

invertebrate remains, other than *Paraneophros*, were present. The results of the analyses are shown in Table XI, together with the stomach analyses of Mahinerangi shags.

The figures quoted for mean numbers per pellet in Table XI are unreliable as some of the pellets were disintegrating and only a part of these may have been collected.

DISCUSSION AND CONCLUSIONS

1. POPULATION CENSUS

The data presented in Table II should not be regarded as accurate as many approximations and assumptions have been made in its compilation. Furthermore, only about one half of the rookeries were visited by the author—the rest of the data coming from Acclimatisation Society records. It seems likely, however, that it is as reliable as those censuses recorded by Williams (1945). Comparison of his data with Table II shows that the population in 1959-60 was very much smaller than earlier.

Year	Source	Number of nests
1926-27	Williams (1945)	1,273
1936-37	"	428
1942	"	1,753
1959-60	present work	228

The decrease in numbers is the result of intensive shag destruction. In view of the high mortality it is probable that the inland population was not self-maintaining in 1959-60 but depended upon recruitment from maritime rookeries. These recruits may have been young birds following the spawning migrations of trout, eels and lampreys.

Since the change in the Acclimatisation Society's policy on black shags the population on Lake Mahinerangi has increased rapidly. This will be discussed in a future publication together with an assessment of the effect of shag predation on fishes.

2. FOOD OF THE SHAG

The diet of shags, as shown in the present work, is very similar to that listed by Williams (1945) with trout being the most important food species in rivers and perch in lakes. Eels are an insignificant part of the diet of Otago inland shags. The author has seen only one eel taken by shags during this study—it was a half-digested 18 inch specimen found at the Luella rookery in 1964. A small number of crayfish are eaten as are native fishes.

The agreement of these results with those of Williams are also reasonable with respect to quantity of fish taken (4 to 7), and length of fish selected, so that the criticisms of Williams' results are discounted. However, the author contends that Williams' conclusions are not justified by his data because he has only shown that the black shag eats a certain number of prey species. This is not sufficient evidence to justify a value judgment as there are numerous cases in which predation is beneficial (Duncan, 1967).

The amount of food per stomach (Table VII) agrees fairly well with the values published by Mattingley (1927), Madsen and Sparck (1950), van Dobben (1952) and McNally (1957) being about 350g per fishing period. Ward (1924), Collinge (1927) and Williams (1945), however, all consider that the shag takes between five and ten times as much per day. The maximum amount of fish present was 880g which agrees well with Madsen's (1950) and van Dobben's (1952) estimate of about 770g.