In some areas of the city, the frequency dropped by as much as 50 per cent in four years. On average, from 1962 to 1967, the frequency of the black ladybirds dropped from about 45 per cent to 25 per cent. In the same period, as a result of the introduction of smoke control zones the level of smoke pollution fell by 40 per cent. There is no direct proof that selection for black ladybirds is caused by smoke pollution, but the circumstantial evidence is very strong.

Assuming that smoke abatement is responsible for the decline in the melanic ladybirds, it is possible to work out from Creed's figures the selection against the melanics in the less polluted environment of Birmingham. If about eight generations have passed since the introduction of smoke control zones, the selective coefficient against the melanics comes out at about 0.12. This means that the melanics suffer a mortality of 12 per cent over and above that of the normal, non-melanic ladybird in the new environment.

Although these selective forces are much smaller than those produced by pesticides, it is important to remember that they are the selective forces involved in the change back to a more natural environment. The original selection for melanism may have been much more drastic. Ladybirds can obviously adapt themselves to these industrial changes without much difficulty. Birds and mammals may not find it so easy. If the partial abatement of one aspect of industrial pollution can have such selective effects in thus raising the fitness of the normal red form of the ladybird, there can be no doubt of the benefit of the abatement of pollution in general in improving the natural environment. The leading article in the issue of *Nature* for October 15 (**233**, 437 ; 1971) made the point that pesticides have brought great benefits to man, as well as a certain amount of harm to the environments of many species: on balance "DDT may be good for people". Smoke and other avoidable effluents seem to offer no worthwhile benefits in compensation.

ANIMAL BREEDING

Keeping Fossils Alive

from a Correspondent

FOR ten years an *ad hoc* group of biologists has laboured to gain support for a scheme that would systematically conserve breeds of farm animals that are in danger of extinction. Several breeds of cattle, sheep and poultry were kept in a "gene bank" at Whipsnade (*Nature*, **202**, 131 ; 1964) but these had to be dispersed when the Zoological Society of London needed the space.

In spite of lack of funds, some of the livestock were taken over by the Royal Agricultural Society of England at its National Agricultural Centre, Kenilworth. The organizing group became a working party under the auspices of this society, and it organized a conference on rare breed survival on October 15 to draw attention to the problem.

Mr W. Longrigg (Chief Livestock Adviser, MAFF) outlined the decline of breeds, which has chiefly been caused by changes in demand. Belatedly, geneticists are beginning to realize that the scientific approach to animal production should not be governed by current profitability, but by the need to maintain variability for future selection.

But economic value is only one aspect of the case for preservation which was presented by Dr P. A. Jewell (University College, London). He pointed out that every breed, like a wild species, represents unique genetic material of importance in archaeological, historical and scientific research as well as being a living museum of educational value. Once lost, a breed cannot be re-created. Dr Jewell described work in which bones from surviving primitive breeds such as the Soay sheep had been used in archaeological comparisons, and outlined research on the blood types of cattle in which primitive survivors had widened the range of study. He pointed out that Darwin used observations on domestic animals in his theory of evolution.

Dr M. L. Ryder (Animal Breeding Research Organization, Edinburgh) showed how survivals of sheep from prehistory, the Middle Ages and the nineteenth century had enabled a study of their development, and particularly of fleece evolution, to be carried out.

Professor J. C. Bowman (University of Reading) gave the results of a survey carried out in 1970 to ascertain the exact status of breeds. It was found that some well known sheep breeds had declined alarmingly to numbers lower than other breeds already designated "rare", for example, the Wensleydale (260) and Wiltshire (400) compared with the "rare" white-faced woodlands (700). He considered that it should be possible to keep a breed viable with as few as fifty individuals, provided the ratio of males to females was kept much higher than in normal husbandry. But two breeds of pigs (Tamworth and middle white) had fewer than the critical number of ten males.

The papers created considerable discussion and comment and it was decided to establish a society for the preservation of rare breeds, the functions of which would include the registering of animals, exchange of stock and technical advice. Further information can be gained from the Royal Agricultural Society of England.

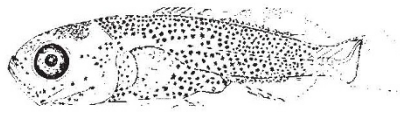
GOBIES

Two Species or One?

from our Marine Vertebrate Correspondent

THE diminutive goby *Lebetus* has attained some degree of distinction among European fish as the smallest vertebrate in the fauna, a claim which has even ensured it a place in the *Guinness Book of Records* (although parts of the entry are sadly erroneous). Now, however, its interest is reinforced by a remarkable uncertainty as to the number of species within European waters.

Neclå Demir and F. S. Russell have reported recently (*J. Mar. Biol. Ass. UK*, **51**, 669 ; 1971) that two forms of *Lebetus* postlarvae were distinguished in the collections of young fish at the Plymouth Laboratory. These two types of postlarvae show certain differences in the concentration of pigment cells, and also show quite distinct differences in fin development at comparable sizes. Thus in one form the dorsal and anal rays are well defined when the young fish is 5.0 5.5 mm long but are only just noticeable in the other form at this length. Pelvic fin development also shows similar differences, and even more significant are the numbers of vertebrae, 25–26 in one form, 27–29 in the other.



A drawing of one of the largest specimens of the Fage form of *Lebetus* postlarvae, 8.1 mm long.

The interest in this discovery, paradoxically, is that it confirms what was discovered by two other workers almost half a century before. In 1919 the Danish marine biologist C. Petersen identified the postlarvae of a goby as *Lebetus scorpioides*, and a year before L. Fage had found postlarvae of the other known species, *L. orca*. Both species had been described from Scandinavian waters in 1874 by Collett. Later work by A. V. Täning on *Lebetus* from Iceland and Faroes confirmed that the postlarvae of the two named species could be distinguished in several ways, notably in their length at development of certain features.

It was thus widely accepted that there were two species of *Lebetus* in European waters, an assumption which was demolished by P. Miller in 1961 (*Nature*, **192**, 675 ; 1961) who postulated that the two named species were sexually dimorphic forms of the same species. His hypothesis was exhaustively reinforced in a later paper (*Bull. Brit. Mus. (Nat. Hist.)*, **10**, 205 ; 1963), in which he showed that having examined more than eighty specimens of full grown *Lebetus*,