been quite firm and unequivocal. In view of strong public statements there appears little chance that the Pakistani government will succumb to any retraction from the agreement, or soft-peddalling. A Foreign Office spokesman in Islamabad said that the government would not accept any change or modification in the agreement already reached.

The French want to substitute a co-processing plant for the planned plutonium reprocessing plant to guard against separation of plutonium that could be used in explosive devices. A co-processing plant can only reprocess the spent fuel once or twice for use in reactors and it does not produce plutonium. Pakistan's nuclear think-tank, however, has plans for using plutonium, particularly when it develops its fast breeder programme.

Mr Munir Ahmad Khan, the Chairman of PAEC (the Pakistan Atomic

Energy Commission), when asked for the rationale behind the timing of the setting up of the reprocessing plant, explained that PAEC wanted to synchronise the installation of the reprocessing plant with the commissioning of a few more reactors, but that for various reasons the reactor programme is running behind schedule. Mr Munir Ahmad explained, however, that the reprocessing technology is highly sophisticated and takes longer to set up than a reactor.

His team would like enough time to acquire the necessary experience in reprocessing technology for its optimum use. Hence, the hurry for the reprocessing plant.

At Chashma, the site of the proposed plant (plus a 600 MW reactor), the foundation concreting is in progress in anticipation of things ultimately working out as planned.

In his recent address to the Institute of International Affairs in Karachi, Mr Munir Ahmad explained the technical and economic reasons for building a