candidate — a personable 39-year-old physicist called Daniel Thoulouze — is also likely to be the recommendation of the relevant section of the Comité National, so there may be no conflict. But the CNRS directorate is put in an awkward position whatever the result. If it selects Thoulouze, it will appear to approve of the grass-roots election of laboratory directors — which it wants to avoid. Yet if it selects another, it will appear to confirm the fears of the more radical scientists and the strong trades union movement in French science that, despite a socialist government, the selection of laboratory directors — who have great power over their laboratories — will remain closed and centralized.

In the event, the CNRS may be forced to ask Tournier to continue. The new CNRS director-general, Jean-Jacques Payan, is not against elections in principle; but he says they should be undertaken only "in a very precise framework", meaning that the electorate should be appropriate to the category of post. But Payan is under great pressure from the grass roots, the technicians and the younger researchers, for a more democratic way of appointing directors, and he will certainly have to give in to some extent. As Tournier himself said this week, the question is whether the CNRS is forced into a system where directors must conform to majority opinion in a laboratory, or a system where the directors can be independent, but must subsequently seek to bring the whole laboratory behind them.

Meanwhile the unions of Grenoble, which have enjoyed a large degree of democracy (or at least, consultation), since 1968, are determined to be "serious" about the election. The candidates were grilled in debates, and their scientific and general laboratory policy examined, they said. The unions' objective is that the laboratory should continue to do good science, and they insist that that requires the director to have good relations with his staff, down to the lowest technician.

And to some extent, this policy is reflected at the Ministry of Research and Technology in Paris, which gave Payan his job at the CNRS. The strong feeling there is that science is more and more a collective exercise — and that democracy and efficiency go together. But on the other hand, they also feel at the ministry that too much democracy leads to "turbulence", a position which would seem to be close to Payan's own (which is perhaps not surprising, for the minister for science, Jean-Pierre Chevènement, and Payan have been close colleagues for a decade.)

In the end, the issue is going to be how far Chevènement is prepared to travel with the unions — and particularly the communist-affiliate CGT, which is strong at Grenoble. The CGT secretary here said last week that he and his union were watching and waiting. And if Chevènement does not come up to their expectations, he promises a struggle.

Robert Walgate

What price IIASA?

Washington

The Vienna-based International Institute for Applied Systems Analysis (IIASA) has now been informed officially that the United States will be withdrawing its support for the institute from the beginning of 1983 (see *Nature* 3 December, p.390). This gives IIASA some breathing space in which to seek ways of keeping the United States involved — even if its contribution is severely reduced.

At present the United States and the Soviet Union together provide about half of IIASA's \$10 million annual budget, and the IIASA council is now looking at ways to reassess the dues from each of the member nations. At present the United States's \$2.5 million contribution comes from the National Science Foundation and is channelled through the National Academy of Sciences, and one possibility is that the money might be raised from other federal agencies. Private foundations are also being approached but so far all offers for support have been well below current levels.

Whether the United States will come back remains an open question. Founded in the early 1970s as a symbol of détente, IIASA has provided a useful window for both East and West on economic and social conditions on the other side — for example information about energy resources. But the institute has failed to stem doubts about the true academic value of its work.

David Dickson

Pakistan's space ambitions

A military option?

Bangalore

Pakistan looks set to embark upon an ambitious programme of space research — with clear hints that the spur is the prospect of military applications in the long term. Dr Salim Mahamood, chairman of Pakistan's Space and Upper Atmospheric Research Commission (SUPARCO), while unveiling the details of a 10-year national space programme in Islamabad recently, said that Pakistan did not want to be left behind in the space race, and that his country is studying in detail the configuration of a satellite which "can serve strategic purposes by taking pictures of military installations, army movements and acting as control, command and communication bases".

The setting up of SUPARCO earlier this year, with President Zia at its head, is said to have given fresh impetus to the hitherto slow-moving Pakistani space programme which is currently concerned mainly with launching sounding rockets from a base on the outskirts of Karachi. Dr Mahamood

claims that Pakistan is on the way to developing a communications satellite that "would be launched with the aid of either a European or an American rocket".

Since the successful flight test of India's SLV-3 rocket in July 1980, there have been fears in Pakistan that India might use experience gained with SLV-3 to build a strategic missile. Indeed, in November 1979 an Indian parliamentary committee was told that within six months of a political decision, SLV-3 could be modified into a medium-range ballistic missile. But the Indian Space Department stresses that military objectives are beyond the purview of the Indian space programme which is directed at "harnessing space for socio-economic development".

There is concern too that with the launch of the Bhaskara II satellite, India is developing the ability not only to survey the land for natural resources but also to carry out military surveillance over Pakistan.

Dr Mahamood claims that over the next five years, Pakistan will attempt to test a space launch vehicle of its own. The controversial deal between Pakistan and the West German private enterprise space agency OTRAG seems to be in obedience. It is claimed that Colonel Gaddafi, OTRAG's host in Libya, had contacted Pakistan with an offer of OTRAG's technology.

How true is the rumour of a link between OTRAG and Pakistan is not known but some strategic analysts say that OTRAG could provide about 2,000 qualified space technologists badly needed to bolster Pakistan's space research efforts.

Meanwhile, Pakistan is negotiating with the US National Aeronautics and Space Administration for the setting up of a \$10 million ground station near Islamabad to receive earth resources data from the Landsat remote sensing satellite.

B. Radhakrishna Rao

India's space programme

Now for real

New Delhi

India entered a new phase in its development of a series of satellites for remote-sensing applications with the successful launching of its experimental satellite Bhaskara II, into a circular Earth orbit from the Soviet Union on 20 November. India's space programme for the 1980s includes as one of its two chief goals a major survey of natural resources. The other task is the development of space-based communications system. The first operational satellite, the National Satellite 1A will be launched in April 1982.

The 440-kilogramme Bhaskara II is an improved version of Bhaskara I, which went out of action, after 26 months, in August. Modifications to the camera system should eliminate the "corona discharge" which caused the breakdown of one of the two television cameras aboard Bhaskar I for a few months. And an extra

frequency has been added to its radiometer for more accurate measurements of atmospheric water content, a key factor in the satellite's subsidiary role of weather forecasting. The satellite also carries indigenously developed solar power cells for space qualification tests.

The next step after Bhaskara II will be the 600-kilogramme Indian Remote Sensing Satellite I (IRS I). A memorandum of understanding has been signed with the Soviet Union for launching it in 1986.

But India now has to face the prospect of a much more expensive space programme than in the past, since Bhaskara II marks the end of free launch vehicle and rocket booster facilities provided by the Soviet Union since the launch of the first Indian satellite in 1975.

Indian scientists are working on indigenous launch vehicles as alternatives, although experiments with the SLV-3 launch vehicle have so far achieved only qualified success. Nothing daunted, the Indian Space Research Organization is developing the Augmented Satellite Launch Vehicle (ASLV), based on SLV-3, which can put a 150-kilogramme satellites into space. India also plans to develop a polar satellite launch vehicle by 1986-87 to launch 600-kilogramme satellites into sub-synchronous polar orbit 500 to 100 kilometres from the Earth. **Sunil Saraf**

European environment

One log-jam ends

Brussels

The Council of EEC Environmental Ministers which met in Brussels on 3 December was remarkably successful, with agreement being reached on several previously contentious issues.

The directive regulating discharges into the aquatic environment of mercury from the chlor-alkali industry was adopted. Attempts to push through the mercury directive and the "drins" directive (regulating aldrin, dieldrin and endrin) foundered on the dispute over whether quality objectives (favoured by the British) or limit values (preferred on the continent) should be used to assess the maximum permitted level of pollution discharged into water from an industrial plant. The ministers have now agreed on a clause requiring the latest technology to be used when building new plants.

The haggling over the Seveso directive on the prevention of major industrial accidents also ended at the meeting. The new French government has toned down its objections to the clause on the consultation of countries across the frontier from new plants. The consultations will now take place on a bilateral basis — without the involvement of the European Commission as originally proposed. Although the directive does not cover nuclear installations, the same consultation procedure is at the centre of a dispute between France and

Electronic intrigue

Palo Alto

In probably the largest theft of semiconductor devices ever, \$2.7 million worth of integrated circuits disappeared over Thanksgiving weekend from Monolithic Memories Inc., a "Silicon Valley" company.

About 498,000 chips of two types were stolen. One kind, a programmable array, PAL, embodies circuits that provide a logic function in a wide range of computer products including video games, industrial equipment and computers used by the military. The second type, FIFO, is used to input data at one speed into computers and take it out at another.

About \$20 million worth of advanced computer chips disappear each year into a national and international underworld electronics trade. Integrated circuits are smaller than a fingernail, hard to identify and can sell for \$100 apiece. Many stolen chips are smuggled out of the United States into Eastern Europe. President Reagan's embargo on allowing Communist countries to buy high technology equipment provides a good market. Other chips are sold to pay narcotics dealers.

In 1979, an employee at INTEL stole 10,000 microcomputer devices worth \$1 million. They passed through black-market distributors in West Germany and eventually arrived at Siemens, a West German computer manufacturer. This robbery was traced when Siemens told INTEL that the untested chips were faulty. That the intensive electronic and human security at Monolithic Memories was bypassed suggests that in this case also the thief was an employee: the company is offering a reward of \$50,000 for information leading to an arrest.

Charlotte K. Beyers

Belgium. The French government intends to build power stations at Chooz, a few kilometres from the Belgian border.

Agreement was reached on a technical proposal to exchange data on sampling and monitoring levels of atmospheric pollution. However, the directive on safety levels for lead in air must wait until a communally acceptable method of monitoring atmospheric pollution is found.

Broad agreement was reached on the European Commission's third environmental action programme and its proposed policy to give environmental considerations greater weight when determining other EEC policies. Finally, despite much discussion, there was no decision to implement the Washington Convention — the EEC regulation on the trade in endangered species is, in fact, reported to be much tougher than the convention.

Jasper Becker

Animal welfare

Promise delayed

The new European legislation to protect laboratory animals seems to be in the hands of legislative snails. Optimists had expected agreement on the draft of a Council of Europe convention on "the protection of animals used for experimental purposes" last May. But the deadline passed, and the hope now is for agreement in March 1982.

Discussions have been under way since 1978, when the Council of Europe appointed an expert committee to draft model legislation. But the experts have so far failed to agree among themselves. Their latest disagreements relate to the "pain condition" that if an animal suffers severe and enduring pain, the experiment must stop and the animal be killed; the use of animals for more than one experiment; and the experimental procedures which should be included in the statistics on animal experiments.

Most of the representatives from the council's 21 member states object to the lack of provision for exemption from the pain condition in the latest draft. The exception is Britain, which wrote the draft when it took over chairmanship of the committee in April 1980. Britain argues that its own legislation, which includes the pain condition without exemption, has worked well since it was enacted in 1929.

Approval of the convention is also being held up by West Germany's objection to a clause which permits an animal used in one painful experiment to be used again. Most other countries accept the clause, some less willingly than others. A further stumbling block relates to whether animals used as controls, for example, should be included in statistics on animal experiments. Sweden believes that they should, but most other countries think their inclusion would push up the apparent number of experiments unnecessarily.

The aim is to resolve these differences before the next annual meeting of the expert committee in March. When agreement is reached, however, a council of ministers will have to approve the draft before it can be laid before individual states for signature and ratification. Because ratification is a lengthy process, the convention is unlikely to come into force for several years.

Meanwhile, the European animal welfare lobby, increasingly vociferous, is asking for tighter controls than those in the latest draft. The Council of Europe's parliamentary assembly, which has no power but which can be influential, has agreed to discuss the lobby's demands and consider recommending changes to the terms of reference of the expert committee. If the assembly decides to recommend changes and the council of ministers agrees to implement them, the convention could be delayed indefinitely or even killed.

That, however, is unlikely. Most states