

## SHAG RECOVERIES

Since the previous report there have been the following recoveries: Fourteen 1955 nestlings; fifteen 1954 nestlings; two 1952 nestlings and two 1948 nestlings. One of the 1948 nestling was found, well worn, in a 1955 nest.

Recoveries were distributed as follows: France 11; Bristol Channel 10; South Coast of Devon and Cornwall 9; Lundy 2; Ireland 1.

Two of the Bristol Channel recoveries were of 1955 nestlings on inland reservoirs in Somerset. Two 1954 nestlings from the same nest were shot at Gull Rock, Falmouth, on the same day, December 19th, 1954.

## BREEDING OF SHAGS ON LUNDY 1954-55

There is little detailed information published on the breeding success and habits of the Shag, *Phalacrocorax aristotelis*, so during 1954 and 1955 all possible data on the Lundy Shag population have been collected. E. White and J. C. Coulson are studying Shag mortality, with particular reference to adults, on the Farne Islands, so a comparison of the two populations should prove of interest. After further work on Lundy, comparison may be profitable with the earlier work of Dr A. Kortlandt and Lord David Stuart on Dutch and Scottish Cormorants, *Phalacrocorax carbo*.

Sufficient material has been collected during the two years for some factors to emerge which appear to affect breeding success. In 1954 one hundred and twenty, and in 1955 one hundred and twenty-four nests were found on the Island. From these nests a varying amount of detail has been collected.

TABLE I  
CLUTCH SIZE

	Number of Eggs						No. of Nests	Mean Clutch Size
	1	2	3	4	5	6		
1954 Nests	1	14	52	7	3	1	78	3.00
1955 Nests	0	6	82	10	4	0	102	3.12
	1	20	134	17	7	1	180	3.07

The two years show practically no difference in the pattern of clutch size although the weather was dissimilar. In both years there was a great predominance of clutches of three. The clutch of six eggs in 1954, which was not found until June 8th, was composed of two dirty eggs and four clean ones almost certainly laid at a much later date.

TABLE II

HATCHING SUCCESS (Date for both years taken together)

	<i>Number of Eggs in Nest</i>						
	1	2	3	4	5	6	
Successful Nests	1	15	125	15	2	0	158
Unsuccessful Nests	0	5	9	2	5	1	22
% Unsuccessful Nests	23.8		7.3		75.0		13.9

Table II shows the varying success of nests according to clutch size. In this instance a successful nest means one in which some, if not all, of the eggs hatched. Whereas 13.9% of all nests were unsuccessful 75% of nests with clutches of five or six were unsuccessful. There is a statistically significant difference between the success of the three groups of clutch sizes, with a clutch of three being the most successful. There is a tendency for clutches laid later in the breeding season to be of a size greater or less than 3.

TABLE III

NESTING SUCCESS

<i>Year</i>	<i>No. of Eggs Nest Laid</i>		<i>Eggs Hatched</i>	<i>Young Fledged</i>	<i>Mean No. of fledged young per nest</i>
1954	49	147	102 (69%)	92 (90% of eggs hatched)	1.88
1955	93	299	185 (61%)	177 (96% of eggs hatched)	1.90
1954 and 1955	142	446	287 (64.3%)	269 (93.6% of eggs hatched (60.2% of eggs laid))	1.89

The striking similarity of hatching and fledging success for the two years is shown in Table III. Although the rough and wet weather of 1954 was known to cause the loss of a total of four fledglings, it evidently had no important effect on fledging success and it must be supposed that food was as readily available in the almost constantly rough seas of 1954 as in the calm seas of 1955. 93.6% of young hatched during the two years reached the flying stage, a remarkably high percentage. Even so, the number of young fledged was not sufficient to secure replacement of breeding adults, even if yearling mortality is low and breeding takes place at one year old. From the evidence of recoveries the yearling mortality is fairly high and the species appears not to breed until at least three years old. Therefore adults must average several seasons of breeding in order to replace themselves.

TABLE IV  
NESTING SUCCESS IN RELATION TO NEST-SITE

Nest Site	Number of Nests Studied			Number of Young Fledged			Young Fledged per Nest
	1954	1955	Total	1954	1955	Total	
Under Rock	40	48	88	89	99	188	2.14
In Open	60	63	123	99	110	233	1.89

All nests found have been divided into nests situated under rocks and those open to the sky or with only slight rock overhang. As Table IV shows covered nests are significantly more successful than open nests. This was so in both years, which showed very similar differences. The reasons appear to be that young in covered nests have shelter from rough weather and seas, and are not liable to be inadvertently pushed out of the nest and possibly over the cliff. The latter is probably the most serious disadvantage of the open nest situated on a ledge—for instance in 1954 one out of two young of approximately thirty-five days old suddenly appeared on a ledge about four feet below the nest, where it remained for a further eighteen days.

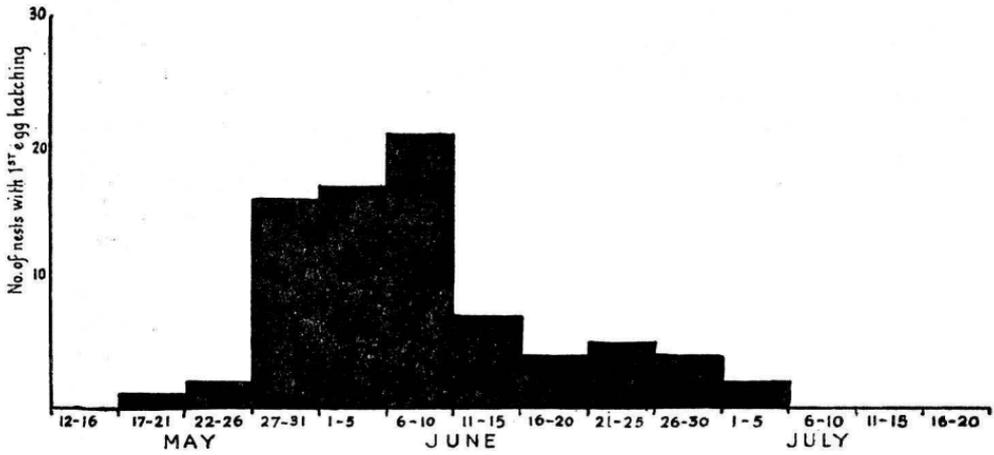
TABLE V  
RELATION OF TIME OF HATCHING TO NESTING SUCCESS

	Number of Nests Studied			Number of Young Fledged			Young Fledged per Nest
	1954	1955	Total	1954	1955	Total	
Nests with 1st egg hatched by May 31st	20	34	54	50	82	132	2.44
Nest with 1st egg hatched on or after June 15th	12	8	20	17	10	27	1.35

Another significant factor in fledging success is the date of hatching as is shown in Table V. The earlier nests have a markedly higher rate of success than the late nests. It is justifiable to use the data from the two years together as the season of breeding was virtually the same for both years (Histogram I). There is a certain amount of evidence from plumage and behaviour that late nests are those of young birds. Conversely there is some evidence that earlier nests are those of older birds: for instance thirty-one of the thirty-four 1955 nests with the first egg hatching by May 31st were nest sites used in 1954.

There is considerable continuity in use of nest sites, ninety-three out of one hundred and eighteen 1954 nest sites being re-used in 1955. There were fourteen 'new' nest sites in 1955, i.e. known certainly not to have been used in 1954, with a fledgling success per pair of 1.14 which is extremely low. In future work it is hoped to follow the success of the 'new' and 'old' nest sites and possibly relate them to the age of the occupiers.

1954 (data from 79 nests)



1955 (data from 86 nests)

