

BOTANY

Plants Threatened

from our Botany Correspondent

EXTINCT and vanishing animals probably arouse much more sympathy than plants in the same situation; poaching the Nile crocodile for its skin seems a more dastardly crime than indiscriminately picking wild orchids. But in many places plants are more seriously threatened than the more widely publicized animals. Throughout the world many plants are in danger of extinction—some have probably never been described, so that there are not even any dried specimens in herbaria. The International Union for Conservation of Nature has taken up the cause and is to produce a *Red Data Book* of threatened plants, like that for animals which lists the species in danger of extinction.

The book is being prepared at the Royal Botanic Gardens, Kew, by Dr Ronald Melville of IUCN's Survival Service Commission. He is collecting information, from the literature and from correspondents in all parts of the world, about plants which are likely to become extinct. Dr Melville estimates that about a quarter of a million plants are in this precarious situation; the list is clearly going to be very long.

Apart from collectors and commercial exploiters, who have wrought particular havoc with orchids and succulents, sometimes reducing wild populations to almost nothing, the problem primarily is the destruction of habitats. The situation is particularly serious where there is a large proportion of endemic species; because they do not grow anywhere else their loss will be absolute. The islands of the Pacific are a case in point. Ninety-five per cent of the native flora of the Hawaiian archipelago is endemic and many species are endangered. The genus *Hibiscadelphus*, for example, once consisted of four species, but now one is extinct, two others have been reduced to a single plant each and the fourth is only preserved in national parks.

In the latest issue of *Biological Conservation* (1, 2; 1969), Dr Melville describes how Philip Island in the western Pacific, which was covered in vegetation when discovered by Captain Cook in 1774, is now completely eroded with only a few plants remaining in the valleys. There used to be three endemic plants, but of these the Philip Island glory pea, *Streblorrhiza speciosa*, is extinct—last recorded about 1805. In 1967 there were a few bushes of *Hibiscus*, *H. insulans*, and no plants of the grass *Agropyron kingianum* could be found. The situation of endemic species is similar in many parts of Africa; Madagascar, for example, has many threatened plants.

In Britain the story is less spectacular because there are very few endemic species, but there are about three hundred rare species, some in grave danger. *Cypripedium calceolus*, lady's slipper orchid, is now virtually extinct, remaining only in one secret locality. The small aquatic plant *Elatine hydropiper* was thought to be extinct, but last year it was recorded in Scotland again when water levels fell during the fine weather. The attractive fern *Trichomanes* used to be widespread in Britain, but is now almost extinct, having been collected to excess by overzealous botanists.

At the Biological Records Centre, Monks Wood, a list is in preparation of the sites of the rarest British plants, defining as a rarity a species which occurs in

fifteen or less 10 km squares throughout the country. This work is geared to conservation, and when the *Red Data Book* is ready some assessment will be possible of the worldwide conservation effort needed. National parks and nature reserves will obviously be important, as exemplified by Mutomo Hill in Kenya, which has been set aside for the preservation of East African succulent plants. Botanic gardens also have an important part to play in providing a refuge for threatened species, and a source of supply and example for commercial cultivators. Some countries, such as Australia and Czechoslovakia, already have strict regulations which forbid the picking of certain plants, and British botanists are hopeful that the Wild Plants Protection Bill will be passed soon.

FUEL CELLS

Expensive Optimism

THERE has been civilized rejoicing this week on both sides of the Atlantic about the inventor of the form of fuel cell which was carried in the Apollo 8 spacecraft just before Christmas. The National Research Development Corporation in London gave a dinner for Mr Francis Bacon, whose work it has supported since 1957. In the United States, Dr T. O. Paine, acting administrator of NASA, sent a warm message for the occasion.

The commercial outlook for the patent fuel cell is nevertheless still somewhat unclear. On Tuesday, Mr J. C. Duckworth, managing director of the corporation, said that commercial organizations would not at this stage be able to pursue Mr Bacon's idea for lack of the promise of speedy returns. The NRDC is spending nearly £200,000 a year on fuel cell work at the laboratories of Energy Conversion Ltd at Basingstoke, but so far the only commercial application has been in Apollo. Mr Duckworth was nevertheless optimistic about the opening up of the market. He pointed out that there were a number of military applications, and there is even high hope that private yachts may come to value the quietness of fuel cells.

SATELLITES

More of the Same

WITH the help of NASA, Britain will launch its fourth scientific satellite some time in 1971. The Science Research Council announced this week that it was spending about £1 million to build the satellite, called UK 4. Once up in its 500 km circular orbit it will adopt the name Ariel 4, by analogy with its predecessors. Like them, UK 4 is an ionospheric satellite, and indeed carries three experiments identical with those in Ariel 3. The prime contractor for the UK 4 programme will again be British Aircraft Corporation, and the electronics will be the responsibility of GEC-AEI Electronics Ltd. The project will be managed by the Space Research Management Unit of the SRC, with the Royal Aircraft Establishment, Farnborough, as research and development authority.

UK 4 will carry five experiments. One of them, to investigate charged particles, will be supplied by an American organization not yet named. The rest will all be familiar to those who have followed the Ariel programmes. Professor J. Sayers and his team from