

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

the University of Birmingham will again be measuring electron densities and electron temperatures. Professor T. R. Kaiser from the University of Sheffield will be sending up a combined experiment with Mr F. Horner from the Radio and Space Research Station, to investigate VLF radiation and lightning impulses. Professor F. G. Smith from Jodrell Bank will also be combining with the RSRS in an experiment to measure radio noise. All that is missing from Ariel 3 is the experiment from the Meteorological Office, which studied the vertical distribution of molecular oxygen in the atmosphere.

Excluding launching costs, the satellite will cost £1 million, which is remarkably cheap. This has presumably been possible because UK 4 will use large amounts of material left over from Ariel 3. Five models of Ariel 3 were built, two of which were used for mechanical and electrical tests, and three of which were flight models. As the first launch was a success, two were left over, providing a good opportunity to launch UK 4 cheaply. It is a pity, however, that room aboard was not found for an experiment from outside a narrow circle of British space scientists. Others must be beginning to feel left out.

TELECOMMUNICATIONS

Whose Monopoly?

THE House of Commons Standing Committee on the Post Office Bill is now well into its examination of the proposal to establish the GPO as a public corporation. Under the new bill, the postal, telecommunications, giro, money remittance and data processing functions of the present department are to be run by the new public authority—the Post Office—while public savings will be hived off into a Department for National Savings responsible to the Treasury. A new Ministry of Posts and Telecommunications is to be set up, which will replace the office of Postmaster-General and will oversee the Post Office. The standing committee has been meeting regularly since November and so far has covered the abolition of the office of Postmaster-General and the transfer of his functions to the new ministry.

Discussion has more recently centred on the extent of the monopoly of the Post Office in telecommunications, and in particular the attachment to the telephone system of equipment not belonging to the Post Office. The growing practice of data transmission along telephone lines, which the GPO is belatedly encouraging and which depends on terminal units at present supplied by the GPO, is particularly affected. But the ban applies to all kinds of equipment which could conceivably be connected into the system.

The fear is that badly designed attachments will wreak havoc in the telephone system. This question has been receiving attention in the United States, where the Federal Communications Commission recently ruled that restrictions imposed by American Telephone and Telegraph were unlawful. The doubts of telephone engineers have been overcome by attaching equipment to the system through what amounts to a fuse box, rented from the telephone company (*Nature*, 219, 1097; 1968).

In Britain, the Postmaster-General, Mr John Stonehouse, is by and large sticking to his guns. The GPO

is seeing to what extent a little more freedom in the supply of equipment can be allowed, he said, but the Post Office must have power to control the characteristics of any equipment attached to the network. Nor could the Post Office give up its responsibility for the maintenance, or deterioration would follow. Nevertheless, last week Mr Stonehouse did soften his words by agreeing that in the past the range of Post Office equipment may have been too small. Now there are to be discussions with other interested bodies to see whether the variety of devices which can be connected to the system can be broadened.

The standing committee has been particularly searching in its examination of the monopoly which the new Post Office will have in the telecommunications field. While the Government's line is that the bill merely transfers the monopoly of the present department to the Post Office, others suspect an extension of the monopoly is involved. Much of the discussion has centred over the claim that the new bill does away with a restriction in an earlier Act limiting the monopoly to frequencies below 3×10^{12} Hz, but Mr Stonehouse argued that all the new bill does is to spell out more clearly restrictions which were inherent in earlier legislation. This is intended to prepare the way for developments still in the future. He went on to make some reassuring noises in the direction of the relay services, which are anxious not only that the Post Office may become their principal competitor if present experiments are successful, but more seriously that in future the Post Office will be responsible for granting licences. To appease the relay companies, the Government has promised that there will be no changes before 1976.

COMPUTERS

Competition for Small Users

FOR the best part of a decade, people have been wondering when the Philips company would enter the computer business, and how. The answer came last week, when the company launched a series of desk-size computers on the markets of nineteen countries. The computers, known as the P350 series, are said to be successors to the present generation of mechanical and electrical office equipment. They are designed for invoicing, payrolls, accounting and similar activities.

There are three models in the series, costing £3,000, £3,850 and £5,750. Philips claims that "the performance to cost ratio" of the new computers is several times greater than that for electro-mechanical machines. The smallest has a store of 200 sixteen digit words and the other two have 400 word stores with a capacity for extension up to 1,000 words. Although one or two small companies have already moved into the minicomputer market, it appears that Philips has stolen a useful march over its rivals. International Computers Limited has no immediate plans for a rival machine, and is concentrating instead on a new computer bureau which is to be opened later this year by its subsidiary, International Computer Services. National Cash Register is naturally jealous of any serious inroad into one of its traditional markets, and Philips is already claiming to have three hundred potential customers on its books.

How will these new machines meet the needs of smaller companies for computer time? ICL is hoping