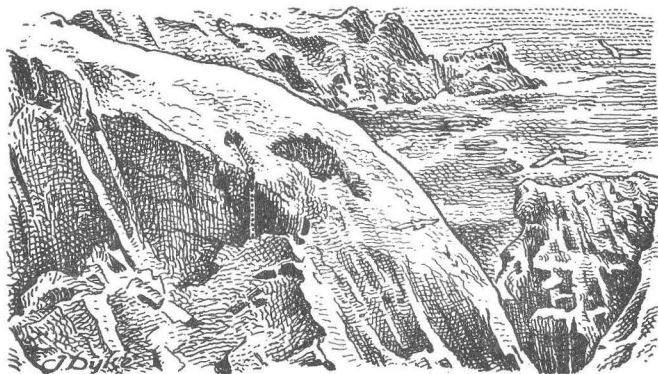


important. Answering the second question may provide the best way of answering the others.

The information recorded above shows that the continued study of population trends is needed. It shows too that the methods employed in 1949 were not efficient ; but the season's work should ensure that the investigations of succeeding years show improvement in this respect.



THE GROWTH OF NESTLING SHAGS

During May, June and July I was studying the growth of Shags *Phalacrocorax aristotelis* from hatching to the time of leaving the nest. The objects of the work were to obtain a picture of the general course of growth and development, to compare the rates of growth of various elements of the limbs and body, and to find out something of the development of behaviour-forms. The latter topic did not receive intensive treatment (this was planned for later years) so that little definitive information was secured. A considerable body of data on growth was accumulated, from which the summary that follows presents points of general interest. It is proposed to publish a fuller account elsewhere.

Daily visits were made to a group of three nests and on each occasion the young birds were weighed and measured. It was found impracticable to make use of more than three nests, which was unfortunate, as from the nine eggs laid in these nests only six young hatched and only two survived to the time of deserting the nest.

The growth of the young, measured as change of weight, follows a not-unexpected pattern, closely resembling that found by Portmann for *Pelecanus*, the nearest relative of the Shag so far studied in this way. The incomplete table of weights below indicates the general form.

TABLE III.—WEIGHTS OF YOUNG SHAGS (in grams)

| | A1 | B1 | B2 | B3 | C1 | C2 |
|---------------------|-----------------|----|----|-----------------|-----|-----|
| Egg before hatching | 42 | | | | 50 | 49 |
| On first day | 32 | 38 | 35 | 36 | 36 | 38 |
| 3rd day | 44 | 51 | 45 | 56 | 50 | 34½ |
| 5th day | 69 | 65 | | 95½ | 59 | 63 |
| 10th day | 185 | | | 265 | 181 | 152 |
| 20th day | 682 | | | 795 | | |
| 30th day | 1160 | | | 1299 | | |
| 40th day | 1523 | | | 1590 | | |
| Greatest weight | 1714 (46th day) | | | 1700 (42nd day) | | |
| Latest weight | 1653 (52nd day) | | | 1634 (51st day) | | |

The fledging period is long, but it will be seen that the rate of growth is high and sustained, apart from an initial spell of two or three days of little growth (this 'lag period' is general in young birds and is here relatively short) and the final week or so, during which the weight fluctuates but declines from the peak figure.

At hatching the young Shag is quite bare (its skin nearly black) and the body down does not begin to sprout until the eighth day, but its subsequent development is very rapid so that by the twelfth it is all over the body and on the fourteenth extends over the sides and back of the neck. On the head its appearance is further delayed: small supra-occipital tufts on the twelfth day are the first to show and it is some time before the crown is covered.

The first indications of the primaries appear between the fourth and eighth days, but it is not until sixteen or seventeen days that the true feathers show. The tail feathers appear very similarly, the middle pair being somewhat slower than the rest.

The naked chick is very weak and lies flat with its head resting on the nest. Not until about fifteen days can the chick hold up its head for any length of time, but subsequently its increase in vigour is remarkable. The characteristic gape-flashing and throat-quaking movements of the adult were first noted on the twenty-second day. It was about this time that the chicks started active resistance to being handled and by twenty-seven days it was necessary to confine them in a box for weighing. The beginning of resistance to handling appeared to be simply a concomitant of increasing strength. There was no sign of fear and almost invariably after the chick had been put in position for measuring it became quiescent and permitted extension of a wing, and similar manipulations, without resistance. Only in the last few days of nest life did the young seem really 'wild'.

Opening of the eyes may occur on the first day (two cases) or not until the fourth (two cases), but in any event the lids are not moved for some days. The iris is dark brown, though at first the eye has the blue opalescent look common to young birds. At about twenty-four days an outer ring of bluish-white appears and during the remainder of the nestling period this colour gradually replaces the dark brown.

The bill grows at a more uniform rate than any other of the measured structures. At hatching the upper mandible is a little shorter than the lower and straight-tipped, but in a few days it becomes equal and on about the seventh day the developing hooked tip overhangs the lower mandible. By the end of the nestling period the bill is of adult length, though appearing less massive.

The tameness of the parent birds was almost equal to that of the young. Only a few days after my daily visits had begun they were found to return to perches within ten yards of me and later they came very much closer. One would approach within six feet, and might have improved on this had not the mysterious disappearance of its two young caused it to desert the nest.

HUGH BOYD.

MISCELLANEOUS NOTES—TERRESTRIAL AND MARINE

Marine Ecology.

Mr and Mrs Harvey, assisted by working parties, continued the survey of the shores of Lundy during April and August. Considerable progress was made with the work, but it is unlikely to be completed for some time to come, and no interim report can do justice to the accumulating data. The most striking observation during the year has been the discovery of a red seaweed new to British waters. Mrs Harvey found this while collecting on the shore at the Gates at Easter. Being unable to recognize it she submitted it to Mrs K. Drew-Baker of the Department of Cryptogamic Botany, Manchester University. It proved to be a species of *Falkenbergia*, an Australian plant which has been progressing towards Britain for some years, having been known from the French Atlantic coast and from the Channel Islands. This was the first time it had been seen in Britain, and a joint note on the occurrence was published by Mrs Baker and Mrs Harvey in *Nature* 1949, reporting its discovery. Since then it has been found in some quantity off the west coast of Ireland.

Freshwaters.

The principal additions to the freshwater ecological studies are recorded elsewhere in this report, in the Rev R. Fraser Bastow's lists of Diatoms. These present a valuable addition to our knowledge of the group, and Mr Bastow hopes to be able to visit the island in person next spring in order to complete his survey.

Terrestrial Records.

Here again, no co-ordinated report is available on the work of the year, partly because final results have still to be attained, and partly because it has not yet been possible to complete examination of material collected. New records for Lundy include one plant,