It is perhaps significant that the R.A.O.U. Branch Report by M. Sharland *(loc. cit.)* recording an influx into Tasmania in 1957 of new arrivals from the north lists 40 or 50 White Ibis, Royal Spoonbills, Little Egret, and Pacific Heron, in addition to a substantial increase in the numbers of Coots.

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# FOOD OF YOUNG BLACK-BILLED GULLS (LARUS BULLERI) IN A BREEDING COLONY, NORTH CANTERBURY

*By ELLIOTT W. DAWSON*

During the years in which Acclimatisation Societies and so-called sportsmen have held sway in the management of New Zealand wild life, one or another species of bird, whether native or introduced, has been given a "black mark," and, without giving it much of a chance to justify its existence, has been summarily dealt with. This happened, for example, some years ago in the case of the Black Shag *(Phalacrocorax carbo novaehollandiae)* with the result that, even in these more enlightened days, one can easily see that to many "trigger-happy" individuals it makes no difference that there are eight or so different species of shag frequenting our lakes, rivers, and shores. They are all just "shags" to these people. The work of Falla and Stokell (1937; 1945), and of Dickinson (1951), on the stomach contents of a number of shags at least gave some more conclusive idea of what might compose the diet of these birds in various places and at various times. At the moment the bird with the black mark seems to be the Rook *(Corvus frugilegus)*, but, if one is to judge by the comments and letters in various newspapers (*cf.*, for example, 'Christchurch Star Sun,' Oct. 23, 1956), opinion is not entirely uniform as to whether this bird, in New Zealand, deserves the black mark with which it has been branded. It is interesting, in this connection, to read Nicholson's remark on this species and its habits in England (Nicholson, 1951: 42-44).

In a similar way, about 1930, even the Black-billed Gull, for a short time, had a black mark put on it. E. F. Stead (1932: 56) tells us how this took place in Christchurch. To use his words, "They do not come into Christchurch on foraging expeditions as does the Red-billed Gull in Auckland, and perhaps this is not greatly to be wondered at, for on one occasion, when a small flock came to Hagley Park, they were shot under orders from the local Acclimatisation Society, because they

were eating some of the trout fry which had been put into Victoria Lake."

The Black-billed Gull, the Red-billed Gull (*Larus novaehollandiae scopulinus*), and almost constantly the Black-backed Gull (*L. dominicanus*), have not been immune from further verbal or physical attacks during the passing years, but, at least, it is now possible to see the Black-billed Gulls, together with a lesser number of Black-backed Gulls and an occasional Red-billed Gull, feeding in considerable numbers throughout the year on the banks of the river in the very centre of the city of Christchurch. This advent of the gulls to central Christchurch illustrates the corollary to Nicholson's maxim (1951: 172): "A town which is inhospitable to birds must be strongly suspected of being inhospitable also to people."

The measures that can be taken by land-owners to reduce the damage done by Black-backed Gulls to ewes and lambs seem to be fully covered under Section 5 of the Wildlife Act although, no doubt, these regulations will be construed by some people as applying to any kind of gull just as happened in the case of the Black Shag. One still sees, for example, that Red-billed Gulls are threatened by such people as groundsmen who find them puddling on playing fields. I have been concerned to see that newspaper accounts reporting such incidents rarely trouble to explain that, in fact, the vast majority of New Zealand birds, including the small gulls, are absolutely protected and may not be killed without a permit. Such permits are rarely given even for serious scientific investigations, and then sometimes inadequately, so that the greatest caution must be shown when an "informed" layman suspects that his pleasure is being disturbed by the birds. Particularly is this so with regard to complaints about the food of birds. Collinge (1913) made a notable contribution to ornithology when much of his data on the food of British birds was published. From his work we now know quite well the likely food of the British gull species in various places and at various times, and many papers adding to the sum of knowledge on this topic have since been written. Such a state of affairs does not yet exist in New Zealand, and we will only achieve this if those of us who have the opportunity to report on food taken by our birds do so. We will then be in a position to know with some certainty which species deserve a black mark, and hence may have their protection lifted for the benefit of those who desire it, and which deserve all our efforts in conservation and protection. It is with this in mind that I have put forward this somewhat incidental note on material eaten by some members of a species I have come to know well, the Black-billed Gull.

From time to time, during ringing operations in a colony of Black-billed Gulls in the Ashley River, North Canterbury, fledging gulls have regurgitated recently-taken meals in the manner recorded earlier by Gurr (1954: 209). In contrast to Gurr's observations of the food of young Red-billed Gulls, close to the sea, on the Boulder Bank, Nelson, where "Small fish seem to constitute the principal food of the nestlings," the food of the young Black-billed Gulls in an inland situation on the Ashley has been found, over the period 1950 to 1954, to consist chiefly of insects, larvae, pupae and adults, and of small red worms. Marine food or freshwater fish appear to have been only exceptionally taken as food for the gull chicks.

Recently, Mr. B. B. Given, of the Entomological Research Station,

Cawthron Institute, Nelson, very kindly identified the insect remains from some regurgitated meals which I had collected, and I am indebted to him for this favour. Mr. Given wrote: "In a number of cases, identification is possible only as far as family, and in others as far as genus or even species. All species are probably native except the ladybird *Adalia bipunctata*. The *Oxycanus* larvae are probably all *O. cervinatus* (Walk.), but this is not certain. The elaterids (unidentified) in samples 2, 8 and 19 are different species."

Twenty-three samples of food, regurgitated by chicks or dropped by parent birds at the nests, and collected mainly in the 1951 season, may be taken to illustrate the variety and relative abundance of the food of the fledging gulls on the Ashley from 1950 to 1954.

1. Regurgitated by chick, 25/11/51: 3 small fish; 2 beetles and 1 'grass grub' (larva of the 'Brown Beetle,' *Costelytra zealandica*); 1 earthworm.
2. Regurgitated, 25/11/51: 8 insect larvae (Coleoptera, Elateridae; Lepidoptera, Agrotidae); 4 small red earthworms.
3. Dropped at nest, Nov., 1950: 1 small crab (*Hymenosoma* sp., Crustacea, Brachyura).
4. Regurgitated, 9/11/51: 3 small flatfish (*Rhombosolea* sp., Pisces, Heterosomata).
5. Regurgitated, 2/12/51: large mass of partly-digested fish remains.
6. Dropped at nest, 17/11/51: 3 'grass grubs' (larvae of *Costelytra zealandica*).
7. Regurgitaed, 20/11/51: 1 insect larva (*Oxycanus sp.*, Lepidoptera, Hepialidae).
8. Dropped at nest, 25/11/51: 3 insect larvae (Coleoptera, Elateridae. 'Wire worms').
9. Dropped at nest, Nov., 1953: 9 'Brown Beetles' (*Costelytra zealandica*); 2 large insect larvae (*Oxycanus* sp.).
10. Dropped at nest, Nov., 1951: 2 insect larvae (*Heliothis armigera*, Lepidoptera, Agrotidae); 1 insect pupa (*Oxycanus* sp.).
11. Dropped at nest, Nov., 1951: 1 'sand-hopper' (*Talorchestia* sp., Crustacea, Amphipoda); 1 ladybird (*Adalia bipunctata*, Coleoptera, Coccinellidae).
12. Regurgitated, Nov., 1951: 6 insect lavae (*Oxycanus* sp.; and *Monocrepidius exsul*, Coleoptera, Elateridae).
13. Regurgitated, 9/12/51: 8 small flatfiish (*Rhombosolea* sp.).
14. Regurgitated, 2/12/51: unidentified plant tissues; remains of earthworm.
15. Dropped at nest, 20/11/51: 11 beetles, 5 pupae, 1 larva (*Costelytra zealandica*); 3 small red worms.
16. Dropped at nest, 20/11/51: 8 small red worms.
17. Regurgitated, 2/12/51: 6 Whitebait (*Galaxias attenuatus*, Pisces).
18. Dropped at nest, 25/11/51: 27 small red worms.
19. Regurgitated by 3-day-old chick, Nov., 1951: 1 insect larva (Elateridae); 2 small red worms.
20. Dropped at nest, 6/12/54: 1 'Pipi' (*Amphidesma* aff. "*forsterianum*," Mollusca, Pelecypoda).
21. Regurgitated, 6/12/54: mass of partly-digested Whitebait (*Galaxias* sp.).

22. Regurgitated, 8/12/54: large mass of 'Brown Beetles' (*Costelytra zealandica*).
23. Regurgitated, 8/12/54: mass of 'grass grubs' (*Costelytra zealandica*).

Although Hartley (1956: 202) has once more drawn attention to "how misleading combined results can be when the contents of each individual bird are recorded on a percentage basis only," it may be said that the organisms making up these 23 samples occur in the following frequencies: insects, 43 per cent.; earthworms, 23 per cent.; fish, 20 per cent.; crustaceans, 7 per cent.; molluscs, 3 per cent.; plant materials, 3 per cent.

Despite the fact that only a very small number of food samples is being considered here, and that the breeding sites of *Larus bulleri* vary, within certain limits (*cf.* Sibson, 1942; Stidolph, 1949, and Black, 1955), a study of the nature of the food taken may be helpful towards an understanding of the ecological relationships of the three New Zealand gulls, and of the part that each of them plays in our agricultural economy. Hartley (1956: 201) has said also that, in studies of this kind, "it remains to present the data in such a form that their significance in the ecology of the species may be at once apparent." At the moment, with the lack of samples from other localities for comparison, the best that can be said is that the relatively large amounts of remains of destructive insects, for example the 'Grass Grubs' and the 'Brown Beetles (*cf.* Hoy & Given, 1952), indicate that the Black-billed Gull is performing a useful service to the farmer, at least in the Ashley district at this time of the year. Dumbleton (1942: 307) has recorded two kinds of insect larvae occurring in food samples. The quantities of subterranean grass caterpillar, *Oxycanus* sp., also show that these gulls are worthy of their place among us. Dumbleton (1942) has indicated something of the seriousness of the depredations of *Oxycanus* and *Costelytra* as pasture pests. Later (1945: 124) he recorded how, during the month of January, starlings and dotterels were seen feeding on young *Oxycanus* larvae, and the way in which "seagulls" gathered the larvae as they emerge from the tunnels in flooded or water-logged pasture.

Stead, as well as giving us the anecdote of the Black-billed Gulls and the trout fry in Christchurch, has provided quite a number of observations on the food and feeding of this species of gull. He has said that: "The food . . . consists mainly of fish and insects . . ," and has commented on the adoption of night feeding by the gulls in Lyttelton Inner Harbour under the electric lights, a sight now familiar to users of the inter-island ferry. After finding that inland Black-billed Gulls "feed extensively on insects," his conclusions were that: "In this way there is no doubt that they do a great deal of good, and the protection that is afforded them by law is fully justified . . . even if in some isolated instances Black-billed Gulls should be inimical to the particular interests of the angler, there is no doubt that they are beneficial to the community as a whole."

Black (1955: 169), discussing the breeding biology of the Black-billed Gulls at Lake Rotorua, remarked: "The first food of the fledgling appears to be the partly digested larval forms of the smelt. Lake Rotorua teems with this small fry." Gurr's findings for the Red-billed Gull, already mentioned, indicate, similarly, that the principal source of food was that closest to the breeding colony, namely from the sea, just as Black's gulls at Rotorua used their nearest source.

Although Stead has said that Black-billed Gulls follow the plough only to a limited extent, they have frequently been seen so doing in the fields adjoining the Ashley colonies, and this habit is reflected in the food supplied to the growing chicks. The birds frequenting the banks of the river in central Christchurch by day seem to feed largely on the bread and lunch-time scraps thrown to them, although it may be that in winter, when not so many office workers take their lunches out of doors, they supplement their diet from more natural sources.

It appears, then, that the Black-billed Gull, like the Black-headed Gull *(Larus ridibundus)* of Britain with which it is often compared, is an opportunist, taking its food from whatever source of supply happens to be closest, whether it be near the breeding colony in the summer where insects, freshwater fish and earthworms may be available, or from river mouths where marine food can be found, or whether it be amongst the lunches of the city's office workers at another time (*cf.* Collinge, 1920, 1926, 1927). In a similar way Oliver (1955: 212) has concluded from a review of the feeding habits of the Black Shag that the differing accounts of stomach contents, one showing trout and eels in equal proportion and the other with trout far outweighing eels, reflected the fact that "the shags take the kind of fish hat is locally dominant," so that, in the latter investigation, the "habitats of the birds killed were mainly rivers where obviously trout were predominant over eels." Beal, in 1897, had already pointed to this situation when he said: "Within certain limits birds feed upon the kind of food that is most accessible. . . . It is not probable that a bird habitually passes by one kind of insect to look for another which is more appetizing . . . It is thus apparent that a bird's diet is likely to be quite varied, and to differ at different seasons of the year." (Beal, 1904: 3-4).

Incidentally, with regard to the comparative roles and relationships of the three New Zealand gulls, the interesting discussion which Sparck (1951) has provided of the role played in the economics of agriculture and fisheries by the various species of gull in northern Europe may be noted. Over 7,500 stomach contents were examined in this survey, giving quite a comprehensive view of the situation. The species considered by Sparck are interesting to compare with their New Zealand counterparts. *Larus canus* and *L.ridibundus* "are not marine or shorebirds in their food habits but land birds relying on a diet consisting of insects, earthworms, plants, etc." *Larus marinus* and *Rissa tridactyla* are "shore birds, feeding on fish and marine invertebrates." *Larus argentatus* is "a shore bird. . . . more associated with civilisation, offal playing a great part in its diet, and this may explain the terrific increase in this species during the last decades." *Larus fuscus,* on the other hand, is "partly an insect feeder, partly a fish eater . . . breeding on the shore, but migrating in many cases through the Continent." From our present knowledge we can place *L. bulleri* in the same ecological group as *L. canus* and *L. ridibundus,* while *L. novaehollandiae scopulinus* appears to belong to the group represented in Europe by *L. marinus* and *R. tridactyla. Larus dominicanus,* then, approximates both *L. argentatus* and *L. fuscus* in habits, although perhaps not closely. However, in the New Zealand gulls, the striking features are the close association of the Black-backed and Red-billed Gull's with man's establishment of freezing works, harbours, and whaling stations, and the great increase in their numbers due to these assured sources of food.

The increase of the numbers of Black-billed Gulls and their spread into towns and settlements is also due to their association with man, but, in this case, due rather to man's generosity than to his industry.

Even at this stage we know very little about the food and feeding habits of the New Zealand gulls, and it is certainly not possible to condemn any of them out of hand, not even the Black-backed Gull, as menaces to the progress or pleasure of man. With the unrealistic and unappreciative attitude to their flora and fauna which it is evident that a good number of New Zealanders possess, the sort of happening which Stead related could take place again very easily indeed. Black (1955: 168, 170) has reported on the "ruthless," or, perhaps better, thoughtless, destruction of gulls' nests and eggs at Lake Rotorua, and I have experienced this situation in my Ashley colonies quite often enough to be well aware of this element in the human population frequenting such areas, and to be able to echo Black's concluding remarks: "*Larus* is not a game bird, to be protected, nurtured and duly slaughtered in season, so is of little account — or so it would seem!" There are, apparently, some "sportsmen" who entirely agree with these sentiments, though whether their actions are motivated by the feeling that their livelihood is being threatened by these birds or whether they are due to mere vandalism is another matter.

I make no apology for using these somewhat inadequate localised findings from a study of the Black-billed Gull as an excuse to appear in the role of a "bird-lover" or of a sentimental defender of the doings of "our little feathered friends"; but, I have seen enough during my association with nesting gulls and terns in various colonies close to the public path to feel a little qualified to express some opinions on the need for a "scientific" basis for providing evidence when some body or individual demands that a particular species of bird should justify its existence by human standards. Assisting in the education of the public to put a stop to the unwarranted destruction of nesting birds and their eggs is a matter that we, as individual ornithologiss, can well combine with our field work, and it is to be hoped, at any rate, that with more concrete *facts* about food and feeding in our birds, native and introduced, those who are concerned with birds as rivals in business or pleasure will be able to be advised on the proper course of procedure without resorting to unrestricted, and unlawful, violence.

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* Since these notes were prepared an important paper on "foods and feeding-habits as subjects for amateur research" by Gibb and Hartley (1957) has appeared. This contains a great many comments and suggestions which should be seriously considered by those concerned with this field.—E.W.D.