

not been recorded there for many years. The northern section of Weeting Heath consists largely of chalky grassland forming a thick turf with pine trees scattered in groups. The more barren parts of the heath have yielded a very rare spider (*Oxyptila scabricula*), and another spider (*Philodromus collinus*) occurs only at two other places in Britain.

Applications for permits, which will be necessary for those who wish to visit the reserve, to undertake research and to collect specimens of animals or plants, should be addressed to the Regional Officer for East Anglia, The Nature Conservancy, Bishopgate, Norwich.

Knocking Hoe in Bedfordshire is a small relic of a particular type of close-grazed chalk downland turf,

which is rapidly disappearing under the present system of land use in Britain. The turf is thought to be of very ancient origin, and has probably remained undisturbed by cultivation at least throughout historic times. There is a rich flora of low-growing chalk downland species. The reserve has been established under a Nature Reserve agreement with the owner, Mr. L. T. Franklin. It will continue to be used for sheep grazing, as this is considered to be the best way to preserve the present composition of the sward. Access to the reserve will be by permit only, of which only a very limited number will be issued. Applications can be made to the Regional Officer for the South-East, The Nature Conservancy, 19 Belgrave Square, London, S.W.1.

POPULATION STUDIES OF THE COMMON EARWIG

DURING the summer of 1956, there was a plague of the common earwig (*Forficula auricularia* Linn.) in the garden of 28 Yarborough Road, Lincoln. Traps were erected to catch the earwigs and large numbers were caught. P. F. Baker (*Trans. Lincolnshire Naturalists Union*, 14, No. 2; December 1957) made a study of the relative numbers of males and females in the population and of the percentage of the population consisting of the variety with large elliptical forceps, known as form *forcipata* Steph. Later, it was decided to investigate the distance moved by different individuals in the population; this was done by a marking experiment.

The final total of 337 males and 332 females showed that during August and September 1956, in the earwig colony studied, males and females were present in almost equal numbers.

The males were found to be the most variable: the commonest varieties being those in which one-half of the calipers differed markedly in curvature from the other. This was found in both typical and form *forcipata* males. Two specimens were caught which from their external appearance seemed to be gynandromorphs.

Previous work on population statistics had led to the belief that earwigs were migrating from one part of the garden to another and it was decided to assess the movements of separate individuals in the population. To investigate movement an evenly

spaced network of traps was set up over the area so that each trap was about one yard from its immediate neighbours. Separate pots were labelled and all insects caught in any particular pot were marked on the elytra with oil paints of a colour characteristic of the pot.

To mark the insects during a period of relative quiescence—from general observations the earwig seemed to be active at night and inactive, or nearly so, during the daylight hours—an actograph was used. This relied on a displacement of equilibrium as the insect moves in a cage; a mark is registered on a drum. In this way the earwig was shown to be entirely nocturnal, commencing activity at dusk and continuing to dawn. For this reason removal of the insects from the traps was carried out in the daytime; these earwigs were then marked with oil paint and released at the base of the trap in which they were caught. The marking, to be recognizable, usually lasted for one re-trapping only; other earwigs ate the oil paint off their fellows.

Recaptures of marked individuals made up 12 per cent of the whole.

The results showed small daily migratory trends. In this case conditions were ideal and food was not scarce. It is known, however, that the common earwig will, under special environmental conditions or when food is scarce, migrate in thousands in search of new grounds.

DIRECTING YOUNG SALMON

RESearch on the methods of guiding young Pacific salmon while migrating downstream have recently been described by J. R. Brett and D. F. Alderdice (Fisheries Research Board of Canada. Bulletin No. 117: Research on Guiding Young Salmon at Two British Columbia Field Stations. Pp. viii + 75. Ottawa: Queen's Printer, 1958. 75 cents).

The first experiments, in 1953, were performed in a large divided trough using captive sockeye yearlings. These tests were intended to survey broadly the possibilities of using various techniques, including light, sound, air bubbles, curtains of hanging chain, odours, dye releases and differences in water velocity as means of guiding young fish. Significant deflexion resulted from the use of a relatively large area of

illumination at night, a band of rising air bubbles or bursts of dark dye during the day, and strands of chain hung vertically during both day and night.

Further trough experiments, in 1954, on the use of hanging chain demonstrated that the maximum distance between strands which produced a deflexion of 75 per cent or more fish through an angle of 45° was 4 in. Apart from its light-reflecting quality, the type of chain was found to be unimportant. The sensory stimulus causing the avoiding reaction was found to be primarily visual. Slow oscillation of the chain increased the deflexion of sockeye. Coho yearlings were not significantly deflected.

In conjunction with the trough experiments, a limited number of field tests using a 56-ft. oscillating chain deflector (144 oscillations a minute) in the