The detailed arrangements for the use of the telescope have yet to be worked out between the US National Aeronautics and Space Administration (NASA) and ESA.

ESA's decision has ruffled several British feathers. The Edinburgh proposal was based on the Starlink image processing system, which also uses the VAX computer and links six British universities. A confidential report by an ESA subcommittee, set up to evaluate the proposals, is said to have highlighted the scientific merits of the British scheme but put it in second place because the location was "far off from most member countries". Problems with pay differentials and apparent weaknesses in management and archiving were also mentioned, but these objections are dismissed by some British astronomers, who consider that a system based on Starlink would provide the best facility for European astronomers. Such a system could, however, be developed with advantage at ESO. **Philip Campbell**

Curien on top

The council of the European Space Agency (ESA) has unanimously elected Professor Hubert Curien, president of the Centre National d'Etudes Spatiale, the French space agency, to be its next chairman. In a break with tradition, the council has also elected two vice-chairmen Dr Harry Atkinson, a British delegate to ESA, and Dr H. Grage, a Danish delegate. The hope is that the three new appointees, who represent separate national interests, will between them steer the agency onto a truly European course as it negotiates its future for the next ten years.

Despite the unanimous vote, however, Professor Curien's election was not without dissent, some delegates fearing that it might give too much weight to French arguments for the further development of the Ariane launcher. Britain had argued that it was time for a British chairman, the last one having been Sir Harrie Massey who chaired the European Space Research Organisation, ESA's predecessor, in the early 1970s. But other countries feared that the possible British candidates would be too partisan. An attempt by Italy and Switzerland to bring John Adams, ex-joint-director of CERN, the European centre for high-energy physics, into the competition failed on the grounds that he is not a delegate to the ESA council. John Adams had declined to apply for the post of ESA's director-general when it became vacant last year.

In the event, the compromise has been to elect the British and Danish vice-chairmen to work with Professor Curien. With the current uncertainty over ESA's future programme, they are bound to play a more vital role than ESA chairmen in the recent past. **Judy Redfearn**

US space research

Halley again?

Washington

A faint glimmer of hope that there may, after all, be a mission to Halley's comet filtered from the House of Representatives last week. The House has voted to include $5 million in the budget to keep the project alive during 1982. But this is less than the $25 million which scientists at Jet Propulsion Laboratory (JPL) of the National Aeronautics and Space Administration (NASA) say is necessary in the 1982 budget for the first stage of a $350 million project.

The Republican-dominated Senate in passing a parallel bill last month did not include money for a Halley mission because it had not been requested by the Administration. Even if the proposed mission survives the compromise bill which the two legislative bodies must now negotiate, it still has to go through the appropriations process in which budgets rather than programmes are agreed.

Scientists at JPL are hoping to convince President Ronald Reagan that *not* mounting the mission would be a serious blow to national prestige, given that the European Space Agency (ESA), Japan and the Soviet Union (in partnership with Comecon countries and France) are preparing their own plans.

Dr Ray Heacock, JPL's choice as project manager for the Halley mission, said last week that the $5 million would be sufficient to fund the project for the first three months of the next fiscal year. After that the President, if the mission is approved during negotiations on the 1983 budget for the agency, could direct NASA to reprogramme some of its 1982 funds.

The proposal has some strong supporters, particularly among those who feel that space science activities in NASA have been unfairly squeezed by the agency's preoccupation with the space shuttle.

The original plans have also been scaled down considerably. NASA had initially talked of a spacecraft which would travel alongside the comet on its way to a rendezvous with the smaller Tempel 2 comet. The latest plans are for a more modest mission using reserve equipment from previous planned missions to launch a spacecraft through the comet's tail within 600 to 1,000 kilometres of the nucleus.

There remains hope, however, that NASA may at least be able to resurrect its full participation in the International Solar Polar Mission, originally planned to fly two spacecraft in complementary orbits over the poles of the Sun. The agency's decision, at the prompting of the Office of Management and Budget, to eliminate funding for one of the spacecraft generated a storm of protest from European allies which are building the other.

The House authorization bill passed last week added $15 million over the Administration's request to allow NASA to continue construction of its spacecraft. This decision is likely to be supported in negotiations with Senate counterparts, where ex-astronaut Jack Schmitt is responsible for overseeing NASA programmes. The recommendations from the Appropriations Committee would also permit the project to continue, and given the importance which top State Department officials have attached to maintaining international commitments, it seems unlikely that the Senate Appropriations Committee, which meets to discuss NASA's budget next week, will object.

At the same time, NASA is unlikely to accept ESA's offer to build the second spacecraft, made during the negotiations to salvage the mission. Representative Don Fuqua, chairman of the House Science and Technology Committee, said that he was opposed to this proposal, because it was unfair to expose European contractors to the vagaries of US policy, and because even though the price-tag would be lower, spending the money in Europe would still result in a loss of US jobs and profits. TRW, the company selected by NASA as contractor for its own spacecraft, is now said to have found ways of reducing its costs considerably, a move likely to increase the mission's chances of survival. **David Dickson**

Trypanosomiasis

Question of breeding

Schemes for breeding cattle resistant to trypanosomiasis are to be hatched at a research institute being planned in the Gambia (West Africa) with support from international aid agencies and foundations. The objective is to throw light on why N'Dama cattle in Africa appear to be genetically more resistant to infection by trypanosomes (also the infectious agent of African sleeping sickness) than are the more common Zebu cattle, and to find ways of propagating this resistance.

Much of the enthusiasm for the new institute comes from the President of the Gambia, Sir Dawda Kairaba Jawara, who was trained as a veterinary surgeon in Glasgow in the early 1950s, and who became leader of the People's Progressive Party in 1960. A preliminary meeting was held at Bellagio last year, and a meeting in the Gambia in May this year worked out a timetable on which further decisions must be made in time for a final decision about the project by January 1982.

Among international research projects, the Gambian research centre is unusual in that the African Development Bank seems to be prepared to take the lead in providing funds. Other interested parties include the European Community and the British government, the Food and Agriculture Organization and the World Health Organization of the United Nations, and research institutes in the World Bank

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network, including the International Laboratory for Research in Animal Diseases in Nairobi. A technical appraisal of the project is being carried out this month in the Gambia, and should be completed in October.

The mechanism of trypanotolerance in N'Dama cattle is far from clear. The capacity for tolerance obviously has a genetic basis, but the older cattle are the more free from trypanosomes in the blood, suggesting that tolerance is acquired in response to trypanosomal antigens — and that even N'Dama cattle might benefit from multiple vaccines. Part of the intended research programme will be to look for genetic markers for the easy identification of resistant cattle. The long-term objective is to prepare the ground for setting up breeding centres for the propagation of potentially resistant cattle.

The initial costs of the centre are estimated at $3.5 million, with annual running costs of $1.5 million.

Bulgarian wildlife

Shooting for keeps

Plovdiv

Bulgaria, which this year is celebrating its thirteen hundredth anniversary of statehood, has for a number of years been committed to an ecological policy aimed at restoring its range of wildlife to the level indigenous in the country a millenium ago. During the past few years, extensive herds of roe and red deer have been built up, moufflons have been reintroduced and a small herd of bison has been established based on stock remaining from a former royal park. And now, during the past month, a second herd has been formed in the national game and forestry park at Preslav; fourteen animals, including four pregnant cows, were transferred from the existing reservation and will eventually be joined by animals from Poland and the Byelorussian SSR.

This faunal re-establishment policy is part of an overall reafforestation drive. During the long Turkish occupation, which ended just over a century ago, a large proportion of Bulgaria's primaeval forests were destroyed. But shortly after the establishment of the Bulgarian People's Republic in 1944, a major tree-planting programme was started and considerable attention given to conservation. During the Second World War, Bulgarian game herds multiplied virtually unchecked, so that stocks became sufficient for the new regime to incorporate into its forestry policy a role for the human gun-bearing predator.

According to a report presented last month at the Plovdiv symposium on "Wildlife and the Environment" (part of the "Expo-81" World Hunting Exhibition), this policy is working well. Although every adult Bulgarian citizen is entitled to join the Hunting and Fishing Union, thereby acquiring the right to hunt game, stocks are flourishing. The latest census gives 14,000 red deer (which have spread to almost all suitable habitats throughout the country), some 117,000 roe deer, which have moved permanently into arable areas and established a field ecotype, some 30,000 wild boar, 2,700 fallow deer, 2,000 moufflons, 1,500 chamois and 700 bears.

However, some small game species have suffered, apparently because of changing ecological conditions. The hare population, in particular, suffered a considerable decline in the late 1970s. The Hunting and Fishing Union, however, implemented a strict conservation plan — which included a total ban on hunting for two years — and the latest figures show a considerable increase.

Managing forests as a combined hunting and conservation resource does not seem to produce major conflicts of interest in Bulgaria. The various hunting clubs affiliated to the Hunting and Fishing Union are assigned specific tracts of the state forests, and are expected to assume many of the traditional duties of the gamekeeper — including the distribution of fodder in hard winters. No paid keepers are employed — the club members perform such tasks on a voluntary rota basis, which gives them a good insight into the problems of forest management. (Foreign tourist hunters, of course, are provided with the normal complement of beaters and ghillies — at the cost of some £500 per week.)

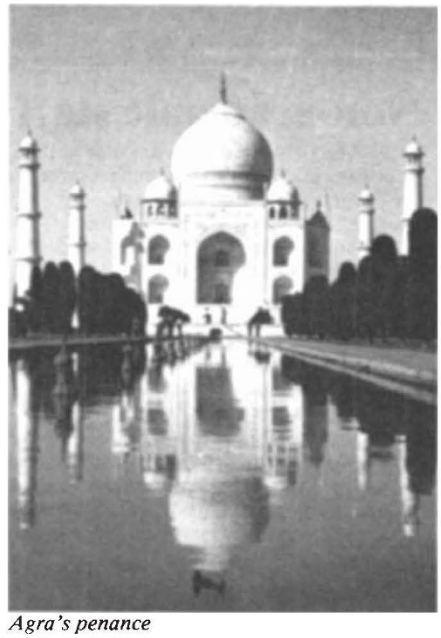
Nevertheless, Bulgaria has not been free from ecological mistakes in recent years, and this makes experts wary of introducing totally new species. Some years ago, for example, it was proposed to introduce American trout alongside the native Bulgarian variety, with which, it was confidently predicted, they would not compete. In the event, however, the newcomers attacked and virtually wiped out the local trout. Nevertheless, Bulgarian fisheries experts are prepared to consider innovations, and have reported some success with the bester — a non-migratory hybrid of beluga (white sturgeon) and sterlet, first produced in the Soviet Union about ten years ago. **Vera Rich**

India's environment

First steps

New Delhi

To protect the world-famous Taj Mahal, the Indian government is to close two coal-fired power stations in Agra, about 85 kilometres from the capital, New Delhi. This is one of the first concrete actions of India's new Department of Environment, aimed at saving the seventeenth century white-marbled monument from being blackened by smoke billowing out from the power stations. The new department has also persuaded the railway authorities to switch from coal to diesel power in their Agra workshops.



Agra's penance

These actions seem to be only a beginning for India's environment programme. According to the Ministry of Agriculture, some 175 million of the country's total 304 million hectares of land are subject to environmental problems. These include serious water and wind erosion over 150 million hectares, and shifting cultivation, waterlogging, saline and alkaline soils in the remaining area.

India is annually losing more than 6,000 million tons of topsoil through water erosion, and the total area subject to periodic floods now stands at 40 million hectares, an increase of 100 per cent in the past 10 years. Soil erosion is causing premature silting-up of tanks and reservoirs in which India has invested a massive $12,500 million.

Another major problem is the large-scale deforestation in the Himalayas and other hilly areas of the country. And the 19 national parks and 202 wildlife sanctuaries covering more than 2.3 per cent of the geographical area of India are inadequate to protect the many endangered habitats and threatened species, especially as most of the sanctuaries suffer from a lack of any scientific, or any other kind of effective management.

One of Indira Gandhi's first concerns when returned as Prime Minister after the election of January 1980 was to stem the degradation of the environment, and this led to the setting up of a fully-fledged government department to tackle the problems. The government is expected to announce far-reaching recommendations shortly, but for the time being there is a campaign to create awareness among the general public on environmental matters. This summer, for the first time, "environmental camps" are being held all over the country to involve young people in tree planting schemes, and to put a similar message over to the inhabitants of the rural areas where the camps will be based.

Sunil Saraf

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