

general areas: X-ray interactions with matter, atomic arrangement of materials containing actinide elements and materials subject to extreme environments such as high pressure, and advanced X-ray optics and detectors. Only the latter — the development of detectors, is weapons-related; X-ray studies in general, however, are relevant to the new focus on ballistic missile defence since President Reagan's "Star Wars" speech last January. The University of California scientists will use the beam lines for protein structure analyses and studies of catalysis.

"We have every reason to believe that a considerable amount of excellent science

will be performed," Bienenstock said. He emphasized that the work on detectors that will be conducted at SSRL will deal with "generic instrumentation techniques" and that a significant fraction of the studies will be aimed at improved X-ray optics for synchrotron research as a whole.

The Stanford faculty meanwhile last week asked the Committee on Research to reconsider the entire question of restrictions based on the end-use of research and the possible conflict between academic freedom of individual researchers and the needs of large-scale research involving more than one organization.

Stephen Budiansky

## Chemical warfare

# Ambiguity of Cuban plans

THE Cuban army is to establish an advanced training school for "chemical troops", to be staffed by Soviet experts and Soviet-trained Cubans, according to Havana radio. Major Juan Purugorria Cruz, described as a member of the "directorates of chemical troops", told listeners to his broadcast that the school was necessary both because of the level of development of the Cuban Revolutionary Armed Forces (FARO) and the recent "substantial changes in the nature and complexity of chemical warfare technology". The school, he said, would be responsible for the advanced training of officers, command-level training of engineers as "chiefs of platoon for small chemical troop

(Kampuchea). Although some Soviet chemical enterprises, notably *Karabogazsulfat*, do produce defoliants which could be used in anti-guerilla actions, these are intended for an entirely peaceful aim — the stripping of cotton leaves before the machine harvesting of the bolls.

If *armamento* is to be interpreted in the defensive sense, however, it is not clear what high technology the Soviet experts

can offer. During the past few years, civil defence precautions against atomic, bacteriological and chemical (ABC) weapons have been stepped up in the border regions of the Soviet Union — notably the Baltic states and along the Turkish-Iranian-Afghan border.

During the past few weeks, a similar exercise has been staged, apparently for the first time, in the far-eastern Maritime Krai — as a response to the hawkish policy of the current Japanese Government. These exercises, however, seem to consist of little more than the evacuation of buildings and the donning of protective clothing. In the Soviet Union, the latter is normally stored at the work-place, and in many cases is simply the normal industrial gear of overalls and masks. A special protective wrapping known as KZD-4 is advised for infants under 18 months (but if this is not available, ordinary blankets or quilts are recommended), while adults who are not members of civil defence units are supposed to prepare their own protective suits out of ordinary clothes, by arranging tight fastenings at wrists, neck and ankles, and then soaking the outfit in an emulsion made of 250 grams of domestic soap, 500 ml of mineral oil (such as motor oil) and 3 litres of water at about 65°C. Vera Rich

## Soviet information technology

# Academy scents central role

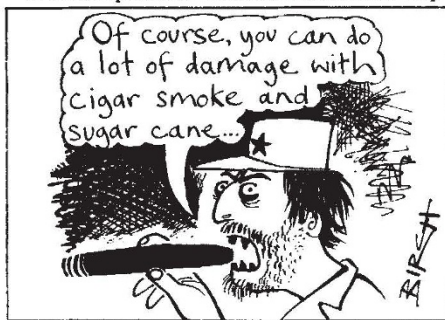
COMPUTERS and information technology should be under the control of a single "non-ministerial" scientific organization, Academician Evgenii Pavlovich Velikhov, a vice president of the Soviet Academy of Science said recently. Interviewed on Moscow Radio, Academician Velikhov suggested that the Soviet Union's position in information technology is "by no means as good as it might seem" and that a "unified scientific policy" in this sphere is necessary.

Computers, as Velikhov stressed, have an important role in the robotization of Soviet industry. This is a priority of Soviet planning, not least because of the threat of a dwindling workforce in some regions of the Soviet Union, where in spite of government incentives, the birthrate remains low. Even more important is the computerization of the planning process itself. Dr Yu Kanyhin, of the Cybernetics Institute of the Ukrainian Academy of Sciences has estimated that the management of the Soviet economy demands the annual preparation of 60,000 million planning documents with an average of 10 pages each. Moreover, some 60 per cent of all such documentation prepared by individual enterprises is, he wrote recently in *Pravda*, superfluous or redundant. Computerization could, he says, cut the bulk of hard-copy documentation by as much as 90 per cent — provided that the systems were standardized. So enormous is the task of standardization for the whole

economy, Dr Kanyhin says, that even the prestigious State Committee for Science and Technology is not competent to cope with the problems. For that a "state organ of high rank" would be necessary.

Dr Kanyhin did not specify what this organ should be. Academician Velikhov was more specific — it is a job, he feels, for the Academy of Sciences. This is no new attitude; earlier this year, the report on computerization and automation which he presented to the academy led the academy to establish a special "Section for Information Science, Computer Technology and Automation". At that time, Academician Velikhov explained that the academy had "taken a historical decision" in assuming completely the scientific leadership" for this problem since it possessed the research potential to provide the necessary hardware and software.

In the recent radio interview, however, he went considerably further, suggesting that as well as providing the systems, the academy should decide where and how they should be introduced. Although casting no direct aspersions, he pointed out, in general terms, the "enormous losses" that could be incurred if wrong decisions were taken "at such a colossal pace of development". His emphasis that a "non-ministerial" scientific organization" should perform this task, however, seems to indicate a less than perfect trust in the bureaucrats. Vera Rich



units" and of engineers in charge of the development and maintenance of the chemical troops' *armamento*.

The word *armamento*, which can mean either offensive or defensive armaments, poses problems. If Major Perugorria really meant chemical weapons, then this is a gaffe beside which Fidel Castro's statement in 1980, that "scores" of Soviet cosmonauts-elect had been killed in training, pales into insignificance. For the Soviet Union is strongly committed in all appropriate international forums, to a total ban on all chemical weapons, and steadfastly denies ever having supplied such agents to the various theatres of insurgency where they have appeared.

According to the Soviet side, such weapons are either of United States origin (Eritrea) or else natural substances such as pollen or bee excrement which have caused unjustified panic among natives