

Other wild species in which infection has been reported include — from North America — the American coot, *Fulica americana* (Gullion, 1952), the Snowy Owl, *Nyctea scandiaca* (Meade and Stoner, 1942), and various waterfowl (Bellrose, Hanson and Beamer, 1945); and, from Europe: the Mute Swan, *Cygnus olor*, the Pheasant, *Phasianus colchicus*, the Jay, *Garrulus glandarius*, and the Waxwing, *Bombycilla garrulus* (Christiansen, 1949).

Known also as mycotic pneumonia and brooder disease, aspergillosis is — in other countries — the commonest fungous disease of game farms, where, apparently, it is usually fatal. However, relatively little is known of its incidence in wild populations. An excellent account of the disease and its symptoms may be found in Biester and Schwarte, 1952.

I am grateful to the Diagnostic Officer of Wallaceville Animal Research Station for giving me the information upon which this note is based and to Dr R. W. Balham and Mr K. E. Westerskov for making available to me some references on aspergillosis.

- Beaudette, F. R. (1945): Aspergillosis and parasitism in a gull. *Bird Banding* 16: 99 - 101.
- Biester, H. E., and L. H. Schwarte (1952): Diseases of poultry, 3rd edition. Iowa State College Press, Ames, Iowa.
- Bellrose, F. C., H. C. Hanson and P. D. Beamer (1945): Aspergillosis in wood ducks. *J. Wildl. Mgmt.* 9: 325 - 326.
- Christiansen, M. (1949): Sygdomme hos vildtlevende fugle. *Dansk ornith. For. Tidsskr.* 43: 189 - 215.
- Cowan, I. McT. (1943): Aspergillosis in a Thayer gull. *Murrelet* 24: 29.
- Davis, W. A., and L. S. McClung (1940): Aspergillosis in wild herring gulls. *J. Bact.* 40: 321 - 323.
- Gullion, G. W. (1952): Some diseases and parasites of American coots. *Calif. Fish and Game* 38: 421 - 423.
- Herman, C. M., and G. Bolander (1943): Fungus disease in a Glaucous-winged gull. *Condor* 45: 160 - 161.
- Herman, C. M., and M. N. Rosen (1947): Another outbreak of fungus disease in gulls. *Condor* 49: 212.
- Meade, G. M., and D. Stoner (1942): Aspergillosis in a Snowy Owl. *Auk* 59: 577 - 578.

SOME NOTES ON THE BLACK-BILLED GULL (*Larus bulleri*) AT LAKE ROTORUA, WITH SPECIAL REFERENCE TO THE BREEDING CYCLE

By M. S. BLACK

The Black-billed gull breeds on the volcanic plateau, and probably one of the largest known colonies of this species in the North Island is sited on a low reef of silica rock which juts into Sulphur Bay, an arm of Lake Rotorua, immediately to the east of and approximately 200 yards from the Ward Baths. Offshoots of this colony also breed on the several small islets and rocks at the approaches to the bay, in one or two suitable localities within the Whakarewarewa Reserve, and at Lake Rotomahana. Doubtless there are other small colonies nesting in isolated areas in this region. R. B. Sibson (Bull. No. 2, pp. 7-8) mentions in his review of this species, 'a rather inaccessible lake on Mount Tongariro where "small" gulls nest . . . these might well be *Larus bulleri*.' However, the purpose of this article is to deal only with the Rotorua colony as this is the one that I am most familiar with.

Generally speaking this gull is present here all the year round, a few stragglers remaining over the winter months after the exodus of the main body, which usually, though not habitually, takes place between mid-April and the end of May. Indeed the numbers fluctuate considerably throughout

the year, and sudden irruptions may occur at any time. In June 1952 and July 1954 counts of 200 plus and 160 plus respectively were made, and for a few hours on each occasion the reef was white with gulls, and the noise deafening. Then they are gone as suddenly as they came. All very puzzling these unseasonal irruptions. With regard to the autumn migration, the diminution in numbers at Rotorua is not markedly noticeable until mid-May, and by the end of that month only stragglers remain. By that time the Redbill (*L. n. scopulinus*) irruption from the sea has ended, and the presence of the Black-bill here is easily overlooked. Very rarely does one encounter this bird in the streets of Rotorua, where the Redbills are in great force. A few Buller's gulls take to scavenging, but practically all the birds seen in the town, clustered in front of the places where they are fed daily, are Redbills, for this species is a notorious scavenger.

The wintering ground of the Rotorua Black-bills is not known for certain. Some observers believe that the bulk of the birds which regularly, year by year, congregate on the shores of the Firth of Thames are Rotorua migrants. In this I agree with them, but am of the opinion that part of the migrational movement is eastwards to the Bay of Plenty. The only way to elucidate this mystery is by 'banding'. Since the 1951-52 breeding season this has been impossible because of the wanton destruction of the gull colony by vandals, and in a lesser degree by dogs and vermin. During that season E. G. Turbott and the writer banded some thirty-odd chicks, but up to time of writing — 1/6/55 — none of these banded birds has been recovered. Many more could have been 'ringed' during the season under review were it not for the nature of the terrain. To approach the site of the colony from landward on foot, or by boat from the lake, unobserved by the breeding gulls, was quite impossible. Immediately the intruder is spotted the old birds hustle the chicks into the water and shepherd them well offshore. These chicks of course are the ones we want as they are old enough for 'banding'. The innumerable 'nestlings' which are too young to escape are also too young to ring.

The Red-billed Gull also nests with the Black-bills, but is an earlier breeder, from two to three weeks as a rule. This species appropriates the best nest sites, which include three small rocky islets off the end of the reef, and it is amazing how many nests the small area of these islets will accommodate. Last season, 1954-55, the count was 70 nests, the terrain being completely covered with brooding gulls. Unfortunately, not one chick from this congregation even left the nest! All were ruthlessly destroyed by humans. A few pairs made a further effort to raise a brood, but harriers and Black-backed gulls wiped them out. During this period the Black-bills (c. 150 nests) were also destroyed by the same agency. Owing to the proximity of the breeding site to the Government gardens and Baths, and as it is within the boundaries of the borough of Rotorua, the colonists are frequently subjected not only to deliberate persecution by vandals, but also from well-meaning but thoughtless people, mostly tourists, who out of curiosity disturb the brooding birds, maul eggs and chicks, take photographs and generally disrupt the even tenor of this avian household. Canines loom large on the list of predatory quadrupeds, killing chicks, treading on eggs and barking, terriers and gun dogs being the worst offenders. Feral cats and their domestic congeners, stoats, harriers and black-backed gulls do some harm, but humans and dogs are the gulls' worst enemies. Both Black-billed and Red-billed Gulls are protected by law. After the autumn exodus, the vanguard of the Black-billed colonists reappears in August. From then onwards to October and early November contingents arrive to swell the ranks until the numbers present reach a total of from 500 to 700 gulls excluding half that number of Red-billed Gulls which remain to breed after the wintering population of this species has departed for its coastal breeding grounds.

But it is practically impossible to assess the full numerical strength of either the combined or individual species, as a great number of both Red-bills and Black-bills are non-breeders. Nest counts I have realised are no criterion of a true census of a colonial bird population. However if an accurate count

of nests is made we know that, say, 150 occupied nests means 300 owners. During the day great numbers go inland to feed, many feed and procure food for their offspring over many square miles of lake surface, and there are to my knowledge three large roosting sites around Sulphur Bay, besides the colony under review. The most successful season for many years was that of 1951-52, when the count of Black-bill nests was 220, plus about 70 Red-bills, these latter occupying the islets already mentioned and also a part of the extreme eastern end of the reef. After the arrival of the main body the next phase is the claiming of territory. This is the occasion for much squabbling, bickering and general clamour. Every bird tries to outdo the other in a regular screeching contest reminiscent of a crowd of humans at a bargain sale. This goes on for several weeks before any attempt is made at nest-building. Then on a day in the middle of October, the colony suddenly becomes a hive of industry, and the air is alive with gulls carrying building material to the site and returning for more. To and fro, to and fro! After the nests are completed there is a lull, and a period of inertia sets in lasting from five to ten days, sometimes longer, before the first egg is laid.

The nests of the Rotorua Black-bills cannot compare with those of their South Island congeners, whose nests are generally well constructed affairs, raised from four to eight inches above the terrain. The Rotorua birds make the most of the holes, dips and crevices which occur on the silica reef, merely placing a few bents or rootlets on the bottom of these depressions and laying the eggs thereon. When the nest is sited on an eminence or a flat surface, more material is employed.

Two eggs is the normal clutch of the Black-bill, as it is of the Red-bill. In the season under review, 1951-52, the colony as previously stated contained a maximum (in mid-December when at its peak) of 220 nests of Black-bill gulls. Approximately 15 per cent of these nests contained three eggs and about 10 per cent one only. 'One-egg' nests are inclined to be rather misleading, for several reasons: (1) The second egg may have been taken by a marauding Black-backed gull, or filched by a neighbour. (2) The owner may be an aged female. (3) An egg may have been accidentally smashed by its owners. This refers of course to eggs advanced in incubation. As far as I could ascertain the period of incubation occupied from 22 to 24 days.

So restricted was the area occupied by the brooding birds, and so closely packed were the nests, that on one isolated slab of rock that jutted into the lake, and the dimensions of which were 15 feet by 12 feet, no less than twenty-five occupied nests were counted.

The first food of the fledgling appears to be the partly digested larval form of the smelt. Lake Rotorua teems with this small fry. This is regurgitated on to the ground, then picked up by the parent and placed in the open maw of the chick. When the chick is old enough to move around it feeds itself from the food regurgitated, and is sometimes beaten to the draw by a neighbour's offspring. The chick does not seem to make much headway until it is nearly a fortnight old, after which it grows rapidly and becomes extremely active. About this time the parent birds, by alternate coaxing and coercion, introduce the chick to its natural element, and it is amusing to watch this performance as I have done many times with the aid of binoculars.

Reluctant to leave terra firma, its guardians will get it eventually into shallow water of a depth of a few inches, where it hesitates to swim out to the parent a yard or two ahead, and breaks back to the land. All this time it is keeping up its thin piping whistling, but eventually it is induced to swim out to the waiting parent, after which, like the human 'toddler', it likes it. The second chick, if there is one, is similarly initiated.

The 1951-52 season was exceptionally dry and the lake fell in consequence, exposing a sand bar about a hundred yards from the reef. When the youngsters' plumage was well advanced, and the wing feathers about half developed, the chicks were taken from their place of hatching to this sandspit. This was their jumping off place into the wide world.

Their sojourn here lasted until the full-fledged stage was reached, and from here they took off on their first flight. The training for flight was the replica of that employed by the parents in the swimming debut. The parent (one only by this time — presumably the female) would fly for about 20 yards and settle on the water. The youngsters, after much wing-flapping, would fly to her. The next lap would be further, and so on, until the young gulls were taken far out on the lake, where they were doubtless given tuition in the art of obtaining their own food. This last performance too I had the good fortune to witness on several occasions. It appears to me that the parent gulls display the greatest solicitude for the safety of their young during the period between hatching and the first swimming lesson.

Once afloat, the juveniles are safe from all but aerial foes. Should a harrier, Black-backed gull, bittern or any large bird approach the colony it is immediately pursued with vim and tenacity — not, I believe, by the parent birds, but by what I imagine may be an organized band of scouts, which invariably are the first to take wing and harass the intruder. From the earliest days of the colony's formation it was noticed by me and several others who studied the birds daily that a number of individuals took no part in nest-building activities, but stood about in small groups and exhibited an air of alertness that was not apparent in other members of the community. Not only were these supposed special guards the first to meet the invader, but they were also the last to relinquish the pursuit.

On the approach of an enemy, all brooding gulls rise and hover over the nest. When the danger is past they drop vertically on to the nest and resume their brooding. All of which reminds me that I have never yet seen an attacking gull make actual contact with the foe, although I have heard it stated frequently by other observers. They seem to rely wholly on 'bluffing' the enemy, and in the case of aerial predators the bluff usually works. Not so however with ground vermin.

Copulation takes place continuously from the first settling of the colony apparently right up to the date of the laying of the full clutch, and spasmodically thereafter, in many instances when the female has been brooding the eggs for a considerable period. During the act of coition the male bird hovers over the female, drops on to her back lightly and continues to flap his wings until the operation is completed. I have never seen copulation take place on the water — always on land and frequently with the brooding hen bird on the nest.

My observations of the Black-billed gull here and on the wide river beds of the South Island have revealed the fact that all breeding birds have reached full adulthood. I cannot recollect a single instance of immature nesters. In full breeding plumage the adult Blackbill is indeed a beautiful bird, with its blue-grey upper surface, the black wing-pattern finalized, back, rump, tail and under surface snow-white, with at times the evanescent roseate reflections emanating from the breast plumage, visible only at close quarters. The streamlined body, slender bill black as jet, irides very pale grey and the black tarsi, toes and webbing. Add to this the long, narrow, sharply pointed pinions, the graceful airy flight, and you have an aristocrat of the gull family. The Black-headed Gull of the Northern Hemisphere (*L. ridibundus*) is without doubt the Blackbill's closest relation.

I cannot end these notes without a word or two on protection. *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! Year after year the tragedy is repeated, and vandalism goes unpunished. The whole area of Sulphur Bay and its immediate hinterland is a dedicated sanctuary for all time, but the Act has apparently never been enforced and the area remains a sanctuary in name only! The word 'protection' has no meaning within its precincts — certainly not in the case of the nesting gulls.