the "large and increasing number of licences to import tortoises". In 1968, however, the number of applications to bring tortoises to Britain decreased to 350,000 from 600,000 in the previous year. Moreover, it seems that only two thirds of the licences granted in 1968 were followed by the import of a living tortoise. What seems to happen is that importers overstate their requirements, presumably so as to be able to meet fluctuations of demand.

The import of animals for serious purposes seems also to have eased during the year. Old world monkeys, which play a part in the development and testing of vaccines, are prominent in the list. The Advisory Committee says that the only significant increases in applications for licences have been for the importation of kangaroos, wallabies, giant tortoises and iguanas, and even here, it seems, only a proportion of the licences issued were eventually translated into living animals.

PURPOSES FOR WHICH ANIMALS WERE IMPORTED IN 1968			
Animals	Zoos and breeding	Scientific research	Resale
* Marsupials			
Macropodidae			
kangaroos and wallabies	17	6	3
Phalangeridae			
opossums, koalas	3	—	3
Primates			
* Lemnidae	2	—	—
* Pongidae			
anthropoid apes	23	1	—
Cebidae			
South American tree monkeys	22	442	1,075
Callitricidae			
marmosets, tamarins	8	60	358
Cercopithecidae			
old world monkeys	47	8,642	1,371
* Ungulates			
Rhinocerotidae	2	—	—
Reptiles			
Testudinidae			
tortoises	9	7	223,129
Iguanidae	10	—	462

*Animals considered to be rarer than the rest. Some of the Testudinidae come into this category.

PLANT ECOLOGY

British Flora in Extinction

from our Botany Correspondent

BOTH man and climate have influenced the distribution of British flora, although from the Neolithic period onwards it is generally difficult to distinguish between the effects of each. The shift from tundra to trees that occurred some 15,000 to 13,000 years ago was chiefly the result of climatic change, which must still be taken into account in predicting the future of British flora. This was the upshot of a conference held in London from September 19 to 21 by the Botanical Society of the British Isles to consider the flora of a changing Britain.

J. P. Savidge described studies of the influence of climate on the vegetation of Cader Idris, a hill in West Wales. He and his colleagues at the University College of Wales, Aberystwyth, are recording the abundance of the various species, together with details of the environment in which they grow—soil pH and concentrations of nutrients, for example—with the intention of establishing an "environmental spectrum" for each species.

This will help to detect changes in the distribution of a species that are the result of climatic changes alone.

Savidge pointed out that, as the climate alters, species that can adapt to new conditions will survive, while those that cannot, because their breeding system does not encourage variation, will tend to die out. This category includes for example apomictic species which reproduce by seed without the intervention of fertilization. Furthermore, if summers continue to become cooler, the British flora may lose the continental species which grow chiefly in the south, and which need a fairly high temperature for germination and a fairly hot summer for fruiting.

C. D. Pigott (University of Lancaster) is also investigating the response of plants to climatic change, and has found that the small thistle *Cirsium acaulon* grows more densely and has a greater reproductive capacity in the south of England than in Derbyshire, near the limit of its distribution. In the south there seems to be a potential of about three hundred good seeds per flowering rosette, but in Derbyshire the number is only thirty to fifty in a good year. The temperature sensitivity of fruiting in *C. acaulon* is a sure sign that climate is a cause of the different behaviour in the two parts of Britain.

The ecological significance of such a phenomenon, Pigott explained, has to do with the ability to exploit new habitats. A species such as *C. acaulon*, growing in conditions which limit its sexual reproductive capacity and make it dependent on vegetative propagation, will be less able to adapt to changes in the environment than species which can produce abundant seed, some of which should be genetically equipped to cope with changed conditions. In the face of climatic changes *C. acaulon* may therefore die out in Derbyshire, but it is less likely to do so in the south of England where all the variation consequent on abundant sexual reproduction would be available for adaptation.

The speakers who went on to assess the changes that man has wrought on the British flora made it clear that his influence has not been wholly bad, in spite of pollution and wholesale destruction of habitats. J. E. Lousley (past president of BSBI) related how the coming of the railways created vast stretches of new habitats for foreign plants. As is well known, Oxford ragwort (*Senecio squalidus*) spread throughout the railway system after seeds had been dispersed from the Botanic Garden to Oxford station. Canals have had a similar effect on the aquatic flora. For example, *Elodea canadensis*, Canadian pondweed, arrived in Britain in the 1850s and has since infiltrated the whole canal system. With increasing cleanliness and container transport, there will be much less scope for the spread of plants by rail and canal, but motorway verges could prove interesting as sites for the spread of new species.

A. J. Gray (Nature Conservancy, Merlewood), who has the task of assessing the botanical consequences of the Morecambe Bay barrage, predicts that new habitats will be created; it will be interesting to see what species move into them. Gray suggested that even species such as *Senecio palustris*, extinct since 1899, could return in such conditions. For botanists, barrages, like many of man's activities, could have welcome results in spite of the initial destruction involved. Nonetheless, climatic change cannot be made to bear all the blame for the twenty-one species of plant that have become extinct in Britain since 1800.