

and on such a schedule their array would be in operation by 1984–85. If the 25-metre dish is approved for funding next year, as hoped, there will be no conflict. However, if it is postponed again, then relations between what could become rival projects would be more delicate.

Experience has taught supporters of the ground-based array that any debate over who should run the facility ought to be resolved before the funding battle begins. Many feel that proposals for a mid-west telescope floundered because of inter-university rivalry for control. "We are determined not to make the same mistake again", says one radioastronomer.

David Dickson

## Nuclear protests

### Were Croats first?

With the Madrid Conference about to commence its review of the Helsinki Accords on Security and Cooperation in Europe and the Campaign for Nuclear Disarmament recently revitalized in the United Kingdom it is interesting to look back at what was almost certainly the first ever anti-nuclear protest — that of Dr Ivan Supek, a Yugoslav physicist, in 1944, more than a year before nuclear bombs were dropped on Hiroshima and Nagasaki.

Before the war, Supek had been a pupil of Heisenberg. In 1941, after a visit to

impossible the final victory of progressive forces — a victory which Marxist theory stated was inevitable. Therefore such weapons could not exist.

Supek, however, remained unconvinced, and a few months later published his papers from the congress in the Croatian popular science journal *Priroda* under the titles "Developments in Modern Physics" and "Science and Society".

Although at that time his main fear was of the perverted use that the Nazi regime could make of science (biology as well as physics), his stand against nuclear weapons has never wavered. He has from the beginning been an active participant in the Pugwash movement, and is extremely wary of proposals for peaceful uses of nuclear energy (including research), lest they be perverted to military ends.

Vera Rich

## Research councils

### Geological setback

The Department of the Environment will slash a third from its spending on geological science over the next three years, raising a question mark over the future of the Geological Survey of Great Britain, officials of the UK Natural Environment Research Council (NERC) said last week.

NERC was launching its first annual report since Sir Hermann Bondi took over a month ago as the new chairman of NERC (see *Nature* 5 June, p. 349). Bondi had no influence over the report and was much less concerned than his colleagues: "This report is not in my style", he said. "As you know, I'm an eternal optimist."

Bondi favours the Rothschild "customer-contractor" principle, which the report described as a threat. In 1973 NERC lost control of a third of its budget to government departments, following Lord Rothschild's recommendations for a shake-up in government science spending. At the time, the council warned that many of its projects — such as the Geological Survey — which were dependent on a group of customer departments would be vulnerable to the whim of any one of its customers. "It is of little comfort that this forecast is proving correct" says the report.

A quarter of NERC's £20 million contract research income depends on multi-customer contracts. The Geological Survey itself costs about £4.5 million a year, of which the Department of the Environment currently contributes £1.5 million. The survey was established in 1835, and produces near-surface and deep geological maps of Britain, improving them area by area as techniques develop. Some 180 scientist-years are spent each year on the survey, which involves 10 field units and a number of palaeontologists and chemists, mostly at the Institute of Geological Sciences (IGS).

The survey, UK geologists argue, is a national resource, drawn on regularly in

major civil engineering works, for example. But if the Department of the Environment takes too short a view, the value of the survey will be diluted and ultimately lost. A thorough survey for a "sheet" covering an area of 12 miles by 18 miles takes around 25 scientist-years and 5 to 7 years. "So you can't turn on a tap when you need a survey" said Dr Brian Kelk, who heads NERC's geosciences division. The survey is not purely an academic exercise. Dr Kelk argues that the survey must be developed on a continuous basis. It is not possible to predict exactly which areas are likely to prove important; for instance, the massive construction work carried out for North Sea oil terminals on the west coast of Scotland and the Shetlands would probably have been slowed without the geological maps which may have seemed of only academic interest when they were made in the 1920s.

Other bodies in the "consortium" which has managed the survey since Rothchild are the Department of Energy (contributing 5 per cent), the Department of Industry (also 5 per cent) and NERC (60 per cent, through the science vote of the Department of Education and Science). But the consortium will now collapse, with the Department of the Environment cutting its share to 20 per cent and offering its money piecemeal for particular areas and purposes. A new management structure must thus be found for the survey — and one is being sought actively by the director of the IGS, Dr G. M. Brown, who will present his proposals to NERC in two weeks' time. Dr Brown will also have to cope with other Department of the Environment cuts at IGS, where the department is reducing its spending from £3 million (at 1979 prices) this year to £2 million in 1982–83, out of a total IGS budget of £16 million. Staff recruitment, for one thing, will be reduced to a trickle.

Nevertheless, NERC's total income of £56.6 million in 1979–80 will hold roughly constant in real terms in 1980–81, largely through a slight increase in funds from the Department of Education and Science; but there is another problem over the replacement of the council's two research ships, RRS *Shackleton* and RRS *Discovery*. The *Shackleton* is older, and will probably be retired around 1983. The *Discovery* should remain effective until about 1987, but a new ship must be found to replace her if Britain is to maintain her place in oceanographic research, says NERC. This would cost £18–20 million at present prices, plus equipment: and to have her ready for the 1988 season, the order must be placed in 1984 at the latest. But there is no sign of the necessary money being made available — except perhaps if the ship were used jointly by the Science Research Council's Marine Technology Directorate and NERC.

It is here, perhaps, that Bondi's contacts and experience in the Advisory Board for the Research Councils — which advises on



Supek (left) and comrade, 1944

Heisenberg in Leipzig, he said that, although his main interest at the time was solid-state physics, he was able to make an "informed guess" that the Germans were working on both fission and fusion bombs.

Supek made his fears known in June 1944, at a congress of Croatian "cultural workers" (a term which included scientists) held in the newly liberated town of Topusko. His views did not go unchallenged. Several Marxist participants were doubtful that such weapons could exist at all. Nuclear weapons in Nazi hands, they argued, would render utterly

the science vote of the Department of Education and Science — may tell. He is reluctant to challenge the Rothschild principle, to which he still adheres firmly — while recognizing the dangers of multi-customer arrangements. He and his staff will redouble their efforts to get new contracts for support for projects in Third World countries. **Robert Walgate**

## London university

### Medical schools stay

Two of the medical school of the University of London, whose survival has been in doubt since March this year, were reprieved last Wednesday (29 October) by a resolution of the university Senate. The decision is regarded, within the university, as a sign that the more far-reaching inquiry into the organization of the university as a whole now under way will be less radical than some have feared.

The two medical schools concerned are Westminster Hospital Medical School and King's College Hospital Medical School (which includes a pre-clinical school at King's College proper and a clinical school at King's College Hospital, in south-east London). The disbandment of the two schools was recommended to the university in March by the report on medical teaching in the university prepared by a committee under Lord Flowers, rector of Imperial College.

The politics of last week's narrow Senate decision have a particular interest for the future reorganization of the University of London. The resolution eventually adopted by the Senate was proposed by Dr Bryan Thwaites, principal of Westfield College, one of the smaller institutions of the university. Thwaites and the others supporting the resolution argued that the university should not attempt to coerce constituent academic institutions into courses of action they found unpalatable.

This line of argument has an obvious bearing on the general inquiry into the organization of the university being conducted by a committee under Sir Peter Swinnerton-Dyer and set up by the vice-chancellor, Lord Annan, earlier this year. One possible outcome of that inquiry is a recommendation that the smaller institutions within the university might be merged with larger college or with each other. If however the principle of self-determination has been established, proposals involving loss of independence are less likely to be seriously put forward.

The battle over the independence of the two medical schools is not yet over. Although the decision may in principle be overturned by the Court of the university, this is unlikely without further consideration. A more likely course is that the Academic Planning Board, to which the issue has been referred, will come to a different decision from that of the Senate last week.

## Séveso scare

### Bloat, not poison

A flurry of fear last week that dioxin had reared its head again at Séveso has quickly abated. The local community was alarmed when 150 sheep died after spending a single night on a forbidden field, out of bounds to grazing animals for the past four years. The dead sheep were part of a flock of 250 driven 50 miles from the dry uplands of northern Italy.

First thoughts had blamed dioxin. The field was one of the most exposed when a chemical factory exploded at Séveso in 1976, distributing dioxin over the neighbourhood, and it had not yet been cleared for farming. (The shepherds say they did not see the notices.) But the sheep died too quickly for dioxin poisoning, and the levels in the field are now thought to be quite low. In fact the Séveso special office, headed by Senator Luigi Noé, was planning shortly to open nearby fields for cereal growing, but these plans were halted after the death of the sheep.

IMAGE  
UNAVAILABLE  
FOR  
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REASONS

#### Dead sheep, dead landscape

However, the necropsies now show that the sheep died of bloat — severely distended gut, caused by the over rapid fermentation of wet hay, rye and grass in the stomachs of the hungry animals.

The result has been backed up by analysis of the livers of the dead sheep at the Mario Negri pharmacological research institute in Milan, which first detected dioxin in Séveso goats during 1976. According to Dr Luciano Manara, head of

the drug metabolism laboratory at the institute, the sheep had liver dioxin levels below 1 ng per g — compared with 1 µg per g in the most exposed goats in 1976.

Senator Noé has declared himself satisfied with these results, and has restarted the plans to open the Séveso fields. **Robert Walgate**

## Bovine tuberculosis

### Badgers at risk

Tuberculous badgers are more of a threat to themselves than to the cattle they infect. This is the nub of Lord Zuckerman's report on the British practice of gassing badgers, suspended a year ago after protests from conservationists (see *Nature* 28 October). Immediately after the publication of his report, *Badgers, cattle and tuberculosis* (HMSO, £5.20), the Secretary of State for Agriculture, Fisheries and Food announced that the practice of gassing infected badger setts is to be resumed as soon as possible and then reviewed after a three-year trial period.

Bovine tuberculosis is most common in south-west England, chiefly in the counties of Avon and Cornwall. The British badger population is to some extent concentrated in southern England, but the agriculture of the eastern counties is more concerned with cultivation than with cattle-rearing.

Evidence in the Zuckerman report for the association between bovine and badger tuberculosis is largely circumstantial. The incidence of bovine tuberculosis is correlated with that of badger tuberculosis and with the density of the badger population. There is also evidence that transmission from one species to the other is feasible. In Britain, the association (long suspected) became the basis for official policy on badger control only in 1971, after experience in New Zealand suggested that opossums were there a feral reservoir for bovine tuberculosis.

The issue has been contentious in Britain for the past decade. The Badger Act of 1973 gave badgers specific protection over and above the provisions of the Protection of Animals Act of 1911, but the Ministry of Agriculture was given power to control badgers (and even to enter farmers' land for that purpose) by later legislation in 1975 and 1976.

The causative organism of bovine tuberculosis, *Mycobacterium bovis*, is the chief cause of tuberculosis in badgers. The most arresting data in the Zuckerman report are those for the incidence of *M. bovis* infection in badgers. The most extensive series of measurements is that carried out by ministry laboratories of badger carcasses submitted for autopsy, usually after being killed on roads. In south-west England, more than 4 per cent of adventitious carcasses yielded *M. bovis*, while elsewhere in Britain isolation of the bacillus from dead badgers was sporadic and not statistically significant. In another

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