

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 reforestation drive. During the long Turkish occupation, which ended just over a century ago, a large proportion of Bulgaria's primeval 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.)

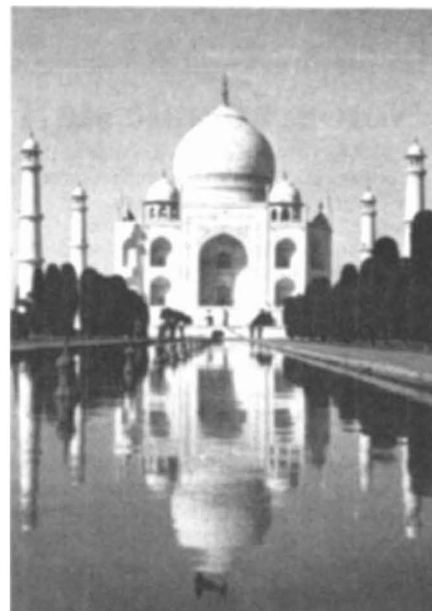
Nevertheless, Bulgaria has not been free from ecological mistakes in recent years, and this makes experts wary of introducing totally new species. Some years ago, for example, it was proposed to introduce American trout alongside the native Bulgarian variety, with which, it was confidently predicted, 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