

the launch was perhaps a quarter of a mile away but the bird had no difficulty in catching up with the launch in a matter of seconds. We encouraged it to follow by feeding pieces of meat and fat to the gulls following the launch.

The white deposit of guano on Cathedral Rocks could be seen many miles away. There was no direct evidence to show that the rocks were used this year as a breeding ground, but it is possible as the gannets were flying in that direction. The only other likely place would be Groper Rock. The Maoris informed me that gannets had bred on Groper Rock a few years ago but were apparently driven off by the enormous numbers of mosquitoes that bred in the fresh-water lake in a crater on top of the rock. The Maoris who were fishing nearby for kingfish, landed to have a look at the young birds. Perhaps if the insects were killed by a small application of oil on the freshwater lake, the gannets might come back to the rock.

In the late afternoon a black-browed mollymawk (*Diomedea melanophris*) circled the launch several times. The black upper wing coverts with no wing patches of white, the black feathers across its back, the black edging of the undersurface of the wings and the large black eye patch immediately caught my eye and established its identity without question. A giant petrel (*Macronectes giganteus*) was seen a few minutes later as we approached the Needles. A few unidentified petrels were circling towards the small islands off the coast of Great Barrier Island itself, but in the twilight it was not worthwhile guessing their identity.

On the previous day, however, in the strong sunlight and calm seas, the petrels were seen to advantage, particularly between Katherine Bay and Fanal Island. The most common species was the fluttering shearwater (*Puffinus gavia*) which was seen in large flocks. The two white side patches identified these birds for us. The plump and round-bodied diving petrels (*Pelecanoides urinatrix*) only took to the air when the launch came very close to the flocks. Some birds were seen to almost fly right out of the water. Some were so heavy with food that they had difficulty in taking the air and sank back to paddle furiously away from the launch as it neared them again. It was a field day for petrels as all allowed the launch to approach closely before they took to the air. Although some 2000 petrels were seen in the 3½-hour trip it was only possible to identify single petrels that came close enough to spot the difference. Odd sooty shearwaters, grey-faced petrels, flesh-footed shearwaters (*Puffinus carneipes*) were easy when one could see the bill closely. Many smaller petrels were also seen.

THE WINTER FOOD OF THE BLACKBIRD IN N.Z.

By C. McCann, Wellington.

The widespread occurrence of the black nightshade (*Solanum nigrum*) (Linn.) an exotic weed, in all possible localities, many far distant from human habitation and influence, set a trend of thought in motion. How did this almost cosmopolitan weed spread so fast in New Zealand? As the fruit of the plant is a berry and a poisonous one at that, the most likely agent of dispersal was in all probability a bird. It was not long before I discovered the most likely bird, the blackbird (*Turdus merula*). Whenever the life-cycle of a bird and a plant are linked, it becomes necessary to study the interrelation that exists between the habit and habitat of the two individuals. This is common to any interrelation. However, before going further, it is necessary to clarify a few points.

Frequently, I have heard the black nightshade (*S. nigrum*) referred to as the deadly nightshade. The deadly nightshade is known as *Atropa belladonna* (Linn.) and is the source of the drug, belladonna. It is more poisonous than the black nightshade and as far as I am aware does not occur in New Zealand. Both the nightshades belong to the same family, *Solanaceae*, a family, strangely enough, which embraces some of our commonest food plants, such as the potato, tomato and several others. The family contains a poisonous substance peculiar to itself known as solanine,

besides other poisons, such as the belladonna referred to above. Solanine varies in quantity with the various species and at different stages of growth.

The green tissues of the black nightshade (*S. nigrum*) are known to be poisonous. Although the berries are known to be injurious to children, they have frequently been eaten by adults without any ill-effects. However, this is no reason to try them out! It is well-known that certain chemical changes take place within fruit when about to ripen and accordingly we must expect a possible reduction in the amount of poison present in the fruit of the nightshade when fully ripe, more so when the plant is largely dependent on some animal agent for the dispersal of its seed.

Close observation soon convinced me of the role the blackbird played as an agent of dispersal for the black nightshade. I watched them feeding on the berries and an examination of the excreta confirmed my observations. The blackbird is an omnivorous feeder and is particularly partial to fruits of many kinds. On this account it is not only a pest in orchards but is also a dispersal agent for some plant pests, such as the blackberry. The pulp of the fruits is digested and the seeds are passed out uninjured, in fact, the passage of seeds through the alimentary canal of a bird often enhances their chance of successful germination.

In habit the blackbird is somewhat a skulker and crepuscular, favouring undergrowth, but not averse to coming out into the open. The crepuscular habit of the bird easily explains the presence of the nightshade under bushes and trees both in the forest and in gardens. Under such lighting the dark purple berries of the nightshade are not very conspicuous. However, the nightshade seems to "get over the difficulty" by ripening its fruit when little or no other fruits are available!

Let us look into the life-cycle of the nightshade for a bit before proceeding any further. The nightshade is an annual, but under favourable conditions some plants exceed their allotted span of life. The seeds generally start germination between February and March of each year and soon develop clusters of green berries which remain on the plants, ripening only in late autumn or early winter. The berries continue to ripen slowly throughout the winter. Under the circumstances, the nightshade is one of the few berries available throughout the winter period and so constitutes one of the main sources of fruit for the "hungry" blackbirds. Probably, at other seasons when other fruit are available, the blackbird would not bother to look for the obscure berries of the nightshade! It would almost appear as though the plant had adjusted its fruiting period to its own advantage!

Thus, during the winter months and early spring, the nightshade berries constitute the main source of berries for the blackbird. That the birds are not poisoned by the large number of berries they consume may be explained by the fact that the blackbird is immune to the poisonous properties of the nightshade or that the amount of poison in the ripe fruit is not sufficient to have a serious effect on the birds. However, I have noticed that when the birds are feeding almost exclusively on nightshade berries the berries produce a form of looseness of the bowels, the effect of which is often visible on the walls of houses and window panes, as the birds fly past. A similar result, but to a much greater extent, I have witnessed in the case of the Asiatic race of the blackbird when it fed almost entirely on the ripe fruit of *Olea dioica* Roxb., an Indian olive. The fruit is extremely bitter, yet the birds did not seem to mind this quality!

From the observations I have made it appears that the blackbird is largely responsible for the dispersal of the black nightshade in New Zealand. The habits of the bird and its food cycle link up with the growth and development of the nightshade. However, there is one point which I would like to draw attention to, namely, that although nightshade berries are available at the time when the young are hatched, the young appear to be fed almost exclusively on soft-bodied insects and earthworms.