

# AAAS plans pressure on education

## Dismay at proposed NSF budget cut

Toronto

The American Association for the Advancement of Science (AAAS) has decided to devote a substantial proportion of its efforts over the next decade to reversing what the US Department of Education has recently described as a growing tide of "scientific illiteracy".

Concerned about the growing gap between scientists and technologists on the one hand and the public and congressional decision-makers on the other, the association plans a series of programmes aimed, in particular, at raising the general level of scientific and mathematics education in the nation's primary and secondary schools.

The announcement was made during the AAAS's 147th annual meeting in Toronto this week. On Sunday, the association's board passed a resolution pledging the AAAS to work with its affiliated science and engineering societies to reverse what it called a "damaging decline" of science and engineering education in the United States.

Mr William Carey, the association's executive secretary, later said that the Carter Administration's apparent intent to cut back expenditure on science education by the National Science Foundation (NSF) was "a severe malfunctioning of the bureaucracy".

This cut was occurring, he said, only two months after the NSF and the Education Department had delivered a report to the President which concluded that there had been a 15-year decline in the national commitment to excellence and international leadership in science, mathematics and engineering.

Mr Carey added that as a result of the Administration's decision to absorb cuts in the NSF budget by focusing in particular on its science education programmes, under the terms of the budget proposals which the President will present to Congress next week, science education would be reduced to only 7.5 per cent of NSF's efforts — the lowest figure for 30 years.

What concerns AAAS is not so much the quantity or quality of university science graduates — the department's report found little problem here, and suggested that where there were shortages or deficiencies, these would probably be corrected by market forces — but evidence of declining educational standards in schools.

Dr Allan Bromley, professor of physics at Yale and next year's president of AAAS, said that it had been a "dismal mistake" to

leave things in the hands of "professional educators". He cited, in particular, national surveys of educational achievement which demonstrated a general decline in scientific and mathematical abilities among high school students, as well as widespread evidence of the remedial action which universities and colleges were having to take with undergraduates enrolled in science classes.

"A whole generation of students is being short-changed" Dr Bromley said. "In physics, if you look at undergraduate curricula across the country, the first year is being increasingly devoted to teaching subjects that you would not have had to worry about 10 or 15 years ago."

Other AAAS officers were slightly less harsh in their criticisms. Current president Dr Frederick Mosteller of the Harvard School of Public Health pointed out that many subjects, such as calculus, were now widely taught in schools where they had been missing a generation ago. Retiring president Dr Kenneth Boulding spoke up in support of less conventional teaching methods, arguing that "education is becoming less important as a means of

learning".

However, what Dr Bromley described as a "severe crisis" in science education has spurred the AAAS into convening a conference of the heads of its affiliated societies to look at the health and priority needs of science and engineering education in the United States in the 1980s — and to make educational excellence in these areas a major theme of next year's meeting.

The association also intends to use its new monthly magazine, now called *Science 81*, to produce teaching materials for use in secondary schools, and it announced that Dr F. James Rutherford, previously associate director of NSF responsible for science education, and at present assistant secretary of the Department of Education, will join AAAS as adviser on science education to the board of directors after leaving office on 20 January.

"The AAAS cannot solve the problems on its own, but if we don't get busy, things will get worse" said Dr Mosteller, adding that both federal agencies and private industry would probably be approached to support the association's proposed activities.

David Dickson

## Slow progress on Greek reforms

As Greece enters the European Community (from 1 January) the universities are still in the throes of reorganization, with student unrest at some institutions. But the new Science Research and Technology Agency is in good shape, with two years of constructive work behind it, although the threat of its becoming ensnared in Greek bureaucracy remains. The hope is that the influence of the community will strengthen the recent tendency to reform.

The government's first attempt at university reform (see *Nature* 2 February 1978) met with strong opposition and the enforcement of some of the provisions of the new Law 815 had to be postponed. A committee was set up to make new proposals and these have now been presented to the government. The success of the committee, representing the fourteen university-level institutions in Greece, owes much to the way in which its chairman, Professor F. Mitsis, enjoys the confidence of all sides.

Much deadwood was painlessly removed from the academic profession by the provisions in Law 815 for voluntary retirement — in one department of the University of Athens only three out of twelve are still in post. Now there are many openings to be filled using new selection procedures.

The new draft bill would abolish the unpopular system of "chairs", in which professors were surrounded by a mixed bag of assistants. Instead subject "sectors" would be introduced, each consisting of at

least seven academics at three grades: lecturers, associate professors and professors. The short-term appointment of assistants, usually working for higher degrees, would also be allowed. Undergraduates are granted 20 per cent participation in all university bodies under the proposed law.

Examination regulations are being drafted separately, amid protests from student associations that as long as general conditions in the universities leave so much to be desired, students cannot be expected to attain high standards. At the Technological University at Athens there was a prolonged sit-in to protest against the system of semesters, considered unduly onerous by many students. And at the University of Athens chemistry students have been striking against the alleged harshness of a particular professor.

Greece's newest university, in Crete, remains in a critical state. Facilities are makeshift and most of the teaching depends on visiting lecturers from abroad. Permanent senior appointments are being blocked by the Athens-based administration committee, perhaps under the influence of the old establishment. Fotis Kafatos of Harvard is no longer a member.

For research, the outlook is more cheerful. More than two years ago the government invited Dr George Argyropoulos back from the United States to head the new Science Research and Technology Agency (see *Nature* 23 February 1978). The main achievement of the agency has been the introduction of

project grants on the pattern of the British research councils, instead of state subsidies for the overall budgets of institutions.

Following wide consultations, the agency prepared a list of nine priority areas of research, approved by a ministerial committee in June 1979. By October 1980 436 grant applications had been received and some 70 approved projects were already under way. Applications are being dealt with speedily, the process taking an average of seven months including the time required for three referees (at least one from abroad) to report.

Other achievements include eighteen international agreements for joint projects. Solar energy plants are to be built with Germany and France, and a geothermal plant constructed on the island of Melos in cooperation with the European Economic Community.

There are some clouds on the horizon, however. The law setting up the Science Research and Technology Agency sought to exempt it from the notoriously bureaucratic public accounts regulations, but the Ministry of Finance nevertheless managed to block payments of grants for "technical reasons". The Committee of Ministers which oversees the work of the agency has reaffirmed its confidence in it. One hopes that it will now be allowed to function unhindered.

**E. M. Pantelouris**

## UK space policy

# Year of decision

Last year was a busy one for makers of British space policy. By November, a committee of the Central Policy Review Staff, the think tank, had submitted to the Cabinet its study of Britain's efforts in space applications; and an inter-departmental committee, under the Department of Industry, had been created to coordinate space policy more effectively and to discuss the think tank's deliberations. The Home Office was also busy preparing a report on direct broadcast television by satellite.

The sudden interest in space seems to have been stimulated by the fear that Britain might miss out on the profits that could be made from selling space technologies, especially telecommunications satellites. The think tank's report is to remain confidential for commercial reasons. The gist of the recommendations is that there is a demand for space applications satellites which British industry should be encouraged to meet.

One important question is whether Britain should try to build up its industry alone or whether it should continue, perhaps at an increased level, in the space applications programmes of the European Space Agency (ESA) which France and Germany, in particular, have used more effectively than Britain to boost their own industries. The most likely outcome is that Britain will continue at more or less the same level in ESA's telecommunications

programmes, but that greater efforts will be made to transfer the results of ESA's research and development to industry.

The government is unlikely to rush to pour money into the industry, seeking rather to encourage private investment. A central issue in the telecommunications field will be the government's attitude to the monopolies held in television broadcasting by the broadcasting authorities and in satellite communications by the telecommunications division of the Post Office, British Telecom. A bill to dilute British Telecom's monopoly is now before Parliament, and could be used by the Department of Industry to liberalize access to satellite communications, leaving the way open for private operators, in particular, of small satellites for business communications. If greater incentives are given to satellite operators, the next question will be the ability of British Aerospace (which not everyone is convinced could withstand open competition) and other UK manufacturers of satellite components to meet the demand.

A government announcement on the subject is expected soon and it may seem rather bland, leaving the question of monopolies at least until the Home Office has reported on direct broadcasting by satellite. A decision will have to be taken fairly shortly, however, on the scale of Britain's effort in another space application — remote sensing — if it is not to miss the opportunity of cooperating in ESA's next programme. This year promises to be a vital one for Britain's space industry.

**Judy Redfearn**

## Herbicide safety

# Bill of health

The herbicide 2,4,5-T has been given a cautious but clean bill of health by two recently published reports. One\*, by the Advisory Committee on Pesticides of the UK Ministry of Agriculture, Fisheries and Food, says that there is no sound medical or scientific evidence that herbicides based on 2,4,5-T are harmful to humans, animals or the environment in general. The second, by the European Community's Advisory Committee for Safety, Hygiene and Health Protection at Work, says there is no conclusive evidence that 2,4,5-T causes cancer, but asks for further evaluation of the long-term risks.

The British pesticides committee, essentially the licensing body for pesticides and herbicides, has reviewed 2,4,5-T nine times since 1970. Its latest review was undertaken at the request of the Minister of Agriculture after the National Union of Agricultural and Allied Workers claimed,

\*Further review of the safety for use in the UK of the herbicide 2,4,5-T. Available free of charge from Pesticides Branch, Ministry of Agriculture, Fisheries and Food, Room 678, Great Westminster House, Horseferry Road, London SW1P 2AE, UK.

in March 1980, that 2,4,5-T was harmful.

The union reviewed the scientific literature on 2,4,5-T and referred to 20 cases where it was alleged to have harmed humans or farm animals. The advisory committee says, however, that the union's evidence does not indicate that 2,4,5-T is a health risk.

Concern about 2,4,5-T has centred mainly on the presence of a contaminant, 2,3,7,8-tetrachlorodibenzodioxin (dioxin), a teratogen and carcinogen in some animal species. The committee now believes that this concern may have been misplaced and that the risks posed "by dioxin contamination in 2,4,5-T formulations may hitherto have been overestimated".

First, the committee says, dioxin contamination of 2,4,5-T formulations sold in the United Kingdom is now at the low level of 0.01 p.p.m. Second, the committee says that new studies enable it to identify for the first time "a daily level of intake below which effects on reproduction do not occur in the rat", that is 0.001  $\mu\text{g kg}^{-1} \text{ day}^{-1}$ .

In the circumstances, the committee considers that 2,4,5-T itself would present a problem before its dioxin contaminant, but that there is no convincing evidence that any effects caused by 2,4,5-T will be passed on to succeeding generations "on an heritable basis". The committee also notes that the WHO/FAO authorities have set a "no effect level" for 2,4,5-T in animals at 3 mg  $\text{kg}^{-1}$ . Employing a thousandfold safety margin, WHO/FAO have set a "temporary acceptable daily intake" for a man at 3  $\mu\text{g kg}^{-1}$  for 2,4,5-T containing 0.1 p.p.m. dioxin.

The committee does, however, accept the union's claim that workers using 2,4,5-T are not always adequately protected. It suggests that exposure to the herbicide should in future be measured in urinary excretion.

On the question of alternatives to 2,4,5-T, the committee is doubtful. Much less is known about their toxicity and the committee, in continuing to allow 2,4,5-T to be used, is relying on the maxim "Better the devil you know . . .".

All of the twenty cases where 2,4,5-T exposure is alleged to have caused health problems are discussed in the report. The advisory committee has harsh things to say about coverage of alleged 2,4,5-T incidents and accuses the press of causing needless distress by publicizing cases without the consent of the individuals involved. The committee may have been unwise in making this accusation, given that most of the individuals referred to in the report seem to have sought out journalists.

Although the committee has given 2,4,5-T herbicides a clean bill of health, it does ask for prospective epidemiological studies of the risk from exposure to herbicides in general. Professor Robert Kilpatrick, chairman of the advisory committee and dean of the school of medicine at the University of Leicester,