If a close season became operative, then obviously there must be suitable machinery for dealing with marauding deer. I would suggest, therefore, that the farmer should contact the D.C.A. which would give sanction immediately for the offending deer to be killed, preferably by the stalker or stalkers of the nearest deer forest. When this had been done the D.C.A. would issue the necessary number of tags and give instructions for the disposal of the deer. Deer killed out of season should automatically become the property of the D.C.A. and the sale of the carcases would help to defray expenses. If there was some such system for dealing with marauding deer, then I consider that in addition to repealing the section of the Agriculture (Scotland) Act of 1948 whereby deer may be shot on enclosed land, it would also be wiser to alter the existing provision in the same Act which prohibits the killing of deer between the hours of darkness, so as to legalize it on *enclosed* lands only. The hours of darkness are the very time the deer do their marauding and it is preferable that the offenders should be tackled on the spot and *in the act.*

These are but a few of the problems that this most controversial subject presents. From a cruelty point of view shooting *at* deer with shot guns—it is hardly shooting *of* deer, because the percentage of kills per shot is so negligible—causes far more suffering than any lack of a close season, and I believe that the two problems, a close season and the prohibition of shotguns, should be tackled concurrently. This latter view was also suggested by the Home Office Committee on Cruelty to Wild Animals who, in their Report published in 1951, observed " Our view is that the shooting of deer with shotguns must inevitably be accompanied by a great deal of suffering ".

FIELD RESEARCH ON BRITISH BATS

By Michael Blackmore

Comparatively little work has been done to ascertain the distribution and habits of British bats. Much of the data in standard works on mammals is scanty and some of the more detailed accounts of habits appear to have been based on behaviour in captivity, which may vary considerably from that of bats in their natural environment.

Before the distribution of our twelve native species can be worked out in detail one must be able to recognize the distinc-

tions between one species and another. Morrison-Scott's key, based on external characters and reproduced in full by Matthews (*British Mammals*, Collins, 1952), is invaluable for identification because it dispenses with the need to examine tooth and skull characteristics. This key was first published in the *Naturalist* (1939, pp. 33–6), but the version given by Matthews embodies corrections made by the original author and is therefore more reliable. It can be used by anyone who has not previously handled a bat.

Some species can be recognized on the wing by practised observers but this method of identification must be used with extreme caution by the novice. Flight characteristics are not easy to describe with much accuracy and the distinctions between one species and another on the wing are sometimes so slight that descriptions of them are not infallible as an aid to recognition, especially in a poor light. Moreover, variations in the manner of flight can be noticed in an individual species on different occasions. If these reservations are borne in mind the following notes may prove helpful as a rough guide :

(1) *Large Size :*

(*a*) Wings narrow. Flight high (15–80 feet) and dashing. Repeated steep dives. (*Noctule.*)

(*b*) Wings broad. Flight medium to high (8–40 feet). Dives occasionally. (*Serotine.*)

(*c*) Wings broad. Flight low to medium (2–10 feet) ; heavy and butterfly-like, with frequent gliding. (*Greater Horseshoe.*)

(2) *Medium Size :*

(*a*) Wings narrow. Flight medium to high (10–50 feet), with shallow dives. (*Leisler's.*)

(*b*) Wings broad ; very long ears. Flight medium (8–20 feet) ; frequent hovering near foliage. (*Long-eared.*)

(*c*) Wings broad ; longish broad ears. Flight low to medium (4–15 feet) ; rather slow. (*Bechstein's.*)

(*d*) Wings broad ; narrow ears. Flight low to medium (4–15 feet) ; rather slow. (*Natterer's.*)

(*e*) Wings broad ; ears noticeably wide *on top of head*, giving " top heavy " appearance. Flight low to medium (4–15 feet) ; heavy and fluttering. (*Barbastelle.*)

(3) *Small Size :*

(*a*) Wings fairly broad, flight low to medium (4–13 feet), usually near foliage ; not very rapid, and somewhat fluttering. (*Whiskered.*)

(*b*) Wings markedly broad. Flight low to medium (4–15 feet); no defined beat and rather rapid. (*Lesser Horseshoe.*)

(*c*) Wings fairly broad. Very low "vibrating" flight over water in wide circles. Rather rapid. (*Daubenton's.*)

(*d*) Narrow wings. Flight medium to high (6–40 feet), often with defined beat. Rapid and jerking. (*Pipistrelle.*)

(*N.B.*—No bat should be identified as Daubenton's merely because it is seen flying over water. This habit is usual with most species.)

If more naturalists took an interest in bats and were able to recognize them it is probable that the area of known distribution of some species would be enlarged. Within recent years the serotine (*Eptesicus serotinus*), for example, has been found in Cambridgeshire, but it is not known whether the specimen was an isolated visitor or whether the bat is resident in the county. Leisler's bat (*Nyctalus leisleri*) has also been recorded once in Cambridgeshire since the war. The fact that it has also been found once in Essex and twice in Hertfordshire suggests that it may be more widespread in East Anglia than the known occurrences indicate. Mr. H. G. Hurrell has also seen it once in Devon near Plymouth but he informs me that he has searched the same area for it many times since, but without success. Only an intensive search over a wide area of Devon would confirm whether Leisler's bat is an established species in that county.

Very little precise information about the diet eaten by bats is available. There is, of course, some overlapping between one species and another but to what extent this takes place is uncertain. Seasonal variations in the food may be considerable. One method of adding to our knowledge about diet is to collect the dung of a known species throughout the year and then to analyse its contents by shaking it in water so that the insect fragments separate themselves. This method will not yield complete results; the digestion of a bat is very rapid and it will not be possible to identify every insect fragment, but an examination of dung should at least help us to understand more about the ecology of various species.

It is well known that the wings and legs of moths and other large insects are invariably allowed to fall to the ground beneath the feeding places of bats. Some useful data can therefore be obtained by collecting these fragments in outhouses and porches and at the entrance to caves.

Bats travel far more than we normally suspect. Bat-banding has been carried out in this country by small groups of enthusiasts since the war—notably in Devon by the Devon Spelaeological Society, and by a few naturalists working on their own. The results have been encouraging on the whole, as shown by the number of " refinds ", which prove that there is a good deal of movement between one cave and another even during mid-winter. These journeys, so far as is known at present, do not appear to exceed about twenty miles and much more work will have to be done before our knowledge is reasonably complete.

True migration does, however, occur among British bats. A group of long-eared bats (*Plecotus auritus*) was observed on 4th November, 1948, travelling (presumably from Scandinavia) towards the east coast of Britain. They were first seen 45 miles off Spurn Point and alighted on board ship after having travelled across the open sea from a north-easterly direction. After resting on the vessel they continued their journey westwards in broad daylight. Migrations of the noctule (*Nyctalus noctula*) from Germany to Lithuania and Poland have been known to occur, and it is possible, though by no means certain, that this species also migrates between Britain and the Continent. Intensive observation may well produce further data. The particoloured bat (*Vespertilio murinus*) has also been recorded here as a rare vagrant. Its last known occurrence (31st March, 1927) was on the Scottish island of Whalsay, 13½ miles north of Lerwick. The bat was picked up alive after a strong easterly wind; so it had probably been drifted across the North Sea, but the possibility of deliberate migration cannot be overlooked. The fact that the species was taken at Plymouth and also on board ship in Yarmouth Roads about 120 years ago suggests that it may occasionally try to reach our shores of its own accord.

The above notes indicate some of the lines on which intensive research might usefully be done in the future.

SHORT NOTES

Bechstein's Bat in Shropshire

On 3rd September, 1953, a male Bechstein's bat, *Myotis bechsteini* (Kuhl), entered an open window of a training and