

is already extensive work on isolation including the use of cellulase produced in the Institute of Plant Physiology in Shanghai. K. J. Scott (University of Brisbane) reported success in the division of barley leaf protoplasts using a special rapid method of isolation and sequential media incubations; and it was exciting to see in a visit to the laboratory of Li Hsiang-Hui in the Institute of Genetics, Peking, that he was able to obtain division of wheat leaf protoplasts after isolation by means of Chinese cellulase, and incubation in a relatively simple culture medium.

The post-symposium tour took the party to Shanghai, Hangchow, Kweilin, Nanning and Kwangchow. Visits of scientific interest were interspersed with tours of factories, communes, botanical and medicinal herb gardens.

In comparison with the West conditions in the universities left much to be desired, and invariably deficiencies were blamed on the iniquities of the Gang of Four. To fulfil projects of somatic hybridisation and genetic engineering better trained students are required.

The tour also gave the party first-hand experience of haploid breeding. Particular mention may be given to the work on wheat seen in the Red Star and Tung Pei Wang communes near Peking, on rice at the Chung Po County Laboratories and Chin Chow, and on maize in the Corn Research Institute and the Kwangsi Agricultural University, Nanning. Development of future programmes of transferring nitrogen fixing genes into cereals and of somatic hybridisation will be watched with interest. □

rather than the reed (*Phragmites australis*). Physical damage from boat traffic rather than eutrophication is a likely cause of this change.

To ornithologists the Broads are closely associated with the bittern (*Botaurus stellaris*), a reedswamp bird which began recolonisation of the area in 1911 after 50 years during which only three records of breeding exist. Day and Wilson (*Brit. Birds* 71, 285; 1978) have collated information on the expansion of this species in Britain since that time, but they also have bad news for the Broads. By 1954, 60 pairs were nesting in Norfolk (about 75% of the British breeding population of the time) but this was reduced to 27 pairs by 1970 and to 10 pairs in 1976 (about 20% of the birds breeding in Britain).

The decline has not been seen in other British counties. The bittern population of Suffolk has risen by 50% over the same period. It is therefore unlikely that any non-local factor, such as hard winters, has been involved. Day and Wilson also produce data concerning the density of breeding herons (*Ardea cinerea*) in the Broads. They declined abruptly following a hard winter in 1962/63 as did the bitterns but they have subsequently recovered to their former level. The bitterns show some recovery, but the general decline in numbers since 1954 has continued.

The explanation must lie in a deleterious local factor such as pollution, habitat destruction or disturbance. The answer may well lie in the simplified food chains resulting from eutrophication and increased turbidity. The bittern, unlike the heron, seems unable to cope with such habitat changes. The Broads thus seem to be another classic of conflicting interests—wildlife conservation and recreation being the two main opponents. The conventional British compromise of partition is an incomplete solution to this kind of problem where the Broads are interconnected waterways and where many of the best wildlife areas, such as Hickling, Horsey and Heigham Sound are also the most popular sites for sailing. Where entire river catchments form the basic ecological unit for management, sub-division of the waterways among the conflicting interests alone will not solve the problem. □

The Norfolk Broads under pressure

from Peter D. Moore

THE conservation of fresh water habitats and their associated swamp and fen vegetation is rendered difficult both by the natural process of succession and by the vulnerability of such ecosystems to human misuse. The Norfolk Broads in eastern England provide a good example of how these two forces can interact to produce an ecological headache.

The open water areas of the Broads were themselves produced by Mediaeval peat-cutting and so can be regarded as a man-made environment. The value of this series of lakes and interconnecting rivers for recreation has long been recognised, although its exploitation is fast increasing; the number of power-boat licences issued has risen from 1,250 in 1947 to 9,247 in 1976. Boating interests are naturally concerned to maintain open, navigable waters, but the natural processes of secondary succession have tended to reduce the open water areas as reed-swamp encroaches. Ellis (*The Broads*, Collins London, 1965) concluded that the amount of open water in the Broads had declined from 1,200 ha in 1880 to 700 ha in the 1950s. During the following decade there was an increase in open water as a result of the grazing activity of the introduced coypu. The coypu population is now controlled, but no further encroachment by vegetation seems to have taken place.

The current state of the aquatic flora and fauna of the Broads has been

reviewed by George (*Trans. Norfolk Norwich Nat. Soc.* 24, 41; 1977). He describes experiments which are in progress using 20-m diameter Lund tubes which isolate a body of water and sediment from its surroundings. Preliminary results suggest that some of the characteristic Broads water plant species which have recently declined, such as *Potamogeton pectinatus* and *Najas marina*, germinate widely but survive only in the tubes. It is not yet clear whether some chemical factor, or turbulence created by boats is involved in their inability to survive.

Mud sedimentation rates have increased dramatically in the past 30 years and this can probably be ascribed to higher phytoplankton productivity resulting from eutrophication. Jackson (*Trans. Norf. Nor. Nat. Soc.* 24, 137; 1978) has conducted a survey of the macrophyte flora of the Broads and has concluded that there has been a serious decline in the diversity and abundance of water plants in the area. Much of the eutrophication of the Broads results from sewage treatment plants, but the contribution of agricultural run off and from boats has been considerable. George describes fish kills which have been associated with toxin production by phytoplankton components and a decline in benthic invertebrate diversity. Chironomid midge larvae and tubificid worms have replaced a previously rich fauna.

George also points out that the marginal reedswamp, which itself once threatened the survival of open water in the Broads, is now declining. Tussock fen often borders the waters

Correction

In the article 'Monkeys prefer kin' (*News and Views* 274, 311; 1978) Wu and Sackett's work was carried out with the pig-tailed macaque (*Macacca nemestrina*) and not the rhesus monkey as stated.

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