

1 Stead, Edgar F. (Edgar
Fraser),

1877-1949

Life histories of New Zealand
birds

by Edgar F. Stead.

This eBook is a reproduction produced by the National Library of New Zealand from source material that we believe has no known copyright. Additional physical and digital editions are available from the National Library of New Zealand.

EPUB ISBN: 978-0-908328-74-1

PDF ISBN: 978-0-908331-70-3

The original publication details are as follows:

Title: The life histories of New Zealand birds

Author: Stead, Edgar F. (Edgar Fraser)

Published: Search Publishing, London, England, 1932

90974

9

THE LIFE HISTORIES OF NEW ZEALAND BIRDS



THE AUTHOR AND OSWALD

THE LIFE HISTORIES OF NEW ZEALAND BIRDS

By
EDGAR F. STEAD

LONDON
THE SEARCH PUBLISHING CO., LTD.
6 OLD GLOUCESTER STREET, W.C.1

1932

598.29931.

362678

210ct49

Printed in Great Britain at
The Westminster Press
411a Harrow Road
London W9

TO MY WIFE

PREFACE

SO far as the scope of this book is concerned, I have restricted it entirely to a life history of the birds dealt with, particular reference being made to their numerical status at present, and over the period during which I have observed them. I have no illusions as to its completeness, realising as I do that a complete life history of any one of these birds would more than fill a volume of this size; nor do I imagine that I know their complete histories. Indeed, it is not until one begins to put down on paper what one knows about a bird, that one discovers what a tremendous lot there is that one does not know. I hope, however, that the observations here recorded will fill up a few of the blanks in our knowledge, and may be a help to future students. I much regret the very limited size of the book, but the cost of the plates made a larger volume impracticable at the present time.

As regards the order of the birds in the book, I have departed from the ordinary systematic order in one case: I have placed the Mottled Petrel after the Southern Skua, instead of at the beginning of the book. This I did because, in dealing with the life histories of these two birds, it seemed to me more appropriate that that of the Skua should come first.

In the matter of nomenclature, I have followed that of Oliver's *New Zealand Birds*. Although this may differ in cases from what is used to-day by cabinet workers in other parts of the world, it will, at any rate, enable anyone to readily identify the birds described, and whole pages of synonymy could not do more.

Of the accompanying illustrations, some have been published in the past by the Christchurch Press Co., N.Z., and *Country Life*, London, and to these companies I am indebted for permission to reproduce them here. One of them, my photograph of the two Fantails sitting on one nest, was used by Buller in his Supplement without my knowledge or authority. He acknowledged it to the *New Zealand Graphic*, in which it has never appeared.

I have been keen on birds ever since I was a child, and was fortunate in that my father, though taking no interest in them himself, always

PREFACE

encouraged me to do so. The result has been that I have derived a life-long pleasure from their study. My researches have taken me into many parts of the country which are rarely visited, and to get there I have often had to ask for help from some nearby resident; and such assistance has always been cheerfully forthcoming. From one end of the country to the other, there are scattered people too numerous to mention, some of whom were indeed no more than acquaintances at the time, to whom I am indebted for kindnesses and hospitality; for the loan of pack-horses or other form of transport; for information, help, and even food. To all these I gratefully tender my thanks and appreciation.

Among them, however, is one whose services to me have been so outstanding that I feel that he should be specially mentioned. He is Major Robert A. Wilson, of Bulls. For over twenty years we have gone on expeditions together—to remote districts inland, or to islands off the coast—and during that time I have received the benefit of his wide botanical knowledge, his exceptional abilities as a camping mate, and, above all, his encouragement in the preparation of this volume. In all these years, and with all the demands I have made on his time and patience, he has failed me only once—he would not stand still in the open and allow a swooping Skua to strike him on the head that I might photograph it in the act!

INTRODUCTION

WHEN New Zealand was first colonised by the White Man, birds existed there in enormous numbers. This was no doubt largely due to the fact that there were no feral carnivorous mammals in the country to prey upon them. The Maori dog does not seem to have run wild to any great extent, while the Maori rat, though closely allied to the introduced Black Rat, does not appear to have ever been as numerous as the latter is, nor to have been a really active agent of destruction among the birds. The Black Rat to-day is common throughout the country, and literally swarms in most bush areas, and there is no doubt that it takes a heavy toll of eggs and young birds during the nesting season. The exact amount of this damage it is difficult to estimate, because stoats and weasels are also responsible for similar destruction. I do not think that Black Rats kill adult birds on the nest, so that in those cases where the feathers of the parent bird are found scattered about a destroyed nest, the damage may probably be put down to stoats or weasels—almost certainly the former, for the latter is relatively very scarce. Stoats are numerous in the vicinity of most streams, being particularly so on the Canterbury river-beds, their presence being clearly indicated by their spoor on any wet mud or sand.

So far as the "bush-birds" are concerned, the destruction of the bush itself for timber, or to make the land available for farming, removed the birds' shelter and their food supply, and necessarily the birds went too; for even where considerable areas of bush are left, these, if isolated, will support only a small population of indigenous birds, for two reasons: Firstly, because such patches of bush will invariably be found to contain a great number of introduced birds, particularly Blackbirds, Thrushes and Starlings, which compete with the native birds for the berries, when such are plentiful, and, when there is no berry supply, subsist on worms, etc., which they get from the open land near by—a thing the natives cannot do. The result is that in times of scarcity the natives either die or leave the patch of bush, and do not return. Secondly, many New Zealand trees and shrubs are notoriously spasmodic in the production

INTRODUCTION

of flower and fruit*; and it may easily happen that, either because the trees have no intention of fruiting one year, or because their efforts to set seeds are negatived by frost or other meteorological cause, certain areas of bush will have very little fruit in them for the whole or part of that particular season. The birds, as before, would have to go hungry or leave, and, if they had to travel a considerable distance to a new home, they probably would not return to their former abode. I think it almost certain that the great hordes of Parrakeets and Kaka that came into Canterbury last century were caused by a failure of their food supply on the West Coast.

Taken as a whole, Canterbury contained less bush than any other Province, the plains being almost devoid of it. The forests of the foothills of the Southern Alps, and particularly those of Bank's Peninsula, however, contained a heavy bird population. The wide, open shingle river-beds, moreover, were among the chief breeding grounds of some of the Plovers, Gulls and Terns. Prior to 1905, these river-beds, which in many places were over a mile wide, consisted of large areas of bare shingle with streams running between them. The highest of these areas were only flooded on very rare occasions—perhaps once in three or four years—and then usually in the latter half of summer or the autumn, so that they formed most suitable and safe nesting places for the birds named. It was notable, too, the skill with which the birds selected for their nesting sites the highest banks in any given area.

The Rakaia River may be taken as a typical example of the changes which have taken place in most of the Canterbury river-beds in the past thirty years. Some time about 1900, yellow lupins were planted on its banks in order to check the flying sand, and these have completely changed the whole face of the river-bed. Their seeds have been spread by wind and water until now the river-bed is full of them for twenty miles up from the sea. In real "old man" floods—when a heavy nor'-west storm may cause, in twenty-four hours, a rainfall of over twelve inches at the

* I had a very interesting example of this. In 1925 I promised some friends in England seeds of silver beech (*Notofagus solandrii*), and at the end of that year I began my search for them. In both 1926 and 1927 I visited the beech forests at Rockwood, Oxford, Ashley Gorge, and Mt. Grey, and found a total of only a few seeds. In the spring (October) of 1927 the beech trees throughout Canterbury were red with blossom, and early in 1928 I got all the seed that I required off one small branch; but in 1929, when I again examined a number of beeches out of curiosity, I found only an occasional seed.

INTRODUCTION

head of the river—the stream rises until it is a “banker”—a turgid, yellow torrent a mile wide. This will leave lupin seeds on the highest of the banks which the river itself piles up, and in three years the plants will have grown together to form an impenetrable mass, covering the whole of the higher banks, the river flowing in the channels between. During heavy winds, the flying sand is held by these lupins, and the grasses which grow in their shade, and the banks are thus raised another six inches or a foot. Now lupins have one very curious characteristic: as immature plants, i.e. until they have bloomed freely, they do not object to being flooded, or having wet silt deposited on the ground about them; but after they have reached maturity, such a process kills them outright, and a rank growth of grasses, chiefly cocksfoot and Yorkshire fog, takes their place. Thus are the very best and safest nesting places for the river-bed birds—the Terns, Gulls and Plover—completely destroyed, for none of these birds will nest in heavy cover. Save in the year or two succeeding a very heavy flood, therefore, when high banks may have been swept clean, the birds are forced to select inferior nesting sites—sites which may be covered by even moderately high floods, such as occur not infrequently during the spring and early summer when the birds are breeding. The thickets of lupins and grass also afford convenient cover for vermin, so that the introduction of this lupin has been a severe blow to the river-bed birds. Incidentally it may be remarked that lupin is one of the chief agents that is causing the Canterbury rivers to wander, for the shingle of the main banks of the river, being devoid of roots, is more readily eroded than the root-bound material of the low islands in the middle of the river-beds.

Perhaps the greatest change that has taken place in my time in connection with birds in New Zealand, is in the attitude towards them of the public as a whole. Thirty years ago, for instance, great numbers of Terns and Gulls were shot (during the breeding season) at the mouth of the Rakaia by irresponsible hoodlums. To-day such is rarely the case. The Animals Protection and Game Act 1908 did a lot to stop such practices; and this measure and some of its amendments were consolidated and improved by the similar Act of 1922, so that there is ample protection afforded most birds so far as the Law is concerned. The enforcement of the Law is, however, another matter, and unless public sentiment is strongly behind it, the Law is almost useless. Fortunately,

INTRODUCTION

nowadays, public sentiment in favour of birds is strong, and is growing every day.

Largely owing to the efforts of the Nature Bird Protection Society, instruction *re* birds is now being given in schools, and this should result in a considerable saving in bird life; for if people are able to identify an unusual bird when they see one, there will no longer be any call for them to shoot it, just—"to see what it was."

CONTENTS

PREFACE	page vii
INTRODUCTION	ix
CHAP. I. BLACK SHAG (<i>Phalacrocorax carbosteadii</i>)	I
II. PIED SHAG (<i>Phalacrocorax varius varius</i>)	12
III. SPOTTED SHAG (<i>Stictocarro punctatus</i>)	18
IV. BLACK-FRONTED TERN (<i>Clidonias albistriata</i>)	25
V. WHITE-FRONTED TERN (<i>Sterna striata striata</i>)	32
VI. BLACK-BACKED GULL (<i>Larus dominicanus</i>)	42
VII. BLACK-BILLED GULL (<i>Larus bulleri</i>)	50
VIII. SOUTHERN SKUA (<i>Catharacta antarctica</i>)	60
IX. MOTTLED PETREL (<i>Pterodroma inexpectata</i>)	72
X. BANDED DOTTEREL (<i>Charadrius bicinctus</i>)	81
XI. WRY-BILLED PLOVER (<i>Anarhynchus frontalis</i>)	91
XII. PIED STILT (<i>Himantopus leucocephalus albus</i>)	97
XIII. HARRIER (<i>Circus approximans drummondi</i>)	106
XIV. MOREPORK (<i>Ninox novaeseelandiae</i>)	116
XV. KINGFISHER (<i>Halcyon sanctus vagans</i>)	123
XVI. FANTAIL (<i>Rhipidura flabellifera</i>)	130
XVII. BLIGHT-BIRD (<i>Zosterops halmaturina</i>)	139
XVIII. BELL-BIRD (<i>Anthornis melanura</i>)	145
XIX. EGGS	152
APPENDIX	160

LIST OF ILLUSTRATIONS

	THE AUTHOR AND OSWALD	<i>Frontispiece</i>
PLATE I.	NEST OF BLACK SHAG	<i>facing page</i> 1
II.	BLACK SHAG ON NEST	2
III.	BLACK SHAG	4
IV-VII.	YOUNG BLACK SHAG	6.11
VIII-IX.	PIED SHAG COLONY	13.15
X.	ROCK WITH COLONY OF SPOTTED SHAGS	18
XI.	NESTS OF SPOTTED SHAGS	20
XII.	SPOTTED SHAGS AND NESTS	22
XIII-XVI.	SPOTTED SHAG	25
XVII.	NEST OF BLACK-FRONTED TERN	27
XVIII.	BLACK-FRONTED TERN ON NEST	29
XIX.	WHITE-FRONTED TERN COLONY	32
XX.	NEST OF WHITE-FRONTED TERN	34
XXI.	NEWLY HATCHED WHITE-FRONTED TERN	34
XXII.	WHITE-FRONTED TERN COLONY	36
XXIII.	WHITE-FRONTED TERNS	38
XXIV-XXV.	BLACK-BACKED GULL	43
XXVI.	NEST OF BLACK-BACKED GULL	45
XXVII.	BLACK-BACKED GULL TAKING FOOD OFF WATER	47
XXVIII.	BLACK-BACKED GULLS FEEDING IN LYTTTELTON HARBOUR	48
XXIX.	NESTING COLONY OF BLACK-BILLED GULL	50
XXX-XXXIII.	BLACK-BILLED GULL COLONY	52.54.56.57
XXXIV.	BLACK-BILLED GULL ON NEST	59
XXXV.	NEST OF SOUTHERN SKUA	61
XXXVI.	YOUNG SKUA	61
XXXVII-XL.	SOUTHERN SKUAS	63.64.66.68
XLI-XLII.	MOTTLED PETREL	74
XLIII.	NEST OF MOTTLED PETREL	77
XLIV.	MOTTLED PETREL ON NEST	77
XLV.	SKUA'S SLAUGHTER YARD	79

LIST OF ILLUSTRATIONS

PLATE XLVI-XLVII.	BANDED DOTTEREL	<i>facing page 82.</i>	84
XLVIII.	NEST OF BANDED DOTTEREL		86
XLIX.	BANDED DOTTEREL CHICK		86
L.	HEN BANDED DOTTEREL ON NEST		88
LI.	"LITTLE MR. DOTTEREL"		89
LII.	NEST AND EGGS OF WRYBILL		91
LIII.	WRYBILL APPROACHING NEST		93
LIV.	WRYBILL ON NEST		95
LV-LVI.	WRYBILL DISPLAYING IN ANGER AGAINST INTRUDER NEAR NEST		96
LVII-LIX.	PIED STILT	97.98.	100
LX-LXI.	PIED STILTS WADING		102
LXII.	PIED STILTS IN FLIGHT		103
LXIII.	NEST OF PIED STILT		104
LXIV-LXV.	YOUNG PIED STILTS		105
LXVI.	NEST OF HARRIER		107
LXVII.	HARRIER RISING FROM NEST IN SWAMP		109
LXVIII-LXX.	HARRIER	111.	112
LXXI-LXXIV.	YOUNG MOREPORKS	116.	118
LXXV-LXXVI.	ADULT MOREPORKS		120
LXXVII.	HORACE AND OSWALD		121
LXXVIII.	NEST OF KINGFISHER		123
LXXIX-LXXXI.	KINGFISHER	125.	127
LXXXII.	YOUNG KINGFISHERS WHICH HAVE JUST LEFT THE NEST		128
LXXXIII.	NEST OF FANTAIL		130
LXXXIV.	FANTAILS ON NEST		130
LXXXV.	PIED FANTAIL ON NEST		132
LXXXVI.	BLACK FANTAIL ON NEST		134
LXXXVII.	NEST OF BLIGHT-BIRD		141
LXXXVIII-LXXXIX.	BLIGHT-BIRDS FEEDING ON PEARS PUT OUT FOR THEM IN THE WINTER		143
XC-XCII.	BELL-BIRD	148.	150



Plate I. NEST OF BLACK SHAG

CHAPTER I

BLACK SHAG

Phalacrocorax carbosteadii

THE Black Shag is generally distributed throughout New Zealand; wherever there is water one may see Black Shags. From 1870, when trout were introduced, this bird has been persecuted by every Acclimatisation Society in the country. I am a keen angler myself, deriving as much enjoyment as anyone from pitting my wits against those of an artful trout, but that does not cause me to wish for the destruction of all the Black Shags in the country, but rather to regard them as brother anglers, whose need of fish is, indeed, much greater than mine. Most of the Societies put a price on the bird's head, the sum varying from one to five shillings in different districts, and prominent members of them take great pride in destroying breeding colonies of Shags, in many cases where the nests are inaccessible, leaving the bereft young to die of starvation. Quite apart from the question of whether the Shag (throughout New Zealand "Shag" to a layman almost invariably means "Black Shag") does damage to the trout fishing, the crude method adopted of putting a price on the birds has resulted in all species of Shags being persecuted. The whole question has been discussed from time to time in the correspondence columns of the Press, usually heatedly, the one side contending that because the Shag eats trout it must necessarily do damage to the angling; the other claiming that Shags eat more eels than trout, thereby doing good; and that in most cases where they do eat trout, they are doing no harm as the streams are overstocked; and the Shag is as good an agent as we have for thinning out the fish and bringing about the survival of the fittest. There are, no doubt, certain streams where Shags do affect the angling adversely, but it is difficult to believe that no better plan for their destruction on such waters can be devised than the clumsy expedient of putting a price on their heads throughout the country. The question is too big to be fully discussed here, but one outstanding instance may be cited: Up to 1911

half-a-crown each had been paid for Black Shags' heads by the North Canterbury Acclimatisation Society, and their numbers had been greatly reduced throughout the district, and particularly at Lake Ellesmere. At this time the angling in the Selwyn River, the principal tributary of the lake, was poor. In 1911 the Society ceased paying for Shags' heads, and for fifteen years did not do so, and in that time there was a great increase in the numbers of Shags on the lake, and an equally marked improvement in the angling in the streams running into it.

Shags' food consists of fish and crustaceans of various sorts, which they catch by diving. Within its body the bird has five pairs of air sacs, and these, as well as its lungs, are filled when it breathes, thus giving it a large supply of air and enabling it to stay under water for a considerable time—half a minute or more. When submerged it swims with its neck outstretched, its wings held tight to the sides, and its feathers compressed to reduce its buoyancy and decrease its hydraulic resistance. Thus it cruises around, searching under stones or among snags for any fish that may be hiding there. It uses its feet alternately in swimming, and when in direct pursuit of prey it can attain to a speed of ten or twelve miles an hour. Some time ago a newspaper correspondent stated that Shags use their wings under water, and travel at forty miles an hour when doing so. The first observation is wrong, and the estimate of the speed simply ridiculous.

The Black Shag, or Cormorant as it is called in most other countries, is very widely distributed, being found practically throughout the world with the exception of South America. The New Zealand form is slightly smaller than birds from other countries, and does not assume so elaborate a dress during the mating season. It nests on trees or cliffs, but usually on the former, choosing if possible branches which overhang water. Whenever Shags settle on branches they immediately pick off the leaves and twigs within their reach. This may be done with the idea of getting a better view, but I think it more likely that it is to give the birds a clearer place on which to alight on future occasions. Their excrement, which is fluid and full of lime, soon kills any trees in which the birds nest or habitually roost, which accounts for the fact that nests are so often found on dead branches. The nest is a solid structure, up to three and a half feet across, with a foundation of sticks, many of which may be as much as two inches in diameter, and two to three feet long. The birds



Plate II. BLACK SHAG ON NEST
The bird has just arrived and is panting and excited.

select sticks which are twisted and twiggy, and exhibit considerable skill in weaving them into a solid mass. The cup-shaped depression for the eggs is lined with finer twigs and reeds, or, if it is to be had, tussock or coarse grass, the whole nest weighing anything from ten to forty pounds. If undisturbed, the birds return year after year to the same site, and repair, and add to old nests, which sometimes assume huge proportions. I once found in the fork of a tree, where three branches grew upwards and almost parallel to one another, a nest which had been added to season after season until it was nearly four feet high; as a rule, however, nests which have been added to several times become so clumsy that they are upset by winter storms. On cliffs or in caves the nests are never placed as close together as is the case with some other Shags, but are spread over a considerable area.

During building and hatching operations the birds exhibit great affection for their mates. When a hen is sitting on the nest and her mate arrives, she greets him with demonstrative devotion, rubbing her cheek against him, and stroking his head and neck with her bill; preening his feathers and generally making a great fuss of him; while he is obviously just as pleased as she over their reunion, returning her every caress. I well remember watching a pair which was building in a ribbon-wood tree. The hen sat on the half-finished nest adjusting the material—pulling out a stick here, and thrusting it more deeply there, or tidying and sorting some of the smaller twigs, apparently for the sake of something to do. Presently her mate returned with a piece of stick in his bill, and settled heavily with a great flapping of wings, and a loud “kau-kau-kau,” on the side of the nest, almost upsetting the whole thing. Now it was a very ordinary stick that he had brought, yet she received it with fervent admiration, running her bill along it and nipping it as if to test its soundness; then stroking the back of his head and neck as he bent down and laid it at her feet. Evidently touched by her display, he stood beside her awhile, intertwining his sinuous neck with hers, before flying off for more material, while she built the last piece into their home.

The breeding season proper begins in Canterbury in September, but sporadic laying may take place at any time, and in a large colony of Black Shags eggs will be found during any month of the year. Four is the full clutch, though three is not unusual, and I once found five in a nest. It is by no means uncommon for Shags to lay their eggs at intervals of a week

or more. Two records from my notes will suffice to illustrate this: On 30th November, 1930 I found a clutch of four eggs of which three were nearly hatching, while the fourth had been sat on for only a week. Another containing four eggs on September 25th, 1904 had "one young one about a week from hatching, two eggs half incubated, and one quite fresh." I should think that in these cases the later hatched young would stand a very poor chance of survival, as the older members of the family would get all the food; and in support of this supposition I may say that I have never seen a brood the members of which exhibited a great discrepancy in size.

Shags are most unenterprising so far as the defence of their nests and families is concerned, leaving the colony if frightened and flying around near by until the cause of their disturbance is gone. When photographing Shags years ago, I had set up my camera in the top of a big lancewood, and, having screened it, was waiting for the birds to return, when a Harrier came along and hovered over the nests. The Shags, which were circling around near by, did nothing to try to drive it away, and after hovering over the nests for a while, it departed. When the Shags had all settled at their nests again this Harrier returned (it had a bob-tail) and made a swoop at a Shag which was sitting on the top of a kohai tree. The Shag gave a hoarse croak of alarm and flopped off its perch, circled around once and settled again. On another occasion I had disturbed the birds of a colony, and before they returned a thunder-storm began, accompanied by heavy hail. After it had ceased I went back to see what was the result, and found many of the nests half full of hail and all the eggs broken by it. It is interesting to note that the birds did not lay again in those nests that year, and, so far as I know, did not breed elsewhere.

The young when hatched are naked, and have an exceedingly reptilian appearance, their thin wrinkled skin being many sizes too big for their bodies, and so loose that pulling it at the tail-end will tighten it right over the head. This skin is dark with a bluish tinge, the front of the head and bill being an unhealthy-looking pink. The grey feet are small and feeble, and give no indication of developing the size and strength they are subsequently to possess. In about a fortnight the young bird begins to grow a thick coat of dark smoky-black down, but the face from behind the eye is bare, it and the bill being horn colour, while the bare skin under the bill is tinted with yellow. At this stage the young are



Plate III. BLACK SHAG
Coming to its nest and young.

capable of veritable prodigies in the art of balancing and clambering about among the branches. If a person climbs up to their nest from below, their first line of defence is to disgorge the contents of their crops at him—a considerable volume of half-digested fish, possessed of a penetrating and almost ineradicable odour—and if their aim has been good, this usually has a definitely discouraging effect on the intruder; but if he persists, they will forsake their nest on his approach, crawling out along the branches and balancing themselves in a manner that would have seemed impossible in such apparently flaccid creatures. Their very flaccidity is indeed a great help to them, for they sag down on all sides of their support and so lower their centre of gravity, enabling them to remain poised on thin bare branches. In order to illustrate their ability to stay on a branch I once placed a young bird on a bare stick and photographed it, showing its pouch and abdomen hanging, one on either side of and below the point of support. I then shook the branch, and the bird dropped its wings down so that they acted as a pendulum, and in this position it was really astonishing the amount of movement it could successfully withstand. I do not think it could have been dislodged from its branch by the swaying of the tree in the wind. Wishing to see the final effect of shaking the branch, I gave it an even more violent oscillation and unseated the bird, which however still hung on to its perch with its toes, and by crooking its head around it. It has been said that young Shags will hold on to a branch by their neck, with the bill grasping some part of the body around it, but I have never seen one do this.

When the nests are built over water, the young, at any time after they have begun to get feathers, will, if disturbed, plunge into the water, swimming and diving as if long accustomed to it.

Throughout their sojourn in the nest the young are fed by both parents by regurgitation, putting the whole of their heads into the parent's throat to take out the food. When one of the parents arrives back from a hunting expedition it is immediately besieged by its brood, who gather in front of it, their bodies quivering with excitement, flapping their wings, waving their heads to and fro, and giving vent all the time to a querulous, whistling cry. At first the food is supplied in an almost completely digested state, but as the young grow and their appetites increase they are fed on larger and larger fish, which have undergone very little digestion in the parent's stomach. It is then that

the eel is so much superior to any other fish as an article of diet. Shags always swallow their prey head first, and if, as would be the case with fish of over five inches long, it cannot be turned around in the stomach they would have to feed it to their young tail first. In the case of an eel this would make no difference, as it would as readily slide down the young bird's throat tail first as head first; but in the case of trout, or any similarly shaped fish, the fins would jam in the young bird's throat, and the fish would be rejected. It is this that accounts for most of the trout that are to be found under the nests in a Shag colony.*

Until they are well able to fly young Shags do not leave the nest, which is by that time trampled into a flat platform. When they do go afield they stay with their parents for some time, accompanying them on their fishing trips, and gradually learning to fish for themselves, returning each night to the nesting site to roost. Soon, however, they are weaned and left to catch their own food.

At this stage they are much paler in colour than the adults, the feathers of the under parts are white tinged with buff, and their backs to a large extent lack the sheen that is such a noticeable characteristic of the adult's plumage.

In colour there is no difference between the sexes, but in size the male is larger than the female, the discrepancy being particularly noticeable when a pair of birds is flying overhead. It is not until they are a year old that they moult into their adult plumage in which the whole of the under parts, the head, neck and rump are shining blue-black; the scapulars and upper wing-coverts are a beautiful lustrous bronze-green, margined with shining black; the bill is horn colour, darker along the ridge of the culmen and at the tip; while the feet are jet black. The feathers at the back of the head and the upper back of the neck are elongated, and form a mane which can be erected at will; and during the courting

* I first put forward this argument in 1907 and just recently (1932) had a most interesting confirmation of its soundness. Lord William Percy showed, at the June meeting of the British Ornithologists' Club, a most interesting film of a Bittern. Together with other phases of the bird's life, it was shown feeding its young, and when the food consisted of eels (which it usually did) the young birds swallowed them easily. Once, however, the bird brought back a fair-sized roach, but the young bird, though about three parts grown, was unable to swallow this tail first, and, after several unsuccessful efforts to do so, dropped the fish over the edge of the nest into the water. The parent picked it up and re-swallowed it, but I have little doubt that, had she not done so, and an ordinary angler come along and seen it, he would have regarded it as quite sufficient evidence that the Bittern's food consisted chiefly of roach.



Plate IV. YOUNG BLACK SHAG
Chick two days old.



Plate V. YOUNG BLACK SHAG
Balancing on bare branch.

BLACK SHAG

season the glossy black of the head and neck is emphasised by the presence of numerous fine white filoplumes, and a large patch of fleecy white feathers on each thigh. Both sexes grow these ornaments equally, and in both they fall out very soon after nesting has commenced. Of a colony numbering seventeen nests which I visited on September 25th, only two hen birds still retained their neck filoplumes, crests and thigh-patches at their best, while all the other birds had shed them more or less completely.

When young Shags are first hatched they have open nostrils the same as other birds, but these gradually close up, until in the adult there is merely a wrinkle to indicate where they have once been. One might assume that this is the result of not using them—the birds when in pursuit of fish, and coming to the surface for more air, would naturally wish to get a supply as quickly as possible and would gasp it in through the mouth rather than sniffing it through their nostrils; and so perhaps they got into the habit of mouth breathing, and ceased using their nostrils altogether—but if this is so, it seems strange that other diving birds, Grebes, Divers, Penguins, etc., should not have undergone a similar modification. One result is easily seen: If a Shag be closely watched when flying it will be noticed that at intervals it opens its bill widely and takes a deep breath, the process of expiration being carried on gradually through the bill while almost closed.

Shags are very strong fliers. It is true that they rise laboriously from the water, striking the surface strenuously with their feet in order to help them to get under way, but once in the air they make good speed, and are capable of very sustained flight, often going fifteen to twenty-five miles to feeding grounds. They do not flap their wings continuously when in flight, but volplane for short distances now and then. They are quite good at soaring too—far better than might have been expected from their heavy bodies and comparatively small wing area—and I have frequently watched with admiration the way in which they will sail in circles on outstretched wings, making use of an up-current of air on a hillside, to give them an elevation of five hundred feet or more, before they would set off on a journey. In descending from great heights they adopt one of two methods; either they half close their wings, and, dropping and spreading their feet to act as brakes, sink slowly and at a steep angle, or they dive head first with a twisting darting flight, acquiring

a very high speed which has to be checked by an upward swoop at the last. Except on water, however, they are not very good at settling, and when forced by circumstances to do so down-wind on to a branch or a rock, will often have to make several attempts at it before they succeed. When wishing to alight on a tree they approach at a much lower level than that of their intended perch; set their wings when some fifty or a hundred yards away from it, and sail up towards it at an ever increasing angle, aiming at arriving just above it with very little forward velocity, when, with a strong flapping of their wings, they land heavily on their perch. But more often than not they fail in this manoeuvre, and have to circle around and try again and again, sometimes making five or six attempts before they are successful. Once, when at a Shag colony, I saw a building bird flying towards me with a large piece of dead flax in its bill. I stood still, and the bird, whose nest was in a matipo tree near by, did not see me until within a few yards, when its consternation was really comic. Giving a loud croak, and dropping the flax, it tried to turn, but its speed was too great, and it flopped into the middle of the bush. Here it struggled violently, with hoarse cries of alarm, and presently fell through on to the steeply sloping ground, when it made off down the hillside with a very dramatic show of terror.

Last year I came upon a much more tragic result of this lack of skill in alighting. In the middle of a stream stood an old bridge pile, weathered and split so that it had a tapering fissure down one side. A Shag had evidently tried to settle on it, but, missing its mark, had fluttered down the pile, caught its head in the cleft, and hung there until it died.

Although they will occasionally pick up dead fish from the ground, Shags take practically all their food by diving for it, but they cannot swallow under water, so they bring their prey to the surface before eating it. Often they will swim along on the surface of the water with only their head underneath on the lookout for food. The catching of a good-sized eel by a Shag is quite an interesting performance to watch. The bird dives, and presently comes up, and in its bill is an eel, say two feet long, wriggling and squirming as only an eel can; yet the Shag is able to hold it without difficulty, for the edges of its bill are so sharp that they cut into the eel's skin and so give a good grip. After waiting a moment or two for the eel to get over its first paroxysms, the bird shifts its grip to get its prey by the head. The eel is by no means idle, and tries to hook

BLACK SHAG

its tail around the bird's neck, and so get a leverage that will enable it to twist itself out of the bird's bill. The Shag's counter move is to throw its head forward and down, but often the fish succeeds in getting such a grip that the bird is forced to let it go, in order to get free of its coils. The eel disappears under water, but the bird instantly follows, and in a few seconds comes up again with it, and the contest begins afresh. On an average such an eel will break away three or four times, but if the water is not weedy the Shag recaptures it without difficulty, and gradually the struggles of the fish become less and less violent. The Shag is all the time trying to get hold of the eel just behind the head, and when at last it succeeds in doing so, flings the eel straight out in front of it on the water, and, putting its own head and neck along the surface in a straight line with the eel, proceeds to gulp it down. All is not necessarily over yet, however, for I have seen an eel half swallowed by a Shag give (no doubt when its head first came into contact with the bird's gastric juices) such a convulsive heave that it flipped itself clean out of the bird's throat. Caught again in a moment, however, it was quickly swallowed, the bird lying stretched along the water, back-watering with its feet and hunching up its shoulders, as it gulped at the eel to get it as far down as possible. Even when swallowed there may be four or five inches of the fish's tail hanging out of the bird's bill, but the Shag, after a rapid bath, swims or flies to some convenient perch, and sits there, occasionally swallowing more eel, as that part of it which is already in the bird's stomach becomes digested.

Shags which are not nesting feed early in the morning, and, if they get a good supply, sit still during the middle of the day to digest it, and then feed again in the afternoon, thereafter flying home, so that they arrive at their roost with a stomach full of food to digest while they sleep. In rocky streams the birds dive to the bottom and work round the big boulders, searching under them and the ledges of rock for any fish that may be in hiding. I have seen Shags too, in pools so shallow that they could not submerge their bodies, poking their heads under the fringe of watercress in search of bullies and whitebait. Despite their oily nature, the feathers of Shags are wetted by continued diving; the birds then get on to a perch, and for half an hour or more hold their wings out in the sun and wind to dry them. If, when its feathers are wet, a Shag catches a big fish, it is unable to rise off the water with it, and,

should it be pursued, has to disgorge its food before it can fly. Shags can swallow quite large fish, trout or fish of similar shape up to a pound or more, and eels of two pounds or over in weight. There are several records of dead Shags having been found choked by a trout of about a pound and a half which has jammed in their gullet. Sometimes they hunt in packs numbering perhaps thirty birds, and they will then take a strip of water, and, spreading out, work it from end to end. I once saw such a pack at work in a pool in the Selwyn. It was before sunrise, and I was on my way to try for a large fish I had seen the previous day, when the Shags arrived and settled at the head of a pool near by. I crept up to the edge of the stream and peered through the reeds at the birds as they worked down-stream, quartering the pool as they came. They passed so close to me that I could almost touch them, could watch their silvered bodies as they swam submerged, and see their bright emerald-green eyes when they came to the surface for breath. In the shallow at the tail-end of the pool, one of them caught a fish, probably a trout, but I could not see on account of the others which immediately tried to snatch it when its captor rose to the surface to swallow it. The whole flock then flew off up-stream to another pool. At that time I believed all the stories one heard about the way in which Shags cleared streams of trout, so that I was surprised when, later in the morning, on my return, I saw quite a number of small trout in that pool.

Owing to their constant persecution the Black Shags in New Zealand are generally shy and wary, but this was not always so, for it is on record that in the early days they were known to nest on the roofs of buildings. This I can well believe, for I have seen one sitting on the cross of a village church, and, during the years when there was no price on their heads in Canterbury, the birds became much more confiding. At that time some half-dozen pairs returned to an old nesting site on the cliffs above the road between Christchurch and Sumner, and they have nested there ever since. The cliff is perhaps three hundred and fifty feet in height, and the Shags nest in little nooks about two-thirds of the way up it, flying unconcernedly to and fro, quite undisturbed by the traffic and the electric trams passing on the roadway below. They feed in the nearby estuary, chiefly no doubt on eels which are plentiful there, and if they ever even see a trout it must be only a very occasional one. The local Acclimatisation Society has announced that it would not pay for



Plate VI. YOUNG BLACK SHAG
Using wings as pendulum to enable it to balance on moving
branch.



Plate VII. YOUNG BLACK SHAG
Holding on with "tooth and claw".

BLACK SHAG

Shags' heads from the estuary, and one can only hope that this will afford these birds protection, for their presence there certainly adds to the attractions of the spot, giving just that touch of life that is so necessary to complete any scene.

For sixty years the Black Shag has had a price on its head and it has survived in spite of it. Enormous colonies of the birds such as used to exist in the neighbourhood of favourite feeding grounds are no longer to be found; but in the by-ways and in the hedges, so to speak—in secluded or inaccessible localities—it may still be found nesting in small companies, and despite the fact that most men are its declared enemies, I think it will continue to do so.

CHAPTER II

PIED SHAG

Phalacrocorax varius varius

THE Pied Shag is unevenly distributed around the coasts of New Zealand, never going any great distance inland in the South Island and only to a very limited extent in the northern half of the North Island. In former times it was plentiful in places where to-day it is never seen—it has been entirely shot out, very largely as a result of the Acclimatisation Society's policy of paying for Black Shags' heads, a policy that has resulted in all species of Shags being persecuted. According to Potts and Buller, it used to be found on Lake Ellesmere and on Bank's Peninsula, though I have neither seen nor heard of one there in the past thirty-five years. I have seen it in the past on the Waimakariri estuary, and twenty years ago it was still common at the mouth of the Ashley River. To-day I doubt if there is a single specimen left between the Ashley and Dunedin Heads, a coast-line of over two hundred and fifty miles. It is still found though in reduced numbers in sheltered bays on Stewart Island; in the Southern Sounds, and all around the north end of the South Island. In the North Island it is scarce on the west coast south of New Plymouth, and it is not numerous on the east coast south of Napier; but north of these limits it is plentiful on both sides of the Island. It is essentially a salt-water species, feeding off-shore and returning to the mainland, or to some island to roost, for which purpose it selects trees overhanging the water in sheltered bays or channels. Its food consists almost entirely of fish, which it catches by diving, though no doubt it would take cuttlefish and crustacea when available.

Pied Shags, like the other members of the genus, breed in colonies, the nest being almost invariably placed in trees, preferably those overhanging water, but never far back from the water's edge. It delights in narrow, sheltered bays, the nests in the southern part of its range being nearly always built in Rata; further north it chooses Ngaio, where it is available;



Plate VIII. PIED SHAG COLONY
The black young to the right are White-throated Shags.

while further north still, particularly in the big bays and harbours of the Auckland Province, Pohutukawa is the tree most favoured. The nests may be placed at any height from ten to a hundred feet above the water, and consist of a foundation of heavy sticks, lined with fine twigs, leaves, or grass, or, occasionally, with bits of dried seaweed. They are as a rule smaller than those of the closely allied Black Shag, although the birds themselves are much the same size. The laying season is at its height in early September, though in a large colony, as with the Black Shag, odd birds may be found nesting at almost any time of the year. The usual clutch of eggs is three or four.

The young when first hatched are stark naked, repulsive-looking little things entirely lacking any trace of beauty; indeed, when they are at rest, each with its head lying on the back of one of its mates, or against the side of the nest (they can hardly hold their heads up for a day or so after hatching), they give the impression of being dead. Later they grow a covering of dark grey-brown down, paler on the front and under parts, only the face and feet being bare. They are fed by both parents, the procedure being the same as with the Black Shag. When in the nest they have a short whistling cry—a dull, squeaky note that recalls to my mind a windmill outside my bedroom window when I was a boy, and which made the same note—just as regularly and just as annoyingly—when it had not been lubricated.

I was photographing a colony of Pied Shags in the Marlborough Sounds on one occasion, and in one of the nests there were three young, about a fortnight old. Two of these had evidently been well fed, but the third was hungry. The day was hot and cloudless, so the hen parent stood on the side of this nest to shelter her young from the scorching rays of the sun. And hour after hour the hungry chick waved its head slowly to and fro in front of her, monotonously calling on each beat. I had two friends with me at the time, and remarked that the cock bird of this nest had been away for a long while. "Yes," replied one of them, "and I am not surprised that he stays away, when his family persists in making tiresome noises like that." Yet the hen bird sat placidly on the side of the nest, looking straight in front of her, and seemingly totally indifferent to a performance that would have driven most human beings mad in a very short time.

Unless disturbed, the young stay in the nest until fully fledged and

well able to fly, when they go out to sea with their parents. In their first plumage the breast is brownish white, the feathers being white at the base and brown at the tips; the upper parts are browner than in the adult, and the coloured edging to the feathers of the scapulars and upper wing-coverts are not so well defined. It may be noted here that in the first plumage of a young Pied Shag the feathers of the upper surface fade rapidly and considerably, so that before they are moulted, many of them are a light sandy colour. As they do not all fade to the same extent, they give the bird a definitely mottled appearance. The amount of brown on the breast varies considerably in different individuals. In some, the chest and abdomen are almost white with streaks of brown, the foreneck being darker; while in others the whole of the under parts are so dark that at a short distance it is difficult to tell if the bird is a young Pied or Black Shag. Occasionally I have had the young of both species flying above me at an elevation of a hundred feet or less, and there was a complete gradation between the palest breasts of the Pied to the darkest of the young Black.

Formerly, as I have said, Pied Shags were much more numerous in Canterbury than they are to-day. There were colonies just north of the Waipara River, and two large ones at Motunau. Another favourite nesting site was in the Ngaio trees at the foot of the cliff just inside the mouth of the Hurunui. These colonies have all been destroyed, which is a thousand pities, for the Pied Shag is an exceedingly handsome bird, and was absolutely harmless in that district. It spent its days feeding at sea, or sitting on the beach, coming back in the afternoon to its favourite trees to roost. There it would sit, its snow-white breast gleaming in the sunlight, so that when a number of birds had collected, the impression was created as of a tree studded with enormous white blooms. Owing, however, to the unfortunate fallacy that all Shags are the enemies of mankind, all these fine birds have been shot; and on one occasion in the spring, when I went to the locality to fish, I was sickened and disgusted to find the bodies of ten or a dozen of them hung in a row on a wire fence on the top of the bank—evidently done by some person who was proud of his handiwork. One might have hoped that in these days Government Departments would have set a good example in these matters, but such is not always the case. Three years ago the fishermen in Kaipara Harbour complained that the Pied Shags were doing great damage to the flatfish



Plate IX. PIED SHAG COLONY

Note hen on left standing over her young to protect them from the hot sun, and hungry young with neck stretched up to her.

industry there. The truth was probably that the waters were being heavily overfished, for so far as I am aware no effort had been made—nor indeed has been made—to discover what numbers of *small* flatfish were there; and the Marine Department, under whose control the matter came, allocated forty pounds from the Public Funds to be used for the destruction of these Shags. Protests in the newspapers caused the Department to slightly modify its original scheme; but, even then, what they were pleased to term an investigation into the matter consisted of shooting over one hundred and twenty Pied Shags in one day, and opening them to examine the food contents of their stomachs.* Of course young flatfish were found in them, but that does not necessarily mean that the birds were doing harm. The progeny of the flatfish must be thinned out by some means, or there would not be enough food to go round, and if the Shags did not do the job, or part of it, some predacious fish, or other agency (possibly starvation), undoubtedly would.

Buller says that a Pied Shag diving off Kawau Island used its wings and tail, when under water, to assist its progress. I have never seen them do this, and, from the mechanics of the case, the bird would not proceed as fast under water with its wings open as it would if they were closed. From a cliff on the Hen Island I watched these Shags diving, and all that I saw kept their wings pressed tight against their sides. At Cundy Island our huts were situated on a cliff, sixty feet high, which bordered the little harbour. From the edge of this cliff we got an excellent view of the birds—Pied and Blue Shags, and Blue Penguins—feeding in the clear, calm water below. Many times I watched Pied Shags feeding there, following their every movement under water with my field-glasses, and never at any time did I see them give so much as a flick of their wings while submerged. This harbour was, for some time, full of small fry, and it was most interesting to watch the Shags go after these little fish. The birds would dive, and cruise about looking for a fish, and, when they saw one, dart in pursuit, twisting and turning with really remarkable speed. Fast though the Shags were under water, however, they were not so fast as the Blue Penguins.

* The Marine Department, possibly because it was not very proud of this effort, has not, to my knowledge, published any figures regarding the affair. This number I got verbally from a source I have every reason to regard as reliable.

The speed at which diving birds can travel under water is interesting. I personally have no doubt that Penguins are the fastest of all birds when submerged. They fly through the water with their flipper-like wings, just as other birds fly through the air, carrying their feet straight out behind them; and, just as web-footed flying birds do in the air, so do Penguins, when submerged, use their tails as rudders and their feet as brakes. From observations made on Penguins in the Antarctic,* and on the sub-antarctic islands, it is known that Penguins can jump vertically out of the water to a height of five feet, but that this is apparently about their limit. Such a jump necessitates a speed on leaving the water of about eighteen miles an hour. This is no doubt their "sprint" speed—their absolute maximum—and could probably be maintained for only a very short distance. A tame Crested Penguin, which I had when I was a boy, I used to put into the stream which flowed through our garden. The bird was very playful, and if I ran along the bank he would race with me in the water. I could easily outdistance him, and estimated his speed at about twelve miles an hour, but the water was perhaps rather shallow for the bird to attain his best speed. Putting the speed of the little Blue Penguins in Cundy Harbour when in direct pursuit of fish at twelve miles an hour, I should judge the rate of the Pied and the Blue Shags there, under similar circumstances, to have been not more than ten. Their speed appears to an observer to be much higher than this owing to the fact that they are constantly twisting and turning.

All the Shags which I have seen diving keep their wings tightly shut against their bodies when submerged, but this is not the case with some diving birds. Many of the Petrel family, including some of the Albatrosses, go down with the wings more or less open, but their under-water speed is low. I have seen a shy Albatross go down after a sinking fish-head, and remain below the surface for a period of over half a minute. Many of the surface-feeding Ducks, and some of the Plovers (e.g. Oyster-catchers), dive if they are pursued when wounded, and use both wings and feet under water, but their progress is slow, being not more than four or five miles an hour at most.

Pied Shags do not feed to any extent in fresh water. Where their nesting colonies or roosts are situated on the banks of a stream near its mouth, the birds will sometimes settle in the river, or the lagoon at its

* *Antarctic Penguins*, by Dr. Murray Levick. A most delightful little book.

PIED SHAG

mouth, and hunt for a while, but even in these situations the fish taken form a very small proportion of their food supply. There is no reason, therefore, for the persecution that is at present their unfortunate lot. They are fine, handsome birds, and, if undisturbed, quickly become quite tame, allowing persons to approach within a few yards of them before taking flight. So far as one can see, their sole effective enemy is man, and if he could only be persuaded to alter his attitude towards them, these striking birds would not only hold their own, but would, no doubt, soon repopulate the coasts from which he has at present driven them.

CHAPTER III

SPOTTED SHAG

Stictocarbo punctatus

NEW Zealand is noted for the number of Shags that are found in the waters surrounding it, for whereas Australia has only three species, New Zealand has no less than sixteen. These may be divided into two groups, the Thin-billed (*Stictocarbo*) and the Thick-billed (*Phalacrocorax*). Of the former there are three species in New Zealand, of which the commonest is the Spotted Shag. It is a strictly marine bird, frequenting rocky coasts, and not going into fresh water, excepting very occasionally as a young bird. Together with the other Shags, however, this bird has suffered much on account of its supposed depredations among fish. A few years ago a prominent member of one of the Acclimatisation Societies made the statement that Shags were doing damage to the fisheries of New Zealand to the extent of five millions of pounds sterling annually. This wonderful result, as I heard its proud originator proclaim, was arrived at by taking the number of Shags in the waters around the mainland as one and a half millions; computing the amount of fish they eat as so many pounds per bird per diem; assessing the value of this fish at ninepence per pound; and, hey presto! fisheries that, according to Government statistics, are worth under three quarters of a million annually are being damaged to the extent of five millions. The childish stupidity of such a calculation should have been apparent to anyone who heard it: Firstly the estimate of the number of Shags was pure guesswork, and a gross exaggeration; secondly it was assumed that all the Shags' food consisted of edible species of fish; thirdly that if the Shags did not eat these fish nothing else would; and fourthly that if, and when, these fish reached maturity they were all going to be caught and brought to market. It is to be regretted that several newspapers published the statement, together with its founder's suggestion that the Government be asked to pay a royalty on the heads of all Shags. The matter, of course, ended there, but the mere

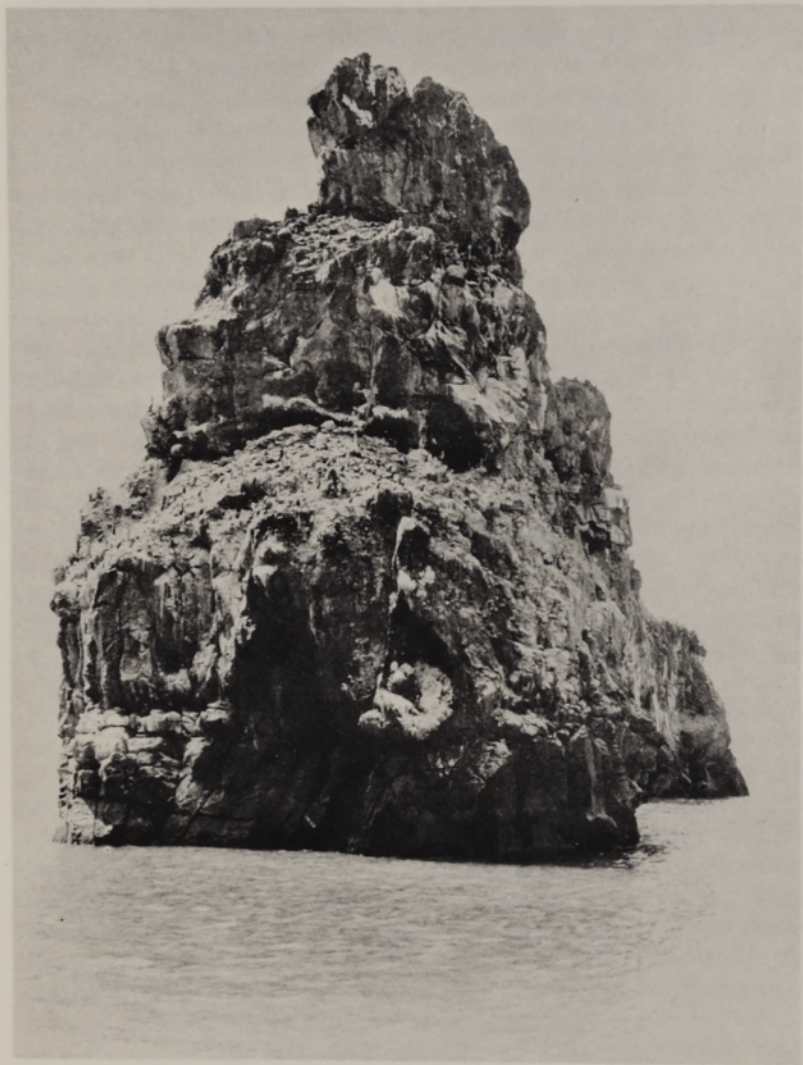


Plate X. ROCK WITH COLONY OF SPOTTED SHAGS

publication of such balderdash does a lot of harm, for many unthinking persons are only too ready to seize on such a paragraph as an excuse to give free rein to their desire to hunt and destroy some unfortunate animal.

The Spotted Shag has suffered at the hands of gunners as much as any one of the native birds. Formerly very abundant in many localities, it has been greatly reduced in numbers in most of them, and completely exterminated in others. It was, however, never evenly distributed along the coasts, the unevenness of its occurrence being, no doubt, due largely to the very rigid nature of its requirements: it never settles on trees, but only on cliff-faces, rocks or beaches, and it never nests save on rocks that rise straight out of the sea. It used to be abundant on some rocky islets near Auckland, but there were only a few more colonies down the east coast of the North Island, and, so far as I know, none on the west; on the south coast of Cook's Straits it was plentiful, but there was another big gap with but few of these birds in it, between Marlborough and Bank's Peninsula, where there were greater numbers than anywhere else. Thence to south of Oamaru the bird occurred only as a straggler, but there were several large colonies at, and north of, Dunedin Heads. South of Dunedin it was found in the west coast sounds, but to what extent records of it from Otago refer to the closely allied Blue Shag (*Stictocarbo steadi*) I do not know. I have never seen the Spotted Shag on Stewart Island, and I think it certain that all records from there refer to the Blue Shag.

Two years ago, at the instance of the Auckland Acclimatisation Society, the Spotted Shag was placed in the list of birds protected by law. Great credit is due to the Society for this action, but for which this handsome bird would soon have been completely exterminated in Auckland Harbour, and it will be interesting to note to what extent the birds will increase as a result. At present only a small colony is still at Auckland; there are a fair number left on the east coast of the North Island; not very many in Cook's Straits; a considerable number (some thousands anyway) on Bank's Peninsula; and a fair number in the vicinity of Otago Peninsula. One may hope that the ghastly practice of so-called sportsmen, who used to make up launch parties, go and lie off the cliffs where these birds were nesting, and callously murder whole colonies of them, leaving the young to die of starvation in the nests—one may hope that this at any rate will cease.

For its nesting site the Spotted Shag selects, where they are available, ledges of cliffs overhanging the sea. It is on this account that Bank's Peninsula is such a favoured resort, for there the volcanic cliffs are in many cases overhung, and, being stratified horizontally, offer numerous ledges that are ideal for these Shags to nest on. Secluded bays and nooks are chosen wherever they occur, but the great desideratum is that the cliff should rise straight out of the water, having no beach below it; Spotted Shags are very fond of large caves in the faces of cliffs, and will use them as nesting sites if there are suitable ledges, or as roosts. I know of several caves into which the sea runs, and it is usual to find some Spotted Shags sitting in them at any hour of the day. The birds seem to appreciate an overhung situation for their rookery, no doubt because dripping water does not fall into their nests.

Building begins in August, the nests, which are solid structures from two to three feet across, being placed close together. They consist chiefly of seaweed, as a rule, though sticks are sometimes used in the foundation, and the inside is lined with grass, ice-plant (*Mesembreanthemum*) or with tussock. In a colony that I visited off Bank's Peninsula the nests were all of seaweed, lined with tussock which the birds pulled from plants at the top of the neighbouring cliffs. Many of the nests had large sprays of "sea-apple" built into them, and these were decaying and producing a most offensive smell. The odour of a Shag colony is not very seductive at any time, but these rotting sea-apples added a cachet that brought this one well above the average.

The eggs are laid from the second week in September onwards, the clutch varying in different localities. On the Otago Peninsula the clutch is two or three, but on Bank's Peninsula it is almost invariably three or four.

The Spotted Shag is a bird that is exceedingly interesting on account of the various plumages through which it goes. Born naked, it later grows a brownish down, and this gives place to its first real plumage. In this the top of the head, the nape, hind neck, mantle, scapulars, and upper surface of the wings are pale grey-brown, each of the feathers of the mantle and scapulars having a small black spot on its end. The front of the neck, the breast, and abdomen are greyish white tinged with cream. The rump and thighs are brown with a greenish lustre; the tail brown. This plumage fades very considerably before it is moulted,



Plate XI. NESTS OF SPOTTED SHAGS

some of the upper wing-coverts becoming pale sandy yellow. The bill is pale horn colour; the bare skin of the face, and feet are pale flesh at first, later becoming yellow. Perhaps the most interesting feature of a young Spotted Shag's plumage is the presence of a number of small white filoplumes on its neck, and a few on its flanks.

The young are fed by both parents while in the nest, in the ordinary Shag manner. It is quite usual to find Red-billed Gulls hanging around a Spotted Shag colony—in fact, they often establish their own nesting colony near by. When the young Shags have been fed, and their parents have left for the sea to get more food, one of the Gulls, which have been watching the whole performance, immediately flies to the nest and, standing on the edge of it, swears at the young Shags (the Gull's whole manner and tone of voice convey just this impression), who forthwith disgorge some of their food, which the Gull promptly eats. The Gulls continue to do this up to the time when the young Shags are getting their feathers, by which time the Shag is a good deal larger than its persecutor. When watching a colony of these Shags, and another of Red-billed Gulls above it, on a cliff on Bank's Peninsula, I came to the conclusion that the Gulls got quite a large proportion of their food by this barefaced robbery.

When the young Shags can fly they leave the nest, as a rule settling in the sea nearby. Here they have a bath, and, their wings being wet, they find it difficult to get out of the water, particularly if the cliff is smooth at the base. I watched a family of three that were in such a plight. The nests were situated on a ledge about fifty feet above the sea, and the cliff-face, though rough, fell almost vertically into the water. Having tried to fly, without success, the young Shags swam close along the base of the cliff looking for a foothold. Knowing the object of their search I examined the cliff-face with my glasses, but could see no chance of their getting up. The sea was calm, there being only a gentle swell, which rose and fell against the wall of rock without breaking. Two or three times the Shags failed to effect a landing, and then one of them jumped from the top of a wave into an angle in the rock, and here, although the face was practically perpendicular, he held on. Using his bill in a tiny fissure, and his wings, feet and tail, it took him five minutes to worm his way up to a small ledge six feet above the water, where he was able to take a rest. His nest-mates had been watching from below, and when

they saw his success they followed, but the third one fell back into the sea twice before it reached the ledge. From their first resting place the going was easy for a little distance, and then they made use of a little "chimney" to get up a very bad bit. When I left they had got up about thirty feet of rock-face that no human would have had a hope of climbing, and the remainder of their climb was comparatively simple. It was a really remarkable performance, yet I cannot help thinking that, had the sea been rougher, they could not have made their initial landing; but perhaps under those circumstances they would not have left the nest.

In the first quarter of the year when the young are all able to fly, whole parties of them and their parents—indeed quite possibly all the members of a colony—go on long journeys up or down the coast. At this season, perhaps, two or three hundred may appear at Motunau Island, for example, some fifty miles north of Bank's Peninsula, and stay there fishing for a period. I have seen similar parties off the mouth of the Rakaia River, thirty miles to the south of their breeding grounds, but these birds probably returned to the Peninsula to roost. During this time one finds single young birds in odd places. Every few years one will make its home in the Rakaia lagoon. The usual result is, of course, that it is shot, but sometimes it escapes this fate and stays about for a month or more. Such birds are very tame, and allow one to quietly approach to within a few feet of them; indeed on Lake Ellesmere I once walked up to one which was sitting on the stern of a boat and caught it with my hands. When I released it, it would not sit on that boat again but soon took up its stand on another one near by. Occasionally these young birds will be found heavily infested with ticks and lice—the former more or less spherical, one-eighth of an inch in diameter, of a pale blue-grey, with their legs arranged around the stout sucker, which is driven deep into the victim's skin, and gets such a grip that the body may be pulled off, leaving the sucker still embedded; the latter flat brown beasties which move quickly among the feathers in a most evasive manner. I once found a young Spotted Shag which had hundreds of each of these parasites on its neck, so I wiped its feathers with kerosene and, after a while, washed them with soap and let the bird go. Possibly the cure was worse than the disease—I never saw the bird again.

In July and August, if the outlet to Lake Ellesmere is open, numbers of Spotted Shags will gather in the sea outside to feed, diving among

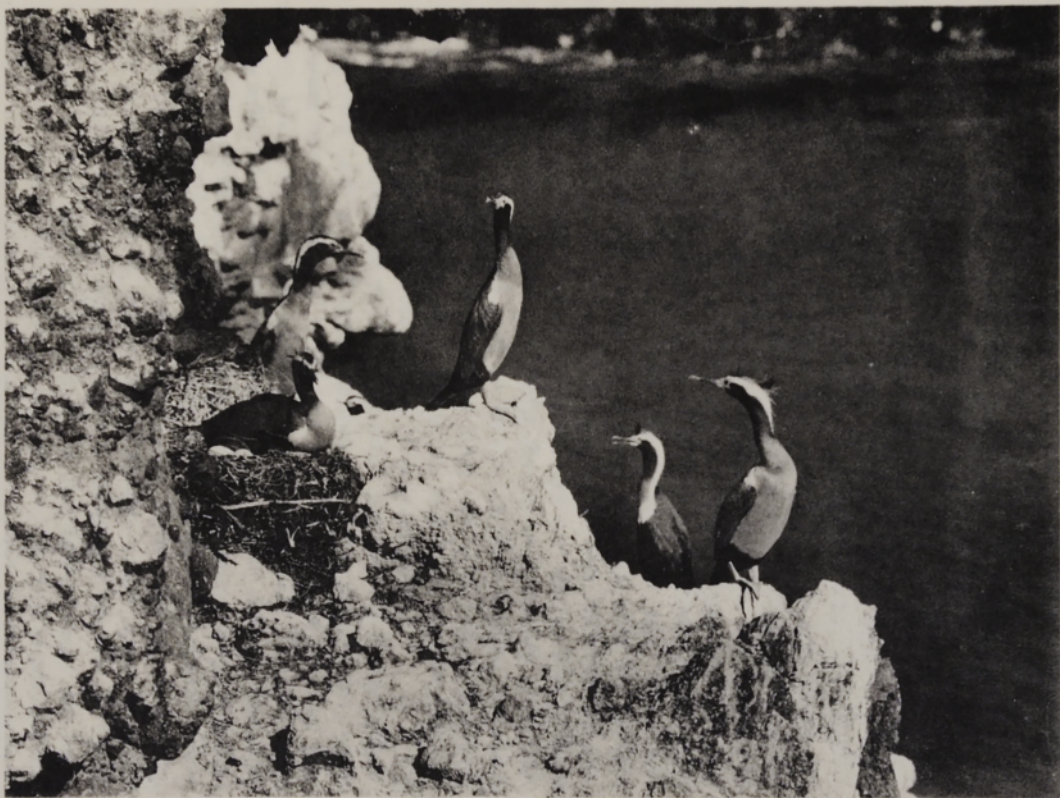


Plate XII. SPOTTED SHAGS AND NESTS
The birds are just losing their breeding plumage.

the breakers and coming close inshore in pursuit of the silveries which are running into the lake. At this time, many of the birds have attained their full breeding plumage, and it always gives me a sense of incongruity to see them so wonderfully attired, yet going about their daily work; for there is no doubt that Spotted Shags, when they do attire themselves in the vestments of courtship, make a job of it—there are no half measures. They grow two forward-curving crests of long soft dark feathers, one on the front of the head, the other at the nape. The front of the neck becomes black, and this is separated from the dark back of the neck by a broad white stripe which runs from the bill, above the eye, right down to the shoulders, the whole of the upper part of the neck being thickly studded with long white filoplumes. The breast and abdomen are pale blue-grey, with a curious sheen, suggestive of having been touched with aluminium paint. Then they don their lustrous dark blue trousers, covering their flanks, lower abdomen and rump, and these too are flecked with white filoplumes. The bare skin on the face becomes brilliantly coloured: a ring of greenish blue encircles the eye, and merges into the rich royal blue of the face and throat. The feathers of the nape, scapulars and upper wing-coverts are brownish grey, each having a conspicuous black spot on its tip. In these regions too there are a few white filoplumes, an extra long one (two inches or more) issuing from the elbow joint. Both cocks and hens acquire this gay dress, and in equal degree. And so the birds go courting.

Alas, for Romance! It must be reported that all this finery outlasts mating but a week or so. Even before the nest is begun the dainty white filoplumes have commenced to fall out, and by the time that the eggs are laid, few, if any, of these transient ornaments remain. The two crests quickly follow them and ere the first chick chips the shell the fine sooty black of the under neck is beginning to fade, the white stripe is dotted with black, and the birds are going back to their workaday dress. During September and October, near the main nesting colony, but usually detached from it, will be found an area where some birds are still acquiring their mating plumage—a dressing-room, so to speak. Here will be seen birds still completely in their first plumage, no doubt late-hatched ones of the previous year; others with their crests and filoplumes sprouting vigorously, giving them a curiously bristly appearance; and still others that have acquired their full dress and are ready for the

fray. I think that all these birds are yearlings—certainly most of them are—for even when they are at their best their plumage is not comparable with the finery of the adults in July and August. The fact that these yearlings go into a breeding plumage would indicate that these Shags nest in their first year.

The food of the Spotted Shag consists chiefly of small fish and crustaceans, and when there is a migration of whale-feed, or britt, along the coast, the birds subsist almost entirely on it. They usually travel to and from their feeding grounds in flocks, flying with a quick beating of the wings, only a few feet above the surface of the water. This Shag is an inquisitive bird, and should it, when flying, encounter a ship, it will usually circle around it once or twice before going on its way again.

Protected by law as the Spotted Shag now is, there is every reason to hope that it may become more plentiful, and eventually re-establish itself in its old haunts near civilisation.

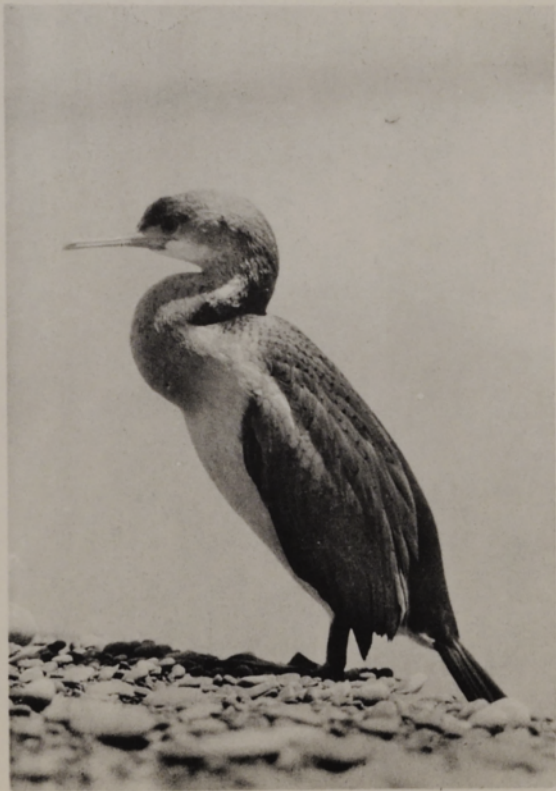


Plate XIII. SPOTTED SHAG
Full grown young.

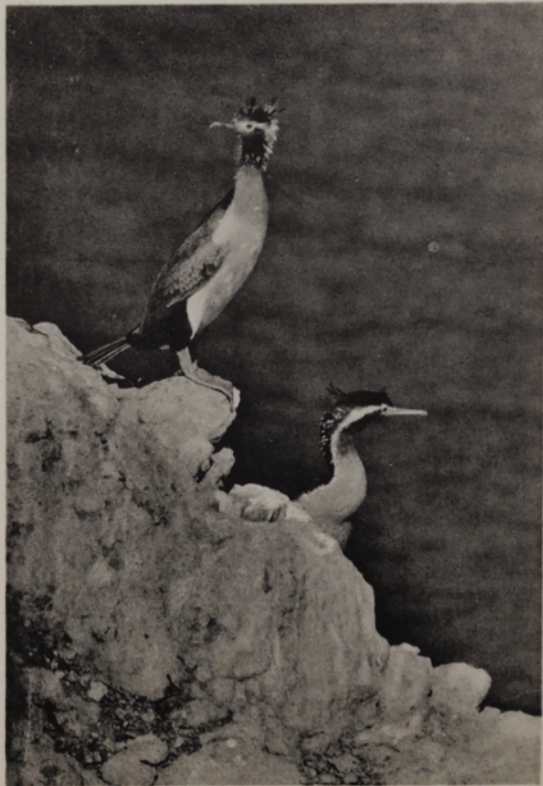


Plate XIV. SPOTTED SHAG
Young assuming breeding plumage in the following spring.

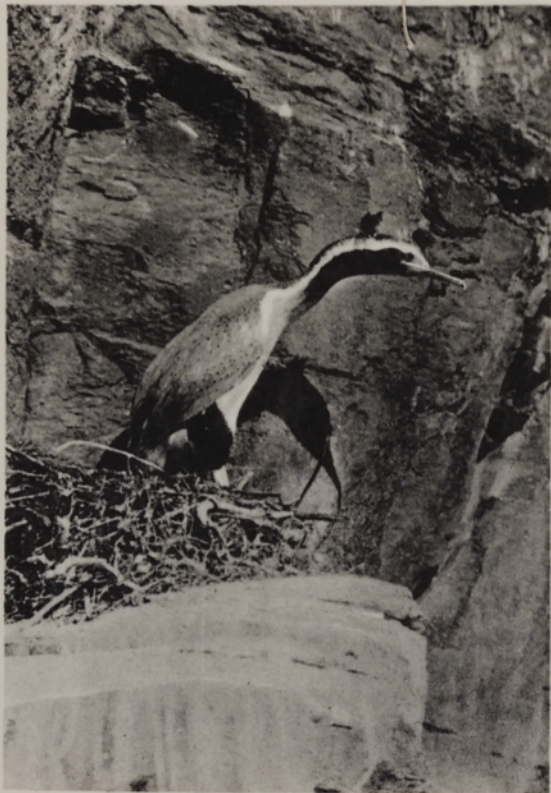


Plate XV. SPOTTED SHAG
Nesting bird still wearing crests.

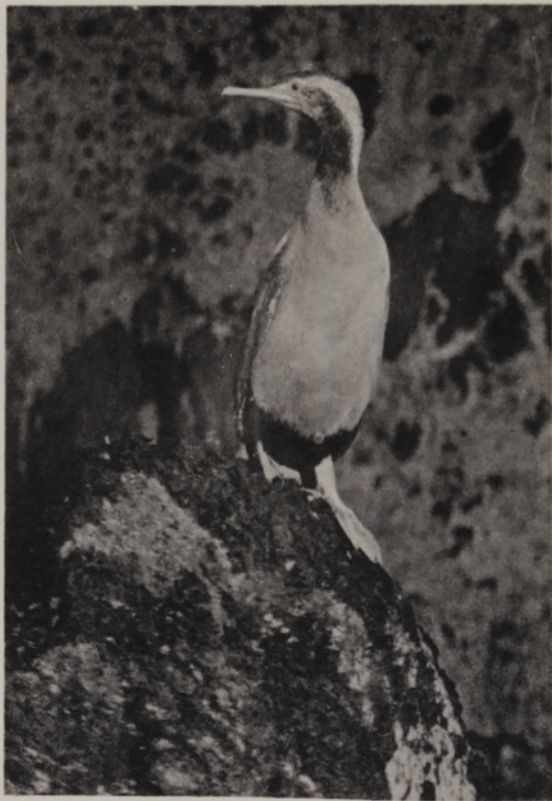


Plate XVI. SPOTTED SHAG
Bird after nesting season reverting to winter dress.

CHAPTER IV

BLACK-FRONTED TERN

Clidonias albigularis

THE Black-fronted Tern, although occurring in the North Island, has always been a comparatively rare species there. I have seen it on the Waiouru Plains, and have often wondered that it was not a more plentiful bird in that locality as is the case in similar country in the South Island. The only other time I have seen it in the North Island was near the coast at Foxton. It has been recorded, however, from most districts from Auckland to Cook's Straits, though not commonly. In the South Island it is much more plentiful, especially in the southern half. It is to be seen on the coast, though never in great numbers; but inland it still occurs in flocks of considerable size.

The adult in its summer plumage is a very charming bird, smaller than the White-fronted Tern, being only twelve inches long as against the latter's seventeen inches. From the angle of its mouth backwards the whole of the top of the head and nape are deep velvety black, separated from the beautiful blue-grey, which is the general colour of the rest of the bird, by a white stripe; the eye is very dark, and is not noticeable among the black feathers of the head, save at very close range; the upper and lower tail coverts are white, and the bill, and tiny webbed feet, are rich orange. In this plumage it goes courting. I have never seen it bring food to a prospective mate, though when mated it indulges in the same pretty flights *à deux* as does its white-fronted relative.

It nests in scattered colonies, almost invariably on river-beds, though to a small extent, on the sea coast. In the early days of the settlement of Canterbury there were many nesting colonies of this Tern scattered about on shingly parts of the plains, the one at Pudding Hill, to the south of the Rakaia Gorge, being noted for its size, containing as it did some hundreds of nests. To-day, owing I think to the presence of sheep, all these old nesting sites are deserted, and have been so for many years, the present breeding grounds being in what might be termed the active

parts of river-beds—that is to say, on more or less bare shingle that is occasionally subject to flooding.

The birds collect on a suitable shingle bank in September and begin to mate. By the beginning of October they are selecting nesting sites and building, a procedure that takes about a fortnight, though most of this time is spent in play; for the making of the nest, which consists of a shallow scratching or even a natural depression among the stones, with perhaps a dozen or so short bits of twig around it, could easily be achieved in an hour at most. The birds, however, appear to be in no hurry, for the hen will sit for some time in one spot as if on a nest, while her mate walks around her, or stands near by preening his feathers. Sometimes they will both go for a fly, and when they return will stand on the edge of the proposed site, talking to one another as if discussing its merits; and moving their heads about, sometimes carrying them low, with the bill pointing to the ground.

Perhaps after a week of this a pair will try another site near by, or sometimes the whole colony will move off to another situation. When they really want to nest in a hurry, as is the case when previous nests have been destroyed by floods or vermin, they will finish the job within a day or so, and the eggs will probably be laid within a week.

On October 4th, 1903, I found a number of Black-fronted Terns on a nesting site on the south branch of the Rakaia about four miles up from the sea. The birds flew around my head screaming, but they had no eggs. On October 17th there were no birds to be seen in the vicinity, but on November 1st there were fifteen pairs there with nests and eggs. In the ordinary course of events, egg-laying in Canterbury begins in the second week of October, but I have known it to start earlier, for on October 22nd, 1904, I found eggs which had already been incubated for a fortnight; and on November 30th, 1903, just below the Rakaia Gorge, I saw young birds of the year able to fly, which would indicate that these birds had laid at the end of September.

Near the mouths of the big snow-rivers of Canterbury, Black-fronted Terns may place their nests anywhere in the area selected, but up near the gorges, and in the back-country, where hard nor'west winds are prevalent during the spring and summer, the birds almost always choose nooks deep down among big stones, behind tussocks, or little bushes, or on banks, where they are sheltered from this wind. Even so, when a



Plate XVII. NEST OF BLACK-FRONTED TERN
Rakaia Gorge. Sheltered from prevailing Nor'-west winds by the big
stones behind it.

howling gale is driving clouds of sand and grit down the river-beds, so that it stings like needles when it strikes bare skin—even with the shelter of a neighbouring stone, sitting on a nest on the ground must be an uncomfortable business. Yet the Terns do not seem to mind, and I have never known them to desert even the most exposed nests on account of the weather.

Sometimes a heavy flood will cover their nesting ground, and sweep their eggs away, and in such a case the birds will immediately begin to nest again on shingle which was not flooded, if any is near by, or, in the case of a flood so heavy that it has covered the whole river-bed, on the highest suitable area near their previous site.

The young when hatched are covered with thick down, dark grey on the back with black markings, and white underneath. Until they are getting their feathers, they are very sedentary, staying in or near the nest. They are by no means good at walking, and always try to avoid detection by squatting among the stones, but if they are seen and disturbed they run away with a curious rolling gait, frequently stumbling over little obstacles. The young that are hatched far inland are fed almost entirely on insects of various kinds, though they would get a small quantity of fish, while those that are reared near the coast would probably get more fish than insect food.

In their first plumage the young have a white throat, and the breast paler than in the adult; the crown of the head and nape are brown streaked with black; the mantle and scapulars are heavily marked with smoky black, each feather having a pale edge. The general colour of the wings is also paler than in the adult.

Usually, when the young are well able to fly, a flock of old birds and young comes to the lagoon at the mouth of the Rakaia, and here the young sit on the sandspits, waiting for their parents to bring them food. When full grown, the young practise catching food. Flying low over the water they will dip to the surface and pick up a bit of stick; carry it for a few yards and drop it; immediately stooping to pick it up again; they will repeat this performance a great number of times, and then go back to take a rest on their sandspit.

By March, the adults and any early hatched young are beginning to moult. The adults lose the black cap, the top of the head and nape being very pale grey, indistinctly marked with black. Unless the bird is very

close to the observer, the top of the head in the winter plumage appears to be white. The young moult into the winter plumage, though late-hatched ones do not complete their change before winter, moulting only the scapulars. I believe that such birds continue to moult in August and September, and probably nest in their first year.

I think it possible that some pairs of Black-fronted Terns nest twice in a season, for I have found fresh eggs in the Harper river-bed in the first week in January. These may, of course, have belonged to late-hatched birds of the previous year; if not I should put them down as second broods.

The call of these Terns is a high-pitched, staccato, whistling note given at intervals, but when an intruder approaches their nests they fly around in an agitated manner, giving this cry much more frequently, and every now and then swoop close overhead, emitting a harsh scream.

Although these Terns are not very good at walking—and indeed one would not expect them to be, with their short legs and small feet—yet occasionally they use most unexpected perches. Near Templeton, one day in June, I saw a Black-fronted Tern sitting on the post of a wire fence around a ploughed paddock, while near by another was actually sitting on the wire, balancing itself by spreading its wings every now and then. They frequently sit on posts, particularly those on tidal mud flats. Once at the head of Lyttelton Harbour at high tide, I was watching a flock of these Terns fishing, when one of them settled on the end post of a fence which ran some distance out into the water. Presently another arrived, and, making as though to settle on the first bird, the latter flew to the next post, and alighted on that, while the second arrival occupied the end post. A third arrived and went through the same proceeding, and the other two moved up one; and this went on just as if the birds were playing at a game until the eight posts which were standing in the water were occupied, when four more birds settled on the top wire of the fence.

The Black-fronted Tern is an exceedingly useful bird to the agriculturalist in Canterbury, Otago and Southland. Together with Black-backed and Black-billed Gulls, it follows the plough when land is being turned up, its chief food at such times being grubs of different sorts, and wire-worms; but unlike its two larger associates it does not take the big "lob-worms," so that it spares the farmer's friends whilst destroying



Plate XVIII. BLACK-FRONTED TERN ON NEST
Rakaia Mouth. There being no heavy prevailing winds here, the nest is
fully exposed.

his enemies. When land is being harrowed, it is unusual to see any Gulls following the work, but this Tern will quite likely be there—a further proof that when land is being worked the Gulls chiefly go after lob-worms, for very few of these are turned up excepting by the plough.

During the summer months, Black-fronted Terns may be seen in scattered flocks all through the back-country of Canterbury, feeding along the edges of streams, or over the adjoining tussock country. At this time their food is almost entirely insectivorous, for even when feeding over water it will be seen that they are picking up food from the surface, and not diving underneath for fish. Often a whole flock will feed on insects at a height of perhaps a hundred feet, and on such occasions their flight, which is always graceful, is particularly so, as they circle about with even wing-beats, giving a few quicker strokes whenever they see an insect; rising and pausing as they catch it; and then falling downward slightly to pick up speed again, and resume their cruising. Sometimes, for a period, I have watched such a flock, the individual members of which were catching from six to fifteen insects a minute, curiously enough, nearly always rising to take their prey; not often going sideways; and rarely downwards. I put this down to the fact that they would see the insect best against the sky.

Often, too, one may see small flocks of these birds hovering over turnip fields and dipping to the ground to pick up insect food. In August, September and the early part of October there is usually a tremendous "hatch" of a small May-fly on the Rakaia and other snow rivers, and then Black-fronted Terns collect in numbers, daintily picking these insects off the surface of the water.

On the coast these Terns take fish by diving on them from a height; and in rivers they occasionally take whitebait, silveries, bullies, or trout, but the total of such fish taken is absolutely negligible.

In the winter they leave much of the back-country—the whole of the Mackenzie Country, and the Lake Heron district, for example—migrating out on to the plains and towards the coasts, and from March onwards they may be found roosting in flocks in the river-beds, anywhere from the Gorges to the sea. A few years ago there was a considerable flock in the Waimakariri river-bed opposite Burnt Hill. The river terrace here is about four hundred feet high, and it was a very pretty sight to see small flocks of Terns coming over it, twisting, spiralling, and diving, as they

descended to the chosen shingle bank below, to join the birds already collected there. Every now and then the whole flock would rise up and circle around for a minute or two before settling again; and by dusk there were perhaps seven hundred to a thousand birds there.

Although still a plentiful bird in the districts already enumerated, the Black-fronted Tern is not as common as it was thirty-five years ago; but I think it has maintained its numbers over the past ten or fifteen years. Stoats and weasels undoubtedly destroy many eggs and young of this species, and also numbers of adults. Where there is a Tern colony, or even a "roost" on a river-bed, the accumulation of droppings and (especially in the autumn) moulted feathers gives rise to a fishy smell that is quite apparent at some distance. One afternoon when fishing on the Rakaia, I noticed such a smell, and, looking across the river, saw the signs of a "roost," although no birds were there at the time. Presently I saw a stoat running up my bank of the stream, pausing at intervals and raising his head to get the wind. I kept still, by a lupin bush, and presently he stopped, and after sniffing in the air for a few moments, he ran down the bank, and began to swim across. There was a big volume of water and a swift current, but he landed on the other side about a hundred yards below, and immediately ran up the bank and cautiously approached the roost. I do not know if anyone has ever ascertained it for a fact, but it always seems to me that stoats are short-sighted animals. At any rate, this one slowly worked over all the roost, perhaps a quarter of an acre, while I fished opposite, and then he came back to the river and began to swim across again. Waiting until he was well started, I put down my rod, picked up a stick, and ran down my bank to meet him. He came straight on, even after he had seen me, and, when within a few yards, he made an extra effort, rising on the surface of the water and "planing" on it as a young duck would do, at the same time making a barking noise at me. I brought the stick down on his back and knocked him out, and then tossed him on to the bank, apparently dead. Foolishly I did not make certain, and a little later had the mortification of seeing him struggle to his feet and crawl into some bushes. The incident showed, however, to what an extent these wretched vermin would affect Black-fronted Terns; for I have no doubt whatever that, if this particular animal had gone at night, he would easily have caught as many sleeping birds as he wanted.

BLACK-FRONTED TERN

Black-backed Gulls would take some young Black-fronted Terns, whenever opportunity offered, and I think it probable that the increase in numbers of the former has some connection with the decrease of the latter. Exotic growths on the river-beds no doubt also have a bearing on the matter; while the introduced small birds, being competitors with the Tern for its insect food supply, and trout, which have greatly reduced the numbers of small indigenous fish in our waters, are inimical to the interests of these Terns; however, as I have said, they seem to have quite held their own over the past decade or so, and I see no reason to expect a reduction in their present numbers.

CHAPTER V

WHITE-FRONTED TERN

Sterna striata striata

THE White-fronted Tern is the commonest member of its family in New Zealand seas, occurring plentifully along the whole length of the coast-line, from Stewart Island to North Cape. It is almost entirely a marine species, though in some cases it feeds in fresh water to a certain extent during the breeding season. It nests on rocks or islets off-shore, on cliffs or sandspits, or up the river-beds, in colonies that sometimes number tens of thousands. Throughout the winter months the birds frequent the coasts, feeding at sea all day, and returning in the late afternoon to roost in companies on sandspits or isolated bare rocks. At the end of September they begin to collect in the vicinity of their future nesting site, and pairing commences. The mouth of the Rakaia River may be taken as a typical breeding haunt of these Terns, for in that vicinity there is a colony every year. There the river, with a shingle bed a mile wide, runs by several streams into a lagoon, which is separated from the sea by a long narrow shingle ridge, through which the water cuts a channel to the sea.

The heavy southerly seas, aided by a strong current from the south, cause constant changes in the mouth of the river, and the contour of the shingle ridge. On the side of the lagoon remote from the sea are numerous spits of sand and shingle, and it is one or more of these that the Terns will choose for a gathering ground in the spring.

From the beginning of June there may have been no White-fronted Terns seen near the mouth of the river until the latter end of September; perhaps a few birds may have rested there occasionally; or, in some years, a small flock may roost there nearly all the winter; and when spring really begins to make itself felt, the birds come back, and in a few days there may be several thousands of them there, their numbers being constantly supplemented by the arrival of new flocks.

A hundred or two of Black-backed Gulls, and perhaps three or four



Plate XIX. WHITE-FRONTED TERN COLONY
Rakaia Mouth.

times as many Black-billed Gulls will join up with them, the whole lot dispersing in the morning to feed, and gradually returning as the day progresses. By midday there would be a number of Terns on the roosting ground, and courtship commences. I say "courtship," yet the procedure is perhaps less like our ideas of courtship than an auction sale.

Uttering his monotonous call of "crek" at intervals of a few seconds, a cock bird will come in from the sea carrying a small fish in his bill; circle over the sitting birds, and perhaps settle with them, holding his head high, and strutting and turning about as if to say, "Look what a good food provider I am." Almost immediately one or more hens will approach him with their necks stretched out, as if asking to be fed, when the cock bird will rise in the air, followed by his admirers, and fly about until only one is following him, when he may settle and give her the fish; but not always, for I have often seen a bird, perhaps disapproving of the looks of his pursuers, or disappointed with their powers of flight, settle on the ground again, and eat the fish himself. Granted that he feeds the hen, the initial feeding over, the pair seem to regard themselves as mated, and thereafter indulge in what one might term "ecstasy flights," the most striking being one in which, the cock bird leading, they achieve a certain height, when he will spread his wings at an angle above his back and sail downwards in short sweeping curves, first to the right and then to the left, the hen, close on his tail and with her wings similarly spread, following his every movement. The effect is very beautiful, and when the birds alight again they run about together, and around one another, heads raised, and "crek-ing" loudly, as if well pleased with themselves.

By the middle of October they are busy selecting a nesting site for their colony. Prior to 1908 this presented little or no difficulty, for, if there was no part of the shingle ridge between the lagoon and the sea of sufficient height to be secure from the waves, the birds had only to go up the wide river-bed and choose a suitable area. This should be of high bare shingle—safe from all but the very highest floods—and preferably an island between two streams. Indeed, their chief trouble must have been an *embarras de richesse*, for there were plenty such sites, all of them apparently equally suitable. Since the introduction of yellow lupins, however, good nesting grounds are scarce, so that the Terns may have to go ten miles or more up the river before they get a suitable one.

The nesting site having been chosen, those birds which are mated repair to it and begin nest building. A shallow depression is scraped in the ground and lined with small pebbles from an eighth to a third of an inch in length, the nests of very industrious birds containing as much as two handfuls of small stones. If there is a snag near by silted up with sand, the nest is merely a scratching in the sand, with no lining. On river-beds these Terns rarely use any other material than stones for lining their nests, but on rock they often use short bits of broken wood or seaweed.

The earliest eggs are laid by the end of October, when a number of birds will lay their first egg on the same day. On one occasion I visited a Tern colony on the Rakaia, and found some hundreds of nests all ready, but no eggs. On going back next day, I found that in nearly every case these nests contained an egg. The Black-billed Gulls do the same thing, and one can only conclude that it is done by arrangement, that the young birds may all be ready to leave the nesting site at the same time, and so be protected by their numbers from enemies. Actually this does not work out properly in practice, for more and more Terns join the nesting colony, and laying is going on continuously until the beginning of January, and sometimes even later than that.

The nests are placed close together, the distance between them being rarely less than one foot or more than three. This means that the closest sitting birds are just out of pecking range of one another. Two eggs are laid, though it is by no means unusual to find considerable numbers of birds in a colony sitting on one. On the very rare occasions that I have found three eggs in a nest, I have always considered that two birds had laid in it.

When the young are hatched they are covered with down which varies to an extraordinary degree in colour. The typical colouring of the backs and head is stone grey with black spots, while the chest and belly are whitish; but the back may be dark brown, or even smoky black, with or without spots, the under parts always being lighter; or the whole chick may be very pale grey—almost white—with no spots at all; or white below and pale yellowish brown above.

One cannot help speculating as to the cause of this very wide variation in colour of newly hatched White-fronted Terns. It may be caused by the chief food of individual birds, and some support is lent to this theory by



Plate XX. NEST OF WHITE-FRONTED TERN
Note the quantity of small stones used in construction.



Plate XXI. NEWLY HATCHED WHITE-FRONTED TERN
Typical colouring.

the fact that the young of the Black-billed Gulls nesting near by exhibit a similar, but by no means so wide, range of coloration, and they always have spots on the upper surface. The young of the Black-backed Gulls, however, show very little variation indeed. Perhaps this Tern is comparatively recently evolved, and the whole type is not yet fixed. Whatever the cause, the very wide variation in the colouring of the down of the chicks is most remarkable.

In the fortnight that elapses before their feathers begin to grow, the chicks increase considerably in size, and, as their down does not seem to grow at all at the same time, they have the appearance of being rather meagrely clad. Their feathers, however, grow quickly, and in about a month from hatching they are able to fly, though their wings are small and rounded, and their tails short.

During the time the young are at the nesting colony, they are fed by the old birds bringing one small fish at a time to them. These fish are always carried broadside on in the parent's bill, and are, for preference, pilchards, though, particularly when the nesting colony is on a river-bed, silveries are often used. If, as sometimes happens, the colony is situated ten or even twelve miles up from the mouth of a river, and the parent birds are going a mile or more out to sea to get each pilchard, it will be seen that they must travel prodigious distances daily. As a rule they go to and from their feeding ground in small flocks, and sometimes one bird from a flock travelling seawards will spot a silvery in the river below, dive and get it, and immediately return to the colony with it. In recent years I have occasionally seen these Terns take the smolts of the quinnat salmon, but not often, and they do not make a habit of doing so.

When the young are able to fly sufficiently well, they go to the sea-coast, if the colony was not situated on it, and presently begin to accompany their parents out to sea on their fishing expeditions. At this stage they are fully feathered, the wings being as large as those of the adults, though the tail is shorter and not so markedly forked. The upper surface of the wings, back, tail, and particularly the head, are heavily marked with smoky brown.

If they are normal season young—young that can fly by the end of January—they begin to moult by the end of February, and by the end of May are in the adult winter plumage. In this, the whole of the under parts are pure white, the upper side of the tail is tinged with grey; the

back is a beautiful blue-grey; the forehead is white, which passes through aluminium and grey to black at the back of the crown and nape. The long outer tail-feathers which are so noticeable a feature of the nesting adult are still growing in May and do not reach their full size until June. In September, the whole crown of the head, with the exception of a narrow white frontal band, becomes deep black, and the white feathers of the neck and breast are suffused with a lovely soft pink tinge, so faint that it is not perceptible at more than a few yards, and so evanescent that it fades out again before the birds begin to moult; or if the bird be killed and skinned, no matter how well the skin is preserved, even in the dark, this pink tint entirely disappears in a few days. If young White-fronted Terns are reared late, they do not complete their moult before the winter, but, as a rule, moult the scapulars only and then cease to moult until the following spring. I think it doubtful if these birds would nest that year, though I believe the earlier hatched ones, which completed their moult before the winter, would do so.

White-fronted Terns are very fond of bathing, in either fresh or salt water, but they prefer fresh, and, if on a spit between a fresh water lagoon and the sea, will always bathe in the lagoon. Even young birds that can little more than fly bathe if there is a drying-ground for them not much above water level.

A Tern colony is an exceedingly interesting place. It is so full of life and movement, especially after the young are hatched. There are always dozens or, in a big colony, hundreds of birds hovering over the ground, as well as the sitting birds, and, from daylight until dark, a constant stream of arrivals and departures; and all the time there is a ceaseless noise, the short intermittent "crek" of thousands of birds combining to produce a continuous babel of sound. The birds are tame when nesting, and will come back to their nests even when people are standing not a dozen feet away, provided the spectators keep still. If one stands so until the birds have all settled down, and then gives a shout and a sudden movement, the whole of the birds rise into the air. The "crek-ing" is suddenly hushed, its flat din being replaced by the subdued roar of thousands of wings, and then it breaks forth again in tenfold volume as the birds wheel overhead; and this clamour gradually subsides again to normal as the birds settle down, each one alighting near its nest, and waddling to it; for a moment or two the bird stands over the eggs, with



Plate XXII. WHITE-FRONTED TERN COLONY
Rakaia Mouth. The birds, having been disturbed, are settling down on to
their nests.

head bent down, taking a last look at them before sinking down on them with a few little comfy shuffles. There are many suggestive gestures among animals, but I know of no one so expressive of complete satisfaction as that of a bird which, without fear, settles down on its nest, gives a final contented shuffle, and raises its head and looks around.

To walk through a Tern colony when the birds have eggs will almost invariably result in some eggs being stepped on—the nests are so close together, and the eggs are so like the stones among which they are placed that it is difficult to avoid all of them. Particularly so when one's attention is to a certain extent distracted by the clamour overhead, the general din being pierced by the harsh grating "ka-a-a" of the particular birds, whose nest one is near at the moment, as they swoop close past one's head.

As I have said, there is a constant stream of birds coming from, and going to, the sea. Several will join together to make a small flock, which proceeds on its way at what one might term its cruising speed. Then single birds following will speed up until they catch their leaders, and so on until flocks of from ten to fifty individuals are formed. Going with the wind they fly high, but against it, travel low down, and take advantage of every bit of cover, keeping under the lee of trees, fences, or banks of lupin. They are always graceful in flight, but there are two occasions on which I was particularly impressed by this. One was when a colony was situated on the shingle ridge at Rakaia mouth, and the young were all hatched. A stiff wind was blowing in from the sea, and the sky was a cloudless blue. The birds going seawards swept down the slope of the shingle ridge, just cleared the tops of the breakers, and then, low against the water, kept straight out to sea until they were lost to sight among the white-capped waves. How far they went I do not know, but a mile or more out there was evidently a big shoal of pilchards, and it was on these that the birds were feeding. With a pair of field-glasses, I could pick up, as silver specks against the sky, the returning birds, already at a height of three to five hundred feet, and coming at a great speed with the wind. They maintained their altitude until they were right over the colony, and then, turning round with a downward swoop, they faced the wind and closed their wings sufficiently to allow them to descend almost vertically to the ground.

The other occasion was when a large colony was situated up the Rakaia, ten miles from the sea. It was at the end of January, and, the moon being full, I had gone with a friend at evening, to a pool a mile up the river, to fish for big trout after dark. A light northerly wind faced the Terns as they came home, and, as dusk fell, thousands passed us, flying about ten yards above the ground. As the light faded, the oncoming flocks flew lower and lower, until they were just skimming the surface of the water. The sun had set at about a quarter past seven and by nine o'clock the light had all faded out of the western sky, yet when we left at after ten the birds were still passing. The flocks were fairly uniform in size, numbering about thirty birds in each, and for some time around sunset they passed us at the rate of about two flocks a minute, but later the frequency dropped to about half that. As darkness fell, the birds stopped their calling and travelled in silence. We could see their backs flash in the moonlight as they banked round a bend in the river two hundred yards below; then as they came towards us, they were lost to sight save for the occasional flicker of a wing; until, close up, they suddenly appeared again, fully illuminated, passing us swift and silent save for the swish of their wings, and disappeared into the night.

Bare rocks off the coast, provided they are high enough to be clear of the waves during storms, are favourite nesting places for White-fronted Terns. The birds lay their eggs in any slight natural depression, in most cases, adding nothing whatever by way of a nest. If, however, there is any vegetation on the rocks, the Terns will usually collect a few bits to place around the eggs. Such rocks may be thickly covered with Terns, and, before the end of the breeding season, will be completely white-washed with the birds' droppings.

White-fronted Terns feed exclusively on small fish which the birds catch by diving from a height on to them as they swim near the surface of the water. From April to August they feed at sea, but, when the whitebait begin to run, a few Terns frequent the river mouths to prey upon them, and the small sea fish that follow them. When the silveries begin running, these Terns, together with the Black-billed Gulls, reap a rich harvest, waiting as each succeeding wave carries fish up the beach, and leaves them more or less exposed as it recedes. The unhappy silveries have a bad time of it. They are harried by fish at sea; by birds,



Plate XXIII. WHITE-FRONTED TERNS

trout, herrings and kahawai as they enter the rivers, and by Gulls, Terns, trout and eels as they make their way upstream.

When a shoal of silveries is trying to negotiate a shallow rapid, one or two birds may see them and begin diving at them. This attracts the attention of other birds, and in less than a minute there may be a hundred or more hanging a foot or two above the water and diving down as the distracted fish dart hither and thither.

Where two swift streams meet there is a "boil" on the surface, and this is a favourite fishing place for White-fronted Terns. A silvery is thrown up to the surface by the rapidly whirling water, and, like a stone, a Tern drops on it from fifteen feet overhead. As a rule the fish is caught, but if the bird misses its mark, it swears loudly—a prolonged, grating, "ar-r"—the exact counterpart of the ejaculation of the angler who has just lost a fish: "Dammit! He's off!"

Throughout our whole coast-line this Tern is plentiful, nesting on barren rocks or islets off the coast; on spits or beaches; and sometimes, as for example on Bank's Peninsula, on cliffs. It has not many effective enemies. The Black-billed and Red-billed Gulls will rob it of food which it is carrying, if they are able to do so, two or three of them chasing the Tern and trying to snatch the fish from its bill, or cause it to relinquish its hold, when the falling fish will be caught by one of the Gulls in mid-air. But the Tern sticks tenaciously to its prey, and is an accomplished flier, so by sheer dexterity in its aerial manœuvres it often escapes from its pursuers; or leads them such a dance that they come to the conclusion that the game is not worth the candle, and leave the Tern alone. Harrier Hawks may take an occasional chick from a colony, but the sight of a Harrier near their nesting ground will cause a flock of Terns to rise and attack it, swooping at it, and screaming angrily. The moral effect is great, and Harriers being arrant cowards, usually lose no time in getting away. Black-backed Gulls, on the other hand, take a certain toll of both eggs and young of these Terns, and also those of the Black-billed Gulls. On one occasion there was a combined colony of the two last-named species on the shingle ridge at Rakaia mouth, and, about a quarter of a mile upstream, a pair of Black-backed Gulls had their nest and young. I saw both of these Black-backs come at different times to the Tern colony and, despite the clamour of thousands of the two smaller species who fluttered around them, calmly take a young bird and carry it off to

their nest. Once one of them picked up a small chick, swallowed it whole, and possibly still alive, and then picked up another larger one and flew off to its nest. It was noteworthy that, so far as I saw, none of the smaller birds actually struck the robber, though they had ample opportunity to do so, without any chance of effective retaliation. I afterwards went to this Black-back's nest, and found several young Terns and Black-billed Gulls there, uneaten, and the remains of many more scattered about.

The worst enemies, however, of Tern colonies, especially when these are situated in river-beds, are stoats and weasels. Although not often seen, these vermin swarm on our shingle river-beds, and it is rarely that any large patch of wet sand does not bear their footprints. In 1903 there was a very big colony of White-fronted Terns on the south branch of the Rakaia about three miles up from the sea. At the time, I estimated (admittedly roughly), by counting the nests in a unit area, that there were about thirty-five thousand birds there. The colony had been started on one side of the river, adjoining a colony of Black-billed Gulls, but later additions had taken place on a large island between two streams and here some acres of ground were thickly covered with nesting birds. At that time there was no lupin on the river-bed, so the whole area could be viewed at one time, and it was a remarkable sight. As I passed through the original part of the colony, I noticed with surprise that a big dead manuka branch, that was sanded up on the shingle, had no nests near it, although it was a most suitable spot. This made me examine it closely, and I saw a small burrow in the sand; so I armed myself with a stick and began raking it out, when I found it full of eggs and young Terns—over thirty of them. As I worked at it, a stoat suddenly bolted from the back of it, but he got some sand in his eyes, and a lucky smack with my stick ended his marauding career. From this may be gauged the damage these brutes do, and to them, as well as the exotic growths on the river-beds, may be attributed the diminution in the size of the Tern colonies on the Rakaia in recent years.

Many of the Terns' off-shore breeding colonies, however, are inaccessible to stoats and weasels, and as tangible evidence that these birds are still thriving elsewhere, I may mention that in January, 1931, there was a colony of many thousands of them on a reef near Akaroa Heads.

WHITE-FRONTED TERN

Although one finds occasional dead Terns of this species in the drift above tide-mark along the coast, I have never seen or heard of great numbers of them found so—they are not nearly so plentiful, for example, as any one of several species of Petrel—so that they are evidently well able to withstand heavy storms, and there appears to be no reason to believe that this bird will ever be other than an abundant species with us.

CHAPTER VI

BLACK-BACKED GULL

Larus dominicanus

THE Black-backed Gull is perhaps more frequently seen than any other of our birds, occurring as it does on all the coast-line, as well as throughout the length and breadth of the land. Together with the Harrier, it shares the distinction of being a bird that has increased in numbers since the White occupation of New Zealand. Shipping, sheep-farming, agriculture and the meat-freezing industry have all provided this Gull with an increased food supply, and it has profited by the abundance. Bush or scrub-covered areas, which in past times were of no use to Gulls, are now cleared, and make, at any rate during certain seasons of the year, excellent feeding grounds. This factor alone must have resulted in a considerable increase in these Gulls, particularly in the North Island.

Their food consists largely of animal matter. On the sea coast they live chiefly on food that is cast up by the waves: dead fish or carcasses of any description. A dead whale cast on the beach is soon the centre of a flock of Gulls, which will continue to feed on it for weeks. Although Black-backs capture a few fish at sea by fair angling, so to speak—by pouncing from the air on surface swimmers—their main supply of live fish is obtained from pools left by the tide. In estuaries, they kill a considerable number of eels which they find on exposed mud banks; and at the mouths of rivers they get good hauls of smelts (*Retropinna*) when these are running in the spring. Shellfish are welcome, and bivalves such as cockles, pipies, and mussels, are broken by the bird carrying them up into the air and dropping them on the hard beach. Some years ago there was a Gull at Sumner that got most of its food in this way, for I saw it, day after day, flying up with pipies and dropping them on the hard wet sand. I remember noting that if one fall did not break the shell, the bird did not go higher with it for the next try, but always dropped from about the same height—forty to fifty feet—no doubt having learned



Plate XXIV. BLACK-BACKED GULL

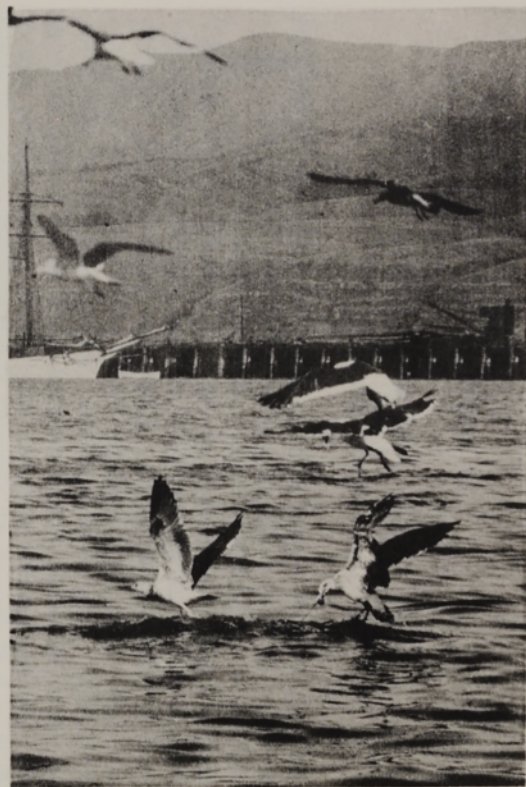


Plate XXV. BLACK-BACKED GULL
Right: two lower birds, yearlings: two next above, adults.

from experience that a break was as much dependent on how the shell-fish landed, as on the height from which it fell. Sometimes it took a shell up three or four times, but as a rule once or twice was sufficient. I never saw this bird make an attempt to pull off the rocks any of the quantities of mussels that were exposed at low tide, but it would immediately pick up a detached one from the sand.

At the mouth of the Rakaia River in early spring I have sometimes seen flocks of Black-backs fishing in the sea, and capturing a fish of about nine inches in length, that looked from a distance like a small whiting. This was genuine good fishing, and it was noticeable that the young birds of the previous year seemed to be just as expert at it as the adults.

This Gull is often accused of taking young trout from the rivers. That it does so is quite true, but only in any quantity when a stream is drying up in the summer, and it would usually happen that the fish so taken would die in any case.

In harbours, these Gulls eat all scraps thrown overboard from shipping, thereby performing a very useful work as scavengers. In Wellington Harbour, hundreds of Gulls gather off the outlet of the sewer from the freezing-works, and do much to mitigate the pollution of the effluent; and this same thing goes on wherever there are meat-works, either on the coast or inland. During the autumn when stubble fields are being ploughed, flocks of Black-backs gather and follow the plough, eating worms and grubs of all descriptions. Unfortunately they take great quantities of the big lob-worms, which, no doubt, have a very considerable agricultural value. At this season, too, these Gulls eat quantities of grain, which they pick up from the stubbles, but I have never seen or heard of one taking grain from a stook, or even from the head of a sheaf that had fallen on the ground. After feeding on grain thus, they eject large pellets composed of the husks. These pellets may be found in numbers on the shingle spits in the river-beds where the Gulls roost, and contain the husks of oats, wheat, and barley. In one of these pellets which I examined, on the Waimakariri in February, I found three small apricot stones. I can only imagine that the bird had been feeding at Lyttelton, and swallowed the fruit which had been thrown overboard from some ship.

From the latter half of November to February, numbers of these Gulls

may be seen on the "tussock" land, and turnip crops adjoining the Rakaia River, particularly up by the Gorge. Here they walk about carefully examining the foliage in search of large black beetles, of which they consume great numbers. As these beetles do a considerable amount of damage among turnips when these are beginning to sprout, the Black-backs perform a very useful work in destroying them. The number of beetles that a Gull will take in the course of a day may be gauged from the fact that I have frequently found pellets ejected by the birds which contained quite half a handful of beetles' wing-cases and body-armour.

So far, in their feeding, these Gulls have benefited man, or, at any rate, done him little harm. Unfortunately the story does not end there. During the lambing season these birds roam the country, feeding to a large extent on the offal, but they will not hesitate to attack new-born lambs, killing them by pecking out their eyes and tongues. They will treat full-grown sheep in the same way, when they are "cast," and the damage the birds thus do to the farmer is, in some cases, really serious. They also take young birds and eggs when opportunity offers. At the Rakaia mouth some years ago a pair of these Gulls was nesting half a mile up from the sea, and on the shingle beach there was a large nesting colony of White-fronted Terns and Black-billed Gulls. While fishing near this colony I saw these Black-backs come down and settle among the nests. Thousands of Terns and the smaller Gulls flew screaming at them, but, despite this, the bigger birds picked up young birds and carried them off upstream. Later I went up and examined their nest, finding a number of dead young Black-billed Gulls and Terns lying about, and from what I saw, they formed the chief food supply of these Black-backs at this time.

I once caught a White-faced Storm Petrel, and put it in a box overnight, to photograph it next morning. The "sitting" over, I released it, when, as it flew out to sea, a Black-back started in pursuit. Although the Petrel was flying fast, the Gull quickly overhauled it and swooped at it from below, trying to catch it in mid-air. The little Petrel dodged well, however, and, after three or four fruitless thrusts, the Gull gave up the chase and returned to the shore.

On Big South Cape Island, off Stewart Island, a colony of Red-billed Gulls established themselves on a rocky point, and built eighteen nests; but a week after they had laid their eggs, we saw some Black-backs go





Plate XXVI. NEST OF BLACK-BACKED GULL.
The only one I ever found with brood of four.

there and eat every egg. There can be no doubt that they would eat the eggs or young of such birds as Banded Dotterel, Wry-bills or Black-fronted Tern, whenever they got the chance, and I am not at all sure that it would not be an economically sound proposition to thin out their numbers in many districts. For some time they were "protected," but all protection has now been removed.

At the beginning of September, in Canterbury, Black-backs take up their positions on their nesting grounds, which may be on beaches, cliffs or river-beds, or sometimes on the flat tops of mountain ranges. A typical example of the last-named situation is on the Rock and Pillar Range in Central Otago, where, at an altitude of about three thousand feet, there is an extensive Gull colony, the nests in many cases being built on top of the big outcropping rocks which are so striking a feature of the locality. On open spaces such as river-beds, or beaches, the nests are scattered about, the distance separating any two of them seldom being less than five or six yards. On cliffs, they always nest in little caves, or on wide ledges, preferably with vegetation on them. From the time that building starts, one of the birds is always in attendance at the nest, this being necessary to stop neighbouring birds from pilfering the material or the eggs, which they would not hesitate to do if chance offered. The nest is a bulky structure, built of twigs and grass, tussock always predominating if it is to be had. On river-beds, where the birds choose an elevated shingle spit, free from floods, the nests are usually placed near vegetation or a snag. During the year, such nests get filled up with wind-blown sand, and, as the same site is occupied for years in succession, probably by the same pair of birds, the nest, unless washed away by some exceptional flood, is finally raised a foot or so above the surrounding surface. The nest is compactly made, and has a deep, well-lined depression in which the eggs are laid in October, November or December. It is quite a common occurrence for a Black-back to lay its eggs before the nest is finished; indeed, I have frequently found eggs in a mere scratching among the stones, with a few twigs or bits of tussock surrounding them; but in most of these cases the birds add to the nest afterwards, until it is completed. Three is almost invariably the number of the clutch, though sometimes only two are laid. In the first nest of this species which I found, there were two young just hatched and two eggs chipping; but I have never found four in a nest since, though I

have examined many thousands of them in search of a pink egg. Both birds sit, and during the period of incubation jealously guard the vicinity of the nest. Intruding Harriers, or, in the extreme south, even Skua Gulls, are pursued and driven away, while in large Gull colonies there is always some proprietor to be seen chasing from his domain another Gull which has unwittingly intruded. The young are covered with grey down, lighter underneath, and heavily spotted above with black. Within twenty-four hours of hatching, or as soon as this down is dry, the young will leave the nest if disturbed and hide among the stones, or in any other cover that is near, crouching motionless until danger is past. After a few days they leave the nest, walking about near by with their parents, but for some time return to it at night to be covered by one of the old birds. In the Rakaia river-bed below the Gorge, there was a colony of Black-backs, and in it many of the nests, which had been in use for years, were tall structures. In most of these cases, a second, somewhat scanty nest had been built at the foot of the others, and to this the young were removed when small, so that they did not have to sit in the more exposed nest.

The young are fed by regurgitation. The old bird returns to the family with its crop full of food, and is immediately besieged by the young, who stand in front of it with outstretched heads, continually uttering a shrill peevish cry. The parent lowers its head, and ejects some of its food, the young bird taking some from the bill and picking the rest up off the ground. Should the young not eat all that is provided, the old bird re-swallows the remainder, stowing it away in its crop for future reference, or personal use.

By the second week in January, many of the young are fully grown, and they then accompany their parents to the feeding grounds, returning every night to the nesting site to roost. For another month or so, the young are fed by their parents, and then gradually weaned.

Towards the end of January, the old birds in many cases begin nest-building again, repairing the old home, and putting it in good order, but, so far as I know, they never raise a second brood, or even lay in these nests. The procedure is reminiscent of the autumnal "false-mating" of some ducks.

The first plumage of the young birds is very dark, and this gives them the appearance of being much larger than the adults, when old and



Plate XXVII. BLACK-BACKED GULL TAKING FOOD
OFF WATER

In front: Immature Black-billed Gull, Lyttelton Harbour.

young are seen flying together. As a matter of fact, this is not merely an illusion, for the wings of the young birds, when fully grown, are considerably larger than those of their parents, being both longer and wider, the length of the secondaries in the young bird being over half an inch longer than the same feathers in an adult. The young do not moult until they are a year old, by which time their feathers have faded considerably, the bird being much paler than when newly fledged. In their second year, the feathers of the head, neck, and breast are greyish white, the upper surface of the wings and back being dark brown; the tail whitish, with a wide dark band across the end of it. In the second moult—that is, when the bird is two years old—the adult plumage is assumed. In this the head, neck, all underparts and tail are pure white; upper surface of wings and back are black; the bill is yellow with an orange flash at the end of the lower mandible. I think that, in some cases, it takes the young birds three years to attain their full adult plumage.

The call of the Black-back is a musical "Kaloo-Kaloo-K'loo-K'loo," the last syllable several times repeated, the call being on a falling scale and diminuendo from start to finish. This is much indulged in during the mating season, when the pair of birds walk around one another with shoulders raised, the head lowered and stretched forward, and the wings slightly drooped. When an intruder approaches a Gull's nest, the parents make this call, and another which may be written "Kok-Kok-Kok"—the rendering making it sound very like a somewhat derisive laugh. The cry of the immature bird is a peevish whistle. So far as I know, Buller was the first to apply this adjective to the young Black-back's call, and it fits exactly—it was coined for the job; and it always amazes me that the parents should show no sign of irritation when, hour after hour, they are persistently pestered by their young, and that exasperating cry.

On one occasion I was up the Rakaia, when the river came down in heavy flood. There was a large colony of Black-backs on an elevated shingle spit, but the end of this was gradually being submerged. As the water rose, it surrounded many nests, but the birds still sat on their eggs, until the nests were quite submerged, or washed away. At the height of the flood, a Gull was sitting on a nest which was completely surrounded by water of a considerable width. I watched her through my glasses, her head raised anxiously looking around her, but she did not leave her eggs.

Some hours later as the flood was receding, I went back to see how she had fared, when I found the encircling waters gone, and the bird still on her nest, the only one left within a distance of one hundred yards or more.

Thousands of Black-backs nest in the Waimakariri river-bed, from the Gorge down to the top of Coutts' Island, a distance of over thirty miles, and when the nesting season is over these birds return each night to their breeding grounds to roost. They leave the river-bed at dawn, some going to the countryside near by, but most of them going to the freezing works at Islington, Belfast, and Kaiapoi; or to Lyttelton Harbour. The last journey would be, for some of them, about thirty-five miles, yet they fly it daily, returning home over Christchurch in the late afternoon. Their first concern on arriving at the river is to have a bathe, and thereafter sit on the shingle, drying and preening their feathers for a while, before proceeding to their roost, at which many of them do not arrive until dusk.

Black-backed Gulls will not allow a Harrier anywhere near their nest or young, driving it away with great clamour. They swoop from above, making a peck at it as they pass, but they very rarely strike it, for as they approach from behind, the hawk suddenly turns over on its back with its feet upwards, ready to strike, and the Gull sheers off. If by chance a Hawk gets above a large colony of these Gulls, it is chased by several birds at one time, and gets positively bewildered in its efforts to escape, being driven by one infuriated pair of Gulls from their domain into that of their neighbours, when these, in turn, take up the attack. I have only once seen a Gull actually strike a Harrier. I was fishing in the Waimakariri, near a pair of Black-backs which had their young a little distance off. A Harrier came along, and, being attacked by the Gulls, flew in my direction, but when it saw me, it turned, and headed straight over the spot where the young Gulls lay concealed. The parents were furious, and darted repeatedly at the confused Harrier, which was driven down towards the ground, approaching quite close to the young, whereupon one of the frenzied Gulls dashed at it, catching hold of its tail. The Gull "back-watered" with its wings, and its body came perpendicular, when the Hawk, struck backwards with its feet, catching its assailant by the breast. For perhaps thirty feet they fell thus, locked together, but, when close to the ground, they broke apart. The Hawk made off, and, although



Plate XXVIII. BLACK-BACKED GULLS FEEDING IN
LYTTELTON HARBOUR

Showing use of wings and spread feet as brakes. Pied bird on water, adult; two pied to right, yearlings; two dark ones, that season's birds.

the Gulls still pursued it, neither of them seemed in the least anxious to come to grips with it a second time.

Often one sees a Hawk feeding on a dead sheep in a paddock, with perhaps two or three Black-backs standing near by, awaiting their turn at the feast. Every now and then one will rise and swoop at the Harrier, but the latter as a rule only ducks its head as the Gull passes over, though if it considers it is really being threatened, it will hop into the air, and turn over, when the mere threat of its talons is sufficient to keep the attacker at a safe distance. Should a Harrier, however, find a Gull at a carcass, it just hovers low overhead, and the Gull, unable to take the chance of being attacked in so disadvantageous a position, is forced to rise and fly, when the Hawk settles down to a meal, usually much interrupted it is true, but still a meal; and not until it is satisfied can the Gull return.

Black-backs make quite good pets in a garden, and if taken when young, become very tame; indeed the trouble is, in most cases, that they become too tame, and come into the house. I have known of several cases where tame Gulls have nested and reared broods in gardens; and one in which a single tame hen bird used annually to build herself a nest, lay, and sit on the eggs. I have often wondered why people living near the coast do not tame a pair of these Gulls, keeping their wings clipped for a year; for when the birds moult, and the wing feathers grow so that they can fly, I think it very probable that they would go out to sea during the day but return to the garden at night.

The Black-back is, as I have said, one of our commonest birds, and there is every indication that it will remain so.

CHAPTER VII

BLACK-BILLED GULL

Larus bulleri

DESPITE the statements of several writers to the contrary, the Black-billed Gull is very plentiful in Canterbury. The differences which distinguish it from its close ally, the Red-billed Gull, are not very great, and are certainly not to be detected by the unaided eye at a distance of eighty yards or more. The adult Black-billed, in the breeding season, has the feet dark blood-red, and the bill dark reddish black, while in the Red-billed the feet and bill are both clear red, the bill being darker than the feet. There is a difference, too, in the white markings on the black wing primaries, but these are only of value as a diagnostic character when the birds are in the hand. Excepting off Bank's Peninsula, however, the Red-billed Gull is rarely seen in Canterbury, and never inland. I was told many years ago that two pairs nested up the Opihi River, but the identification is a little doubtful. In an old egg catalogue belonging to Potts, he records Red-billed Gulls as nesting near Rakaia mouth, in the 'sixties. In the past thirty years, I have seen many thousands of small Gulls nesting near the mouth of the Rakaia, but all of them were Black-billed—indeed, I have never seen an adult Red-billed in that vicinity, though I have seen immature birds of this species on a few occasions, and once caught one on my minnow when trout-fishing there.

The call of the Black-billed Gull is a somewhat toneless rasping cry. Ordinarily it is short and frequently repeated, but the birds are able to get a good deal of expression into it, softening it during courtship, and producing a veritable swear when angry.

The Black-billed Gull nests in the river-beds of all the larger Canterbury streams, and on the shores of inland lakes. When it nests on the sea coast, it is usually near a river mouth, and almost always on a sand or shingle beach—rarely on rocks. In the river-beds, particularly within ten miles of the sea, the colonies may be of large size, often containing



Plate XXIX. NESTING COLONY OF BLACK-BILLED GULL.
Rakaia Mouth. This photograph was taken on the day all the eggs were
hatching. It was in 1902 before the river-bed had been invaded by lupin.

five hundred pairs of birds or more; and in one case where I counted the nests they numbered over eleven hundred. Further upstream the colonies are smaller, usually numbering from ten to a hundred pairs. Sometimes it nests in swamps, as, for example, those on the shores of Lake Ellesmere, where in most years colonies of considerable size are to be found.

The Rakaia River may be taken as a typical breeding haunt. Throughout its length from the sea to the Lake Heron stream, a distance of some seventy-five miles, there are scattered companies of Black-billed Gulls. During the winter small numbers may be seen at the mouth of the river, but towards the end of September these flocks are augmented by birds which have spent the winter along the coast; and by the middle of October there may be a thousand there, and pairing is taking place. At this time the birds are very restless, and throughout the day keep on rising in a mass with a veritable babel of cries, and flying about, for no apparent reason; and even occasionally during the night the whole flock will rise and circle around a few times before settling down again. For the most part these nocturnal evolutions are carried out in silence, only an odd bird giving an occasional call.

During the period of courtship the male gives no demonstration of his skill as a food-provider as does the White-fronted Tern, but struts about with his head in the air and his wings held a little away from his sides, giving long-drawn rather harsh cries. A hen having been duly impressed, the two spend much time in walking around one another with outstretched necks and lowered heads. When a sufficient number of birds are paired, a nesting site is selected. In the past this was often on the shingle ridge between the lagoon and the sea, but for the last twenty years the birds have only occasionally nested there, a result, I think, of the increase in the number of anglers, who walk up and down the ridge at all hours of the day and night. The birds have therefore to go upstream for a nesting site, choosing a high bare shingle bank, preferably an island between two big streams. The situation having been decided on, nest building commences, usually towards the end of October. The nests are placed close together, their edges often touching one another, and are well-built structures of rootlets and small sticks, with a deep depression neatly lined with tussock. Although the nests are mostly built on the bare stones, any snag or log that is in the area

chosen will be thickly covered with nests, some of which may be as much as two feet off the ground. As is the case with many other ground-nesting birds, it is by no means unusual for Black-billed Gulls to lay in a partially constructed nest, and to finish it later. It sometimes happens, however, that procrastination, which appears to be almost as prevalent among these Gulls as in the human race, results in the eggs being hatched in the very sketchiest kind of nest—a few twigs around a depression scratched among the stones.

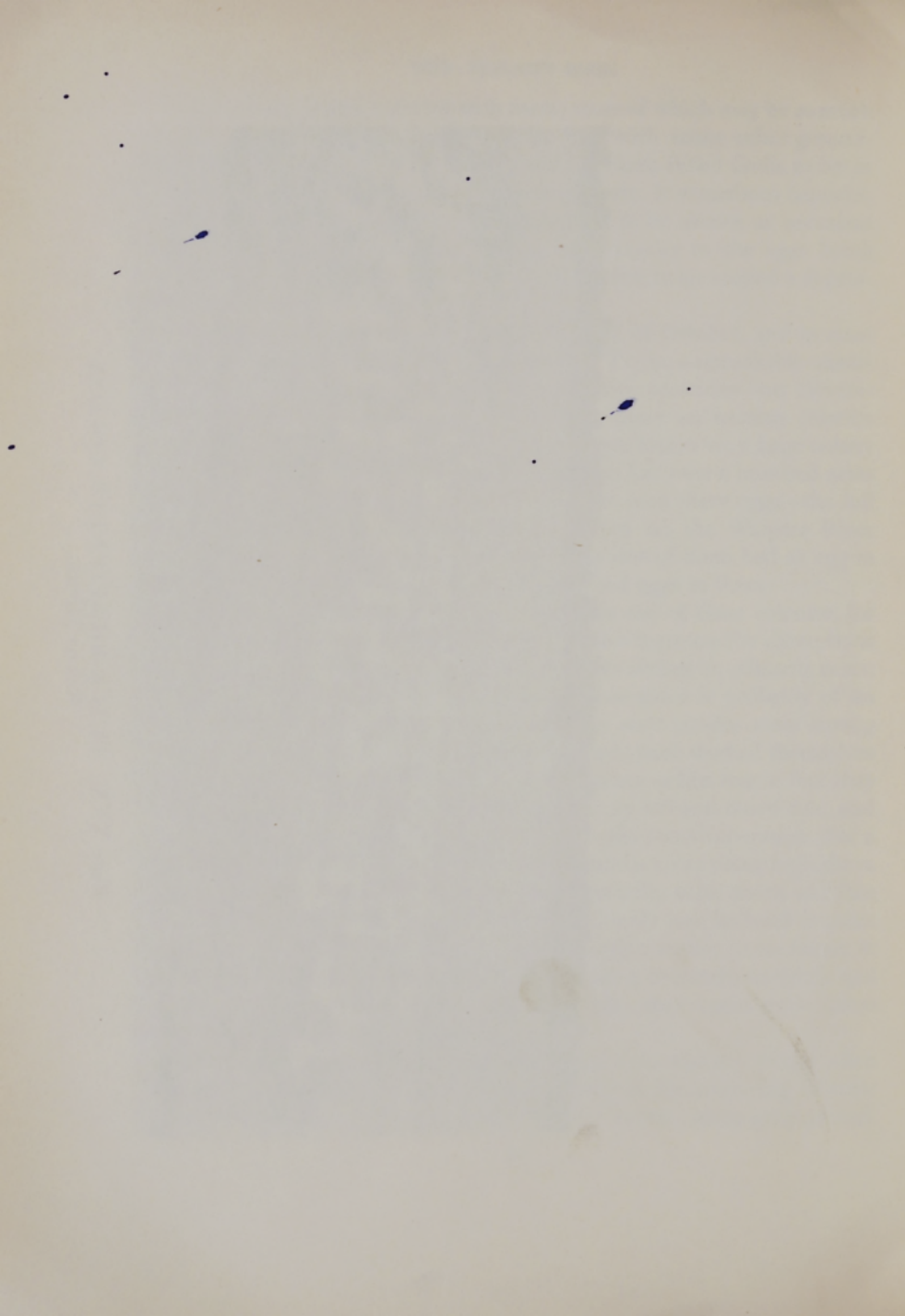
Egg laying begins in Canterbury at the end of October, and in most colonies there is, as with the White-fronted Terns, a remarkable unanimity as to the date of laying the first egg. On two occasions—on November 1st, 1903, and October 31st, 1904—I came on nesting colonies where laying had just commenced. On the first date, a very large colony on the Rakaia about four miles up from the sea had over a hundred nests with one or two eggs each, and only one nest with three eggs—the full clutch. On the later date, two small colonies on the Waipara River had all the nests ready for eggs, though only one of them had an egg in it. Two days later every one of these nests had eggs in them.

There is a continuous babel of sound from one of these colonies, for many birds are always calling; but added to this there are the altercations that are constantly taking place between birds sitting on adjacent nests. Some trifle starts a row—a trifle that in most cases is probably of no more importance than the petty affairs that start similar rows among human beings—and in a few seconds the birds have worked themselves up into a perfect fury. Face to face, at a distance of less than a foot they scream at one another, damning one another up hill and down dale, and their harsh voices are especially adapted to effective vituperation. For a while they will rail thus, their discordant, raucous notes rising high above the general din; but soon they stop and gradually calm down and face in different directions. Perhaps one will suddenly jerk its head towards the other and give a loud call, to which the other replies immediately in kind—no doubt “You’re another!” Then raising themselves slightly and giving their eggs a stir about with their bills, they again settle down calmly to the business of sitting.

The period of incubation is about twenty days and the young when hatched exhibit a most remarkable diversity in the colouring of their down—which may be almost white, creamy yellow, stone-grey or dark



Plate XXX. BLACK-BILLED GULL COLONY
Rakaia Mouth.



brown, always more or less spotted with black on the upper parts, and paler and unspotted underneath. Within twenty-four hours of hatching the young are able to run about, and they leave the nest and walk about in the vicinity, always accompanied by at least one parent. It sometimes happens that the whole colony, old and young, will leave the nesting site within a fortnight of hatching, and move some distance—a quarter of a mile or more—to another situation, where they will take up their abode. Such migrations are unusual, however, and are probably caused by the depredations of vermin.

The young, which are fed by regurgitation in the same way as the Black-backed Gulls, grow very fast, and are able to fly when three weeks and five days old, though at this time their wings are rounded at the tips, and many of their feathers, particularly about the head, still have down adhering to them. In another fortnight they are full grown, and go off with their parents to the feeding grounds. At this stage the upper parts of their plumage are marked with brown, there being a considerable diversity in the amount of such markings, particularly on the head, the top of which in some specimens has a large dark patch of colour. The bill and feet are pale flesh colour, the former having a dark tip. For a while, after they are full grown, the young are fed by their parents, but they soon learn to forage for themselves, and go off on their own. They moult in the autumn, late hatched birds not casting their feathers nearly so completely as those which were born before the end of the year. At twelve months old, Black-billed Gulls may easily be mistaken for Red-billed, for their legs are then red, and their bills are red with a dark tip. They do not breed until they are two years old.

The nesting period for Black-billed Gulls is by no means free from hazard, and on some occasions colonies are almost completely destroyed by flood or storm. Occasionally, for no apparent reason, the birds will desert a situation they have chosen to nest in even after nest-building has begun, but in such cases they will begin operations somewhere else almost immediately. Once there was a very large colony situated on a shingle bank in the south branch of the Rakaia near the lagoon; several hundred nests were occupied and the eggs were already half incubated, when an exceptionally high tide, driven in by a heavy southerly gale, swamped the whole area and piled nests and eggs in a jumbled mass among the stones. The birds were not discouraged, however, and

immediately began another colony about a mile and a half upstream, and here, within a week they had begun to lay again.

In some years, an exceptionally heavy flood—a real “bank-to-banker”—will destroy immense numbers of nests and eggs, and carry away young birds; but it also happens at times that the river, while at normal level, will scour out a bank on which the birds are nesting and sweep the whole lot away. I well remember an outstanding case of this sort some fifteen years ago. There was a very high shingle island in the Rakaia lagoon near the mouth, and this a large colony of Black-billed Gulls and White-fronted Terns selected as a safe nesting place—and indeed it seemed to be so. Many thousands of White-fronted Terns took up their quarters at one end of the island, and some five hundred pairs of Black-billed Gulls occupied the other, the nests being placed so closely together as to cover the ground almost completely. When the eggs were just hatching, however, a heavy sea altered the position of the mouth of the river, with the result that the consequent alteration in the current in the lagoon caused it to begin to scour the island away. In a very short time the river had eaten into the end of the island until the water was undermining a vertical bank ten feet high, on the top of which were the nests. It was a really pitiful sight to see the distress of the parent birds, as slice after slice of the bank slipped into the river, carrying with it the nests and eggs, or newly hatched young, which were swept straight out to sea. For a long time I stayed and watched the little tragedy. The birds sat on their nests, right on the brink of the bank, with the current cutting in underneath. Presently a strip would slide silently down into the water; the birds would fly off as their nests sank; hover for a few moments along the edge of the stream where their treasures had sunk out of sight; and then fly up and search along the new edge of the bank for the nests that were no longer there. In this way practically the whole of the broods of the Gulls were lost, for even when the young were able to run about, they persisted in staying alongside their nests, and when these fell in, it was too suddenly for the young birds to escape, and the surf at the mouth of the river was so heavy that all were drowned. Fortunately another change in the river mouth caused a further diversion of the current, and the scouring ceased before the Terns were affected.

Harrier Hawks no doubt take toll of young Black-billed Gulls, particularly from small colonies where the numbers of parent birds are not



Plate XXXI. BLACK-BILLED GULL COLONY
In swamps. Lake Ellesmere.

large enough to have sufficient moral effect to keep them off; and I have recorded the damage done by Black-backed Gulls. I think it probable, however, that at the present time the worst enemies of Black-billed Gull colonies are stoats and weasels; and hedgehogs also if the nesting site is accessible to them.

The food of the Black-billed Gull consists mainly of fish and insects, the former being taken in one of two ways. Either the birds fly low over the surface of the water, and dive down on any fish; or they stand at the side of the stream and run into the water and catch fish that may swim by. When diving after fish, these Gulls go in with the wings extended and held backwards, the bird very rarely being completely submerged, and usually only putting its head and neck under water. When whitebait or silveries are running up the rivers, Black-billed Gulls will take up their stand on little points and promontories, where the current forces the ascending fish to keep close inshore, and there the birds will wait, keeping a sharp look out downstream. When a fish appears the birds take a step or two towards it and strike at it with the bill. This sounds a most elementary method of fishing, and indeed it is so, yet it is vastly more efficacious than one would expect. It is most amusing to watch Gulls engaged thus, for they are very jealous in their possession of a good point, and fiercely attack any poacher on what they consider to be their particular preserves. Often at the Rakaia when "bait" is running, every point on the shingle ridge adjoining the lagoon will have one of these Gulls on it. If a new-comer arrives, it may fly up the line, looking for a fishing stand, only to be greeted with a harsh "Ka-a" by each bird it approaches. At last it settles in a vacant section, but perhaps a little too close to one of its neighbours, which will lower its head and advance towards the trespasser with threatening aspect and harsh cries. This usually has the effect of driving the intruder off, but should it not do so, the outraged possessor will certainly fight for his rights.

When a shoal of silveries is running up a shallow stream one or two Black-billed Gulls may see them and begin diving at them. In a few seconds other birds near by will see what is afoot, and fly swift and low to the scene of action. When flying thus, the birds preserve complete silence, but when they arrive at the flock, immediately give vent to loud excited cries. In a minute there may be several hundred birds there, some hovering overhead and diving, others swimming, and still others

walking about in the shallow water near the bank, and striking at the bewildered fish as they dash hither and thither in their efforts to escape. It is a wonderfully vivacious sight, the fluttering wings of the birds, the splashing of those which dive, and the continuous harsh, staccato calling combining to produce a scene that, for animation, it would be difficult to surpass.

Black-billed Gulls feed extensively in Lyttelton Harbour on the scraps thrown overboard from the vessels. It is curious that the Red-billed Gulls which inhabit Bank's Peninsula rarely come into Lyttelton to feed, although the same species frequents the harbours to the north and south. The Black-billed is common at Picton, Wellington and Timaru, but diminishes in numbers north and south of those limits, and I have never seen it south of Dunedin. Many years ago, the Lyttelton Harbour Board erected high-powered electric lights on the Ferry Wharf to facilitate the loading of the ships at night. The Black-billed Gulls took immediate advantage of this, and continued feeding around the ships long after dark. They still do so, and, from the ferry steamer on any night, they may be seen feeding or flying about, just as if in full daylight. I have been misquoted as saying that they hawk moths around the lights. I have never seen them do so, nor, indeed, have I ever seen any moths there.

It is only to a limited extent that Black-billed Gulls follow the plough, and, while sometimes considerable flocks may be seen doing so, at other times, in the same district and under similar conditions, very few will be present. 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.

Inland, and also to a lesser extent on the coast, Black-billed Gulls feed extensively on insects. On one occasion when I was staying at my fishing hut at the mouth of the Rakaia there was a veritable plague of big woolly moths, which came into the hut in numbers, fluttering around the lamp, and, of course, falling into our food. The next evening, when fishing on the shingle ridge, I noticed some of these moths being blown out to sea by a strong north-east wind. Some Black-billed Gulls



Plate XXXII. BLACK-BILLED GULL COLONY
Rakaia Mouth.



Plate XXXIII. BLACK-BILLED GULL COLONY
Rakaia Mouth.

also noticed them, and in a few minutes hundreds of the birds had gathered, and flew to and fro in the gloaming, facing the wind and catching the moths as they were blown off shore. It is always interesting to me under such circumstances to try to estimate the numbers of insects that are destroyed, and on that occasion the birds must have taken tens of thousands in the fifteen or twenty minutes that the flight lasted.

In the back-country these Gulls eat a great many insects, and may be seen hawking them along the shores of streams and lakes, or out on the tussock flats. 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. Because Black-billed Gulls take a certain number of small trout, however, some Acclimatisation Societies have endeavoured to have this protection removed. Up to the present they have not succeeded in doing so, and I sincerely hope that they will not in the future, for 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. Moreover, they do not take trout in appreciable numbers excepting under special conditions, such as when streams are very low, or drying up during periods of drought. Apart from the trout that they take, the only charge that can be made against these Gulls is that they occasionally rob a White-fronted Tern of a fish that it is carrying in its bill.

That they themselves are not immune from such attacks, the following incident will show:—On the 1st of May, 1921, I was duck shooting on the lagoon at Rakaia Mouth. There were numbers of Black-billed Gulls about, and as the morning wore on, flocks of from twenty to thirty birds kept coming in from their feeding grounds, out at sea, to join those resting on a sand-bank near us. About eleven o'clock, three Richardson's Skuas arrived on the scene, and immediately set upon a flock of Gulls which was returning from the sea with full crops. The Gulls packed close together, and, flying strenuously, they spiralled upwards, trying to evade their pursuers. The Skuas, however, could outfly them with the greatest ease, and, dashing into the flock, they each selected a bird and pursued it. The three victims so chosen twisted and swerved in their flight, in a vain effort to shake off pursuit, and, finding they were unable to do so, disgorged their food to lighten their load. The pursuing

Skua thereupon dived downwards after the falling food, darting and turning as he picked up item after item of it in the air; while the Gull, relieved of pursuit, spread its wings and sailed down to join the resting birds below. The remainder of the flock meanwhile continued their upward flight, all huddled close together, while the Skuas, having collected the food from their first victims, started after the others. Flying in wider circles than the Gulls, and at great speed, they quickly overtook the flock, and repeated the performance. On one or two occasions they actually caught hold of their victims, when the Gull would instantly disgorge its food and the Skua would release the bird, and dash downwards to pick up the fish. It was a wonderful sight, the strength and speed of the Skuas' flight, and the amazing skill and rapidity with which they would collect in mid-air half a dozen or more falling fish, were truly remarkable. And time after time they returned to the assault, following their climbing victims until they were perhaps a thousand feet up, the light-coloured Gulls being almost invisible from the ground, while the dark Skuas showed up in strong relief against the sky. Each Gull as it was robbed was allowed to go; and at last, when all had been plundered, the three marauders drew together, spread their wings, and sailed slowly and gracefully away out of sight over the sea.

During the winter these Gulls to a large extent leave the back-country for the open plains and the coast, where they remain until the spring. They are, as I have said, very plentiful in Canterbury and some other parts of the South Island, and it seems to me that they will remain so.

Enormous numbers of them collect on the shores of Lake Ellesmere in the summer and autumn months, at which time flocks of two or three thousand birds may be seen feeding in the shallow water and ooze, along the edge of the lake. Their food here consists almost entirely of insect larvæ, with which the shallow water teems. The birds as dense flocks run rapidly along, pecking to right and left, the hindmost members continually rising and flying to the front of the flock. At times, apparently when they come to a stretch of barren water, the birds will all rise, and fly perhaps a mile along the shore before they begin feeding again.

They are easily tamed, if taken when young, and make delightful pets in a garden. At the fishing huts at the mouth of the Selwyn there is a flock of a hundred or more Black-billed Gulls which have been fed by visitors until they are now quite tame. When any of the occupants of the



Plate XXXIV. BLACK-BILLED GULL ON NEST
Lake Ellesmere.

BLACK-BILLED GULL

huts has any scraps of food to get rid of he takes them outside his hut and taps the plate with a fork. The Gulls which are waiting in the road by the river, or perched on the electric-power poles, know the signal well, and immediately fly to the sound, settling almost at the feet of the person with the food. It is really an excellent example of the way in which birds will respond to proper treatment, and, indeed, of the proper treatment of birds.

CHAPTER VIII

SOUTHERN SKUA

Catharacta antarctica

ON the 1st of May, 1903, I went for the opening of the duck shooting to Blackwater Lagoon—a large area of shallow water just south of Lake Ellesmere, and separated from the sea by a narrow shingle beach. A heavy sou'wester with rain had caused the duck to fly well, and we had good sport, but after lunch, when things were a bit quiet, two gunners in a "stook" some distance away began shooting Black-billed Gulls. I went over to them and told them to stop doing so, and on my way back to my own "stook" saw a big brown bird come in from the sea and circle around near the other gunners. It was a Southern Skua, or Sea Hawk—the first one I had ever seen alive—and the only one I have ever seen north of Foveaux Straits.

It was not until February, 1929, that I renewed my acquaintance with this bird, when, on the Government steamer "Tutanakai," I went with my wife to the Snares and Auckland Islands. We had landed on the Snares and were making our way up along the top of the cliffs to photograph the Buller's Albatrosses which were nesting there, when I saw a pair of Skuas circling over another party ahead of us. A sailor, who was in this party, began chasing something, and presently stood up holding a nearly full-grown young Skua, but he quickly dropped it when one of its parents swooped on him, and struck him a blow, knocking his hat off—a good performance, neatly done!

We saw a lot more of Skuas at the Auckland Islands, particularly at the Sea Lion Colony at Enderby Island, but it was in the following November on Cundy Island that I really became acquainted with them.

Cundy Island is a small island lying about one and a half miles off the south-west coast of Stewart Island. On the Admiralty Chart of the region, which is, by the way, both incomplete and inaccurate, Cundy is referred to as First Island. As thousands of Petrels breed there, it is included among the official "Mutton-bird Islands," its birding rights



Plate XXXV. NEST OF SOUTHERN SKUA
On the right are the remains of a Whale-bird which the Skuas have eaten. Kundy Island.



Plate XXXVI. YOUNG SKUA

being owned by the Morrison family of Bluff. Mr. J. Morrison having given me permission to do so, I spent a month on Cundy in November and December 1929. It is a delightful spot, with its fauna and flora very little changed by the advent of man—a hog-back of granite, overlaid by a thick stratum of peat, which supports a rich vegetation, and provides the best of all media for Petrel burrows. Its major axis, about a third of a mile in length, lies north and south, its sides for the most part are cliffs, or slope steeply up from the sea, its undulating surface being from sixty to two hundred feet above sea-level. Although practically the whole of the upper surface is covered with vegetation, most of this is confined to a few species, the predominant two being tupari (*Olearia Colensoi*) and titi-a-weka (*Olearia angustifolia*), which grow to twenty feet high, or more, and cover perhaps five-sixths of the total area. On the higher end of the island is an almost pure strand of rata, many of the trees in it being of great age—their great gnarled trunks semi-prostrate, as though they had been blown over by some exceptionally heavy gale years ago—and in the shelter of these ratas grow the only tree-ferns on the island (*Dicksonia squarrosa*). The rest of the vegetation is made up of various scrubs, ferns, and grasses. Of these, the first, a dracophyllum, with large bunches of vanilla-scented flowers, is plentiful; *Suthonia chatamica* is sparsely distributed; a form of *Coprosma foetidissima* whose smell is a mere wraith of the stink of the mainland plant, and two veronicas are found, the former in the bush, the latter on the outskirts. Of ferns, the common Black fern is by far the most plentiful, growing luxuriantly in great drifts, with fronds six feet long; while a polypodium covers the rata trunks and rock faces of the interior. The small flax grows in exposed places, and scattered over the island in sheltered spots are large clumps of stilbocarpa.

On the outer edges of the island are two grasses: the one with a thin wiry foliage that grows in mats over rock areas wherever it is not washed off by the sea; the other broad-leaved and growing in clumps, eventually forming hummocks a foot to eighteen inches high. In some places, particularly where there is a strong growth of olearia, the ground is naked, and there one could get a good idea of the numbers of Petrel burrows it contained, the soil being literally honey-combed with them, but of these more anon.

Situated as they are, Cundy and its neighbouring islands get the full

force of the westerly gales that are so frequent in that locality. Their western coasts, therefore, are much weather-worn, a striking characteristic being bold promontories of granite, seventy to one hundred feet high, which are swept bare of growths of all kinds, and cut into fantastic shapes by the lash of wind-driven rain and spray. On the tops of these headlands, but well back from the edge, the wiry grass, referred to above, gains a foothold, and further back comes the scrub, its outermost members being reduced to stunted, rigid tufts by the force of the wind.

These bold promontories, windswept and exposed, are favourite nesting places for Skuas. A depression is scraped or trampled in the wiry grass, and in it the two eggs are laid about the middle of October. The young hatch during the second week in November and are covered with thick down of a uniform dull brownish grey; the feet and legs are blue-grey and the bill dark. They are very sturdy, and when only two or three days old leave the nest, and hide in any cover near by. At ten days old they move freely about on the nesting area, and, if pursued, creep along narrow ledges on the cliff face, and fight vigorously with bill and claw when caught. The old birds defend their homes against intrusion with the greatest courage, and will fearlessly attack man, rising to a height and flying downwards straight at his head; striking at him as they pass; then, rising in the air with a magnificent sweep of spread wings, turn over and swoop again. They are big birds, slightly larger than the Black-backed Gull, but more than twice its weight, their full deep chests giving some impression of their strength; but their wide, rather rounded wings give no indication of the great speed of flight which is the Skua's chief asset—that and its courage.

In one attribute it fails and fails dismally; its voice is poor; its cry, shrill and fierce, is yet wholly inadequate coming from such a bird, and such a throat. Indeed it almost seems as though the bird, in trying to give full vent to its feelings, overdid it, and cracked its voice.

To stand near their nest and be attacked by Skuas is most interesting. Some pairs are much more ferocious than others, the worst I have met being a pair that nested on the south point of Cundy Island. I spent a lot of time trying to get a photograph of one of them actually striking, but failed to do so, chiefly because my friends, whom I stood out in the open to be struck, always ducked at the critical moment. I am prepared to



Plate XXXVII. SOUTHERN SKUAS
A nesting family of three. Solomon Island.

admit that a Skua flying straight at one's head, its body foreshortened, but increasing rapidly in size as the bird comes on with swift, short wing strokes, until one can see the gleam in its angry eyes—I am prepared to admit, I say, that this is somewhat unnerving. Still, I had told my friend that, if he perched his hat high on his head, I thought it very improbable that the bird would do more than hit the hat. I even offered to lend him my hat for the purpose, but it was of no avail—at the critical moment he ducked, so that I still do not know if a Skua strikes with its beak or its wing, though I am almost certain it is the latter. The speed at which they are travelling at the bottom of their swoop is amazing, and the photographs I took at one seven-hundred-and-fiftieth of a second were all spoilt by the movement of the bird on the plate. It is a very difficult matter to keep two swooping Skuas in sight all the time, and often when one is high in the air, and you think that number two is also at a safe distance, a sudden scream and a “woosh” as it passes lets you know that number two got back before schedule time. Two of my friends were struck by these birds at different times, but, unfortunately, I did not see either incident, being busy with the camera at the time. In the first case the blow was delivered on the cheek and forehead, just drawing blood, and in the other the bird hit my friend a resounding blow on the back of the head, but did not break the skin. Had this second blow been delivered with the bill, the bird must have seriously torn the flesh, for the noise made was as of a loud thump. On another occasion I was arranging my camera near their nest, and holding as I always did a dry twiggy branch over my head, when one of these birds struck it, breaking off all the twigs, again, I think, with its wings. Another pair when attacking me, flew straight through a dead flax stick which I held above my head, cutting it in two with their wings, and apparently suffering no inconvenience in doing so. They did this on several occasions, so that I do not doubt that in most cases they use their wings when attacking intruders.

The cock bird of the pair on Cundy became so assured that he used to attack us when we were nowhere near his nest. Once when I was taking photographs on the edge of a high cliff at a considerable distance from the Skua's nest, the familiar “woosh,” and rush of air, made me give an involuntary start that might have upset things badly. I did not want to hurt the bird in any way, but decided to teach him a lesson, so

I gathered some small dead branches, and, as he swooped, I threw them up in front of him. This only had the effect of annoying him at first, but presently he flew into one of the branches, which caught in his wing, and he flew off, obviously discomfited, and it was some days before he again took any interest in us unless we were near his home.

Two hundred yards away from the point above referred to was another similar promontory, and on it another Skua's nest. Between lay a beach strewn with huge boulders, on to which the westerly seas dashed, breaking with a pounding roar, and sending their spray and spume high over the tops of the sixty-foot cliffs. The centre of this bay was neutral ground for these four Skuas, but either pair resented the intrusion of the other to the region of its nest, and would attack them, driving them away. A third pair nested on a grassy ledge, halfway down a cliff on the northern end of the island, and these birds were not allowed to fly low down over the southern end at all. In the evenings, however, I several times saw three Skuas, and once four, flying in circles high up over the island, and I took them to be the cock birds belonging to these nests, in the case of the four birds, the extra one having come from an island called "Betsy" less than a mile to the south.

Twice during our stay on Cundy, a Harrier came over from Stewart Island, but his presence caused such an uproar among the Skuas, and they attacked him with such anger, that he was only too glad to make his way back again. The Skuas swooped down on him, and he would turn over with his claws upwards, and they did not strike him; but I have no doubt whatever that they would have done so had he ever got close to their nests.

On Woman Island, south of Betsy, there were four Skuas' nests within a distance of two hundred yards, and the birds of these consorted together in much the same way that the Black-backed Gulls do in their nesting areas. Two of these nests had three adult birds in attendance on each, as described by Guthrie-Smith.* I believe them to have been the pair to whom the nest belonged, and one of their young of the previous year. I took particular note of one trio, and although there was no appreciable difference in their plumages, one bird gave me the impression of being less fully developed than the other two. I once found a similar state of affairs among Keas, when a cock bird, whose hen was incubating,

* *Birds on Island and Shore.*

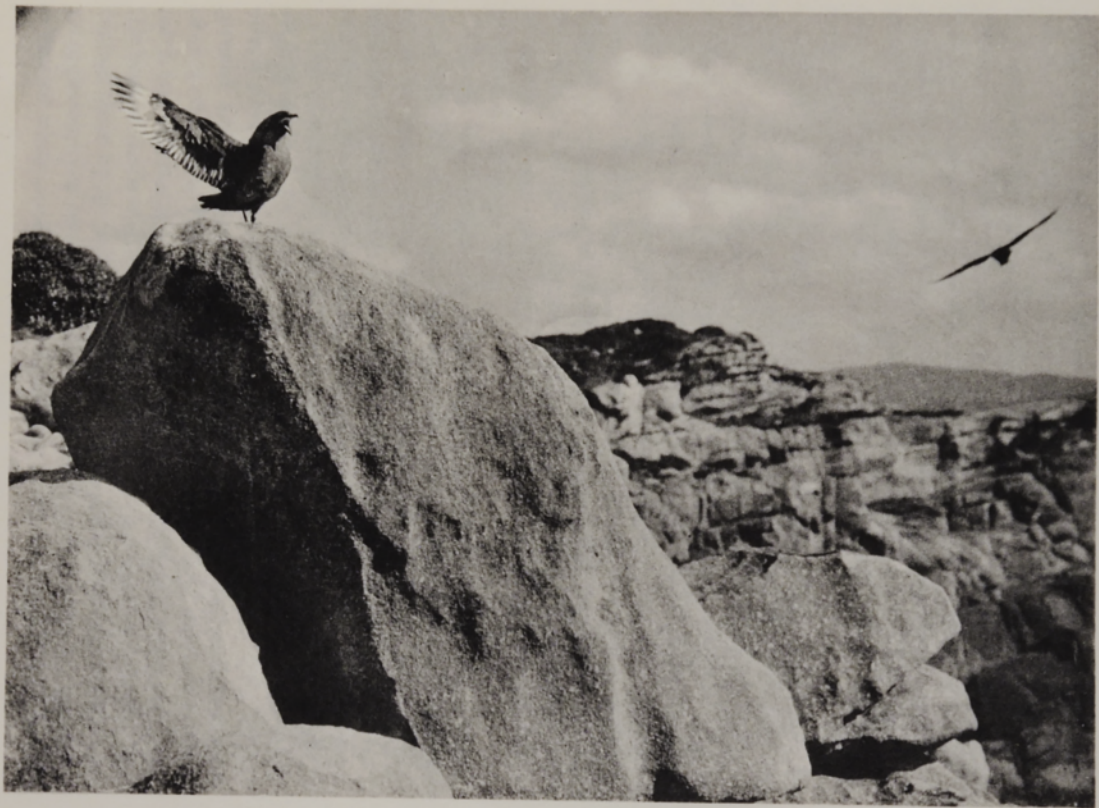


Plate XXXVIII. SOUTHERN SKUA
Hen calling to her mate as he flies past.

was associated with an immature hen, which had not yet moulted into adult plumage, and which I put down at the time as one of their previous brood. In the case of the Skuas, the young birds, particularly if late hatched, would probably not breed in their first year, and I find it hard to believe that any other relationship than the one I have suggested exists between these trios. Of the nine nests on these islands, only two had three birds attached to them. Still further to the south, on Solomon and Big South Cape Islands, Skuas breed in great numbers, and there about half of the nests have three birds in attendance. I shot one such trio, and they proved to be two males and a female, one of the former being a young bird.

Although, as on Cundy, Skuas may be strongly individualistic, so far as the proprietorship of their nesting areas are concerned, I think that they may, on occasion, be even more communal than they were on Woman Island, for on the grassy top of a precipitous rock less than an acre in extent, I saw between twenty and thirty Skuas collected in the nesting season. Unfortunately, we were pressed for time as we sailed past it, so I had no opportunity to try to land on it, but either there was a nesting community of Skuas on it, or it was a collection of the previous year's birds which were not nesting. If, as is indeed probable, these Skuas do not nest until they are at least two years old, the latter supposition is the more likely.

On the wind-swept plateaux which crown Big South Cape Island, great numbers of Skuas breed, the nests being placed among the stunted scrub at considerable intervals—say fifty yards or more apart. In two different localities here, I counted over fifty Skuas in the air at a time, and there were certainly others, at no great distance, sitting on the ground.

The plumage of young Skuas resembles that of the adults, but is slightly darker. They are able to fly by the end of February, up to which time they are fed by the parents who bring food to the nesting ground, and tear it to pieces and give it to their young. In the ordinary course of events, this food consists entirely of birds which the Skuas catch and kill, but around the home of one pair of young Skuas we found the broken shells of some two dozen Mutton-bird eggs, which had been carried there by the old birds from a considerable distance. I never had an opportunity of seeing one of the eggs being carried, but assume that it is carried whole, and although Skuas have a very wide gape, the carrying

of a large, extremely delicate egg like a Mutton-bird's is a really skilful performance.

On islands where sheep are kept, Skuas are a particular menace during the lambing season, attacking "cast" ewes or newborn lambs. Dead animals, such as sea-lions, or dead fish would always be welcome to Skuas, but, in the main, and especially during the breeding season, their food consists chiefly of birds and eggs. In the case of small birds such as Storm Petrels and Diving Petrels, the adult Skuas swallow them whole, feathers and all, later ejecting a roundish pellet of bones and feathers—Storm Petrel remains being easily recognisable by the presence of the long thin legs sticking out of the ball. On Cundy Island the birds mostly taken were Whale-birds and Dove Petrels. Mottled Petrels seemed to suffer the greatest percentage of loss, for although they were not plentiful on this island (that is to say, they were in hundreds only, while the others were in thousands) their fresh remains were always to be found at a Skuas' midden. On Solomon and Big South Cape Islands, Skuas killed these Petrels literally in thousands. In different localities on these islands were veritable "slaughter yards" where the ground was littered with the picked carcasses of Mottled Petrels, whilst odd ones were to be found scattered all over the islands.

Skuas take their prey on the wing or from the ground or water, and, when in pursuit, achieve a speed of flight that would have seemed impossible in a bird of their build. Their prey, if small enough, is carried whole in the bill to their feeding ground, and there torn to pieces, the legs, wings, and, in the case of the larger birds, heads, being left. A trio which used to feed on the cleared ground in front of our hut on Solomon Islands, partitioned their prey in the most polite manner imaginable. Number one would take the bird, say a Dove Petrel, in its bill, getting a good firm grip, and then hold it towards number two, who would pull off and swallow its head. Number three would then pull off a wing, and then perhaps number two would hold it while number one had a mouthful. In this way the food was equally divided, and I several times saw one of them give another a mouthful from a piece, the whole of which it might easily have swallowed had it wished to do so. Of Dove Petrels, the head is usually swallowed, but of Whale-birds, the head is left, no doubt on account of the large broad bill. On Cundy I found no remains of Mutton-birds which had been eaten by Skuas, yet on Woman Island,



Plate XXXIX. SOUTHERN SKUA
Settled bird (left) greeting its newly arrived mate.

two miles away, these shearwaters seemed to form the Skuas' chief article of diet, for their remains were everywhere along the steep slope where the Skuas nested, and also inland, where, in one little clearing, we found fourteen fresh Mutton-bird skeletons lying together. On Snares Island a Skuas' midden contained remains of Mutton-birds, Prions, and Mottled Petrels—indeed it was these remains that enabled me to record the last named as a breeding species on the Snares. On Auckland Islands the Skuas showed a special liking for White-headed Petrels, as large patches of white feathers scattered on the hillside clearly indicated. Mutton-birds were also taken, but I found no remains of White-chinned Petrel, although there was a large colony of these birds underground; and I think that the case recorded by Waite* was exceptional. The Mottled and the White-headed Petrels may suffer more than their relatives of equal size because of their light-coloured plumage, which makes them more conspicuous, in the dark, when they come ashore; or it may be that they are more gentle birds, as they are certainly softer in the feather, than the Mutton-birds, and so fall an easier prey.

Yet, as already recorded, Skuas frequently do kill Mutton-birds, and I once saw one in the act. I had been wakened by the wild yelling of the Mutton-birds as they prepared to leave our island for the day, and I went outside the hut to watch their departure. In the grey dawn I marked them flying down from the higher parts of the island and pouring from the cliffs above the sea. Presently my attention was attracted by a movement near by, and there was a Skua, within five yards of me, pecking viciously at a Mutton-bird which was fluttering at its feet. I drove the Skua off, and picked up the Mutton-bird which was still alive, but had a nasty wound over one ear, and it died shortly after. The Skua had evidently waited at the mouth of the Mutton-bird's burrow, and, when the occupant emerged, had attacked it and stunned it before it could escape.

Some insight into the Skuas' methods may be got from the following incidents:—On Woman Island, we had dug out a Storm Petrel's burrow to identify the species to which it belonged. Finding it to be the White-faced species which is common in those parts, we put the bird back, but it would not stay in the remnant of its burrow, and came out, trying to rise off the ground. This was sheer suicide, for there were several Skuas

* *The Sub-antarctic Islands of New Zealand.*

overhead, so I caught it and took it to a rocky bluff where there was a Skua's nest. Here I stood on the brink of a cliff a hundred feet high, and, when both the Skuas were looking the other way, I slipped the Storm Petrel over the edge. After the manner of its kind, it flew at a steep angle towards the water, and, as neither of the Skuas saw it, I was just congratulating myself on having got it safely away, when I saw another Skua start in pursuit from the top of a rocky islet some three hundred yards distant. Our Skuas also saw it, and, leaving his hen to look after the nest, the cock bird started off, flying first towards the other Skua, but when he discovered what it was after, he changed his course towards the Petrel. The two Skuas overtook the Storm Petrel a quarter of a mile out to sea, when it immediately flopped into the water. They also settled and swam towards it, but before they reached it, it rose and flew. They were heavier at getting off the water, and lost some ground, but soon caught it up again, when the same performance was repeated. After several repetitions of this performance they got so far out to sea that the little Petrel was lost to sight, and presently the Skuas returned, but whether with or without their prey, I do not know.

On Cundy one day as we were returning to the huts, a Diving Petrel was noticed under some fern by the side of the track. We picked it up, and since it appeared to be uninjured, we took it to the sixty-foot bank in front of the hut and let it go. Now Diving Petrels are small-winged and heavy, and when this bird flew straight down towards the water, it appeared to be going as fast as any bird could fly. As we watched it, there was a sudden rush of wings, and the cock Skua which had been flying unseen above us, dashed in pursuit. He caught the Diving Petrel in his bill before it could reach the water, and with a fine upward swoop, cleared the top of the island and sailed off to his nest.

On a rocky islet at the head of Port Ross, Auckland Islands, I was engaged one evening in identifying the Petrels which nested there. A pair of Skuas had reared one young bird to the age at which it could just fly, and the three of them sat within a few yards of us watching the proceedings. Presently a Diving Petrel flew out of one of the burrows I had disturbed, but before it had gone more than a few yards, the hen Skua had it, and, returning to the rocks, tossed it twice in the air to get it head first, and swallowed it, the whole performance taking about fifteen seconds.



Plate XL. SOUTHERN SKUA
A family party of three attacking intruders near their nest.
Solomon Island.

If, however, a Diving Petrel can reach the sea when pursued by a Skua, it will always escape by shutting its wings and diving straight under the water.

In September, 1930, through the kindness of Commodore Geoffrey Blake, D.S.O., I was on board H.M.S. "Dunedin" which was anchored in Foveaux Straits, awaiting high tide to go into Bluff. A flock of Black-backed Gulls had gathered astern and were feeding on scraps thrown overboard. I was throwing them some bits of meat, when a Skua came along, and most of the Gulls moved off. He took the first bit of meat I threw him, settling in the water to pick it up, but, just as I threw another bit, he started off, flying swift and low towards a flock of Black-backed Gulls that were sitting satiated on the water some hundred yards away. They rose at his approach, and he flew under them towards a few scattered birds further on. Whether they saw him or not I do not know, but they sat still. His course was going to take him some yards to the left of one, when suddenly he swerved to the right and fell upon it, grabbing it by the back of the neck. The Black-back was an adult bird, but though it fought for some time, and occasionally was above the Skua, as they rolled and flapped on the water, it was not long before the latter was victorious; the flapping ceased, and the Skua settled down to make a good meal. For a long time I watched them with a pair of field glasses, as they drifted away with the tide, the dead Gull floating on its back, and the Skua, swimming alongside, tearing the flesh off its breast.

Just one more instance, but a valuable one, for it shows the Skua to have a considerable amount of sense—of brains as well as brawn. One evening on Cundy, I set out by myself to watch the Petrels come in at dusk. I chose a place where I could sit in comfort with my back against a tree, in the middle of a colony of White-faced Storm Petrels. Behind me was thick bush; in front, two tall spreading olearias with bare trunks, and beyond them, ten yards away, the cliff edge. The sunset tints were beginning to fade out as I took up my position facing the west, and the silhouette of the tree trunks against the sky grew blacker and blacker as the light failed. The Mutton-birds came in, and went to their burrows, and then at last I heard a faint fluttering, and the first Storm Petrel arrived. As I watched it, there was a flapping of heavy wings and a Skua flew in under the trees, and, settling between me and the light, he walked towards me, until within six feet of me, he took up his stand on a slight

eminence; there he turned around to face the twilight, and, like me, await the arrival of Storm Petrels.

Here was an illuminating incident! Firstly, that a Skua should hunt when it was almost dark, and secondly, that he should be cute enough to take up so strategic a position in which to lie in wait for his prey. Unfortunately, when his eyes became accustomed to the gloom, he saw me, and, running to the edge of the cliff, he flew off into the night. But not before I had gained a new insight into his character, and marked a cunning in him that I had not previously suspected. I have since learned that Skuas hunt all night on these islands, working the more open places on the forest floor; they also cruise to and fro above the bush, being apparently able to see well enough in the dark to detect food on the ground below.

Skuas are very fond of eating other birds' eggs, and many writers have told of their depredations in Penguin and Mollymawk rookeries. On Cundy, any Mutton-bird eggs which were laid on the ground, instead of in the burrows, would, if sighted by a Skua, be immediately pounced upon and eaten, but no damage was done thereby, for the eggs would not have been incubated in any case. During the Mutton-birds' breeding season, Skuas and Black-backed Gulls may be seen all day sailing to and fro above the bush-covered islands in search of eggs. In the bush on Solomon Island I found the remains of a Black-back, which had evidently settled to feed, and had itself been attacked and eaten by Skuas.

The plumage of the Skua is exceptionally thick, especially about the head, neck and breast, where the feathers form a resilient coating that would give very good protection in its battles with other birds. Its skin, too, is unusually tough for a bird's skin, and so would be less liable to be torn in a fight.

It might be assumed that young birds, unable to fly, would have no defence against Skuas, but this is not wholly the case. The young of some of the Petrels—the Albatrosses, Mollymawks, Nellies, and some of the smaller species—always have in their stomachs some ounces of oil, and this they are able to squirt out of their mouths or through their nostrils to a distance of some feet, and with considerable accuracy. A friend of mine who spent some years on the Campbell Islands, told me that, at any time after the young Albatrosses were a bit more than half-grown, their parents would sometimes leave them alone. If a Skua came

along, the young Albatross would continuously face it as it approached, feinting towards it with its head and making a short hissing noise as it did so. My friend assured me that, under these circumstances the Skuas were very loth to attack, having evidently a dread of the results of being squirted with oil. How well founded is that dread, we did not know, until oil-tankers began cleaning out their tanks near coasts, and we saw the devastating effects which the ensuing scum of oil on the surface of the sea had on any bird which came in contact with it. There seems to be no doubt that the Skuas know that certain young birds have the ability to squirt oil, and treat them with respect accordingly.

On a rocky point on the east side of Cundy, that is, remote from the Skuas' nests, a pair of Black-backed Gulls took up their abode towards the end of November, with the evident intention of nesting there. At first the Skuas, when they passed that way, seemed inclined to dispute the Gulls' right to the sole possession of that area, but after a few days they accepted the Gulls' claim, and thereafter any Skua that came too near was pursued and driven off.

So far as one can see, Skuas have no effective enemy save man, but although common enough in the somewhat remote parts they have chosen to inhabit, they are not in vast numbers such as one meets among the Penguins, for instance. Yet, save on the Campbell Islands, Ruapuke Island in Foveaux Straits, and the Chathams, on all of which there are sheep, man does little to reduce their numbers. Whatever the causes that prevent their increase, however, there is no apparent reason for believing that their present numbers will not be maintained.

What, then, is the estimate we are to form of the Skua? He kills considerable numbers of other birds it is true, and with a ruthlessness that makes the killing appear as nothing short of cold-blooded murder. But he only kills to provide for himself and his family, and who shall deny the justice of that? Against this may be set his fine courage in the defence of his nest and young; and his appearance, which is everything it ought to be, as he sails to and fro along a cliff-top, riding a gale on motionless wings, or stands on his rocky lookout, a bold buccaneer among birds if ever there was one.

CHAPTER IX

MOTTLED PETREL

Pterodroma inexpectata

OF the great bird families of the world there is none that is more interesting than the Petrels. Ranging in size as its members do, from the tiny Storm Petrels (the smallest of all web-footed birds, being not as big as a common Blackbird) to the lordly Albatross with the greatest wing spread of any bird, they have been associated with myths and superstitions for ages. Essentially they are birds of the open sea, many of them spending months on end without even touching, or possibly without ever being in sight of land. Indeed, most of them seem to have an objection to alighting on land, and only do so for the purpose of nesting, and even then they come ashore after dusk, and, with the exception of birds which are incubating, leave before dawn.

Petrels are poor walkers. Indeed, with the exception of the Albatrosses and Nellies, most members of the family find it difficult, if not quite impossible, to stand up on their feet in the same way that a Gull does. When on land, therefore, they rest with their bodies on the ground, and, when they wish to walk about, do so with a curious unsteady gait, with the shoulders high and the head and neck stretched forward and slightly downwards. The postures in which stuffed Petrels are shown in museums—standing upright, or even on one foot, with the other held daintily up to the breast—are purely fanciful, and not at all in accord with nature. Their only justification is that they show the whole plumage of the bird.

For the most part they nest on islands, the Albatrosses, Nellies and a few of the smaller species nesting on the surface of the ground; a few nest on ledges on cliffs; but the great majority nest in burrows which they dig in the ground. Generally speaking, the ones which nest in burrows are nocturnal in their land habits, coming ashore after dusk, and leaving before daylight, spending the day out at sea, in some cases at great distances (a hundred miles or more) from the land. When the young are

hatched, they are helpless little balls of fluff, and, as the parents both leave the burrow during the daytime after the chick is a few days old, the latter fall ready victims to any carnivorous animals which care to go into the burrows after them. In those countries where such animals were indigenous, the Petrels which inhabited the surrounding seas nested on small outlying islands from which their predacious enemies were absent, but where there were no such enemies the birds bred on quite large islands. To-day most of such islands are inhabited by Europeans, who have almost invariably brought rats and cats with them. Now these alone are sufficiently bad as enemies so far as young Petrels are concerned, but, for the advancement of his own interests, man has also introduced various members of the *Mustelidæ*—stoats, mongoose, ferrets, and weasels—and these rapacious beasts have, on the islands to which they had access, practically exterminated most of the Petrels.

The two main islands of New Zealand are a case in point. Prior to the arrival of Europeans, there were but two mammals in the land, the Maori rat and dog. At that time many species of Petrel nested in different parts of the country, but the introduction of Norwegian and black rats, cats, stoats, weasels, ferrets, and hedgehogs, has had such an effect that to-day only a few species, and those greatly reduced in numbers, return to the ancestral breeding grounds. One of the worst features of the case is that, owing to the similarity in appearance of different species of Petrels, and also to the fact that the one trivial name "Mutton-bird" was applied indiscriminately to a number of different kinds, records concerning them are most unreliable, and to-day the opportunity of obtaining authentic information is, in many instances, gone and, in others, fast going.

From what trustworthy records we have, however, it would appear that the Mottled Petrel—the "Rainbird," or "Laughing Jackass" of the early colonists—was one of the most numerous, and certainly the most widely distributed. It nested sparingly in all the mountainous parts of the South Island and throughout much of the hill-country, though, so far as I know, there were no localities where it was sufficiently numerous to be sought by the Maoris as an article of food. In the North Island, however, it was especially plentiful in certain parts of the Kaimanawa and Ruahine Ranges, and at Ruapehu and Tongariro, and there the

Maoris collected it, together with another—a dark plumaged species—for food. Its call is a high-pitched “Ti-ti-ti” rapidly and continuously repeated, when the bird is in flight; but it will sometimes make the same call when disturbed in its burrow by persons stamping on the ground overhead. Another call is a deep resonant bugle note of two syllables “Goo-oo,” which the bird makes in flight as a rule, though occasionally when on the ground, but never until very late at night. As is the case with most Petrels, the Rainbird is most noisy on dark rainy or misty nights, and thirty years ago, on such a night, at any time from December until the end of April, it could be heard calling “Ti-ti-ti” in almost any of the bush-clad valleys among the foothills of Canterbury. I have heard it in the Malvern Hills, at Lake Coleridge and up the Waiau River above Culverden. It was plentiful in the hills behind Timaru, being especially so in the neighbourhood of Burke’s Pass. Mr. T. A. Phillips told me that in the ’seventies he was camped one rainy night in a little valley inland from Moeraki, and the air seemed to be full of these birds and their cries. From the Spencer Mountains numerous specimens were obtained, so the bird was evidently breeding there in quantity, while until recent years it could be heard at the heads of most of the valleys on Bank’s Peninsula.

In 1891 Percy Seymour reported that he had found a breeding colony in Preservation Inlet; but apart from this, widely distributed though the bird was in the South Island, I have heard of only one nest being found there, and that was in the hills near Akaroa. I spent a long time unsuccessfully searching for them in localities where I had been told the bird was to be heard, or where I had heard it myself, yet, though I saw birds in flight on one or two occasions, I never found anything that indicated that I was near a nest.

In the early years of this century, say up to 1907, these Petrels used to fly inland up the Rakaia River in considerable numbers during the summer months. At about sunset they could be seen flying around out at sea, coming closer inshore as the light failed. At first they sailed to and fro low over the waves, but presently, one after another they would fly direct towards the land, rising as they came, until they reached the shore-line at an altitude of a hundred feet or more. Flapping their wings continuously, they flew inland over the river-bed, rising until they were perhaps three or four hundred feet in the air, at which altitude they

would continue until out of sight. Their flight was rapid and sinuously direct, the bird tilting its body slightly, first to one side, and then to the other, but not sailing on set wings as it does over the sea.

One night I was fishing where the Acheron Stream runs into the Rakaia about fifty miles up from the sea. A hard nor'-wester was blowing straight downstream, and in the gathering dusk I saw a Rainbird flying straight towards me. It passed overhead at a great speed, and for a moment or two I watched it, driving straight into the wind without any apparent extra effort, and then it was lost in the gloom. A few days later I was told that one had been heard twenty-five miles further inland up the Wilberforce River, where it was still heading back towards the Divide.

Why some Rainbirds should make these long journeys inland to nesting sites that are no different from similar sites nearer the coasts is a thing we shall never know for certain, but the theory is put forward that in doing so they are following the course steered by their ancestors, when the mountains in which they now nest were only islands in the sea; that the land subsequently rose, the islands having their bases elevated clear of the water and so becoming a mountain chain, from the foot of which a further building up of the land thrust the sea back for forty miles or more. And still, through all these countless ages, year after year, the birds returned to the nesting grounds of their immediate forebears, until man interfering, introduced bloodthirsty vermin which in less than half a century have almost—indeed in most localities have completely—exterminated them.

My friend Major Robert A. Wilson, of Bulls, with whom I have made many trips in search of birds, had several times seen nesting burrows of Petrels in the Kaimanawas, and heard the birds flying about at night when camped there. In 1930 he began making enquiries, on my behalf, of residents in these districts, but could not hear of any place where the birds were then to be found. By an old Maori he was told of a gully on the slopes of Mount Ruapehu which had been a favourite nesting ground, Mutton-birds having been taken thence only a few years previously. "But," said the native, "I tink te whistle* got him. He all gone now." Wilson went to the locality, however, in 1931, and even found bird burrows there, but not ones that looked as though they had been used that season; and he did not hear a single bird calling. It is twenty years

* Weasel.

since I have heard one in Canterbury, and although an odd specimen has been found inland during that time, these may have been merely storm-driven birds.

On islands lying off the mainland, however, particularly those near Stewart Island,* the bird is still plentiful, and there I found it nesting in 1929 and again in 1931. On Cundy Island it was not by any means common, but on Solomon and Big South Cape Islands to the south it was in great numbers. We were landed on Solomon Island on November 10th, and stayed until December 14th, having permission to occupy Mr. W. Leader's excellent huts during our stay. We took with us two acetylene lamps, with 10-inch reflectors, which threw a good beam of light for a distance of one hundred and fifty yards, and these we found most useful in identifying Petrels when they were flying about at night. Late on the night of our arrival, we heard many Mottled Petrels calling as they flew above the highest part of our island, and two nights later when we tried our flares on them, we saw numbers of them wheeling about, mostly in pairs, the two birds of which kept close together as they circled about above the trees, giving their "Ti-ti-ti-ti" call at frequent intervals. At this time the birds were evidently mating, for most of them flew about all night, only a small percentage settling on the ground at all. On the night of November 17th we took our flares and went to the north-east corner of the island and stayed there until 11.30 p.m. shining the lights on all passing birds. Mostly flying very high, Mottled Petrels were plentiful; indeed their numbers may be gauged by the fact that we often saw eight or ten of them cross the face of the moon in a minute.

By November 20th most of them were cleaning out their burrows preparatory to nest building, and at this time the two birds often stayed in the burrow all day. They come ashore late at night and leave early in the morning. The Mutton-birds began to arrive in the evening at ten minutes past eight on November 10th, and began to leave again before 3 a.m. when the dawn was just breaking. The Mottled Petrels did not begin to circle over the island until half past nine at night; the earliest that we knew one to settle was at 10.15; and at 2.30 a.m. they had either left the

* This is the bird that Guthrie-Smith pictures as "Dawson's Petrel" and refers to as "possibly Cook's Petrel." Oliver thought the picture represented the White-headed Petrel; but that species is at most only a rare visitor to Stewart Island, except in the winter.



Plate XLIII. NEST OF MOTTLED PETREL

The burrow entered the bank on the right, but turned sharply, and the nest was near the surface. Big South Cape Island.



Plate XLIV. MOTTLED PETREL ON NEST
Big South Cape Island.

island again, or gone into their burrows for the day. It is to be noted that there is a great difference between the time of arrival on land here, and the time the birds used to arrive on the mainland. It may be that this is in order to lessen the chance of capture by Skuas, but, if so, it seems to have failed of its object. On December 2nd I found a broken fresh egg of this Petrel which had been laid on the surface on Big South Cape Island, and the next day we got another from a burrow. The top of this island is undulating, varying in altitude from 500 to 800 feet or more. Bleak and windswept, it is sparsely covered with a stunted growth of manuka and *dracophyllum*. Almost all around the island, the sides fall at a steep angle from this plateau to the sea, and are heavily covered with bush, of which the greater proportion is composed of rata, tupari and titi-a-weka, though in the more sheltered valleys there is a much more varied growth, including rimu. Mottled Petrels nested in numbers on Big South Cape, where they were sparingly distributed over the Petrel area generally. In various places at altitudes from two hundred feet above sea-level upwards, they formed colonies where their burrows would be perhaps one to every three of Mutton-birds. Higher up they were more prevalent, and just below the edge of the plateau, where the fringe of the bush was chiefly composed of rata, they were the predominant species. Right out on the plateau, wherever there was a big flax bush, or where a steep bank gave shelter and a foothold to a more luxuriant growth of scrub than the open ground, there were little colonies composed almost entirely of these birds, for only an odd Mutton-bird nested here. If a Mottled Petrel was released during the day on this plateau, it did not fly as close to the ground as a Mutton-bird would do, and it continued to fly at a considerable elevation even after it got over the sea. We let several go when there were Skuas flying in the vicinity, but always when the latter were so placed that the Petrel could get well on the wing before it would be pursued. Although the Skuas invariably went in pursuit, sometimes following their quarry for perhaps a third of a mile, they did not catch any one of the birds we had released, so that it seems that Mottled Petrels, granted that they are not caught at a disadvantage, can evade a Skua in the air.

The burrows of the Mottled Petrel are, on the average, slightly smaller than those of the Mutton-bird, and are about six inches wide by four or five high, the floor being almost flat. They vary considerably in length,

some being not more than two and a half feet long, though most would be from three to four feet, while others are much longer. If the bird burrows into a steep bank, it usually goes in a foot or so and then turns sharp right or left, the nest in some such cases being not more than a few inches from the surface. The accompanying photograph shows one of these. The tunnel ends in an enlarged chamber in which the nest is placed, and this is often very well made—quite the neatest Petrel nests I have seen—a quantity of fine grass and small leaves being used to make a deep cup-shaped structure which fills the floor of nest chamber. Sometimes, however, the nest is very slight, the egg being laid on the bare peat with only a few twigs or leaves around it.

Apparently Mottled Petrels behave in the usual Petrel manner when nesting; working only at night, and going to sea during the day. They clean out their burrow, or dig a new one if necessary, the working bird digging with its beak, and then, resting on its breast, throwing the loosened material out of the burrow with its feet. When the excavation is finished, both birds stay in the burrow for a period of some days; then the hen is left alone until she lays the single egg, which is usually within the next day or so. This procedure is varied, however, as occasionally one finds a pair in the nest with an egg, and sometimes both birds leave the burrow for a day or so after the nest is completed, and before the egg is laid.

When a stick is thrust into the burrow the sitting bird gives a loud double hiss, and then often "Ti-ti-ti," and, when handled, the trumpet call they make at night, only harsher. They peck hard, always biting with the end of the bill, so that its sharp, curved point sticks into one's hand. They usually draw blood, but are not nearly so vicious as Mutton-birds. Both birds sit, no doubt taking turns for two or three days at a time. The mate of the sitting bird will often come ashore for the night, and one of them will then spend the time at or near the entrance to the burrow. I have not, however, often found them asleep under these circumstances, but that may be because they are light sleepers, and my approach had wakened them before I shone my light on them. The chicks which I saw on the Snares were covered with dark grey down, and are able to fly by the first week in May. On the islets off Stewart Island, they are not to any extent used for curing as "Mutton-birds," but the Maoris during the "birding" season often take enough young "Korori,"



Plate XLV. SKUA'S SLAUGHTER YARD
Big South Cape Island. Showing remains of over one hundred and fifty
Mottled Petrels.

as they call them, for a feed. During the daytime the parents evidently go well out to sea, for, excepting at night, we never saw one, even when howling westerly gales drove Mutton-birds, Cape Pigeons, Diving Petrels, Whale-birds, Nellies and even Mollymawks into the shelter of the islands to feed.

During the winter, Mottled Petrels migrate to the Northern Hemisphere where, according to Bent, they have been recorded from the Aleutian Islands (Kiska Island) and from Alaska (Kodiak Island and Sitka). There is also one record of it from New York State, though that is the only known occurrence of it in the North Atlantic.

The number of Mottled Petrels that are killed by Skuas is enormous. Apart from the dead bodies of these birds which one always finds in the vicinity of Skuas' nests (that is, of course, if Mottled Petrels occur in the locality), one finds veritable "slaughter yards" on the islands, where the ground is positively littered with the carcasses of Skuas' victims. On Big South Cape, one such killing ground was a flat, clear area in front of one of the Mutton-birds' huts, and here, at the time the accompanying photograph was taken, there were over one hundred and fifty skeletons, all of Mottled Petrels, while in the next half mile along the track I counted two hundred more. In these skeletons, the head is left intact with the feathers on it, and the wings from the elbow outwards are untouched; but all the rest is eaten, the bones being picked absolutely clean. On Solomon Island there were three main killing grounds, each having the remains of sixty to eighty Mottled Petrels lying about by the first week of December. The Skuas catch them, almost without exception I believe, on the ground, despite the fact that this Petrel rises readily into the air, requiring no preliminary "run" to launch itself, as do so many of the group. Selecting spots where they know that Mottled Petrels are numerous, the Skuas arrive at night—from ten o'clock to midnight—and await the coming of their victims, which they attack and kill on the spot. On Solomon Island, the "slaughter yards" were all under heavy scrub, so it is obvious that the Skuas are able to see well, even in black darkness.

Accustomed as I am to regard the killing of one animal by another as merely a part of the great scheme of Nature, I confess that I was never able to view these "slaughter yards" without a feeling of revulsion, accompanied by indignant animosity against the Skuas. Mottled Petrels

are such beautiful birds, that it seemed all wrong to find them destroyed in numbers like this, only their bedraggled remains and scattered plumage left to make a mute and pitiful protest against the ferocity of their persecutors.

On all of the islands to the south of Bluff—on Stewart Island and its outlying islands, Snares, Auckland, Chatham and Bounty Islands (and I should say also Campbell Island although I know of no specimen recorded thence)—the Mottled Petrel is persecuted in this way by Skuas, and to-day, having been driven off the mainland by vermin, it has no other nesting places save possibly a few islands north of the Skuas' limit, and it has not been recorded from any of these. It might be suggested, therefore, that in the past the ravages of the Skuas to the south were made up by Mottled Petrels from the north, and that now that Skuas cover the whole of its breeding grounds they will seriously reduce its numbers. I think it very probable, however, that the Mottled Petrels which inhabited the mainland were local races, and that the southern races have in the past held their own unaided against the Skuas. If that is indeed the case, there is no reason to expect that the Mottled Petrel will not maintain its present numbers.

CHAPTER X

BANDED DOTTEREL

Charadrius bicinctus

THE Banded Dotterel is the most plentiful of all the Plover that breed with us, being found commonly throughout the South Island in suitable localities, and also, but more sparingly, in the North. "Suitable" localities from a Dotterel's standpoint are areas covered with very short vegetation, or, better still, with no vegetation at all. Such places as shingle river-beds, the shores of both lake and sea, and more or less level patches in "tussock" country are favourite resorts; as also is newly ploughed land, provided it is flat.

Their call at all seasons is a staccato, high-pitched "Pit," sometimes repeated twice quickly, but often uttered as a single syllable at intervals up to thirty seconds, though much more rapidly when in flight than when on the ground. If a bird is standing still, it gives its head and body a little upward jerk every time it calls, the effect being exactly as though it had an attack of hiccoughs.

The breeding season commences early. I have found young Dotterel during the last week of August, though this is unusual, but by the second week of September, most of the birds are building, and quite a number will be already sitting. The nest is a very simple construction, yet wonderfully well adapted to the bird's needs. It consists of a little hole about three inches across by two deep, scraped in the ground and filled almost to the brim with small pieces of moss, grass, wood or seaweed.

I found a nest once in a ploughed paddock, where the hollow had been made in the top of a freshly turned furrow, and filled with wheat husks—a whole handful of them and nothing else. The eggs when laid are buried in the "lining" of the nest, being always about half covered, and sometimes almost completely so, the top of the eggs being only slightly below the level of the surrounding ground. The result is one of the most inconspicuous nests that I know of. Three is the number of a full clutch of eggs, sometimes two, but never, in my experience, four.

Both sexes take part in incubating the eggs, and, although as a rule, the unoccupied bird feeds within a quarter of a mile of the nest, it sometimes goes much greater distances, and stays away for two or three hours at a time. If a man approaches the nest, the feeding bird flies towards him, "pitting" loudly, circles around his head perhaps once or twice and then settles on some slight elevation, or on very open ground where it can obtain a good view. Its mate remains on the nest, every now and then raising its head to see what is happening. As a rule the bird continues to sit until the intruder is within about one hundred and fifty yards, when it slips off the nest, and, crouching low, runs swiftly away for some little distance before it rises in the air and wheels back to join its mate. Dotterels never swoop at intruders; even in the case of a Harrier, they content themselves with flying in circles around it, as it sails along; and it is rarely that they "sham" in order to lure people away from their nests; but if a person should follow them, they will run away from the direction of their nests until they have got him to a safe distance, say two hundred yards, when the sitting bird will "fly away home" while its mate keeps an eye on him.

The young when hatched are covered with thick short down, the upper parts a golden brown speckled with black, the under parts creamy yellow, the tiny wings having the down longer, and white on its after edges. They leave the nest within a day of hatching and accompany their parents in search of food, but at the slightest sign of danger the watchful old birds give the alarm, and the chicks scatter, run a few feet, and squat, their legs doubled up underneath them, and their head and neck stretched straight out in front, and pressed tight to the ground. They remain thus, motionless, and, harmonising as they do to an amazing degree with their surroundings, are very difficult to detect. When so posed, they will allow themselves to be caught, and I have often touched them, and sometimes even moved them slightly with my finger, and they have made no attempt to run away. Yet when they do run, they are extraordinarily fast for their size, and if pursued, spread their little wings to give them better balance, and dodge with much skill.

We were in a car on the Lake Ellesmere flats one day when we overtook a half-grown Dotterel, which ran ahead of us. Wishing to catch it we followed it, and it ran ahead of the car for over a quarter of a mile at the rate of six miles an hour. I had thought to tire it thus and



Plate XLVI. BANDED DOTTEREL.
Adult male in full breeding plumage. Waimakariri River-bed.

make its capture easy, yet when I jumped out of the car, it gave me a great chase before I caught it. Having examined it, I let it go, when it ran off in the direction whence it had come.

Young Dotterel take readily to the water, and are good swimmers, using their legs rapidly and carrying their head and neck upright with a comical self-possessed air. They grow fast, and are fully fledged in about six weeks from hatching. When feeding, the young do not cluster round the parents as do chicks around a hen, but separate, each trotting along by itself, and each, to a large extent, finding its own food. They are very independent, and when only a week or so old, the members of a family may easily be separated from one another by forty or fifty yards, the old birds being near by and supervising the proceedings. Until they begin to get their feathers, the young ones, on cold days, gather together at intervals and are brooded by the parents for a while.

If a Banded Dotterel loses its eggs or young, it will start another nest forthwith: in the case of the former loss, within a week, making the new nest at no great distance from the old one. I think it is probable that nests with eggs, which are to be found occasionally as late as the end of December, are attributable to the loss of earlier broods, and not to second broods when the first has been successfully reared; though some of these nests are possibly those of birds which were late in returning from Australia.

For some little time after the young are able to fly, they keep with their parents in the vicinity of the nesting site, but soon the family joins with others to form flocks near good feeding grounds, of which, as typical examples in Canterbury, one may name the shores of Lake Ellesmere, and the poor grass lands on the banks of the Waimakariri River. At Lake Ellesmere, during the first four months of the year one can see scattered flocks of Dotterels numbering thousands of birds, associated with Stilts, Black-billed Gulls, and the migratory Plover; while up the Waimakariri flocks of several hundreds of individuals feed on the dry grass lands bordering the river, making periodical visits to the stream for a drink or bath. During hot weather the birds usually stop feeding about midday, and, gathering together, have a rest and a doze.

Their food consists chiefly of flies, grubs and insects; of aquatic larvæ which they get by wading in the shallow water at the edges of streams

and pools; and of wire-worms and caterpillars which they get on ploughed land.

In the back-country of Canterbury there are many old river flats, where the shingle has been covered with a carpet of mosses, lichens and cushion plants, sparsely interspersed with tussock. During the hot summer months these places are parched and dry beyond belief, the sun strikes mercilessly on them so that the heated air from their scorched surfaces rises in shimmering waves. Most unlikely places, one would say, to find Banded Dotterel, yet strangely enough these birds are to be found there in numbers, even in January and February; and stranger still, their food consists chiefly of the fruits of two plants of mat-like growth—*Coprosma petrei* and *Muhlenbeckia axillaris*—the coloured berries of which contain hard seeds. Although Dotterel possess quite well-developed gizzards, they apparently assimilate only the fleshy part of these berries, the seeds passing through them unchanged.

Towards the end of January, a few Dotterel begin to migrate; the main departure takes place in April, and by the beginning of May, most of them have gone to their winter quarters—some to Australia, and some to the northern end of the North Island. Of the birds that inhabit the South Island during the summer, a small proportion—I should say less than ten per cent—stay with us during the winter, when they feed, and particularly fly, in much closer formation than is the case during the autumn. In June and July and the first week of August, they may be seen flying in densely packed flocks, wheeling, rising, falling, or sweeping swift and low along the ground, always in unison as if at the dictates of a leader, now with their white breasts flashing in the sunlight, anon almost invisible as they turn their backs to the observer. During these flights, for the most part they maintain a constant “pitting,” but sometimes, when at a height, they will swoop at a steep angle towards the ground, and then they fall silent, as if devoting every ounce of their strength to the attainment of speed. Close along the ground they will travel for a short distance, and then, all unexpectedly, settle, each bird standing still for a few seconds with head raised, as if in a state of suppressed excitement.

Towards the end of July the winter residents are joined by the returning migrants, and the birds immediately begin to mate and shortly proceed to their nesting grounds.



Plate XLVII. BANDED DOTTEREL
"Little Mr. Dotterel." Waimakariri River-bed.

In the years previous to 1908 great numbers of Dotterel were being shot by market gunners during the last few days of July, when the migrants had returned, and the flocks still retained their close formation. On one occasion, a Springston gunner brought to the market half a wheat sack (say two bushels) of Banded Dotterel which he had obtained by "browning" flocks at the mouth of the Selwyn River; but in 1908 these birds were put in the "protected" list of New Zealand, and they have not been much shot in New Zealand since then.

During their mating season, and also to a lesser extent at other periods of the year, Dotterel have a style of flight that we call "cutting capers." Usually single birds, but sometimes two or three, will suddenly begin to fly at a great rate, steering a most erratic course, up and down, twisting, spiralling and diving at such speed that it is difficult to follow their evolutions with the eye. The whole performance lasts only for a few seconds, and covers a very small area, but it is a most amazing effort of flight. It is apparently indulged in for pure amusement.

The birds which leave New Zealand in the winter go to Australia, where they occur in the coastal regions of Queensland, New South Wales, Victoria, South and West Australia. I am indebted to Dr. Morgan of Adelaide for obtaining for me notes on the birds while there. These show that Banded Dotterel appear along the southern coast of Australia early in March, and by the end of that month numbers are sometimes seen. They are most numerous in May, June and the earlier part of July, but smaller flocks of them are still in the Outer Harbour, South Australia, as late as 23rd August. Perhaps the most interesting records are two by Mr. J. Sutton who noted a single bird there on 20th September, 1930; and another, which by its plumage could not have been the same bird, on 4th October of the same year. As the Banded Dotterel has not been recorded as breeding anywhere in Australia, nor indeed as spending the summer there, these birds would be late in nesting that year, or possibly not nest at all. That the migrating birds begin to leave New Zealand early in the summer is shown by specimens in the Natural History Museum, South Kensington, which were taken on Norfolk Island on 7th February, 1913. They have also been recorded on Lord Howe Island in February.

The route these migrants follow is most interesting, for apparently they all go *via* Auckland, Norfolk and Lord Howe Islands to South

Queensland and New South Wales, whence they work south along the coast to Victoria, Tasmania, South and West Australia. It is certain that very large numbers migrate, and so one is justified in assuming that, if the birds flew straight across from New Zealand to the southern portions of Australia, then, under certain circumstances, such as stress of weather, odd birds at least would seek shelter on passing ships. Mr. Price, Manager of the Union Steamship Company in Wellington, kindly made enquiries of the Captains of inter-colonial boats on my behalf, showing them specimens of the birds, and the result was negative—not one of the Captains had ever seen them when crossing the Tasman Sea. Although this evidence is far from conclusive, it yet goes to support the hypothesis that the Dotterel go north about to Australia; and this fits in with the theory that birds, when migrating over oceans, follow what were shore lines geologic ages ago, when that particular migration started. For geologists tell us that in Cretaceous times, and possibly even in Jurassic, there was a land connection between the north of New Zealand and the coasts of Queensland and New South Wales. The assumption is that along the shore of that land the ancestral Dotterel flew; that New Zealand became separated from Australia; and that, as the gap between the two countries gradually widened, the birds still followed their old route; though, as time went by they had to cover a greater and greater distance over the ocean, until to-day the gap is nearly twelve hundred miles. The only stopping places at which the birds could rest are Norfolk Island, which is four hundred and fifty miles from North Cape; or Lord Howe, which is eight hundred and twenty-five miles from the same spot, and three hundred and fifty miles from Australia. Banded Dotterel have been recorded in numbers from both these islands, but there is not sufficient evidence to prove that all of these migrants stop there en route to their winter quarters in Australia. Indeed, in the present state of our knowledge, it seems probable that many of the birds, though following this northern route, fly the whole distance of about thirteen hundred miles without a stop.

Banded Dotterel moult twice a year, beginning to lose their breeding dress in December. By the end of that month most of them have lost the two bands across the breast, and the black and white frontal bands, but are still moulting the wings and tail. By March 21st they have again begun to grow their red and black bands, and many of them are in full



Plate XLVIII. NEST OF BANDED DOTTEREL
Showing the eggs half buried in the lining. Waimakariri
River-bed.



Plate XLIX. BANDED DOTTEREL CHICK
"Squatting" on the moss and short growths of Waimakariri
River-bed.

nesting plumage again by the second week in May. From the notes supplied to me by Dr. Morgan, it would seem that the birds which leave New Zealand do not moult into their breeding plumage as early as those that stay with us for the winter. This may also be the case with the birds which migrate to the North Island, my dates having been taken from birds in Canterbury. The issue is complicated by the fact that the colours of the breeding dress vary very considerably in intensity in different individuals. As a rule, during the breeding season, it is easy to distinguish the cock bird from the hen, of a pair in the field, by the deep reddish brown of his breast band as compared with the pinkish red of hers; but I have frequently seen nesting cock birds in which the red band was very indistinct, while sometimes nesting hens have very little banding at all, either black or red. I do not doubt that these are young birds, and that the intensity of the colouring of the breast and head would increase each year, as the birds grew older. The red band in the hen bird is never so deep a colour as it is in an adult cock, nor is it ever quite as wide.

At his best the cock Banded Dotterel in his breeding dress is an exceedingly handsome bird, his appearance being equally striking whether on the ground or on the wing. I was fortunate in being able to get some very good pictures of just such a one. In October, 1927, I went up to the old Waimakariri river-bed beyond Harewood, taking my little son Roland with me, and together we looked for Dotterels' nests. We found several, and selecting one belonging to a well-marked pair of birds, I erected near by a screen of brushwood in which to hide the camera, and left it for three days for the birds to get used to it. When we went back after that interval, we found the eggs gone and the nest destroyed, probably by stoats or weasels. Two other nests near by were similarly treated, so I went to another area about half a mile distant and found a suitable nest there. It proved to be a most fortunate change, for the cock bird of this nest rapidly acquired a fearlessness of me and the camera that is very rare in this species, so that while we sat quietly behind the camera, he would run around us only a yard or so away.

As we got on better terms with him we called him "Little Mr. Dotterel," to simplify reference to him. One day I took up some little worms, and threw small pieces of them to him, but, although he would pick them up, he did not eat them. He got so tame that I was able to get

pictures of him within two feet of the lens, but at such close range it is very difficult to get the whole bird completely in focus, and after several days' work, I was still not satisfied with my side view of him. I had found that he sat on the nest from nine to eleven in the morning, so after breakfast the next day I took Roland and the camera up to the river-bed; and as there had been rain overnight, I also took a waterproof sheet on which to lie on the ground. On arrival I drove the car across country to within fifteen yards of the nest, and as we stepped out "Little Mr. Dotterel" rose off it and ran towards us, coming to within a few feet of the car. His mate was nowhere to be seen, but she had not become at all tame, and evidently fed on some ground at a considerable distance, for she used to arrive back at about eleven o'clock each morning. I had screwed my stand-camera on to a box in order to get it within a foot of the ground, and I now placed this outrageous contraption, with its brass-work glittering in the sunlight, within two feet of the nest. I used no screen whatever, but, spreading my ground sheet and placing my large leather camera case on it, I proceeded to focus. "Little Mr. Dotterel" ran around me the while, and when I was ready and was sitting still with the shutter cord in my hand, he took a final survey of the whole arrangement. He came close up to me, and trotted on to the ground sheet, his little feet pattering on the canvas like drops of rain, and then ran between my knees and the camera case, which were not eighteen inches apart. It was perfectly delightful to see him at such close quarters, and not in any way frightened. He took good stock of the whole outfit, pausing as he passed me, and cocking his head on one side to survey me with his beautiful large, dark eye. Then he ran straight to the nest and sat on it without passing over the area on which I had the camera focussed. There is to me something indescribably touching in having obtained the full confidence of a bird, a feeling of elation such as I find it difficult to put into words, and I had it that day, as this lovely little bird sat, all composed, on his nest within a yard of me and that glaring camera.

After he had been on the nest long enough to get the eggs thoroughly warmed up, I made him leave it in order to get the picture I wanted. Later on, when he was sitting on the eggs, his mate arrived and settled about twenty yards away. He immediately flew to her, and after a few moments together he told her to go to the nest. He did so by standing on the far side of her, and drawing himself up to his full height, so that his



Plate L. HEN BANDED DOTTEREL ON NEST
Note her poorly developed second band, and the typical situation for
nest.



Plate LI. "LITTLE MR. DOTTEREL"
Angry because Roland picked up an egg.

legs, body and neck were almost in one vertical line, at the same time spreading out his breast feathers, until he looked twice his normal size. This is the regular procedure with Dotterel, and I had seen cock birds do it many times before, as I lay waiting for a hen to go back to her nest; and always the order had been obeyed; but now this hen ran only a few steps in my direction and then stopped. After a pause, no doubt of incredulity that a hitherto perfectly obedient wife was not doing as she was ordered, "Little Mr. Dotterel" ran towards her with lowered head as though to attack her, but when almost touching her he stopped, and again reared himself up imperiously, and repeated his order. This perhaps was the best evidence I could have had of the completeness of his faith in me—that he should assure his mate that it was safe for her to go back to the nest. She would not do so however, and flew away in the direction from which she had recently come. He watched her until she was almost out of sight and then returned to the nest himself.

Up to this time I had never touched the eggs in this nest, and I thought I might be able to get "Little Mr. Dotterel" to display by doing so. I therefore placed Roland at the nest and focussed the camera on him. "Little Mr. Dotterel" was moving about close to the boy's feet, and I told Roland to bend down and pick up one of the eggs. He did so, and the plucky little bird ran up close to him, raising one wing and trailing the other. I exposed a plate and he then ran away a foot or so and lay down, feigning grave injury, and giving a plaintive cry; but before I could get another plate in he had got up again, and the egg was replaced. I waited for some little time, and then tried the same procedure again, but I could not get him to display a second time. He had seen the egg replaced once, and, though he no doubt disliked our interference, I think he believed that things would be all right in the end; and so we packed up and left him.

I saw him only once again, when I passed that way three days later. It was after midday, but he was on the nest, though at this hour I had expected his mate to be sitting. It may have been due to chance that she was not, but I had a harrowing doubt that, unintentionally, I had played him false—that I had been his undoing—for was I not responsible for his mate's disobedience of his command? A command, too, given so imperiously that disobedience in the slightest degree should have been visited with the most awful penalties; one might have expected some

cataclysm to overtake her and blot her out forthwith. Yet she had entirely disregarded it and escaped unscathed, and perhaps, profiting by experience, had turned the tables on him, and made him take a longer spell on the nest. It was with a sad sense of oppression that I left him.

The Banded Dotterel has undoubtedly increased in numbers in the years since shooting of it was prohibited. It takes kindly to arable areas as breeding grounds; it is too small to be much harried by the average pot-hunting gunner; and it is apparently able to more than hold its own against all the natural enemies that have been introduced up to the present; so that unless the future sees the introduction of some more potent enemy than those already here (which God forbid!), it should continue to thrive.



Plate LII. NEST AND EGGS OF WRYBILL
Rakaia Gorge.

CHAPTER XI

WRY-BILLED PLOVER

Anarhynchus frontalis

AMONG New Zealand's many bird curiosities, the Wry-billed Plover is often not included, but it certainly ought to be, for it is the only bird in the world which has its bill bent sideways. The Crossbills of the Northern Hemisphere might claim that they share in this distinction, but their bills are symmetrical, the upper mandible being bent one way, and the lower, the other. In the Wrybill, however, the bill, which is one and a quarter inches long, is bent to the right in the middle, the end being offset at an angle of 12° to the base. This is claimed to be an adaptation to its existence on the shingle river-beds of Canterbury, where it nests, the bent bill supposedly enabling it to get its food the more readily from under the stones. And no doubt it does this, when occasion demands, but there can be very few occasions when the peculiarity is of any decided benefit to its possessor, for over nearly all the river-beds on which the bird feeds, the stones are so much buried in sand as to make the bent bill quite unnecessary. Moreover, the bird spends less than half the year on shingle river-beds, living for the remaining months on mud-flats, and sea beaches, where its abnormality can be of no benefit. In those localities on the river-beds, where a diminishing stream leaves large shingle (stones, that is to say, of four or more inches in diameter, with very little sand in it), there the bent bill is of some use. In such situations I have seen a Wrybill peck under a stone on its left, and then turn around to get the same stone on its right, and peck under it again. It must be admitted, however, that I have often seen Banded Dotterel act similarly, and, I daresay, just as often as I have seen Wrybills do it, so that any advantage the Wrybill has would seem to be very slight. It has to be taken into account also, that while the bill, bent as it is to the right, gives the bird some advantage when feeding under stones on its right, this structure is a very distinct disadvantage to the bird when it wishes to feed on its left. A bill with an upward curve,

one would have thought, would have been of greater use. In most writings on the Wrybill, the greatest emphasis is laid on the importance of its peculiar bill, but, in my opinion, its coloration is far more important, for this harmonises so perfectly with that of the rounded stones among which it breeds that if the bird remains stationary (and it has a habit of doing so) it becomes exceedingly difficult to detect.

Wrybills leave the South Island for the winter, returning to Canterbury during August, and immediately take up their abode on the shingle river-beds. Very little is on record as to their summer distribution, and this is not surprising for the birds themselves are inconspicuous, and their haunts are not much frequented by man. One would expect to find them nesting on the Opihi and the Waitaki, though I have never heard of their doing so; and they may occur on the Awatere and the Wairau in Marlborough, but so far as my personal knowledge goes, the breeding grounds are confined to a limited number of rivers in Canterbury. I have seen them on the Rakaia River from its mouth up to where the Acheron flows in—say five miles above the Gorge; on the Waimakariri up to the Gorge Bridge; on the Hurunui River, below the Culverden Road; on the Waiau River above Waiau, and on the Rangitata River near the traffic bridge. I know that they frequent the Ashley, and I have been told that they were seen on the Clarence, though this latter record was not substantiated. It may be taken as reasonably certain that they breed on these rivers, wherever there are suitable and sufficiently large areas of bare shingle near water. Those are the two desiderata of the Wrybill for its nesting site: considerable areas of bare shingle, which must be situated near water. The great increase in the quantity of exotic plants in our river-beds has probably adversely affected the Wrybill more than any other species. Banded Dotterels, Oyster-catchers, Stilts, Terns and Gulls—all these have other nesting sites as well as bare shingle spits, but the Wrybill has none, so the introduction of the yellow lupin was a very serious thing for it.

Wrybills are in their full mating plumage when they return south, the black band across the chest being very conspicuous; the narrow white frontal band, with the brownish band behind it, not showing up at all save at very close range. The whole of the upper parts are blue-grey, but with age the feathers lose a certain amount of their blue tint, and also, particularly in the case of the scapulars, become much frayed at the



Plate LIII. WRYBILL APPROACHING NEST
Rakaia Gorge.

edges. It has been stated by some writers that the black chest band is wider on one side than the other, but this is not the case, either in fact or in appearance.

Mating commences as soon as the birds arrive in the south, and during the proceeding the birds are very active, chasing one another about in the air, and also on the ground, and occasionally actually coming to grips. Sometimes a pair may be getting along nicely with their courting, when another bird will arrive on the scene, and then the bird of the pair which is of the same sex as the stranger will proceed to drive it away, running after it, with neck outstretched, in and out among the stones, every now and then opening its wings slightly to help it maintain its balance. Occasionally two birds will run thus at top speed for twenty or thirty yards, their little legs going so fast as to be quite invisible. Later, when they are mated, the cock birds have the same habit as the cock Banded Dotterel, of ordering their mates about by running up to them, drawing themselves up to their full height, and puffing out their breast feathers. It is a very interesting thing that these two birds should have this same habit. It is possible that it is descended from a common ancestor away back in the family lineage; or perhaps only one of them used to do it, and the cock birds of the other species, constantly associated with them on the river-beds, saw how wonderfully it worked—noted with envy and admiration the meek and immediate submission of the hens, and their instant obeying of their orders—and decided that the gesture was well worth cultivation. At any rate both species have it; and what if the attitude should strike us humans as being a little over pompous; as showing, indeed, just a trifle too much self-satisfaction? It works far better in these bird families than our own efforts to ensure one head of each family—the much-discussed “and obey” of the marriage service.

Wrybills nest on high shingle spits, choosing a place where the stones are rather large, and clear of all growths and drift. A mere scratching in the sand, occasionally with a few small pebbles added around its edges, serves as a receptacle for the two eggs, which are wonderfully like the stones among which they are laid.

Both birds take their turn at incubation, and sit very close, so that they will often allow a person to pass within twenty yards of them without getting off the eggs. Owing to the remarkable similarity of their colouring

to that of their surroundings, Wrybills are easily passed when they keep still, and nests would certainly remain undetected if the birds did not move. But if the bird does get off the nest, and run towards an intruder (Wrybills do not fly around intruders in the same way that Banded Dotterel do), the latter has only to stand still for a few moments, when the bird will, as a rule, run straight back, and sit on its nest, even though it be in full view, and not fifteen yards away.

Laying commences about the middle of September and continues throughout October. I have found eggs in November, but I think it probable that they were second clutches, the first having been destroyed. The young when hatched are thickly covered with down, white on the breast and under parts, the whole of the upper surface being stone grey, faintly marked with smoky black. When they are hatched, and even as an embryo in the egg, they have the bend in the bill well defined. They leave the nest within a day of hatching, and follow their parents about in search of food. By the time the young are full grown, the old birds are moulting into their winter plumage, when they closely resemble the young—having no black chest band, and no frontal bands—and then old and young leave the river-beds. The earliest families have left by the end of December, and all of them have gone by the end of February. Sometimes they stay a while on the coastal lagoons, and I have several times seen them on the shores of Lake Ellesmere in January and February, but they are the first birds to go north, migrating nearly two months earlier than the main body of Dotterel and Stilts. They spend the winter on the sea coast of the North Island, frequenting the mouths of rivers, and the mud-flats of the big harbours of the far north. So far as my information goes, it would seem that they travel up the west coast of the North Island in greater numbers than they do up the east.

The young, as do those of the Banded Dotterel, take to the water readily, and swim well when only a day or two old. I had most convincing proof of their ability in 1924. In that year, most of the water of the Rakaia was flowing in the north branch of the river, and, half a mile above the mouth, the stream divided into about equal parts, encircling a considerable area of shingle. On this a pair of Wrybills nested during October. Early in November, there was a sudden and very heavy flood, which covered most of the river-bed. At this time I took the Hon. G. Anderson, then Minister of Marine, to the mouth of the river in connection with the



Plate LIV. WRYBILL ON NEST
Note curve in bill. Rakaia Mouth.

question of netting for salmon there. We crossed the lagoon and walked along the shingle ridge towards the mouth, and, when near the end of the spit, I saw a pair of Wrybills. I watched them for a time, and presently I saw a young one move. I took the Minister along, and stood him within a few feet of where the little bird had squatted and lay stretched out on the stones. I told him to find it, but this he failed to do, and I was not surprised, for, knowing as I did, what I was looking for, I could not but marvel at how hard it was to detect the bird. The most interesting question was, how had it got there? I have been quite frequently at the mouth of the river that year, and am sure that there was no Wrybill's nest closer to the sea than the one referred to above, and I personally have no doubt that the little chick we found on this shingle ridge had taken to the water when its island was submerged, and swam across the river and landed on the shingle ridge, having been carried down half a mile by the swift current. The chick was then about ten days old, so it was a remarkable performance. Its nest-mate was nowhere to be seen and had evidently been lost—most likely it had been washed out to sea.

Wrybills, as one approaches them, have a habit of remaining still among large stones, and they are then very hard to see. Sometimes, when I have been standing in one place, fishing for a while, I have seen a Wrybill trot away from the stones, say fifteen yards away, and realised that it had stood there since I had arrived, and passed unnoticed. When one of them does this, it is a sure sign that it has a nest not very far away on which its mate is sitting.

Once I was photographing a Wrybill's nest on which the hen bird was sitting, when at about 10 a.m. her mate arrived to take his turn at incubation. Owing to my presence, and the fact that the eggs were just hatching, the hen was unwilling to leave the nest, and when her mate came up to her, she stood up over the eggs, but did not go away. Unfortunately, I had just packed up my camera and was leaving when the cock bird returned, for I had the chance of a lifetime, when he stood right against her, drew himself up, and ordered her away. She flew off, but settled again close by, but her mate went up to her again, and ordered her off to the feeding grounds—a backwater some two hundred yards away. Obediently she went, and he, having watched to make sure that she was not going to stop, ran back to the nest. Before he sat on the eggs, however, he moved them with his bill, and, in doing so, saw, apparently

for the first time, the hole in one of them out of which the chick was trying to force its way. He turned the eggs again with his bill, yet made no movement to sit on them, but stood on the side of the nest with a most dejected expression. I do not know why he did this, but perhaps he was only a young bird, and, all unversed in family affairs, and with no previous experience to guide him, his sensations were much the same as those of a bachelor, left for the first time all alone with a crying baby. I put the camera up again and took a picture of him, and then left him, but I am afraid he was in for a wiggling when his mate returned!

Wrybills always display when their eggs or young are handled, running around with the wing near the intruder trailing on the ground, the other lifted in the air; the feathers of the rump are raised; the tail spread fanwise, and depressed so that the tip is almost on the ground; and the bird all the time makes a continuous purring noise.

Their normal call is a high-pitched staccato whistle resembling that of the Banded Dotterel, though it is rather more musical. The Wrybill does not, however, call nearly so frequently as the Dotterel, either when on the ground or in flight.

As to the Wrybills' chances of survival, one would say that they are good, at any rate on those rivers whose beds among the hills above the gorges are sufficiently wide to be to the bird's liking, for there the winter temperature seems to have prevented the yellow lupin from getting a foothold. But the open shingle must be a quarter of a mile wide before Wrybills would make their home on it. They were never numerous, and even thirty years ago I should think that two or three pairs to the square mile on the Rakaia was their maximum population, and, since the lupin has filled the river-bed, below the bridge, their numbers have certainly been much reduced. Their chief bird enemies are Harriers and Black-backed Gulls, yet the toll that both these take would not equal that of the stoats and weasels during the birds' breeding season. It is sincerely to be hoped that this most interesting little bird does survive, for, on its nesting ground, it exhibits in all its stages—adults, eggs, and young—the most amazingly perfect protective coloration that there is among New Zealand birds.



Plate LV. WRYBILL DISPLAYING IN ANGER AGAINST
INTRUDER



Plate LVI. NEAR NEST
Rakaia Mouth.

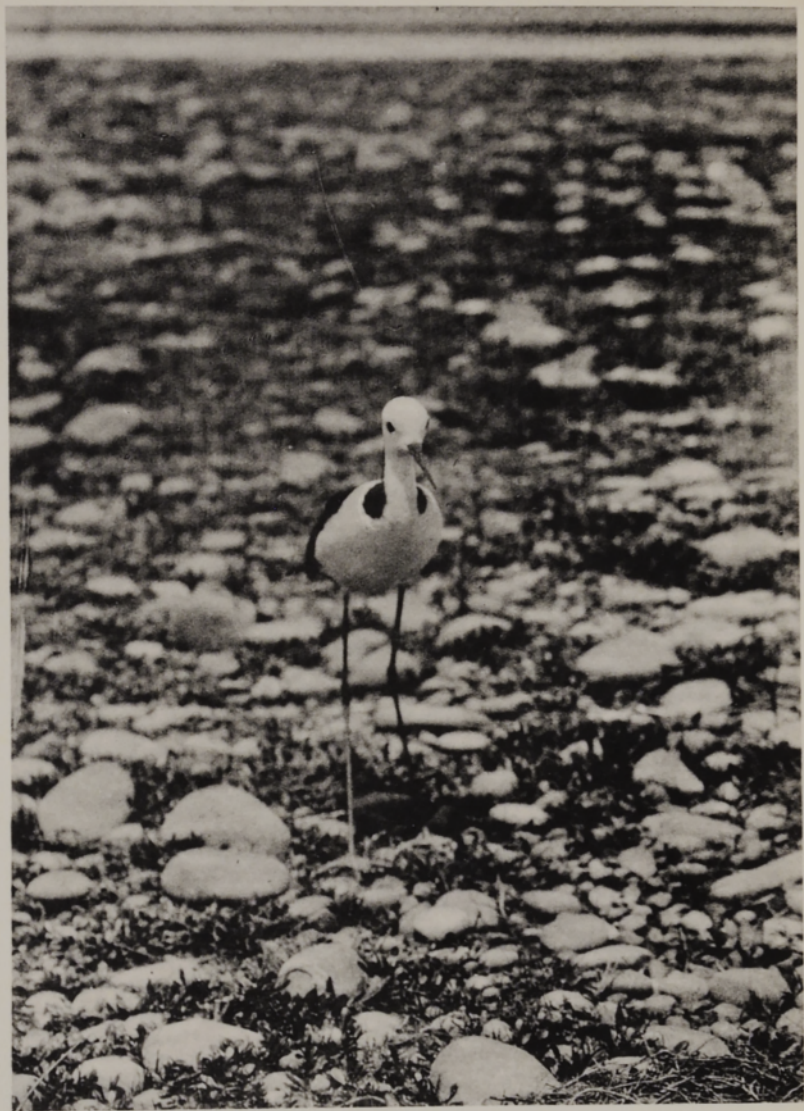


Plate LVII. PIED STILT
Note completely white front to neck. Lake Ellesmere.

CHAPTER XII

PIED STILT

Himantopus leucocephalus albus

AMONG the Plover which breed in New Zealand, the Pied Stilt is second in numbers only to the Banded Dotterel. It occurs on river-beds, the shores of lakes and lagoons, or on the marshy margins of estuaries. It breeds in all these places, the nest never being situated at any great distance from water. When the birds breed on shingle or stony ground, the nests exhibit a considerable variation in the amount of building material that they contain. Sometimes only a few twigs or rootlets are added to a shallow depression scraped among the stones—scarcely sufficient, indeed, to form a ring around the eggs which lie on the bare ground within; at other times, quite a lot of material is gathered and laid down, so that the eggs are supported on it. When the nest is placed in swamps, however, it is usually of much more solid construction, being composed of bits of grass, rushes or waterweed, together with tufts of the roots of swamp grasses; the whole being from four to six inches high, and having a shallow cavity in its apex for the eggs. Yet occasionally on wet ground I have found nests so skimpy that the eggs rested on the mud beneath, and were sometimes thickly daubed with it. Stilts are gregarious birds, even during the nesting season, and it is usual to find several nests together if the locality offers a sufficient food supply; while in very favourable situations I have seen colonies numbering a hundred pairs or more. Their food consists of insects and their larvæ, worms and small shellfish, which the birds obtain by wading, often knee deep in water. I once found a number of tiny "bullies" in the stomach of one from the Ashley River. Although the birds feed in water that may be six inches or more in depth, they do not often put their heads under the surface when picking up food.

Despite the fact that Stilts are of proportions that are somewhat unusual among birds, their movements at all times are exceedingly graceful. When walking slowly in shallow water, they raise each foot

above the surface as they proceed, putting it down again very daintily, the proceeding giving the effect of a consciously elegant, if not mincing, gait. During flight, which is strong and swift, the legs are trailed behind.

The call of the Stilt is a sharp yapping, not at all unlike that of a toy poodle. It affords an excellent illustration of the futility of trying to convey any impression of bird notes in writing. Some people render the call as "pink," though for the life of me I cannot see any rendition of "pink" that even faintly resembles a Stilt's note. I know of some who say that the Stilt calls "twilt," and that can certainly be enunciated so as to have something of the right sound; but to me, the impression that is conveyed by a Stilt is of a high-pitched yapping.

Stilts begin mating in August, and are very noisy at this time, yapping even in the intervals of their feeding. Where a flock of them is gathered together at this season, one constantly sees a bird make a sudden rush at a neighbour, which avoids contact by hopping into the air and flying a yard or so before landing. Sometimes the aggressor will fly in pursuit, when the object of its disapproval flies a swift, erratic course for a short distance, and the pursuer will soon desist and sail back to its starting point. At this time, too, single birds keep springing up into the air to a height of three or four feet, spreading their wings and parachuting down again.

The nests may be placed within a few yards of one another, and egg-laying commences in Canterbury as early as the third week of September. On September 20th, 1903, I found a colony of Stilts nesting on the shore of Lake Ellesmere. A few birds were sitting, but in most cases the nests had only one or two eggs in them, and incubation had not commenced; but among them was a pair of birds with two young which were able to fly quite well. This pair must have laid their eggs in July, though that is most unusual. Four is the full clutch of eggs, but often only three are laid, and in cases where the birds have lost two or more clutches by floods, or from any other causes, they will sit on only two eggs. On December 28th, 1902, I found such a nest in the Rakaia river-bed near the mouth, the eggs being slightly incubated. The manner in which a Stilt settles down on to its eggs is peculiar. When close to the nest it begins to bend its legs and lower its head. At the edge of the nest it pauses, and with little steps moves its feet up, one on either side of the nest, until they are opposite the centre; then, daintily resting the



Plate LVIII. PIED STILT
About to settle down on nest. Lake Ellesmere.

tip of its bill on the far edge of the nest to balance itself, it gently sinks down on to the eggs.

Stilts make a great fuss if anyone goes near their nest, flying to a height, and then dashing straight at the intruder, and giving a harsh cry as they pass close overhead and turn upwards again. Intimidation failing, they try to divert attention to themselves by simulating injury, shamming broken legs or wings in a most realistic manner. I have often watched one flying along, when suddenly it would give a loud cry of pain, and flutter to the ground in a lopsided manner as if one wing was broken. There it would flop along for a yard or so, and then lie down, flapping its wings and calling as if in agony. Perhaps it may stagger to its feet again, and then collapse with a drawn-out cry of anguish and a last faint flick of the wings, and lie still. For a few moments it will remain motionless, but the general effect is marred by the fact that it holds its head up a little, while it keeps a close watch on the intruder.

Dogs are, at first, completely deceived by Stilts' antics, and chase the birds with every expectation of catching them; and when at last they realise that they are not going to do so, the chase has taken them well away from the vicinity of the nest. Any Hawks or Black-backed Gulls which approach Stilts' nesting grounds are vigorously attacked, the Stilts swooping at them from above and behind. I once saw a Harrier flying against a heavy wind over a colony of Stilts, numbers of which were attacking it. They flew at it from a height, and, having passed screaming close over it, spread their wings to the wind and soared up, to turn back, and over, and swoop again. The effect was very curious, for it seemed as though the Hawk was proceeding with a Catherine-wheel of Stilts above its tail.

Years ago I was questioning a Scotch shepherd about the birds in his district and was trying to find out if there were any Stilts there. My description of them failed to enlighten him because of their similarity to Oyster-catchers with which he was familiar; but when I spoke of their shamming, light dawned on him. "I ken yon birds," he said. "They be gay prancin' beasts, twistin' themselves into all shapes and forrums."

The hen bird sits on the eggs for most of the time, but I have seen the cock bird take a turn at incubating. The young when hatched are covered with down, the upper parts being yellowish fawn, freely spotted with black, while the front of the neck and the under parts are

almost white, and devoid of any markings. These young walk about on their long thin legs with a very dainty air, yet giving also the impression of great self-assurance. Their call is a thin high-pitched "peep," always accompanied by an upward toss of the head; but I think they only call when excited or disturbed. When danger threatens they squat close to the ground, remaining motionless, and are then very difficult to detect, particularly if among stones; though they also have a wonderful faculty for hiding themselves in short grass with which their colour may not harmonise at all. They grow quickly, and at a fortnight old they are beginning to get their feathers. At this stage, too, they develop a swelling below their tarsal joints, which gives their legs the appearance of having calves. They can run very fast, and dodge well, so that they are quite difficult to catch. They can fly long before they are full grown—when their wings are still rounded at the tips and their tails are but half the length of those of an adult. At this time, too, they acquire a louder voice, their cry being a whistled "pip," high pitched and repeated at intervals. In a large colony of Stilts, it is inevitable that some young ones should sometimes stray away from the vicinity of their parents. They then wander about, obviously lost, and are pecked at and chided by all the adult birds that they pass. I once saw a young bird, not many days old, trotting along the water's edge where a number of adult birds were feeding. The poor little beggar had to fairly "run the gauntlet," receiving a peck aft from each old bird it passed, to hurry it on its way.

Twice when engaged in photographing Stilts I have seen a most peculiar happening. The birds suddenly ceased to take any interest in me or the camera, and all gathered close together, yapping continuously and excitedly. Many of them had their heads down as though examining something on the ground. The whole colony, some forty or fifty birds, was collected in an area of three or four square yards. Sitting birds left their nests, and parents neglected their young to join the throng, and add their voices to the excited babel. For a minute or two they continued thus, and then dispersed, each going about its own business again. What it was all about I do not know, for though I watched the birds through a pair of glasses during the performance, and examined the spot as soon as they had left it, I could find nothing to account for their behaviour. The second time on which I witnessed one of these assemblies was when I was photographing a young bird, and suddenly realised that the

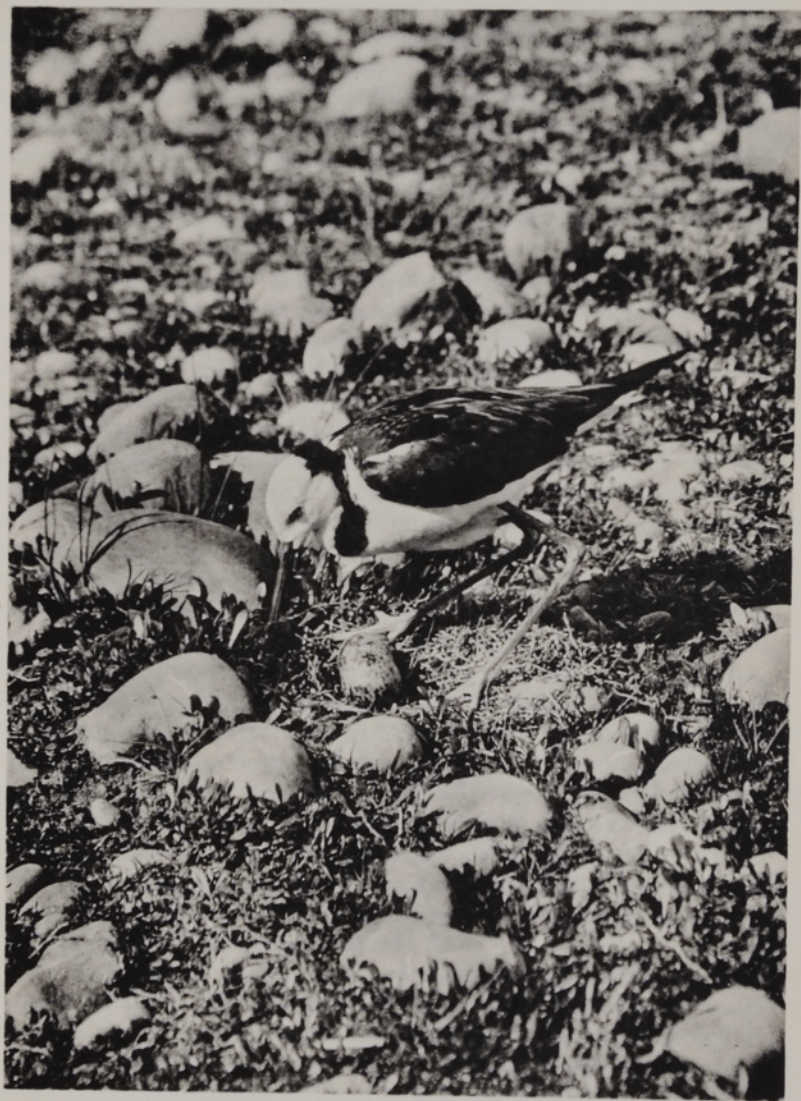


Plate LIX. PIED STILT

Steadying itself with its bill as it settles down on nest. Lake Ellesmere.

persistent and somewhat irritating cries of the old birds about me had ceased. On looking about, I saw a gathering similar to the one already described, taking place in the swamp about two hundred yards away. In this case there were many more birds than in the first one, and their animated calling was plainly audible to me. Here again the birds dispersed after a minute or so. That any bird could have a communal interest that is stronger than its own personal one I should never have believed, until I saw these Stilts behave thus, and I cannot think of any suitable explanation of the occurrence.

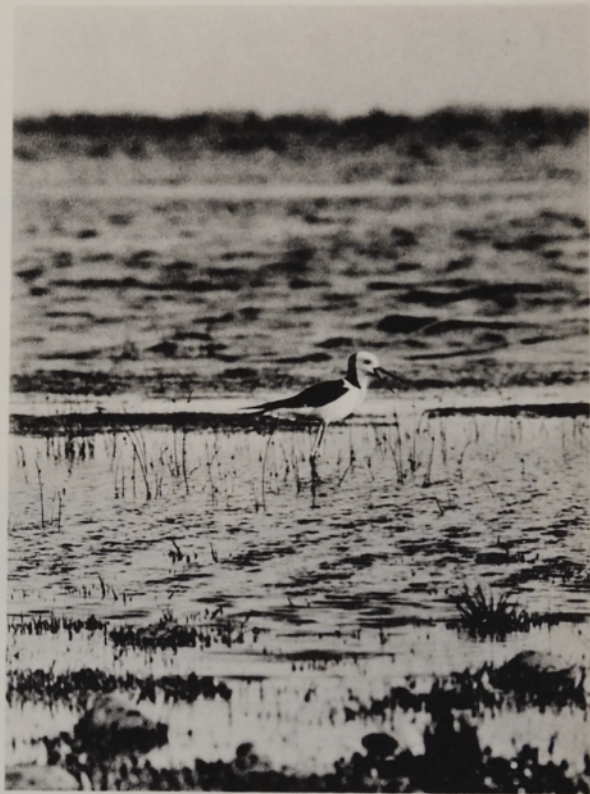
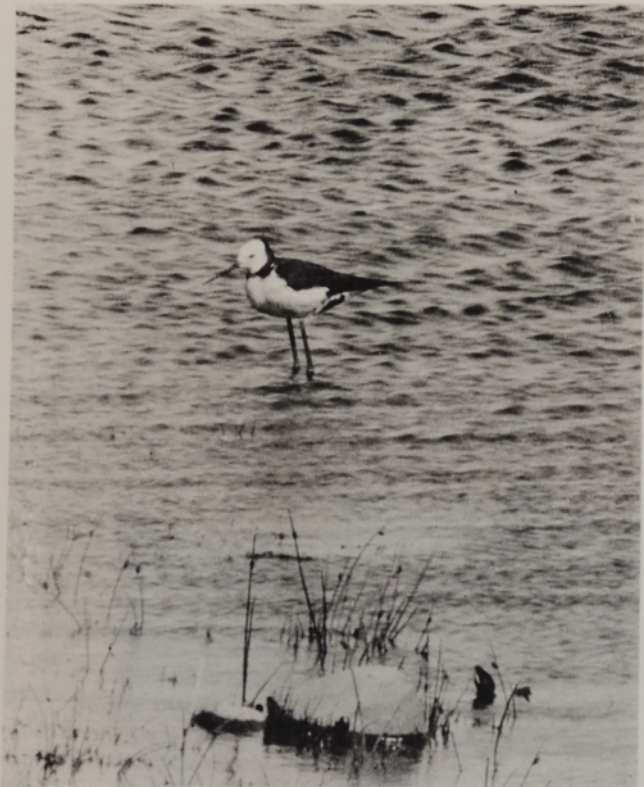
Lake Ellesmere is the principal home of Stilts in Canterbury, for, though they are plentiful on numbers of other lagoons and swamps, they are at Ellesmere literally in thousands. They leave Canterbury at the end of April, only a few small flocks remaining until May, and by the second week of that month all are gone. They spend the winter in the northern part of the North Island, where I have seen numbers of them in the neighbourhood of Whangarei in early June. Although I have insufficient data on the subject, I am not satisfied that all of our Stilts winter in New Zealand, for I have never heard of large enough numbers of them in the north during the winter to account for the great flocks that leave the south at that season. Whether they go abroad or not, they return to the south with great regularity in the last few days of July. On one occasion many years ago, I was shooting on Lake Ellesmere on July 29th. I had been there for several days, and had neither seen nor heard a Stilt, but that evening when I was "flighting" at the mouth of the Selwyn River, I heard several flocks of them calling as they flew high overhead in the dusk; and the next day there were numbers of them to be seen around the edge of the lake. Unlike the Banded Dotterel, they do not gather into close packs at this time of year, but tend to distribute themselves around the lake edge. Pairing commences almost immediately, and soon the birds select breeding grounds, but strangely enough they do not, save in a few instances, return to the same site year after year, as one might expect them to do.

As a matter of fact the shores of Lake Ellesmere are not ideal nesting grounds for them. The lake is a large area of shallow, brackish water (about 46,000 acres at low level), with very gradually sloping shores. It is fed by numerous streams, and separated from the sea by a tapering shingle spit some eighteen miles in length, and varying in width from

about a mile and a half at one end to less than a hundred yards at the other. Through the narrow end of this spit a channel is cut, and the water of the lake allowed to run out to sea, but this outlet does not as a rule stay open for very long, being closed up again with shingle by the waves during heavy southerly gales. The lake then slowly fills up, taking about twelve months to rise three to four feet, when it is again opened to the sea, and its level reduced to that of half tide. So gradual is the slope of its shores, that its annual rise floods thousands of acres of the surrounding land, so that birds such as Stilts, which breed close to the water's edge, are very apt to have their nests swamped by the rise in the lake level, before the eggs are hatched. There is another contributing cause to this swamping. Owing to the shallow and weedy nature of the lake, heavy gales will blow the surface water before them quicker than it can return underneath, the result being a rise in level, on a lee shore, of a foot to eighteen inches.

I have several times known of whole colonies of Stilts' nests which have been swamped around the lake, but the birds very quickly build again, and usually have another clutch of eggs within a week or ten days. What is perhaps most remarkable about the whole thing is that they do not seem to learn by experience, and though they may not nest in the same spot from which they have been flooded out (although sometimes they will do even that) they will rebuild on a site that is equally risky. Still, in spite of their repeated losses they rear a tremendous number of young around the lake every year; and by the middle of January, old and young gather in flocks on especially good feeding grounds, and begin to moult. At this period they behave much the same as the Banded Dotterel, taking a rest and a doze in the early afternoon of bright sunny days, not standing on one leg as might have been expected, but lying down to do so. To give some idea of the numbers of Stilts on Lake Ellesmere, I may say that a few years ago there was a flock of them at the north-east end of the lake which comprised between two and three thousand birds, while this year (1932), on a lagoon at the south-east corner, there were probably even more than that.

In one of these large flocks there are always some birds yapping, the result being a quite considerable and continuous volume of sound, but if a gun is fired in the vicinity, the calling suddenly ceases, the birds rise silently and at a steep angle, until they have attained a height of perhaps



Plates LX and LXI. PIED STILTS WADING
Right: bird "yapping." Note black vent and collar on bird on left.
Lake Ellesmere.



Plate LXII. PIED STILTS IN FLIGHT
Lake Ellesmere.

three hundred feet, when they begin calling again, the sharp yelping of the old birds mingling curiously with the shrill "pip-pip" of the young. At such times they fly in very dense flocks, and on occasion go up to great heights—five or six hundred feet—from which they descend, at first by a long easy glide, and finally by a swift zig-zag plunge at a steep angle to the ground.

Stilts vary greatly in their markings. In New Zealand there are two forms—the Pied and the Black, the latter of which is possibly a mutant of the former, differing from the Pied, not only in colour, but also in its proportions, being the same size in the body, but having a longer bill and shorter legs. Fifty years ago the Black Stilt was not uncommon, particularly in the South Island, but it bred almost exclusively on shingle river-beds, and not on marshes as the Pied one frequently does. In 1904 there were still many places where it could with certainty be found, one such area being the Waipara river-bed. Here, on October 16th, there were several pairs of Blacks preparing to nest; a pair consisting of a Black and a Pied; together with a number of pure Pied; and several that were obviously intermediates. The so-called "Potts' type"—a black bird with a white breast and abdomen—was also there, mated with a Pied bird. Three years later only the Pied form was left there—all the Blacks were gone.

In 1908 I saw several hybrids at Lake Wanaka, but no pure Black, and only twice since have I heard of a pair of Blacks breeding together, though I know of several instances of single Blacks breeding with Pied mates, and as late as last year I saw a Black Stilt with a white abdomen in the Rakaia river-bed.

The two questions naturally arise: What was the Black Stilt? and, Why has it almost, if not completely, disappeared? Its different colour, and, still more important, its different proportions would entitle it to rank as a good species; as also would the fact that, when it interbred with the Pied form, it produced hybrids. Oliver regards it as a mutant of the Pied, and that may be the correct view, but in that case it must be regarded as a structural, as well as a colour mutation. According to Potts, and his observations are, generally speaking, reliable, it did not breed in company with the Pied Stilt. Yet by 1900 it not only bred in company with it, but freely interbred with it. That the two birds occasionally interbred, even in Potts' time, is, I think, conclusively proved by

"Potts' type" which I have no doubt is a hybrid. That the Black Stilt preferred a Black mate is indicated by the instances in later years of a single pair of Blacks breeding together in a colony of Pied, though this indicates also a change of habit from Potts' time. It occurred to me that the Black Stilt might be merely a colour mutant of one of the Australian forms, but on examining the skins in the South Kensington Museum, I could not find any species that had the same proportions. One may regard it, I think, as a good species, which almost entirely bred pure when it was still sufficiently plentiful; that for some reasons (shooting was probably the chief one) it declined in numbers; and about the beginning of this century it interbred freely with the Pied form, chiefly on account of the difficulty of finding mates of its own colour; and that at the present time it is very rare, and what specimens one sees almost invariably have more or less white on the breast, while its hybrid forms are being swamped by the much more plentiful Pied form. To-day one occasionally sees Pied birds with wholly black head and neck, or perhaps a black patch on the abdomen, and these I consider to have a trace of Black blood in them. Indeed, I think it quite possible that the great variation one gets in the amount of black on the head and neck of the New Zealand Pied Stilt—a variation that is much greater than in the closely allied Australian species—is due to an infusion of Black blood in our species that has been taking place for a very long time.

Why the Black Stilt should have become so scarce is probably chiefly attributable to the fact that it used to nest almost entirely in the river-beds rather than in the marshy areas, and the Stilts in the river-beds have suffered most at the hands of irresponsible gunners.

Up to 1908, Stilts were included in the list of game that might be shot during open seasons. Since that date they have been in the "protected" list, and this has undoubtedly resulted in a great increase in their numbers. The presence of rabbits in the scrub on river-beds has had a very definite effect on the numbers of Stilts that inhabit such areas, for gunners, many of them irresponsible youths (or, what is worse, that variety of hooligan who carries a gun and regards every living thing as a target), go after these rabbits when the Stilts are nesting. If their nests are approached by such a one, the birds try to drive him off, with the almost inevitable result that they are shot. I have no doubt whatever that large areas of river-beds which used to be populated by Stilts are



Plate LXIII. NEST OF PIED STILT
Waipara River-bed.



Plates LXIV and LXV. YOUNG PIED STILTS
Left: a few days old. Right: getting its feathers.

PIED STILT

to-day devoid of them chiefly from this cause. All river-beds are now alive with vermin, particularly stoats, but Stilts seem to do very well in spite of them, and may be added to the list of those birds which, given adequate protection from the man with a gun, will continue to be plentiful in suitable areas.

CHAPTER XIII

HARRIER

Circus approximans drummondi

IT has always been a source of wonder to me that New Zealand should not have a greater number of resident species of birds of prey. Australia has twenty-four, yet we have but two, or at most three, if the Falcon be split into two kinds. A small Australian Kestrel has been recorded three times in New Zealand, and one might have expected that it would in the past have succeeded in establishing itself here, but it has failed to do so.

Of the two species of Hawks that breed with us, the Harrier is by far the more plentiful, being indeed one of the commonest of our large birds. Essentially it is a bird of the open, though to a small extent it may be found in large bush areas. Its food consists of animal matter of all kinds, either living or dead: birds, rabbits, hares, rats, mice, large insects, lizards, frogs, tadpoles, and fish, also offal of all kinds, such as dead sheep. The introduction of the rabbit, an action universally condemned to-day, was a veritable boon to the Harrier, providing it with a bountiful food supply over whole districts which had previously, from its standpoint, been almost barren. The clearing of the bush and scrub, and the converting of such areas into sheep farms, have provided it with extended feeding grounds, with the result that, over large tracts of country, it is to-day much more plentiful than it was prior to the coming of the White Man.

Harriers begin to mate late in August, and throughout September and October they may be heard and seen at their mating flights. These can only be regarded as a display of skill by the male to attract a female. Sometimes I have seen what I considered were the beginnings of courtship: a hen bird is flying along, when a cock bird at a considerable altitude above her—say, three or four hundred feet—will rush down almost vertically towards her, attaining a great speed with quick, short beats of his half-closed wings; having descended fifty feet he will spread



Plate LXVI. NEST OF HARRIER
In Toi-Toi. Rakaia River-bed.

his wings wide open, and swoop upwards, giving vent to a shrill, whistling cry as he does so. Up he sails for perhaps forty feet, and then, before he has lost all his velocity, turns over backwards and sideways, and repeats the performance; always giving a scream at the bottom of his flight, and at each stoop getting nearer and nearer to the object of his attentions. If the hen is sufficiently impressed by his display, she sails slowly down to the ground, and settles, when the cock will redouble his efforts; at the last making four or five short frenzied loops just above her head before alighting beside her.

Sometimes, however, the hen does not respond so readily to his advances, flying along, and continuing her search for food, and then the cock bird continues his display until his swoops bring him so close that it seems as if he would strike her, when she will turn on her back and prepare to defend herself with her talons. Perhaps he will fly off and leave her alone, or maybe persist in his attentions, in which case, as in most of the love stories in the magazines, I expect everything comes right in the end.

The nesting site may be in any situation where there is a little cover: in a toi-toi, or a flax bush, among rushes or raupo; in patches of short scrub, or in fields of corn—indeed almost anywhere, provided that it can be hidden. I once found one on the Waipara River in a large clump of mint beside the stream, the only bit of cover for fifty yards. Swamps are perhaps the most favoured situations, the nest being placed among the reeds or rushes well above water-level. Tussock is the material mostly used by Harriers for building, though quite large sticks (with a marked preference for bits of flax sticks and toumatou-kouri) are used in the foundations; blades of dead flax, rushes, grass, cabbage-tree leaves and sometimes lumps of wool are included. The nest is from three to four feet across at the base, with a shallow depression in the top for the eggs, the whole comprising a good big armful of material. When collecting tussock for its nest, a Harrier will usually select detached wisps; but if it has to pull up the tussock, it does so with its bill, always, however, carrying it to the nest in its feet. On Motunau Island, a flat-topped bit of land about an acre in extent, which lies a mile and a half off shore, I found a Harrier's nest with three eggs. These birds would have to go to the mainland for most of their food, so that it was a curious place to build. What was even more strange, however, was

the presence of a White-faced Storm Petrel's burrow right at the edge of the nest.

Building, which as a rule commences in October, takes about a fortnight, the hen, so far as I know, collecting all the material and making the nest, often adding to it considerably after the eggs are all laid. During this time, and even when she is sitting, her mate gives frequent flight displays above her.

Four eggs is the usual clutch, though I have known as many as seven to be laid. Although in the ordinary course of events the eggs are laid on consecutive days, yet occasionally they are laid at much longer intervals. In the case of the seven eggs above referred to, the bird began to sit on three, and then laid the others at intervals, the last a few days before the first young bird hatched. There would be no hope for the survival of these late hatched young, for if the larger and stronger members of the family did not actually eat them, as would probably be the case, they would certainly see to it that the weaklings did not get any food.

The nestlings, when hatched, are clothed with whitish down, which grows considerably as the young bird increases in size, affording an excellent covering until the feathers begin to grow. The parents carry food to the nest, and there pull it to pieces and feed the young. Where rabbits are available, these are much sought as an article of food, particularly young ones, which are not too heavy to be carried whole to the nest. Larger rabbits or hares, that are too big to be carried whole, are torn in halves across the small of the back, and the hindquarters carried to the nest. It is true that I have never seen a Harrier actually carrying such a joint, but I have frequently found such near a nest, with no head or foreparts to correspond. It would be interesting to see the old bird trying to sever the backbone of its victim.

Throughout the nesting period Harriers behave as arrant cowards. When the nest is approached by man, the sitting bird flies off, and, although she may stay in the vicinity, usually high in the air, giving a short sharp cry, quickly and often repeated, she will rarely approach to within one hundred yards of the intruder, even if the eggs be just hatching. The young, from the time that they are a fortnight old, will scramble out of the nest if disturbed, and hide in the surrounding thicket; but if cornered they will face their enemy, and sit with their back against something and their feet out in front, ready to strike with their claws if



Plate LXVII. HARRIER RISING FROM NEST IN SWAMP

they get the chance. When handled they give vent to a shrill, vibrant whistle, yet even then the parents will not come to their assistance. When the young are getting their feathers, they begin to tear up the food for themselves, a procedure that is not always carried on in strict accordance with the tenet that "birdies in a nest agree." They stay at the nest until they are full-grown and can fly well, which is about the beginning of February, and when they leave it, may easily be distinguished from their parents by their very dark colouring. They are still fed for a while, during which time the old birds play games with them—flying games, with the evident object of instructing them to catch their prey; and then, when the old birds are moulting, the young are left to fend for themselves.

With every yearly moult, Harriers' plumage becomes paler and paler until at last they appear to be almost white on the breast, though on inspection it is seen to be streaked with yellowish brown. Another noticeable feature about old Harriers is the quantity of glaucous "bloom" that is to be found, chiefly on the feathers of the upper surface of the body and wings. This powdery bloom is probably the result of the disintegration of the white down at the base of the feathers.

On one or two occasions I have found a deposit of building material in the vicinity of an occupied Harrier's nest. It was obviously being used as a perch, probably as a roost, by the mate of the sitting bird, but whether it had been put there originally with the intention of using it so, or whether the birds had first started their nest there, and subsequently changed the site, I do not know.

As soon as the nesting season is over Harriers begin to collect on certain roosting grounds. For this purpose they usually choose a patch of swampy ground, covered with rushes or cutty grass; though an area of long rough grass or short scrub will serve the purpose equally well. Here they spend the night, sitting on the ground, the exact spot where they sit being clearly indicated by their droppings, and the quantity of white down which is shed as they give their feathers a final preen before going to sleep. Sometimes great numbers—two or three hundred—will resort to a roost for the night, and in such a case they may be seen converging on it from all sides just before sunset, their flight being direct, and, as a rule, at no great altitude. They continue to use such roosts until August, and then, when mating begins, the paired

birds sleep in the neighbourhood of the site they have chosen for a nest.

Their flight when cruising is slow, as one would expect of a light bird with a large wing area; they are good at soaring, and may often be seen circling at high altitudes (up to six or seven hundred feet or more), particularly on calm days. When a wind is blowing across a quick fence, a Harrier will get into the up-draught, and sail the whole length of the fence without so much as a stroke of its wings.

Harriers when in flight do not flap their wings continuously, but set them at frequent intervals and plane for a space. In searching for food they show a great preference for the margins of lakes and lagoons, along which they work, carefully examining any drift cast up on the shore; or beating to and fro as they quarter patches of reeds or rushes. They persistently harry flocks of wild duck, no doubt having learned that nowadays they may find among them wounded birds which cannot fly. Such duck as are able to fly, however, will not allow a Harrier nearer than a hundred yards or so, but rise at its approach and move to another spot. Pukeko, on the other hand, if caught out in the open, will face the enemy, and, if there are several Pukeko, will cluster together with necks upraised, and hop off the ground and peck at the Hawk as it hovers over them. Pukeko can successfully defend their young in this way, but ducks cannot, and there can be no doubt that Harriers are responsible for a great mortality among young duck. Should a Grey Duck be swimming along with her brood, and a Harrier suddenly appear, the old duck will give a loud "quack" of alarm and flutter away a short distance; the young dive, make for the nearest cover, and hide. The Harrier may search for them for a while, but, not being able to find them, will settle on a tree or the ground near by, and wait. If the young duck have got into good cover, their parent will return and call them through it, away from the Hawk, but it is quite likely that she will not collect all her brood before she moves off, and so some will be lost. In this way, besides the duck they actually kill, Harriers cause the deaths of a great many more.

When, during periods of drought, some of the smaller streams begin to dry up, and all that remains is a series of unconnected pools, Harriers, as well as Gulls, collect to devour the imprisoned fish, mostly trout. On one occasion, when the Selwyn was drying up fast, and the rapidly diminishing pools were crowded with small trout—fish up to nine inches



Plate LXVIII. HARRIER
About to pick up dead bird off water.

long—a large flock of Gulls and Harriers was gathered to the feast. Many Gulls were swimming about and striking with their beaks at the frightened fish, while in the shallow water around the edge some Harriers waded “knee-deep,” grabbing with their feet at the fish that the Gulls drove past them; and out on the shingle sat a number of satiated birds, awaiting with impatience the time when their overloaded stomachs should have room for more. I estimated that in three pools there were some ten thousand trout, and what the birds took did no harm, for the water had vanished in two days, and every fish was killed.

This walking in water after food is quite a usual procedure with Harriers, and I have frequently seen them do it in shallow pools on the Waimakariri river-bed. Such pools, left by high floods, soon become filled with a growth of slimy algæ, and frogs get into this, and, if no flood sweeps them out, the pools next summer are full of tadpoles. Harriers walk in the slime, and, balancing themselves on one foot with the aid of their wings, catch with the other any tadpoles they may flush. I watched one doing this for some time one summer’s afternoon. Frequently it fell over into the water, but it did not appear to mind, and it caught quite a number of tadpoles. I thought its wings might be so wet as to prevent it flying away, but when I showed myself it rose without difficulty, though its wings, and especially its tail, were wet and bedraggled.

These Hawks, although not built for speed as is a Falcon, can yet achieve a high rate when in pursuit of small birds. As a rule, however, they catch these as much by strategy as by direct flight. One day I watched a Harrier beating over a stubble field, when it flushed a Skylark, which flew away some distance and settled. The Harrier carefully marked the spot, and flew swift and low towards it; saw the Lark, and struck at it on the ground. The Lark dodged the blow, ducked out from behind the Hawk, and settled again about two yards away; but the Hawk, with a rapidity of movement with which one would scarcely have credited it, rose and swept back on to its victim and flew off with it in its talons.

Blackbirds are fast on the wing, yet Harriers frequently catch them, as may be seen from the remains near these Hawks’ nests. Two months ago I was motoring with a friend to Lake Coleridge, and as we turned the corner into the narrow gully before the lake is reached, another car coming towards us flushed a cock Blackbird from the swamp which lies

for some distance along the roadside. A Harrier saw it and flew at it, when the Blackbird, confused by the proximity of the car, was very nearly caught. It ducked, however, and made for the swamp, but the Harrier very cleverly headed it off, and the small bird was forced to fly along the face of the hill, with the Hawk flying almost parallel, and between it and the cover. I speeded my car up and followed, and was able to gauge the birds' speed at about forty miles an hour. For three hundred yards they flew thus, neck and neck, when the Blackbird feinted upwards, and then quickly downwards; dodged its pursuer, and sought cover in a rush bush at the foot of a tiny willow. The Harrier settled on the willow, and moved about, searching for its quarry below. My friend got out and went to flush the Blackbird, when the Hawk flew away; but it was not until the Blackbird was almost walked on that it could be induced to fly again, and by then the Hawk was too far off to notice it. Still, it was a very fine flight while it lasted.

Harriers will sometimes combine to kill a hare, for once, in the winter, I saw three of them, all adults, attacking a hare in the centre of a large field on the south bank of the Rakaia River. The hare tried to escape by running straight towards a fence, but the birds kept stooping at it from behind, and when one of them got a grip of it the hare rolled over and the Hawk was forced to let go; but the other two joined in, and very quickly administered the *coup de grâce*. I ran up and found the hare dead, but have ever since wished that I had waited to see if the three birds, having worked together for the kill, would have harmoniously shared the feast, or fought over it. Almost certainly the latter, I think.

Single-handed, however, Harriers will kill hares, and I once saw it done. I was driving between Lake Ellesmere and the mouth of the Rakaia, and saw a Harrier stooping at a hare on the road in front. There were wire fences on both sides of the road, with a grassy ditch on the right. The hare ran under a wooden gate, and stopped in the paddock on the left, and when the Hawk stooped at it, it dodged back under the gate and sat in the road. I had stopped the car some three or four chains away and had an uninterrupted view. The Hawk, which had settled in the paddock, rose and flew over the gate at the hare, but the latter quickly hopped under the gate, and sat on the other side, while the former sat in the road. After several repetitions of this proceeding, the bird tried darting at the hare, first on one side of the gate and then on



Plate LXIX. HARRIER



Plate LXX. HARRIER
Picking up food from water with its feet.

the other, not alighting, but keeping the hare on the move. This went on for perhaps two minutes, and it seemed as though it might go on indefinitely, but the performance was exhausting the Hawk more than the hare, and presently the bird settled in the paddock for a spell, while the hare sat in the road ten feet away, occasionally moving its ears. For two minutes they sat thus, looking at one another through the gate, when the hare started to run across to the other side of the road, but just as it got to the ditch, the Hawk was on it, and together they disappeared below the bank. I waited a moment or two, and then drove up, reaching the spot within thirty seconds. The Harrier flew away, and the hare—a full-grown one—was stone dead with a small wound in its side behind the foreleg.

I used to wonder that a bird such as a Harrier should be able to kill a hare—an animal at least five times, and possibly ten times, its own weight—but an experience I had in North America threw a flood of new light on the subject. I was collecting bird skins, in my spare time, for the Christchurch Museum, and one day when out with two friends a Great Horned Owl, which had only the tip of one wing broken, got me by the wrist with its talons, driving them in between the bones until they overlapped in the middle. Now my first sensation was an overpowering desire to keep still—just that, and nothing else; the thought of the pain that any movement of mine would cause, with those two claws grating together in my wrist, kept me motionless. This feeling, which was instinctive, quickly wore off, and I discussed with my friends the best way of killing the bird without spoiling its plumage. When finally we got it off my wrist, one of my friends sucked the hole to reduce the chance of blood-poisoning, and drew air right through from the other side. This incident enabled me to realise to the full how it is that birds of prey are able to kill animals so much heavier and stronger than themselves—it is because the animal when caught is so paralysed with fear of the pain that will ensue if it moves, that it simply cannot exert its superior strength and break away.

At times, however, hares, when attacked by Harriers, repulse them by sitting up and beating at the approaching bird with their fore paws; the Harrier, being a peculiarly cowardly brute, as a rule goes off to seek some prey that will not make even a show of resistance.

Harriers, as related elsewhere in this book, are attacked and driven

off by breeding birds of various kinds. The imported Australian Magpie, which is now becoming very generally distributed throughout the settled parts of the country, is especially savage in the defence of its home, the pair of birds swooping repeatedly on the Hawk from above and behind. Last year, an observer near Foxton watched two Magpies attacking a Hawk near a pine plantation in which they had their nest. They were particularly vicious, and he saw them drive the Hawk down behind the trees, and later, when he passed that way he found the Hawk dead with a wound in the back of its head.

I was in the North train recently, and when it stopped at Ethelton I saw a pair of Magpies assaulting a Hawk on the other bank of the Hurunui River. They drove it down until it settled in a little gulch, in some bushes at the head of which the Magpies apparently had their nest, to judge by their excitement, for they kept swooping at the Harrier, and striking it as they passed. Thrice it attempted to rise, but each time was struck to the ground again before it had gone more than a yard or so. As the Harrier had no chance to fly up clear of the ground, it was not able to turn over and use its feet, its only defence against such aggression. Unfortunately the train moved off before the fight ended, but I had seen enough to convince me that that particular Harrier would be very lucky if it escaped alive, for one well-directed blow from a Magpie's bill would place it *hors de combat*.

For the past ten years or so, some Acclimatisation Societies have paid a royalty (usually threepence per pair) for Harriers' feet, with the result that many thousands of these Hawks have been shot. So generally distributed are they, however, that when shot in any one district they simply repopulate it from the next; and, even where they have been destroyed in thousands, they are still to be seen in considerable numbers. About twenty years ago some English Partridges were imported into Canterbury, and prior to their liberation, the farm on which they were to be released was trapped for Harriers, and over twelve hundred were caught, but within a month they were just as numerous as ever. These Partridges did not succeed, and there can be no doubt that the presence of great numbers of Harriers is one of the chief difficulties in the way of establishing such game birds in open country in New Zealand.

Harriers may readily be shot by trading on their greed. When they have secured a supply of food of a particularly delectable kind, they

indicate their pleasure by giving a shrill staccato call, quickly and often repeated. If a gunner conceals himself thoroughly, and imitates this call, interspersing it with the high-pitched alarm "quack" of a frightened Grey Duck, any Harrier that is within hearing will fly straight to the spot; and, if two or more are following one another, and the gunner does not show himself as he shoots the first, the others will come straight on, taking no heed whatever of the report of the gun. I have shot many hundreds—probably thousands—in this way, but I do not know that there was any appreciable result so far as the preservation of game is concerned.

Harriers are very unpopular birds. They are such cowards to start with, and their habit of taking farmers' poultry, if only occasionally indulged in, does not tend to endear them to country folk. They do, however, kill a certain number of rabbits, and, although I am satisfied that their actions in this connection have very little, if any, practical effect in keeping rabbits in check, still, many farmers spare them on that account; and in some districts they are actually "protected" by law because of the supposed good that they do under this head. They are plentiful birds at present, and there seems every prospect that they will continue to be so.

CHAPTER XIV

MOREPORK

Ninox novaeseelandiae

IN the years from 1898 to 1900 I was at school at Wanganui College, and at that time Moreporks were plentiful in the district, and, ruthless little scoundrels that we were, we used to hunt them with catapults. This we did, particularly in the winter, when these birds used to frequent the pine plantations near the town, roosting during the day in one of the thickest trees.

For three years one of them spent each winter in a small swampy patch of scrub consisting of manuka and olearia. The whole area was not more than half an acre, so, when at home, this bird was always to be found. I had no camera then, but persuaded another boy, who had one, to come with me to get a picture of this bird. The result did not come up to my expectations (I remember well that my friend had only a lens-cap for a shutter), and in 1899 my father gave me a good half-plate camera of English make, and I began to take photographs of birds myself. It is perhaps worth remarking that this camera is still my favourite of the four that I use, and it is still in good order after over thirty years of hard work, during which time it has had considerable knocking about. My own efforts at the Morepork above referred to, however, proved no more satisfactory than those of my friend. The bird looked as though it was squinting, and all the other pictures I have taken of adult Moreporks gave the same impression, with the exception of some taken late in the afternoon of a very dull day.

Around Wanganui we found several Moreporks' nests, mostly in clumps of kie-kie (*Astelia*) growing up trees. One I found in a fir tree (*Pinus radiata*), the single egg being laid in a depression on top of an old Sparrow's nest. This particular fir was on the edge of a large plantation, and as I was approaching it I saw the Morepork fly towards it and settle in a neighbouring tree. This was at about three o'clock in the afternoon, and although it is possible that the bird might previously have been



Plate LXXI. YOUNG MOREPORKS



Plate LXXII. YOUNG MOREPORKS
Kundy Island. Left: about ten days old. Their eyes are not yet circular.
Right: seventeen days old. Brown down concealed by white.

frightened off the nest, I think it is more likely that it had gone on a diurnal hunting expedition in the dim recesses of the plantation. One of my school-mates found a nest with three eggs among the thick dead leaves at the head of a cabbage-tree. In the intervening years, all the Moreporks' nests I have found were in hollows in trees, from five to twenty feet up, with one exception, a nest on Cundy Island, which was on the ground, under the almost prostrate trunk of a huge rata. Save in the two cases above noted, all the nests have contained two eggs or young, and this must be taken as the usual clutch.

The laying season extends from October to November, the nest being a mere depression in whatever material is chosen for a site, nothing being added by the birds. The young when first hatched are covered with a short white down, and for the first week their eyes are closed. In a short time they can see, but their eyes are then mere slits, and it is not for about two weeks that the eyelids develop sufficiently to give the characteristic circular opening. Even as chicks they have claws that are as sharp as needles, and they possess considerable ability in using them against the hands of any person who touches them. When they are about ten days old, during which time their white down has grown considerably, they begin to grow their second coat of down, which is enclosed in a tiny sheath, bearing the white down on its end. When this sheath bursts, the second down, which is dark smoky brown in colour, bears the original white down on its tips. Even when the young bird begins to get its true feathers, particles of this white down still adhere to the brown, particularly about the head, giving the appearance of a halo. At this stage one may take from the top of the bird's head a feather which bears on its tips the brown down, and on the tips of that the white down that covered the chick when hatched. From the time when they are a fortnight old, young Moreporks have a curious cry—a rasping or scraping noise as of a nail drawn across a bit of board. When they are getting their feathers they acquire another call—a shrill vibrant whistle which they use when frightened or angry. At three months they call "cree-e-cree," the same as adults, and at five months begin a little hoot—the first syllable of "Morepork."

From the time that their eyes have become circular, until they are adult, young Moreporks have a most delightfully comical expression—with something quizzical, something of surprise, and almost, it would

seem, something of humour in it—a look that is very appealing. As adults they lose this, but they still have most expressive eyes—eyes that, normally holding a quiet, rather pathetic look, can suddenly blaze with anger or excitement.

The young are fed chiefly on birds. At first, the parents pluck these and tear them up, giving the pieces to the chicks; but, for some time before the young get their feathers, they tear up food for themselves. There is usually a supply of food kept in the nest, on which the young are fed from time to time during the day. Often, too, there is a larder near by, in which an extra store of food is kept. On Solomon Island there was a Morepork's nest in a hollow rata, and, besides the collection of food which was in the nest with the young, there was usually a dead Diving Petrel or some other bird laid on a ledge of the tree outside the nest. We also found the remains of young Bell-birds and Saddlebacks in this nest, and once a dead Short-tailed Bat—a beautiful specimen, which I was very pleased to get.

Until the young are feathered, the hen stays throughout the day in the nest with them, while the cock bird sleeps in some secluded spot near by.

Adult Moreporks feed largely on insects, particularly on beetles of various kinds, whose wing-cases and other indigestible parts are ejected as small pellets. I once saw one hawking large woolly moths over a field, returning after each chase to a post in the fence. They also eat small birds, and, no doubt, lizards, mice, rats, *et cetera*. In an Auckland garden there is a long belt of bamboo which has very dense foliage. Knowing that clumps of bamboo form favourite roosting places for the various introduced small birds, chiefly Sparrows and Greenfinches, which come in hundreds to sleep in them, I asked the owner of the garden if this was the case here. He replied that some years back it had been so, but a pair of Moreporks took up their abode there, and at dusk each evening used to fly along, and flop into the bamboo, thus frightening the Sparrows, which flew out and were immediately pursued and captured by the astute Owls.

When I was at boarding school, I got a young Morepork and kept it in my desk. I fed it on meat, or small birds, chiefly Greenfinches, which I killed with my catapult. Partly on account of its appearance, and partly on account of the unfortunate state into which its food supplies some-



Plate LXXIII. YOUNG MOREPORKS
Left: four weeks old. The white down is falling off.



Plate LXXIV. YOUNG MOREPORKS
Right: five weeks old.

times got, my class-mates christened it "Flyblown Shylock." As the bird grew I hired the next boy's desk for my books for half a crown, and he, having a head for high finance, hired half the next boy's desk for 1s. 3d. for his. When I opened the lid of my desk, Shylock would snap his beak loudly. This is done when the birds are either angry or excited, for Shylock, long after he had lost all fear of me, would still sometimes snap his beak when I brought him food. I took him home in the Christmas holidays, and turned him loose in the garden, where he took up his abode in a large ivy-covered cabbage tree, coming out every evening just before dusk, when I called him for food. He was still there when I came home for my next holidays in May, but had lost much of his tameness, and he left the garden before September.

Perhaps one of the most amusing things about young Moreporks is the effect of food on their appearance. When hungry, they have a keen, alert air, and their eyes are bright and wide open; but as soon as they are fed, their whole aspect changes, their eyes become glazed, and their eyelids droop, and, up to the time when they lose their down, they almost immediately go to sleep. Even as adults they look completely bloated after only a moderate meal.

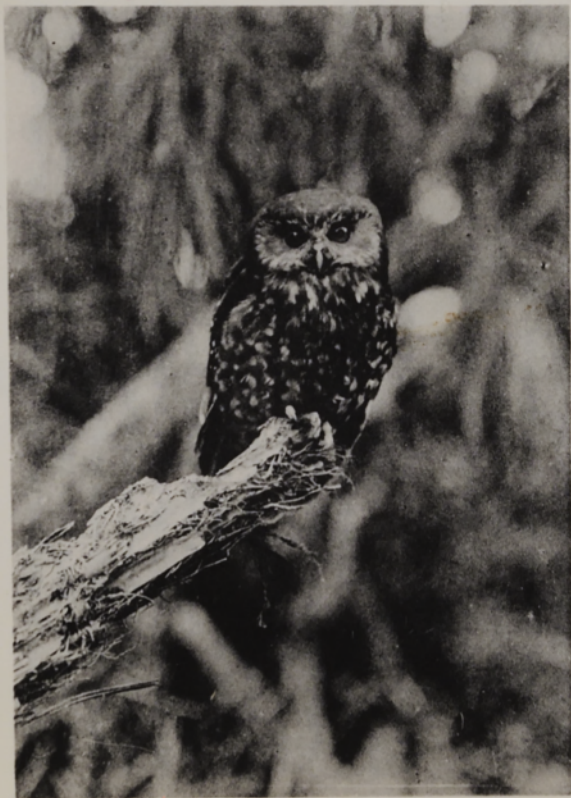
Once in the Ruahines I found a Morepork's nest in a hole in a big matai, and by climbing the tree next to it I could look in, and found that it contained two well-grown young. Cutting a sapling and tying a noose on the end of it, I climbed up the next tree again, and got the two young out and photographed them. When I had finished I set them on the end of a long stick and raised them to the entrance of their nest, into which they eagerly scrambled.

Moreporks are sparingly distributed throughout most bush areas, but twice I have found them unusually plentiful. In August 1910, at the request of the Government, I went on a search for Huia's, to try to trap some, and to transfer them alive to Little Barrier Island. Accompanied by a friend and two Maoris, I left Taihape for the flat-topped Mt. Aorangi, in the Ruahine Range. We crossed the Rangitikei River by spanning a narrow rocky gorge with a sapling, and swarming over it, and four days later pitched camp in a tiny basin on a ridge below the cliffs that encircle the whole of the north and west sides of the summit of Aorangi. I have never, at any other place, heard as many Moreporks as were here. All night long, dozens of them were calling "Morepork" or giving vent to

their long-drawn "cree-cree-cree," each syllable ending with an upward inflection. We saw only an odd one during the day, but at night the bush seemed to be full of them. The other place which I found thickly populated with them was one of the Chickens, of the Hen and Chickens Islands, off Whangarei. Here, in November 1909, I found three nests in hollow limbs of trees in an area of less than two acres.

Moreporks are much mobbed by certain of the smaller birds, some species of which seem to have a special antipathy towards them. I think the Yellow-head, Creeper, Robin and Grey Warbler are the most persistent in their efforts to plague these Owls when they find them abroad in the daylight; but Fantails, Bell-birds and Tuis also join in. The Morepork will fly off, making for any dense cover that is available, particularly liking to find a tree with a thick head, and up into this he will swoop, alighting on a branch with the heavy canopy of foliage just above him. The small birds follow, and keep hopping among the branches near by, maintaining a ceaseless twittering. It is easy to understand that this must be most annoying to one who is very drowsy and wants to get to sleep, but the Morepork will often close his eyes and try, by simulating indifference, to tire his persecutors; and this he may succeed in doing, for they soon cease baiting him if he remains still; but if he is so placed that their movements jar his perch, then he becomes alert, looks around as though seeking the best line of escape, and presently flies off to another perch, and so on, until at last his pursuers leave him and he is allowed to sleep in peace.

On Cundy Island, one afternoon, I caught a young Fern-bird which was just able to fly. At the time, we were on the way to the Morepork's nest, to which I have previously referred, to photograph the young birds, so I took the Fern-bird along, hoping to pose it in an open glade near by, and get a picture of it. I got the camera ready, but the Fern-bird, as soon as released, flew to a rata trunk thickly covered with polypodium and hid. We therefore got the young Moreporks out from under their tree trunk and photographed them, and, having done so, replaced them in their nest. All around were the bodies of White-faced Storm Petrels with their heads pulled off, and these evidently formed the chief article of diet of those Moreporks at that time. Hundreds of these Storm Petrels nested on the island, and every morning we found dead ones, lying on their backs with their plumage undisturbed and no evidence of the cause of



Plates LXXV and LXXVI. ADULT MOREPORK S

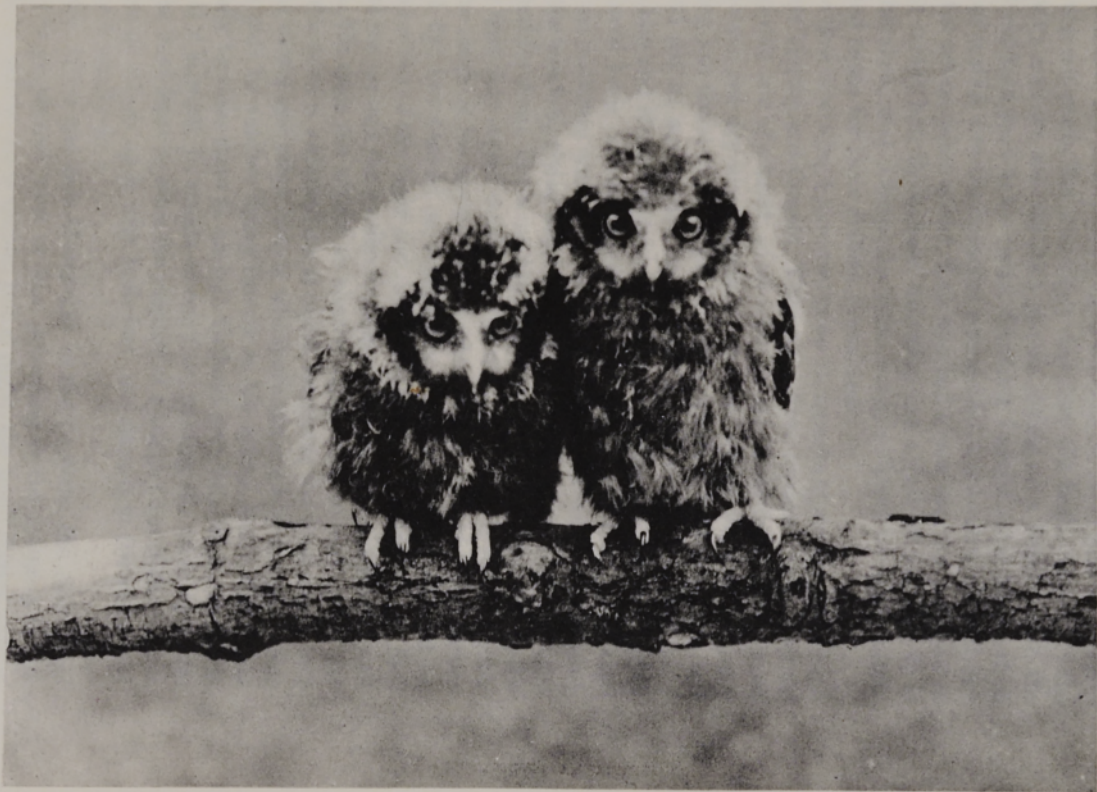


Plate LXXVII. HORACE AND OSWALD

death. Whether the Moreporks picked up such birds, or killed for themselves, was not plain, but it is likely that they did both. As we left the Morepork's nest we saw the cock parent sitting on a branch with the young Fern-bird dead in his claws. Thinking I might cause him to drop it, I threw a stick into the branches beside him, but he flew off with the bird in his talons, when a cock Tui, who had a nest near by, swooped at him and struck him in mid-air, knocking out a tuft of feathers. It is plain, therefore, that Moreporks when being mobbed by other birds, have good cause for their evident uneasiness.

At the time of writing I have two tame Moreporks in my garden, whose names are Horace and Oswald. They came from separate nests: Horace was originally one of a family of two, but he ate all the food, and I found his nest-mate one day when it was about three weeks old, a weak, puny little thing just about to die. I put it inside my shirt, took it back to our camp and fed it, but it died next day. Oswald was a singleton, so I brought him and Horace together to photograph them at the stage when they showed both coloured downs. I took them to "Ilam," and kept them in an outhouse until they were fully grown and could fly, when I opened the window, giving them their liberty, always leaving some food in the shed for them. For some time they roosted in the shed during the day, but later they stayed outside in the trees. Horace was always rather timid, the result of his having been frightened by some children before he could fly; but Oswald is delightfully tame, and when whistled to, comes to me out of the night and sits on my hand to be stroked and fed; or follows me around the garden making a curious little clucking cry all the time. He does not object to electric light, and, indeed, when the light on the drive is switched on at night, frequents the trees near it and hawks the moths and other insects which are attracted by the glare. For the most part he catches flying insects in his talons, but I think that occasionally he takes them in his bill. Ground prey he always catches in his feet. If it is small, he stands on one foot, holding the other up while he eats the food from it, after the manner of a parrot; but if the food is large, then he stands on it with both feet, and tears it in the same way that a Hawk would do.

Normally, when one sees Moreporks in the daytime, the dark pupil of the eye is contracted more or less, according to the intensity of the light, and the yellow iris is visible; but at night, the pupil dilates until it

fills the whole eye, giving the bird a very pleasant expression, which considerably enhances its appearance.

Moreporks no doubt kill a considerable number of small birds. On Cundy Island there was a Fantail's nest in a tree near the Moreporks' home, but there were no Fantails on the island, and I fancy that the Moreporks knew why. Still, the great amount of good that they do in killing insects that are too large for most birds to tackle must be set down to their credit. And, in any case, to-day they probably kill many more imported birds than natives, so on the whole they may be regarded as distinctly beneficial to mankind.

At the present time Moreporks seem to be gradually becoming scarcer. Odd ones still visit the suburbs of our cities during the winter, though why they should do so I do not know. It may be that they find more mice and small introduced birds there, or merely that it is their habit to spread out during the winter, just as some birds (e.g. Californian Quail) pack together at that season. One came every winter to "Ilam" for three years in succession a few years back, and I have heard of, and seen, others near Christchurch recently.

The Little Grey Owl (*Athene noctua*), which was introduced some years ago to deal with the imported small birds, will undoubtedly adversely affect the Morepork's chances of survival. The introduction of this Little Owl stands out in my opinion as one of the worst mistakes ever made in acclimatisation in New Zealand—and, goodness knows, mistakes were frequent and bad enough—for this wretched bird was imported when the dangers of acclimatising aliens were already evident, and when it was being execrated in England, where it had not long been established. There was a law, too, which prohibited the importation of Birds of Prey into New Zealand, but this was set aside, owing to the fatuous credulity of the Agricultural and Pastoral Associations, who believed that this Owl would seriously reduce the numbers of the domestic Sparrow. The whole case is an outstanding example of the pitiful stupidity of allowing such questions to be dealt with by people who know nothing about them.



Plate LXXVIII. NEST OF KINGFISHER

CHAPTER XV

THE KINGFISHER

Halcyon sanctus vagans

TOURISTS in New Zealand often remark, and with truth, that it is difficult to see anything of our bird life, so that we may put it to his credit that the Kingfisher does his best to remove this reproach. Throughout the country, save in very dry districts, he is occasionally to be met, sitting on some prominent perch, his head slightly on one side, on the lookout for food. Telephone wires, the boon of the sparsely settled districts, are likewise a boon to the Kingfisher. They are his ideal perch: high enough to give him an extensive view of the ground below, they have the very great advantage, that this view is practically unobscured in all directions. Where they cross shallow tidal waters, particularly if mud-flats are exposed at low tide, Kingfishers are almost sure to be found on them; but also inland, by streams or lakes, or even remote from these if the country is moist, this bird will be found making his own use of the telephone service. He does not like the modern thin, hard-drawn copper wire as much as the old, thicker galvanised one, but still it will do, and, anyway, there are always the poles.

During the autumn and winter, the birds are more widely distributed than for the rest of the year, odd birds turning up in unexpected places, and staying until the ground begins to get dry in the spring. Their food consists of insects, including beetles, butterflies, moths, and spiders; an occasional small bird, mice, lizards, worms and grubs, shellfish, crustaceans and fish; and in their securing of it they bring to bear a keenness of sight that is nothing short of miraculous. At Wanganui College, the goal-posts of the football grounds were favourite perches for Kingfishers during the winter. Their chief food here was worms, and I have frequently seen one of the birds leave its perch, fly straight to a spot more than half-way down the field, settle on the ground, pick up and swallow a worm, and return to its goal-post. That the bird should be able to see a small worm at a distance of over fifty yards, even if it

were fully exposed, would be sufficiently remarkable; but that it should be able to detect the slight movement of a worm among grass at that range is truly marvellous.

When catching fish, it does not usually go more than a few inches below the surface of the water—indeed, as often as not it “flops” into the water with outstretched neck, so that its body is barely submerged, and I have watched it do this when taking water-beetles from the stream in my garden. The bird, in this case, flew at an angle from a perch about twelve feet above the water, striking the surface with its body almost horizontal, and apparently with its wings slightly spread, swallowed its insect—they were boatmen—and returned immediately to its perch. This particular bird had lived in my garden for some months, and was reasonably tame, so that I was able to approach within fifteen yards and watch it as it frequently repeated the performance. Sometimes, however, Kingfishers really dive into the water, going in with bill, neck and body in a straight line, and wings clapped tight to the sides, after the manner of a Gannet.

As a rule one or two Kingfishers come to my garden in the autumn and stay the winter there, departing with the advent of dry weather in the spring. In front of my dining-room window is a group of old laurestinus bushes, fourteen feet high, and these begin to flower in May, and are fully in bloom during June, July and August. In the middle of a bright, sunny day, even in mid-winter, the warmth is sufficient to stir a few flies and bees from their lethargy, and such will go straight to the laurestinus bushes, settle on a flower in full sun, and absorb nectar and warmth at the same time. The Kingfishers know this, and, taking up a handy position on one of the neighbouring trees, reap a rich harvest. Occasionally they take their prey by daintily snipping it off the flower in passing, so to speak, scarcely reducing their speed to do so; but for the most part they come straight at the bush, and flop into its surface, just as if it were water, stopping themselves from penetrating too far by keeping their wings spread. This performance goes on in full view from the table, while we, too, are having our lunch, and as the birds, with the sun behind them, fly away from us back to their perches, the full beauty of their colouring is revealed. One of the most interesting facts about the Kingfisher's plumage is this: if a specimen be held so that it is illuminated by light coming from in front of the observer, its wings, tail and rump



Plate LXXIX. KINGFISHER
Bringing in a spider for its young.

appear to be a rich cobalt-blue; its scapulars and head a dull greenish: but if it be held so that the light comes from behind the observer, and moved so that the view is almost straight up its back, the wings, tail and rump light up, becoming vivid blue-green, the scapulars and head dark green. To see it at its best, therefore, the Kingfisher should be flying away, with the sun behind it, and then it provides as fine a flash of colour as I know.

By some writers the Kingfisher of the North Island has been separated as a subspecies from the South Island bird. I do not think that there is any justification for doing so. There is, it is true, a considerable variation in the colouring of the Kingfishers throughout New Zealand, but no general difference between birds from the north and those from the south. I think it very probable, indeed, that Kingfishers not uncommonly fly across Cook's Straits, from one island to the other.

Insects that are small enough, as well as worms and grubs, are swallowed whole; but larger food is killed, and, if necessary, pulped before being swallowed. This is done by the bird's sitting on a stout perch, holding its victim crosswise in its bill, and banging it against the perch, first on one side and then on the other. Of "big game" they like mice best, and I have watched one with a mouse in its bill, banging it thus against the perch to break its bones, every now and again tossing it up to get a different grip; then, after perhaps ten or fifteen minutes of this, when the mouse is reduced to a pulp, swallowing it head first with tremendous gulps, thereafter sitting for a long time in quiet content, with the mouse's tail hanging down out of the side of its bill.

I once had a patch of new-sown grass on my lawn, and a small flock of Redpolls found it and began eating the seed. My Kingfisher found them and used to dart at them from the branches of an oak near by. Although I saw him strike at them perhaps ten times, I only saw him catch one, and he signified his joy by a call of triumph as he flew back to his tree—a sharp "kek-kek-kek."

Early in September Kingfishers begin to think of mating, and they may then be heard giving their call—a sharp staccato "kek-kek-kek," the syllable being repeated four or five times—as they fly from tree to tree. Their mode of flight, too, is peculiar at this season, being straighter, and produced by a more fluttering action of the wings than at other times. The birds strike curious attitudes when they alight, drawing the body

up, and assuming an almost vertical position, with the tail at an angle, downwards and forwards under their perch.

Nest building may begin here in Canterbury in October, though it is unusual for eggs to be laid before the latter half of November—mostly they are laid in December, but quite often not until January. For the nesting site, a dead tree or a bank is chosen, preferably where the site is overhung. In the case of a bank, the nest is invariably placed near the top of it, no matter what its height. When digging their burrow, the birds take up their position on a perch, above and some little distance away in front of the nest, and flying straight at the chosen spot, with neck outstretched, drive their bill into the material, chipping out a small piece. I have watched them at work from close at hand, and the proceeding seems to be a most uncomfortable one, for the bird strikes hard, and the whole body appears to suffer a considerable shock. Not until the hole is some inches deep do they sit in it, and peck at the wall in front. In earth banks, the tunnel is usually about nine inches long, sloping slightly upwards to the nest chamber, which is roughly spherical, and with a diameter of about six inches, its floor being an inch or so below the level of the tunnel. I have found them in hard clay; in sandy clay, and in pure sand; but mostly in ordinary loam, because, I take it, that is the soil that usually occupies the position they like—near the top of the bank. In nearly every instance the birds begin work on two or more holes at the same time, and I know of cases where a pair has had six holes more or less completed, before it had finally fixed on the one in which to lay. As the birds go in and out they keep their legs wide apart, and so wear two little grooves along the sides of the floor of the tunnel. In trees the tunnel is rarely as long as nine inches, and often not more than two or three. No building material is carried into the hole, the eggs being laid on small bits of the material in which the tunnel is made.

The usual clutch of eggs is five, but four is not uncommon, six is rare, and I have once found seven in a nest. The young when hatched are naked, and are at first fed on small insects or fish—whitebait, if they are available, being a favourite diet. They grow rapidly, and are soon covered with spiny pin-feathers, the sheaths of which are whitish, and before these break, so that the end of the feather shows, the young birds resemble little, pale grey hedgehogs. About this time, the young, like the Black-birds in the most famous of all pies, “begin to sing,” the “song” being



Plate LXXX. KINGFISHER



Plate LXXXI. KINGFISHER
Bringing six-inch lizard to three-parts grown young.

a curious rasping noise—almost a hissing—without a trace of music in it. Indeed, from outside the hole, it sounds as though there were a ceaseless altercation going on within, but the young are quite happy, sitting together, looking stolidly in front of them, and continuously rasping, but at the least sign of danger from outside, the sound ceases. At first the parents go right into the nest to deliver the food to the young, but when the latter become sufficiently active to go into the tunnel, the parents alight at the entrance, and reach in with the food, which the young come forward to take from them. The young void into the sloping tunnel, which rapidly becomes a veritable sewer, the excrement running out of the entrance, and making a white patch on the surface below. Mixed in the droppings are the wing-cases and body-armour of innumerable beetles that have been fed to the brood.

The parents carry the food to the young in their bills, one item at a time, the size of the item increasing as the family grows, until such things as lizards up to six inches long are used. Despite the messy state of the tunnel, the nesting cavity is clean and dry, and the plumage of the young unstained. The family do not leave the nest until they are fully fledged, and well able to fly—indeed, I have seen a young Kingfisher cover over a hundred yards on its first flight.

The first plumage of the young resembles that of the adult bird, save that there is more dark edging to the feathers of the breast; and the upper wing-coverts are tipped with a fringe of cream. There is, however, a considerable amount of variation, both in the depth of the yellow on the under parts, and the brilliance of the colours of the back. For some time after leaving the nest, the young stay with their parents, but later they scatter, some going far afield to take up their quarters for the winter; and, unless they are disturbed, or their food supply gives out, they will remain in the chosen locality for months.

Nearly every autumn one or two Kingfishers come to my garden, staying there until the spring, when they begin prospecting for nesting sites in the trees, searching all likely knot-holes where a limb has broken off and left an area of dead wood. In an old weeping willow by the stream there is a large hollow, which I cleaned out, and then rammed tight with earth. With an augur I made a hole about two inches deep in this, and when spring came a pair of Kingfishers, which had been in the garden all the winter, began to drill their nest-hole there; but when they

had completed their nest, they were driven out of it by some Starlings. For some time I shot every one of these that I saw, but the Kingfishers would not return to that nest, but began another, not more than a foot above the ground, in an old stump. Before they finished this, however, we got a dry spell, and the birds left the garden altogether.

In bush country they build in dead trees, white pines being favourites. These, when dead, go "punky" inside, while still retaining a hard rind of wood outside, which is too solid for the Kingfishers to drill. As a schoolboy I used to cut little holes through this rind, in suitable places, for Kingfishers' nests, and a pair would usually take the hint and nest there. In trees they will nest at any height from two up to twenty-five feet, and the same applies to earth-banks, though when these latter are the sides of a stream—the favourite site—the birds exercise considerable discretion in keeping above flood-level.

The Kingfisher is no musician. Its call of "keek," repeated quickly four to six times, is used throughout the year, though very seldom during the winter. When mating, and during the nesting season, it has another call as well—"cree-cree-cree," rather drawn out, and with an upward inflection to each syllable; but sometimes this call is elaborated into "tucree-tucree-tucree." The birds show some courage in attacking a person or animal which is near their nest, dashing close past the head of the intruder and giving vent to a shrill scream as they pass. This being so, I have often wondered at the apparent ease with which Starlings usurp a Kingfisher's nest hole, before it is laid in. Starlings are most persistent birds, as is shown by the huge piles of material they will drop into chimneys or other unsuitable nest holes, and this persistence may be the deciding factor; or it may be that the Kingfisher will not have anything to do with a hole that has once been sullied by a verminous bird like a Starling.* Whatever the cause, the fact remains that Starlings do usurp a great many Kingfishers' nests. If their nest is undisturbed, however, Kingfishers will occupy the same hole for several years in succession, which might lead one to believe that perhaps they mate for life.

When perched, Kingfishers move their tails up and down. It is not a flick, as is the case with the Rails, but a much more sedate movement. The tail is slightly raised, then allowed to settle down again, almost, as

* Starlings are the most verminous birds we have here, their nests almost always being alive with "red mite."



Plate LXXXII. YOUNG KINGFISHERS WHICH
HAVE JUST LEFT THE NEST

it were, by the action of gravity; but when excited or angry, the bird increases the frequency of its tail beats. How the thought recalls a scene that is common along the coast of New Zealand: It is low tide, and on a telephone wire that overhangs some newly exposed mud, a Kingfisher sits, its head sunk on its shoulders, its feathers slightly fluffed up, absolutely motionless save for a slow regular movement of its tail. Presently it cocks its head a little to one side, intently watching something down below; its tail beats quicken and increase in amplitude; then suddenly it flies to the ground, picks up something—a small crab, perhaps—and flies back to its wire. Thrice it hits its victim on its perch, to the right, sending a little “ping” along the wire, then, throwing its head back, swallows its food, gives its bill a wipe and a strop on the wire to the left, and resumes its original pose. Its feathers fluff out a little, its head sinks down again, its tail beats slacken to normal, and the scene is all set for a repetition of the little drama—life to the bird; death to its prey.

Kingfishers are, as I have said, distributed throughout the country, but are more common along muddy or rocky coasts than elsewhere, being especially plentiful north of Auckland. Ten years ago I was Pheasant-shooting along the north side of Whangarei Harbour, and Kingfishers were abundant there, sitting on rocks, trees or wires along the road. There was a paddock of about two acres adjoining the shore, and, sitting on the wire fence surrounding it, I counted twenty-seven Kingfishers, many of them being old birds of beautiful plumage. The tide was high at the time, and a few worms were no doubt being welcomed as a snack between meals on the mud-flats below.

Being a bird of the open, the Kingfisher has not been adversely affected by the destruction of the bush, and it does not seem to have decreased in numbers in the past thirty years. Its habit of sitting still in the open, and its bright colouring, make it a target for irresponsible gunners (a species with which, unfortunately, this country abounds), but even so, there does not at present appear to be any reason why it should not continue to be a common bird with us.

CHAPTER XVI

FANTAILS

Rhipidura flabellifera

AMONG the New Zealand bush birds there are only a few which can be attracted to human habitations by food, as can be done with Robins and some of the Tits in England. We have in the Fantail, however, one that needs no artificial encouragement, but which freely enters our houses in search of the insects which it knows it will find there. Apart from its friendliness, it has the added attraction of being the commonest as well as the most conspicuous example of bichromism among our birds. The two forms are very different in appearance; the "Pied" has a white throat and neck, with a narrow black band across it; the rest of the under parts buff, save for a dark area on the forepart of the breast; a white superciliary streak; the whole of the upper parts dark brownish. The tail, that most conspicuous appendage, is dark above and light below; but when widely spread the white inner webs of the feathers show from above, and then it presents the appearance of a fan, streaked radially black and white. The Black Fantail is black, or dark brownish black, all over with the exception of a white spot over each ear.

The Black Fantail is distributed throughout the South Island, and is reasonably plentiful, though it is nowhere as numerous as the Pied, which outnumbers it by, say, three or four to one; while in the North Island the Black form is a comparative rarity. There has not, I think, been any general alteration in the numerical proportions of Black to Pied Fantails in the South Island during the past thirty years. In that period it has happened in some years that the flock of these birds which frequented my home garden has contained an excessive number of Blacks, which might be fifty per cent of the total, but this has always proved to be only a local and temporary condition.

The two forms freely interbreed; indeed, I have found the nests of only two pairs in which both birds were black, and that was over twenty



Plate LXXXIII. NEST OF FANTAIL.



Plate LXXXIV. FANTAILS ON NEST
The cock bird sitting over the hen to protect her.

years ago. Usually two or three pairs of Fantails nest in my garden each year, and on several occasions there have been in the same season a cock and a hen of the Black variety, each paired to Pied birds, so that there does not appear to be any preference on the part of the birds for mates of their own colour. The young of such mixed matings are always either Pied or Black—there are no intermediates—and I have never found a nest belonging to a mixed pair that did not contain young of both colourings. There is no fixed proportion of Black to Pied in the young of such birds, and, more than that, the numbers vary for different broods in the same season of the same pair of birds. A mixed pair which nested in my garden three years ago, had three Pied and one Black in their first brood, and two Black and one pied in their second.

Fantails rear two or, more often, three broods a year, the nesting season beginning early in September. The site chosen for the nest varies considerably, but preference is always shown for the proximity of water. The nest is placed on top of a horizontal or sloping branch five to twelve feet above the ground, and is very solidly constructed. A spot is selected where a twig or even a leaf-stalk leaves the branch, and there the birds hang a few fibres or bits of grass, binding them in position with cobweb. More fibres are added, and, when a platform has been built, bits of rotten wood are used as well, the whole being always tied together with cobweb. Both birds share in the work of building, and often have specified tasks. I once watched a pair, one bird of which brought twigs and bits of grass, merely placing these on the nest, while the other brought cobweb and fine fibres and carefully wove all the material together. The cup-shaped nest is lined with fine fibres, and a few hairs if they are available; the outside receives an extra coating of cobweb to make it neat, and the completed structure sits well above the supporting branch. The birds during building operations are very busy, flying to and from the supply of material with a straight level flight quite different from their ordinary style. Save at this season, Fantails do not often settle on the ground, and when they do so to gather supplies, hop about with their tails held almost vertically above them, pick up the substance they are using at the time, and quickly fly off, as if glad to be away from the earth again. I once supplied a pair of building birds with bits of red, white and blue woollen yarn, some two inches long, which they accepted gratefully, using it all, and showing no special liking for any

one colour, so that the nest, when finished, had a fine patriotic appearance.

I watched with amusement a pair which built in one of my plantations recently. I have a fat pony that, being only used to pull the family lawnmower, is rarely groomed, and the Fantails were going to him, sitting on his rump, and filling their bills with quantities of shaggy hair for the lining of their nest. The pony did not seem to mind, and did not even swish his tail at them, as I half expected him to do.

Three or four eggs are laid and the birds take turns at incubating, changing places with great frequency, often at even less than half-hour intervals. Always tame, they become particularly confiding when on the nest, and I have on many occasions stroked sitting birds with my hand without causing them to leave their eggs. Once when I wished to photograph a sitting Fantail and had got the camera set up in the tree, and all ready, I found the bird was not posed as I wished her to be, so I reached forward to arrange her. I tried gently pushing her aside with my finger, but she stoutly resisted my efforts and stuck to her place, pecking so hard that I could quite distinctly feel it. When I put my finger under her breast and slightly raised her, she called to her mate, who flew straight to the nest, and, sitting on top of her, prepared to defend her. I have always regarded this as a very fine example of pluck, for the disparity in size between a Fantail and a man is very considerable. Strangely enough, this was the only occasion on which I have ever seen a cock Fantail do this, so that I was fortunate in being able to get a photograph of the incident.

Often one sees house Sparrows trying to catch flying moths, a common variety of which has a peculiarly jerky, erratic flight. This completely baffles the Sparrow, which makes zig-zag flights in pursuit, and desperate snaps with its bill at a quarry that eludes it by a timely twist in its flight. A Fantail catches similar moths quite certainly, usually at the first swoop, and apparently with little effort. This indicates the great perfection of the bird's adaptation to its particular mode of feeding; and when Fantails are feeding young, they are able to seize elusive insects in flight, while holding in their bills a number of previous captures.

When feeding, the birds usually take up a position on the edge of a clearing, making short flights into the open to catch their prey. Although



Plate LXXXV. PIED FANTAIL ON NEST
The nest was built on the frond of a Tree-fern.

they do not begin to feed particularly early in the morning, they are among the latest of our diurnal birds to be abroad at night. As the sun sets they work up to the tops of the highest trees in the neighbourhood, whence they pursue the insects that come out in the evening, and swarm above the bush. In such circumstances, Fantails will continue to feed until dusk, a habit that, I fear, may cause them to fall victims to the introduced Little Owl.

The young are born naked, and are assiduously fed by both parents on insects which are carried in the bill. As a rule, when one parent approaches with food, the other vacates the nest, and goes in search of more provender, while the first, having fed the young, sits on them until the return of its mate. From the time when the young are half grown, both parents will go foraging at the same time, only now and then brooding the young for a short period to warm them up. The old birds do not as a rule go more than twenty or thirty yards away from the nest in their search for food, which consists entirely of flying insects, many of them quite minute. For a week or so, after the brood leaves the nest, they stay together near their home site, a happy family of tiny bob-tailed youngsters, either sitting cuddled together in a row, or hopping about among the branches at no great height from the ground. They are fed by their parents, but they soon begin to forage for themselves, and, even before their tails are fully grown, they chase and capture insects with considerable skill.

When the family can take care of itself the old birds begin a second nest, or sometimes clean out and use the old one again; and it must be recorded to the credit of Fantails that a nest which has just been vacated by a brood has no droppings on or even near it, so perfect is their sanitation. Usually a second nest is begun whilst the birds are still feeding their previous brood, and the industry of the old birds then is exemplary—they are never still from dawn to dusk, till one wonders how so tiny a body can be capable of such sustained effort.

The following notes referring to a pair of Pied Fantails at "Strowan," Christchurch, are interesting:—

Nov. 3rd, 1904. A pair is feeding four young that have only left the nest a day or so. The old birds are also building another nest in a weeping willow about thirty yards from the site of the first nest.

Nov. 16th. Nest has four eggs in it and birds have begun to sit.

Nov. 30th. Young about three days old. This makes period of incubation ten or eleven days. Parents feeding them on flies.

Dec. 7th. Nest with one dead young bird in it, with "paint-brush" feathers. Evidently the southerly gale of the last two days was too heavy for the old birds to stay on the nest, and the young died of exposure to cold and wet. The other three young are dead on the ground below the nest. The old birds are already building another nest in a willow on the opposite side of the creek. It is obvious they do not intend to waste time at all.

If a pair of Fantails has good luck, they will have reared three broods by the middle of January, but nowadays, on the mainland at any rate, it must be unusual for them to do so, for time after time I have known of nests from which the young, when nearly fledged, have been taken by vermin. Stoats, weasels and black rats are responsible for this, and even when the young have left the nest many of them fall victims to cats—not only to the "family" cat near houses, but to domesticated cats which have run wild all over the country. These marauding brutes, protected* by the Government because they take an occasional young rabbit, kill birds in great numbers. How effective they may be as agents of destruction among the native birds is shown by some of the outlying islands off Stewart Island. There, on bush-covered islets where cats have been liberated by Mutton-birders, not a single indigenous land bird is to be seen, and only a very few introduced species, while the remnants of wings and feet of Storm and Diving Petrels show that they too are being preyed on; yet similar islands near by on which there are no cats or rats contain a great variety of birds, and in astounding numbers. In the nursery we were taught:

"Ding, dong, dell,
Pussy's in the well.
Who put her in?
Little Tommy Thin.
Who got her out?
Little Tommy Stout."

Bird lovers have recently erected in London a statue to the memory of W. H. Hudson, who, by his delightful writings, has done so much to

* It is illegal to have in possession, or to sell, "wild" cat skins.



Plate LXXXVI. BLACK FANTAIL ON NEST
This and the bird in the previous picture were a pair.

awaken public interest in birds. Fully appreciating Hudson's works, I am sure that, in New Zealand at any rate, the person who is still more deserving of a memorial is Little Tommy Thin; and, if ever such a monument is erected I would like it to show him standing with at least one foot on Tommy Stout's face; and as a further indication of my opinion of the latter, I would suggest that the work of portraying him be handed over to Epstein.

Fantails are very fond of bathing, standing in the shallow water at the edge of a stream and thoroughly soaking themselves; or, where rocky streams have large stones protruding above the surface, the birds will often use the edges of these for bathing places. During the summer, when garden sprinklers are turned on, Fantails will get under the spray and thoroughly soak themselves with obvious enjoyment.

By the middle of January Fantails begin to moult, and during this period they appear very untidy. I think that, more than in most birds, their feathers show the effort of the breeding season, being much worn and faded. The young, whose colouring is similar to that of the adults though duller and lacking the markings about the head and neck, begin to moult at the same time, and after they have got their new plumage, the birds have a tendency to gather into companies when feeding. They may be seen at this season in bands of from five to twenty individuals travelling through the bush, busily hopping about among the foliage, their tails widely spread, and making frequent darting flights after insects that they have flushed. It is at this season of the year that their numbers are greatest, and that they are most in evidence, coming without fear into houses and clearing them of insects. Unfortunately they prefer small insects and do not show any particular fondness for the common house-fly, for if they did, and came after it during the summer, they would be a veritable godsend. As it is they are quite valuable, completely clearing rooms of midges, mosquitoes, sand-flies, etc., making an audible snapping noise with their bills as they catch them. Early in the autumn a Fantail is occasionally to be found fluttering against a window-pane, in its efforts to get out of a room, but later the birds know their way about the houses they frequent, flitting from one room to another, upstairs and down, and showing no perturbation when a person enters even a small room in which they are feeding. They quickly become familiar with the various inlets and outlets of a house, and know and use every fanlight or window

that is usually kept open. When I was a boy, a Fantail used to come into our house early in the morning and do the rounds, always sitting on the gas-bracket in my bedroom, and singing as it fed. One night before going to bed I took a very small trout-fly, and drove the hook into the wall-paper beside my bed. In the morning when the bird came in, it caught several flies and then flew at the artificial one, pulling at it, and even for a second bracing its feet against the wall to get a better purchase. The fly was firmly hooked, however, and did not come away, so the Fantail let it go and flew straight out of the room, and never came back again, though it still continued to frequent the rest of the house.

While they will eagerly take small insects from a wall, they do not as a rule catch house-flies unless these are in flight. I have often "flushed" house-flies from curtains or walls for a Fantail that would sit on some convenient perch—a lamp-shade or a picture-frame—and dart at them immediately they took flight. Miniature golf and table tennis having something of a vogue to-day, I am tempted to suggest this as a pastime in a country where genuine Falconry is non-existent, for it is wonderful how quickly these birds will realise they are being helped in this way, and make every use of assistance. As winter approaches, and smaller food gets scarcer, Fantails will readily take house-flies, and even large moths and blue-bottles, capturing their prey and flying to a perch with it in their bill. There they take it in one foot, and, holding it against the perch, peck it to pieces and devour it. When Fantails are in houses, mirrors have a great attraction for them, and they flutter up and down against the glass, fighting their shadow with the greatest fury, emitting shrill squeaks the while. For perhaps ten seconds they will do this, and then fly to some nearby perch for a spell, returning to the attack as soon as they have regained their breath. They will sometimes continue this procedure for ten minutes or more, interspersing their fighting with an occasional flight after food, as if to sustain them for further efforts.

The winter is the hardest time for Fantails, lack of food and the cold taking a heavy toll of their numbers. Moreporks would, no doubt, take some, and Kingfishers probably get a few, but these agencies would have very little effect as compared with the ravages of a hard winter. Numbers of Fantails inhabit the gardens and plantations on the Canterbury Plains, and it would seem that they are just as well suited by these exotic plantings as they are by the native bush. Yet this is not so, for, under certain

conditions, the birds will survive in the bush, when they cannot do so in the artificial plantings. In the winter of 1918 Canterbury was afflicted with two very heavy snowstorms, the depth of snow which covered the province varying from nine inches on the coast to three feet or more inland, and this was followed by a period of exceptionally cold weather. Of the great numbers of Fantails which inhabited the cultivated parts of Canterbury at that time, there was not, so far as I know, a single survivor; yet in the native bush they seemed to suffer very little more than in an ordinary winter. The dozen or so which had lived in my garden through the autumn disappeared, and their fate was clearly indicated by the only one that I found some days later. It was under the north side of a small gorse bush in the sun, where there was but a light covering of snow, on which the bird lay, its feathers fluffed out, and its head in such a natural pose that for a moment I thought it was still alive; but the little body was stiff and cold when I picked it up from the spot where the bird had gone in a last effort to find warmth. Some days later, when Quail shooting, I found another dead Fantail in the scrub near New Brighton, where it was hanging by the neck in the fork of an elderberry twig. I could picture it, weakened by hunger and exposure, flying against this upright stick, and feebly fluttering downwards, until its neck caught in the fork, and there, unable to release itself, it hung until it died. Yet, as I have said, in the native bush—the environment in which they had been evolved—the Fantails not only survived, but were apparently not greatly affected, and from these areas they re-stocked the Plains in the course of a few years. What a wonderfully illuminating incident this is! Here we have a bird evolved in certain surroundings, but sufficiently adaptable to be able to accommodate itself to other, and, so far as we can see, very similar surroundings; yet when severely tested, it is easily able to survive in the one case, though totally unable to do so in the other.

Fantails do not seem to have diminished in numbers during the past twenty years, and the rapid way in which they increased after the winter of 1918, until they were just about as plentiful as they were previous to that catastrophe, would indicate that the country is fully stocked with them at present. What the limiting factors are I do not know, but it is probable that, in most parts of the South Island at any rate, it is the available food supply in the winter. The bird seems to have reached a

level at about which its numbers remain more or less constant, and that in spite of introduced enemies. Fortunately none of the exotic birds which are now so plentiful is a serious competitor with the Fantail for its food supply, so that we may look forward with confidence to this charming little bird remaining a plentiful species.

CHAPTER XVII

BLIGHT-BIRD

Zosterops halmaturina

BULLER (*Birds of New Zealand*, 2nd Ed., Vol. I) gives a very full description of the spread of the Blight-bird, or Waxeye, throughout New Zealand. It had been known for years on the south-west coast of Otago, and then, in 1856 it appeared in June at Waikanae, in the Wellington Province. Later in the same winter, it appeared in great numbers in the gardens around Wellington, where it stayed for three months and then departed. It was not seen again in the North Island until the winter of 1858, when it arrived in greater numbers than previously, departing again on the approach of spring. For four years it was only a winter visitor to the North Island, though not nesting there, but in 1862 it bred there for the first time, and it has been a permanent resident there ever since.

To-day the Blight-bird is found plentifully throughout the country, being apparently just as much at home in suburban gardens as in the bush. It has very catholic tastes in the matter of food, eating honey, small insects, and blights of all sorts (excepting pear leech), caterpillars, fruit, berries and even kitchen scraps.

It received its name on account of the way in which, when it first appeared in the Wellington Province, it cleared the apple trees of American Blight or Woolly Aphis. No doubt the bird did good work in this direction, but it was not complete enough; and orchardists had to spray to combat the pest until Dr. Tillyard introduced the little Chalcid wasp (*Aphelinus mali*), which is such a complete success that ill effects of Woolly Aphis in New Zealand orchards to-day are negligible. The Blight-bird still deserves its name, however, for the way in which it clears plants of green-fly and other similar pests.

Its nesting season begins in August—I have once or twice found it building as early as July—and two or three broods are reared each season. The nest, which may be placed in almost any tree or bush, at any height

from three to thirty feet above the ground, is always attached to thin twigs or branches. Where a twig forks, or, better still, where two twigs grow out from the same side of a third stouter one, with a distance of about two and a half inches between them, is a favourite situation for the Blight-bird to build, the nest being suspended from the branches by its upper edges. It is built of thin wiry grasses, or hair from horses' manes and tails if they are available, and fibres, dexterously woven together and bound with cobweb and little bits of moss, the walls being of nearly uniform thickness throughout. Really they are very thin, being only about half an inch through, and it is a tribute to the bird's skill as a builder that such a delicate structure should be able to support the weight of a family of well-grown young and the hen bird when she sits on them. The eggs take only a short time—about ten days—to hatch, and the young are fed by both parents, almost entirely on insects. The old birds are very busy at this time, and, strange though it may appear, seem to prefer to go some distance away from the nest in search of food, rather than hunt for it close around their home. Often they fly swiftly and direct for over a hundred yards before they reach the ground of their choice, although there may be other places near by that are seemingly quite as good.

After the young have left the nest, they are fed by their parents for a week or so, and then weaned, and within a few days the old birds begin building a second nest, as a rule within a short distance of the first. I have never known them to rear two broods from the same nest, and this may be because so frail a structure would not stand the strain.

Their usual call is a sharp high-pitched whistle, a single syllable repeated at intervals, but much more quickly when the birds are about to fly, and when they are in flight. During the spring and summer, the cock birds have a very charming song, a soft melodious warble of four or five notes oft repeated, always ending with three or more of the shrill notes they ordinarily use. Sometimes they sing thus when perched with their mate beside them, but also when they are alone, sitting still the while, usually in the sun, and facing it, often preening their feathers in the pauses of their song.

Blight-birds, when paired, have a very pretty habit of sitting side by side on a branch, tucked close together like Love-birds. Pairs always roost thus, side by side, and as I have frequently seen them doing this



Plate LXXXVII. NEST OF BLIGHT-BIRD

in the winter, it would seem that some of them, at any rate, remain paired from one breeding season to another. At school I used to catch with my hands quite a number of small birds at dusk when they had come into some pine trees to roost. On windy nights the birds slept in the low branches on the lee-side of the trees, and there I used to look for them, and when so engaged could always tell Blight-birds by their habit of roosting in pairs.

At present, Blight-birds breed over the whole of the mainland, and have been recorded from all the closer outlying islands, and also from Snares, Auckland and Campbell Islands. This is not to be wondered at, for they are birds of long flight; but one cannot help speculating as to the great numbers that must be lost at sea for every one that reaches these remote islands. There is a very considerable seasonal migration nowadays, birds from Otago and South Canterbury going north in the winter. In Christchurch this migration begins about the middle of April, and for a month, flocks of Blight-birds may be heard flying overhead at almost any hour of the night. It would seem, indeed, that they do most of their travelling at night, feeding in the daytime, though at Lake Ellesmere I have occasionally seen flocks of them working along the shore, feeding in the rushes as they travelled northwards; and I have seen similar flocks crossing the Rakaia River.

At this season they congregate in large companies—often over a hundred strong—which work their way through the trees, always on the move as they diligently search for food. The birds hop quickly about among the ends of the branches, carefully examining every nook and cranny for food, now and again hanging upside down to examine the underside of branch or foliage; and should they find a place where a leaf-rolling caterpillar has stuck down the edge of a leaf to make a home for itself, they will persistently probe the ends of the cavity, or open the seam to get at their prey. These companies are very fond of feeding in oaks, and coming as they do, just when the leaves are falling, they must destroy enormous numbers of caterpillars and insect pests. As a rule, such feeding parties will be accompanied by a few Fantails, which reap a rich harvest from the insects that are flushed by the Blight-birds, for the latter rarely capture their prey when it is on the wing.

At this season of the year Blight-birds undoubtedly do a great deal of good, but in the fruit season they are by no means an unmitigated

blessing. It must be remarked, however, that for the first three months of their breeding season, they feed themselves and their broods entirely on insects. They attack cherries with gusto, but, if cherry trees are unprotected by netting, Blackbirds, Thrushes and Starlings will have absolutely stripped them of fruit, long before it is ripe enough for a Blight-bird to tackle. There is this about it though: Wire netting of one-inch mesh will keep the three above-mentioned birds out, but it requires a mesh not larger than half-inch to keep out Blight-birds—they will readily get through three-quarter inch. They eat all soft fruits with avidity—peaches, apricots, plums and pears are favourites, and apples when the others are not available. Yet even when these fruits are in season and in plenty, the Blight-birds do not subsist entirely on a diet of fruit. Years ago I noticed that a flock of these birds, although undisturbed, continually roved around and around the garden searching for insects on some trees, blights on others, and finally returning to the fruit. Of some berries they are especially fond, while others they rarely, if ever, touch. Elderberries are favourites, and so are gooseberries and currants, the birds digesting the fruits, and passing out the seeds. I have never known them to take hawthorn berries, and only rarely have I seen them attack the fruits of briar, and, when they do so, I think they eat only the fleshy part under the skin and leave the seeds. During the winter months, when food of all kinds is scarce, Blight-birds will clear up any old fruit that is left in an orchard, even though it be quite rotten, and I have seen them eating the decaying fruits of *Cydonia Japonica* in my garden. At this season, a piece of suet placed in a tree, or even on a window-sill, will quickly attract Blight-birds, and they are worth attracting, on account of their bright, trim appearance, and the good they do during the winter.

It is curious that, while their northward migration in the autumn is so noticeable, their southward movement is not seen—at least I have never seen it, nor heard of anyone who has. So noticeable is this discrepancy that I am not sure that they do migrate southward to the same extent as they go north.* A considerable population stays in the south all the winter, and I have seen them in the bush of the Canterbury back-country

* One of the interesting points in regard to the migration of birds is that there are several well-known cases where the migration of a species is frequently observed in one direction, but not in the other.



Plate LXXXVIII. BLIGHT-BIRDS FEEDING ON PEARS
PUT OUT FOR THEM IN THE WINTER



Plate LXXXIX. BLIGHT-BIRDS FEEDING ON PEARS
PUT OUT FOR THEM IN THE WINTER

throughout the year. Seeing that Blight-birds raise at least two, and probably three broods of three young each year, the winter population of the south—in Canterbury at any rate—is quite sufficient to account for the numbers one sees at the end of summer. Yet in the autumn we have the great influx of birds from the south, and their departure in May, with a large proportion of the local birds, and no apparent corresponding return. That some birds have come back is very probable, and indeed we have the evidence of observers when the Blight-bird first colonised the country, which clearly shows an ordinary seasonal migration. Far-fetched as the idea may appear, I believe that at present, numbers of Blight-birds leave New Zealand annually and get lost at sea. In support of this suggestion, we have the extraordinarily rapid increase in their numbers when they first arrived from Australia; the way in which they have spread to small outlying islands, some of which are hundreds of miles from the mainland; that Cheeseman found them on the Kermadecs in 1887, and Oliver (*N.Z. Birds*, p. 480) says they were not there in 1908. All these records point to the fact that Blight-birds do travel extensively over the ocean, and I personally think that great numbers of them are lost annually in doing so. Very hard winters in the south cause a fairly heavy mortality occasionally, but I have not heard of so widespread a catastrophe as befell the Fantails in 1918. The big snow of that year did not have a very marked effect on the Blight-birds in Canterbury, and at present they must be ranked as one of our most numerous birds.

The question as to whether they are a blessing or a bane to the fruit-grower will always be a debatable point. The case would, of course, depend to a great extent on the kinds of fruit grown. In the case of viticulture out of doors, there can be no doubt that this bird is a very serious menace, for it cannot be scared off a large area by firing guns or similar means, as can Blackbirds, Thrushes and Starlings; and when the grapes are ripening it does a great deal of damage. So far as I know, bird-lime is the only remedy tried with any success in vineyards up to the present, and it is a costly business. It is a pity that, under the circumstances, certain people should allow their enthusiasm for bird protection to induce them to try to get the Blight-bird included in the list of totally protected birds. To do so would not protect the bird from those whose fruit it was destroying, and it would certainly have the effect of causing

many people to regard the whole Animals Protection Act as unreasonable. In any case the bird is obviously in no need of protection, for it has in seventy-five years become one of the commonest, if indeed not quite the most plentiful, of all our native song-birds, and seems destined to remain so.

CHAPTER XVIII

THE BELL-BIRD

Anthornis melanura

“WHAT is a Bell-bird?” I do not know how often I have been asked that question, but it is certainly a great number of times. In different districts of New Zealand, the name Bell-bird is applied to different birds. In Canterbury, and, indeed, to a large extent, throughout the South Island, it referred to *Anthornis melanura*; but it was frequently applied to the Tui. In the North Island it was applied to both these birds; but, by the bushmen, particularly of the central portions of the island, it was used almost exclusively for the Crow. In the early days, many people called *Anthornis* “Mockie,” a derivation of its Maori name “Mako” or “Korimako,” but that name is dying out; so despite its ambiguity, “Bell-bird” is perhaps the best name for it.

The history of the Bell-bird's numerical status is most interesting. Buller (*Birds of New Zealand*, Vol. I, p. 86) says: “Even when writing its biography for my former edition (1873), I had to make the following discouraging statement: This species, formerly very plentiful in every part of the country, appears to be rapidly dying out. From some districts, where a few years ago it was the commonest bird, it has now entirely vanished. In the Waikato it is comparatively scarce, on the east coast it is only rarely met with, and from the woods north of Auckland it has disappeared altogether. In my journeys through the Kaipara district, eighteen years ago, I found this bird excessively abundant everywhere; and on the banks of the Wairoa the bush fairly swarmed with them. Dr. Hector, who passed over the same ground in 1866, assures me that he scarcely ever met with it; and a valued correspondent, writing from Whangarei (about 80 miles north of Auckland), says: ‘In 1859 this bird was very abundant here, in 1860 it was numerous, in 1862 it was extremely rare, and from 1863 to 1866 I never saw but one individual. It now seems to be entirely extinct in this district.’

“The above remarks were intended to refer principally to the North

Island; but even in the South, as I have elsewhere pointed out, it is far less plentiful than it formerly was. Doubtless it is only a question of a few years, and the sweet notes of this native songster will cease to be heard in the grove; and naturalists, when compelled to admit the fact, will be left to speculate and argue as to the causes of its extinction."

Apparently it continued generally to decrease until about 1910. In the years 1898-1900 I did not see a single specimen in the bush around Wanganui, though the bird was still plentiful in many parts of the South Island. In 1910 it was sparingly scattered over a large area near Mt. Ruapehu, and it was already being referred to by the sawmill hands as extending its range. It is at present definitely on the increase; and that not only in one district, but quite generally throughout the country. In the middle 'nineties there were still quite a number in suburban gardens around Christchurch, but by 1900 they had all gone, and save for an occasional visitor, have not returned. It would seem that they were at their lowest ebb in Canterbury around 1910, since when they have increased considerably, being now permanent residents, or regular autumn and winter visitors to districts from which they had been absent for years. It is, of course, in native bush where the increase is most marked, and this, particularly in the North Island; and there, in places where, thirty years ago, it was comparatively rare, it is to-day plentiful, outnumbering the Tui, which was by far the commoner bird previously. Within the past few weeks a number of Bell-birds were captured on Little Barrier Island, and released in the Waitakere Ranges near Auckland, where the bird had been unknown for many years. This experiment is of exceptional interest, for, if it succeeds, there is hope that a trial may be given to other species at present absent from the mainland, but plentiful on some of the outlying islands.

It is, of course, for its song that the Bell-bird is chiefly notable. Throughout the year, it sings at any time, from "early morn to dewy eve," performing even during its moulting season, which is unusual among birds. It is said by some people that the hen bird sings more than the cock, but this is quite wrong. It was three years ago that someone assured me that the hen sang as much and as well as the cock, and since then, and with ample opportunities for doing so, I have taken careful note of the sex of the Bell-birds I have seen singing. The hen bird sings, it is true, and quite well, but her voice lacks the fullness and

volume of her mate's; nor does she exhibit the same gusto for singing as he does.

Headed only by the Tui, the Bell-bird is the second to commence singing in the morning. Long before sunrise he begins to sing, usually a song of five or six notes repeated almost continuously for twenty minutes or more. If there are many TuIs and Bell-birds in the bush, this morning song is really magnificent, the whole air ringing with music. Captain Cook, when in Queen Charlotte Sound, made the following note: "The ship lay at the distance of somewhat less than a quarter of a mile from the shore; and in the morning we were awakened by the singing of the birds: the number was incredible, and they seemed to strain their throats in emulation of each other. This wild melody was infinitely superior to any that we had ever heard of the same kind; it seemed to be like small bells most exquisitely tuned, and perhaps the distance and the water between might be no small advantage to the sound."

Later in the day, particularly in the nesting season, several cock Bell-birds will gather together and indulge in "community singing"—a genuine chorus—apparently from pure *joie de vivre*. Once I was sitting quietly, watching a family of Saddlebacks, the two parents and two young, as they travelled through the tree-tops, feeding as they went. In a dracophyllum near by, a cock Bell-bird was busily extracting the honey from the lily-of-the-valley-like flowers, when another flew into the same tree. According to custom the first bird flew at the second, chasing it with noisy flight for a few seconds, then suddenly stopping, and pouring forth a voluble song. Immediately the other bird answered with a wonderful cadence of six notes, the last low one repeated several times. Two others joined them, and then a fifth, and they settled down to a song that can surely have few equals in the bird world. They sat, a yard or so apart, with tails slightly spread, the feathers of the breast and back erected to make the body appear twice its normal size; the head held forward and the bill down; moving the body from side to side as if in ecstasy, while they poured forth their melody. Each one sang for a short period, then paused for about the same length of time, so that there were always two or more singing together. The richness of the notes was amazing, each bird seeming to vie with the others in the production of music, until the bush echoed with the sound. For perhaps five minutes

they continued thus, not moving from the stands they had originally taken up. Then one of them flew to a bunch of flowers and began to feed, and after a few more bars, the others, one by one, dispersed.

This singing in chorus of Bell-birds is by no means uncommon. So far as my observations go, only cock birds take part in it, and it is not done with any intention of displaying to the hens, as would seem to be the case in the massed displays of some cock birds—Blackcock and Prairie Chicken, for example. It often takes place near a good food supply, the most spectacular instance that I can remember being in a beech tree, where the birds were posted around a large clump of mistletoe, which was at the time a mass of scarlet flowers.

The song of the Bell-bird varies considerably in different districts, and also at different seasons, and even at different times of the day; the dawn song, for instance, is used as a greeting to the day, and not again until next morning. A bird which lived near our hut on Solomon Island had a delightful dawn song of five notes, which he repeated *ad lib.* for twenty minutes (we timed him do this); and when he was going to cease, kept dropping the end note, singing four for a while, then three, then two, and at last chiming one note several times before stopping altogether.

Many of the Bell-bird's notes are quite indistinguishable from a Tui's. In most cases one can tell which bird it is, but there are times when I do not think anyone could say for certain.

Bell-birds are lively, and also very pugnacious, chasing their own kind or other birds in and out among the branches with great speed, and making a loud whirring noise with their wings while doing so. They are always rather noisy in flight, but there is no doubt that they can increase this noise at will. Cock birds sometimes fly out of a tree, and with the body held almost upright, dance in the air as it were, making a very loud whirring noise with their wings, as they fly vertically upwards for three or four feet, then sink down on their tails to their starting level. They repeat this two or three times, making excited whistlings the while, and finally fly off with a loud call and the same noisy flight.

During courtship, and before the hen begins to sit, the cock bird feeds her—not extensively, but little titbits now and then, which she receives with mouth open and wings quivering after the manner of a young bird. They have an extended nesting season, commencing in September, and



Plate XC. BELL-BIRD
Male.



Plate XCI. BELL-BIRD
Female at nest. Note large sea-tick on her eyelid.

rear at least two broods a year. The site chosen for the nest may be anywhere from the ground to forty feet up a tree. They prefer thick cover, but even that is not essential. Favourite trees are rata and manuka, the spot chosen being well up under the canopy of foliage; deep in dense clumps of creeper, particularly lawyer, the nest may be placed, or among the dead fronds hanging around the stem of a tree fern; occasionally I have found it well hidden in the thick grass of a steep bank. Cavities in trees may be used, but not unless they have fairly large openings. The nest itself is a beautiful cup-shaped structure, being made externally of fine twigs and stiff fibres, such as fern roots, and lined inside with fine grass, or, if they are available, wholly with feathers. It is about two inches deep internally and two and a half across the opening, which is slightly constricted, the whole construction being strong and compact. Three or four eggs are laid.

Incubation is carried out by the hen only, and during that period, she leaves the nest once or twice during the day to feed, though she is also fed on the nest by her mate. She sits very close, and if approached quietly may in many cases be touched before leaving the nest. Even when she does leave it, she will often go only a few inches, and there, crouching low, she will utter a plaintive cry. Some hens, when disturbed, however, leave the nest with a rush, hopping about near by in an agitated manner, giving their alarm call continuously—a sharp, shrill note quickly repeated. The young when in the nest, and for some time after leaving it, are fed entirely on insects. Even when the parents are eating honey, they give their young insects, collecting them by searching diligently among the foliage at the ends of branches; and, I verily believe, hopping heavily to shake the twigs, and flush flying quarry, which is pursued and deftly captured.

When the young are feathered, but before they can fly, they have a habit of leaving the nest and perching on nearby twigs, being fed there by their parents. This sometimes leads to accidents, the young birds falling to the ground. Once, when camped in the bush, I tried to get photographs of a Bell-bird feeding its young in a nest in a clump of lawyer at the top of a titoki above our tent. The hooked thorns on the vine gave me a lot of trouble, but finally I got the camera up, and in position. One of the three young, which were just feathered, wanted to sit on a branch about a foot away from the nest. I replaced it, and waited, but

the *wanderlust* was in his blood and he went Columbus-ing off right to the end of the branch. I tried to reach him, but he fell to the ground, and while I was getting him up again on a string from my friend, who was below, the parents fed the two in the nest. "Columbus" was replaced in the nest, but the spirit of adventure was strong in him, and off he went, out of focus, to be immediately fed. I waited for a long time, but when the old birds came back next time, they went to the ground and fed a fourth member of this enterprising family, of whose existence we had not known until then. The light had now gone, so I packed up and left them until the morrow, putting the bird from the ground into the tent for safety. The next day, another one was on the ground, so I collected the two from the nest and posed them on a convenient perch, afterwards putting them in a thick bush, where they stayed all day. Next morning they were scattered about on the ground, and while we were having breakfast we saw a stoat hunting for one of them. We chased it, but it escaped, and when we left our camping ground that day it was with deep misgivings for the fate of the Bell-bird family.

For some days after leaving the nest, which they do a fortnight after hatching, the young utter a squeaky call almost continuously, no doubt to guide their parents to them. They grow fast, however, and are soon left to look after themselves, while their parents start another nest. In their first plumage the young resemble the hen bird. They moult in the autumn, but while they are still in their juvenile plumage they begin to sing, their early efforts, though persistent, being decidedly squeaky and lacking in tone.

The food of the Bell-bird consists of nectar, insects, grubs and fruits. It visits most bush flowers, but it is particularly keen on rata, which has a large supply of honey. Flax, too, yields a bountiful supply, which is much appreciated, and during its flowering season the Bell-birds have the crown of their heads bright orange from a covering of flax pollen. In the early spring they have their heads similarly coated, only bright blue with the pollen of the konini.

Bell-birds are common in the beech forests in the foothills of Canterbury, where a considerable portion of their food supply is provided by a black lichen which covers the trunks of the trees. This sends out hair-like growths about an inch long, on the ends of which is a tiny globule of clear sweet nectar.



Plate XCII. BELL-BIRD
Female and young.

Around the coast of New Zealand there is a tick which attacks certain of the sea birds. It has a more or less spherical body of a blue-grey colour which in large specimens is one-eighth inch in diameter. As a rule, it is found in the angle of the gape of the mouth, or in the eyelid, attaching itself to its host by a proboscis which it drives deep into the skin. On Cundy Island I found both Bell-birds and Fern-birds with these ticks attached to their eyelids, usually on the inside; and a photograph of a hen Bell-bird with a large tick above her eye is reproduced herewith.

At the present time, as already stated, the Bell-bird is spreading and is, generally speaking, definitely on the increase. That it will eventually become a frequent visitor to suburban gardens seems probable, while one may even hope that it may become a permanent resident of the larger city parks. Much has been done of recent years by some enthusiasts, in the way of planting berry-bearing shrubs and trees, to afford Bell-birds and Tuis a food supply, but I am afraid that this alone will not produce the desired result, for I know of places where there are great supplies of food suitable to Bell-birds, and the only result is that great numbers of the introduced Blackbirds, Thrushes and Starlings gather to the feast. It seems that some native bush in the vicinity is essential, but, having this with Bell-birds in it, they can easily be attracted to food supplies in gardens. Honey-bearing flowers are the best for the purpose, for they are not sought by the introduced birds to any extent. Once having the Bell-birds in the garden they can be enticed to remain by placing little tins or bottles in the trees and daily filling them with a syrup of honey and water. I know of many cases where this has been tried successfully, particularly during the winter, and for those who take an interest in birds, or who can appreciate bird song, the effort is well worth while.

CHAPTER XIX

EGGS

IN describing the eggs of the birds dealt with in this volume, I have given the measurements (in mm.) of six normal specimens of each species. These measurements are arranged according to the lengths of the eggs in question: the greatest length first; the least length last. The greatest and least widths given are printed in italics. In a few cases I have given separately the sizes of abnormal eggs of the species. I should have liked to have had the descriptions accompanied by coloured plates, but that is out of the question at present.

BLACK SHAG

65×41 65×39 61×36 60.5×37 60×37.5 59.5×37.5

The full clutch is usually four, though sometimes only three are laid, and occasionally, though rarely, five.

The eggs of the Black Shag are similar to those of the other members of the genus, being elliptical in shape, and heavily encrusted with lime over almost the whole service. When the eggs are newly laid, this chalky covering is white, and rather rough on the surface, and the pale blue of the shell shows through it in places. Viewed by transmitted light, the colour of the shell is a beautiful sea-green. The chalky covering is very soon stained by contact with the birds' feet, and becomes brownish; and, as incubation proceeds, it acquires a considerable degree of polish. In districts where the birds are feeding in peaty waters, their eggs quickly become stained a bright brown. The eggs vary considerably in size, and also in the amount of chalky deposit on them. There is no way in which they can, with certainty, be separated from those of several other species of New Zealand Shags.

PIED SHAG

62.5 × 40 62 × 37 61.5 × 38 60 × 39 60 × 37.5 57 × 39

The full clutch of eggs for this Shag is three or four. The eggs are elliptical in shape, and pale blue in colour, but the latter is almost obscured by the heavy coating of chalk which covers the egg. They cannot always be distinguished from the eggs of several other New Zealand Shags, though they usually differ from those of the Black and Spotted Shags in being broader for their length.

It is not unusual for the eggs of this Shag to have heavy blobs of chalk encrusted on them, a feature that I have never seen in those of any other Shag. I have seen such blobs fully an eighth of an inch in thickness in some specimens.

SPOTTED SHAG

65 × 38 63.5 × 38 61 × 37 60.5 × 36 59.5 × 37 57.5 × 36.5

The clutch of eggs for this Shag varies from two to four. They are indistinguishable from the eggs of several other species of Shags which nest in New Zealand. Similar in size, shape and colouring to those of the Black Shag (q.v.), the eggs of the Spotted Shag are a sa whole slightly smaller, but, as the measurements given above indicate, the sizes of the two overlap. The discoloration of the eggs of this species due to soiling during incubation, is not so brown as it is in the Black Shag.

BLACK-FRONTED TERN

42 × 29 41.5 × 29 41 × 29.5 41 × 28 41 × 27.5 38 × 29.5

Two is the full clutch of eggs for this Tern, though rarely a bird may be found sitting on one only. They are handsome eggs, pyriform in shape, and possess a considerable amount of gloss. The ground colour may be buff, dark brown, dark olive-green, or grey with a greenish tinge; marked with black or brown, with underlying markings of dark grey. The markings may take the form of large irregular blotches, with a few streaky lines; or they may be small spots, evenly distributed over the whole surface. Rarely the markings have a "twist," in which case it is from right to left, downwards.

WHITE-FRONTED TERN

51.5 × 34 47 × 32 44.5 × 30.5 44 × 33.5 44 × 33 44 × 31.5

The full clutch of eggs of this Tern is two, but sometimes in a colony numbers of birds will be found sitting on one egg only. The eggs, which have no gloss, vary greatly in colour and shape. What may be taken as typical specimens are ovoid in shape, having a grey ground colour, more or less evenly sprinkled with small, well-defined black spots, and underlying spots of dark grey. The ground colour may, however, be anything from pale buff, through grey, to dark brown. Grey eggs may have a bluish tinge, but not green, while the markings, instead of being evenly distributed, may form a zone round the larger end, or even the middle of the egg.

I have seen tens of thousands of eggs of this Tern, and they exhibit an amazing variation. Sometimes a large blotch of colour may cover the big end of the egg, whilst the rest is devoid of markings. Again the spots may be drawn out a little, and slant across the egg so that, as it were, they spiral around the egg from top to bottom, always having the same twist: viz. from right to left. There is one rare variety of this Tern's egg which is very beautiful. The ground colour is a lovely salmon-pink, with dark red-black markings and underlying spots of mauve-pink. I have seen altogether only about six of these, so they are very unusual.

BLACK-BACKED GULL

76.5 × 46 76 × 49 72 × 50 71 × 47 67 × 46 65 × 45.5

Clutch almost invariably three, though occasionally only two are laid. The ground colour is from pale to dark grey or brown, sometimes with a greenish tinge. The eggs are heavily marked with dark brown or black, with underlying markings of dark grey. These markings usually consist of well-defined roundish spots, but sometimes take the form of large irregular blotches or streaks. The eggs have much more lustre than those of the Southern Skua, though, curiously enough, if the surface be magnified it will be found to have a coarser grain than that of the duller egg.

I have one clutch of Black-backed Gulls' eggs which are distinctly

EGGS

unusual, being pale blue in ground colour with very few markings on them. By transmitted light these eggs are sea-green. I have also a "pullet" egg of this species measuring only 39×31 mm., but perfect as to colouring.

BLACK-BILLED GULL

55×37 54×40 54×38 53×37 52×37 49×37

Clutch usually three, but two are not uncommon. The ground colour may be dark brown, buff, grey, blue-grey or green, boldly marked with dark brown or black, and having underlying markings of grey, or brownish grey. The markings are sometimes evenly distributed, but more often are thicker at the larger end of the egg, where they may form a definite zone, the remainder of the shell being almost free of spots. Streaky markings are not uncommon. When fresh, Black-billed Gulls' eggs are very handsome, but when they have been blown for some time, the colours, to a great extent, fade out. As a whole, they are rounder than is usual with Gulls' eggs. A "pullet" egg of this species, which I have, measures only 28×23 mm.

I have found two very unusual clutches of this Gull, in each case with two eggs. The eggs which are of normal size and shape are a beautiful pale blue, three of them having no markings, while one has two brown spots on it.

The eggs of the Black-billed Gull are similar to those of the Red-billed Gull, and cannot be distinguished from them, although as a whole they are more boldly marked.

SOUTHERN SKUA

80×51 78.5×52.5 78×51.5 76×53 74.5×52.5 70×48.5

The usual clutch with Skuas is two, but perhaps one nest in a dozen contains one only, and I have once found a clutch of three. The shell is finely granulated, and has little or no lustre. In ground colour the eggs vary through shades of brown, and buff, from pale to dark. Occasionally the ground colour is greenish, greenish brown or slate, but such are unusual. The overlying markings are dark brown, and the underlying ones grey or grey-brown. As a rule the markings are congregated at one end of the egg, usually the large end, where they may take the form of

blotches which may be almost confluent; but sometimes the whole surface is covered more or less evenly with small spots. Occasionally the spots are interspersed with thin streaks of dark brown. The percentage of eggs with the major portion of their markings at the small end of the egg is much greater than in most birds, being over 10 per cent. Although in size and shape Skuas' eggs show a considerable diversity, the two eggs of a clutch as a rule closely resemble one another, particularly in regard to their shape. In form the eggs are roundish, but sometimes pyriform.

The only other New Zealand eggs with which they could be confused are those of the Black-backed Gull, and from these they may be distinguished by their lack of lustre, and the fact that their markings are much more obscure.

MOTTLED PETREL

64.5 × 44 63.5 × 42 63 × 43 59 × 43 57 × 41.5 56 × 42.5

The eggs of the Mottled Petrel, of which one is the invariable clutch, vary considerably in size, as the above dimensions show. When fresh they are pure white, but are apt to get stained during the course of incubation, although perhaps to a less extent than is usual with Petrel eggs, on account of the excellence of the nest, which keeps them from coming in contact with the soil. The shell is thin and fragile and has little of the characteristic Petrel odour; its texture is fine, and the egg is very smooth to the touch, having a curious, almost greasy feel. When fresh it is of a rather watery, transparent white, but when dry this appearance is lost. I do not know of any way in which these eggs can with certainty be separated from the eggs of some of the other Petrels—Fluttering Shearwater (*Puffinus gavia*), for example—though the texture of the shell is some guide.

BANDED DOTTEREL

36 × 25 34.5 × 26 34 × 25 34 × 23 33 × 25 32.5 × 25.5

The usual clutch is three; never four, and seldom only two. The eggs are pyriform in shape, but the very pointed type, common among some Plovers, is unusual in this species. The ground colour may be pale blue-green, brown, or olive-brown, thickly speckled all over with black,

EGGS

the speckles at the larger end, or in a zone around it, being confluent. Sometimes the markings are very fine, giving the egg the appearance of having been peppered with black. Occasionally eggs may be found having the ground colour pale buff, thickly covered with fine streaks of smoky black; and I have a set in which the ground colour is cream with streaks of brownish black, in lovely shades, which form a zone around the larger end of the egg, the remainder of the surface being only sparsely marked. These eggs have also faint underlying markings of mauve.

WRYBILL

35×26.5 34×26.5 34×25 33.5×26 33.5×25.5 32×25.5

The clutch invariably consists of two eggs, which in shape are broadly pyriform. The ground colour is pale grey, sometimes faintly tinted with blue or green. They are thinly speckled all over with tiny spots of black or dark brown, and dark grey, the spots being so small as to be invisible at a distance of a few feet; so that, excepting when viewed at very close range, the egg appears to be pure grey.

PIED STILT

47.5×31 46×32 45.5×31 44.5×32 43×33 42×29.5

The full clutch of eggs of the Pied Stilt is four, but three is by no means uncommon. In shape they are pyriform, or in some cases broadly elliptical. The ground colour is brown or olive-brown, boldly marked over its whole surface with black spots or blotches.

Generally speaking the eggs show very little variation, but I have one set of four in which the ground colour is pale green. Three of these are thinly marked with streaks of black; the fourth being heavily streaked with black and mauve.

They cannot with certainty be separated from the eggs of the New Zealand Dotterel, but, generally speaking, are darker in ground colour, and are more boldly marked.

HARRIER

49.5 × 36.5 49 × 38 48.5 × 39 48 × 39 48 × 38 47 × 36.5

The usual clutch is four eggs, but three is not uncommon, and I have found larger sittings of up to seven eggs. Harriers' eggs are white, faintly tinged with blue, the shell being rather rough, and devoid of gloss. Viewed from the inside, against a strong light, they are a most beautiful blue-green. The measurements I have given are typical, but Oliver gives larger dimensions: 52.5 × 39.5, 52 × 39.

MOREPORK

39 × 34 39 × 32.5 38.5 × 34.5 38.5 × 32 37.5 × 32.5 37 × 32

Two is the ordinary clutch of eggs, though one is not uncommon, and, sometimes, though very rarely, three are laid. In colour, they are pure white. The eggs of the Morepork are very round, and the shell, though fine grained and smooth, is without any gloss.

KINGFISHER

31 × 23 30.5 × 23 30 × 25 30 × 23.5 27 × 23 26 × 22

The usual clutch is four or five, though sometimes six are laid; and I once found seven. The eggs are pure white, slightly glossy, with the texture of the shell so fine that, when fresh, the yolk shows through, giving the shell a faint tinge of colour. They are roundish; sometimes almost spherical; sometimes broadly elliptical; and at other times slightly pointed.

BLIGHT-BIRD

19 × 13 18.5 × 13 18 × 13 18 × 12.5 17 × 12.5 16.5 × 13

Three eggs is the usual clutch, though four are sometimes laid. The eggs of the Blight-bird are clear pale blue, and the shell is so thin that one may tell at a glance if they are fresh or have been incubated for any length of time. They cannot be confused with the egg of any other New Zealand bird; and from those of the introduced Hedge-sparrow they may be easily separated by their paler colour, and much smaller size.

FANTAIL

17 × 12.5 17 × 12 16 × 12.5 15.5 × 12.5 15 × 13 15 × 12

The clutch is four, though only three are sometimes laid. The eggs have a ground colour of white, or creamy white, with markings of brown and dark grey, which almost always form a more or less confluent zone around the larger end. The spots are sometimes small and well defined, but more often are of irregular shape. The smaller end of the egg is, as a rule, but sparsely marked with small spots. Fantails' eggs are somewhat similar to those of the Tomtits (*Petroica*), from which they may readily be distinguished by their smaller size.

BELL-BIRD

24 × 17 24 × 16.5 22.5 × 17 22.5 × 16 22 × 17 22 × 16.5

The clutch is usually four, though three is not uncommon. The eggs are very fragile, and very beautiful. The ground colour varies from white with the faintest tinge of pink in it, to rich pink. The markings exhibit a considerable variation in size, shape and colour. Some eggs have the larger end marked with well-defined dark red-brown spots, the remaining three-fourths of the surface having very few, or no markings at all. Others are heavily blotched with pinkish red, particularly at the larger end, which may be almost covered with one daub of colour. In some eggs the ground colour is so dark that the markings are hardly perceptible, giving the egg the appearance of being a self-pink. Often the eggs have definite streaks of colour, so fine that they give the impression of cracks in the shell. It is not at all uncommon for the eggs of the Bell-bird to be more heavily marked on the small end than on the large end.

APPENDIX

Banded Dotterel	<i>Charadrius bicinctus</i>
Bell-bird	<i>Anthornis melanura</i>
Black-backed Gull	<i>Larus dominicanus</i>
Black-billed Gull	<i>Turdus merula</i>
Blackbird	<i>Larus bulleri</i>
Black Fern	<i>Polystichum vestitum</i>
Black-fronted Tern	<i>Clidonias albistriata</i>
Black Rat	<i>Rattus rattus</i>
Black Shag	<i>Phalacrocorax carbo steadi</i>
Blight-bird	<i>Zosterops halmaturina</i>
Blue Shag	<i>Sticto carbo steadi</i>
Boatmen	<i>Corixa arguta</i>
Bully	<i>Gobiomorphus gobioides</i>
Cabbage tree	<i>Cordyline australis</i>
Creeper	<i>Finschia novaeoelandiae</i>
Crow	<i>Callaeas wilsoni</i>
Diving Petrel	<i>Pelecanoides sp.</i>
Dove Petrel	<i>Prion turtur</i>
Fantail	<i>Rhipidura flabellifera</i>
Fern-bird	<i>Bowdleria punctata stewartiana</i>
Flax	<i>Phormium tenax</i>
Flax small	<i>Phormium Cookiana</i>
Giant Petrel	<i>Macronectes gigantea</i>
Grey Duck	<i>Anas superciliosa</i>
Hare	<i>Lepus europaeus</i>
Harrier	<i>Circus approximans drummondi</i>
Hedgehog	<i>Erinaceus europaeus</i>
Huia	<i>Heteralocha acutirostris</i>

APPENDIX

Kahuwai	<i>Arripis trutta</i>
Kaka	<i>Nestor meridionalis</i>
Kea	<i>Nestor notabilis</i>
Kingfisher	<i>Halcyon sanctus vagans</i>
Konini	<i>Fuchsia</i>
Lancewood	<i>Pseudopanax crassifolia</i>
Lawyer	<i>Rubus australis</i>
Leach-blight	<i>Friocampa limacina</i>
Manuka	<i>Leptospermum</i>
Maori Rat	<i>Rattus maoriorum</i>
Matipo	<i>Pittosporum sp.</i>
Mistletoe, red	<i>Eletranthe colensoi</i>
Morepork	<i>Ninox novaeseelandiae</i>
Mottled Petrel	<i>Pterodroma inexpectata</i>
Mutton-bird	<i>Puffinus griseus</i>
New Zealand Dotterel	<i>Pluviorhynchus obscurus</i>
Ngaio	<i>Myoporum laetum</i>
Norwegian Rat	<i>Epimys decumanus</i>
Oyster-catcher	<i>Haematopus longirostris</i>
Pied Shag	<i>Phalacrocorax varius varius</i>
Pilchard	<i>Sardina neopilcharda</i>
Pohutukawa	<i>Metrosideros tomentosa</i>
Pukeko	<i>Porphyrio melanotus</i>
Rata	<i>Metrosideros lucida</i>
Redpoll	(<i>Acanthis</i>) <i>Linota rufescens</i>
Ribbonwood	<i>Hoheria sp.</i>
Richardson's Skua	<i>Stercorarius parasiticus</i>
Saddleback	<i>Creadion carunculatus</i>
Silveries }	
Smelts }	<i>Retropinna retropinna</i>

APPENDIX

Southern Skua	<i>Catharacta antarctica</i>
Spotted Shag	<i>Stictocarbo punctatus</i>
Starling	<i>Sturnus vulgaris</i>
Stilt, Pied	<i>Himantopus leucocephalus albus</i>
„ Black	„ <i>novae-zealandiae</i>
Stoat	<i>Mustella ermina</i>
Thrush	<i>Turdus philomenus</i>
Titoki	<i>Electryon excelsum</i>
Toi-toi	<i>Arundinaria conspicua</i>
Toumatou-kouri	<i>Discaria toumatou</i>
Warbler	<i>Pseudogerygone igata</i>
Weasel	<i>Mustella nivalis</i>
Whale-birds	<i>Pachyptila vittatus</i>
Whitebait	<i>Galaxias attenuatus</i>
White-chinned Petrel	<i>Procellaria aequinoctialis</i>
White-fronted Tern	<i>Sterna striata striata</i>
White-faced Storm Petrel	<i>Pelagodroma marina</i>
White-headed Petrel	<i>Pterodroma lessoni</i>
Whiting	<i>Merluccius gayi</i>
Woolly-aphis	<i>Schizoneura lanigera</i>
Wrybill	<i>Anarhynchus frontalis</i>



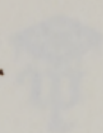
The Westminster Press
411a Harrow Road
London W.9

P-121

NATIONAL LIBRARY OF NEW ZEALAND



3 1111 00028193 9



598.29931

STE

1932

Stead, Edgar F. (Edgar

Fraser),

1877-1949

Life histories of New Zealand
birds

by Edgar F. Stead.

No 362678

card
No 362678

N. Z. birds

3 6 2 6 7 8

ERNMENT
RARY SERVICE

P-129

NATIONAL LIBRARY OF NEW ZEALAND



3 1111 00028193 9

DATE DUE

19 JUN 66 HQ

7 MAR 67 HQ

~~20-10-67~~

19 OCT

10 MAR 1977

11 MAR 1977

23 MAY 1977

25 NOV 1977

26 NOV 1977

30 JUL 1978

NAENAE COLL

22/8/80

30 APR 1992

N.L.S.—11/1

598.29931 Stead, Edgar F. (Edgar
STE Fraser),
1932 1877-1949
Life histories of New Zealand
birds
by Edgar F. Stead.

E DUE

Please return this item to:

Document Supply Services
National Library of New Zealand
PO Box 1467
Wellington

supplied at no charge from the collections of the
National Library of New Zealand.

DATE DUE

362678

card No 362678

N. Z. birds

3 6 2 6 7 8

GOVERNMENT
LIBRARY SERVICE

P-127
NATIONAL LIBRARY OF NEW ZEALAND



3 1111 00028193 9

Please return this item to:

Document Supply Services
National Library of New Zealand
PO Box 1467
Wellington

*Supplied at no charge from the collections of the
National Library of New Zealand.*

**NATIONAL
LIBRARY**
OF NEW ZEALAND
Te Puna Mātauranga o Aotearoa



DATE DUE

16 JUN 2004

16 AUG 2006

23 APR 2007

598.29931

2nd card No 362678

STEAD, E. F.

Life histories of N. Z. birds

TAKP
8723

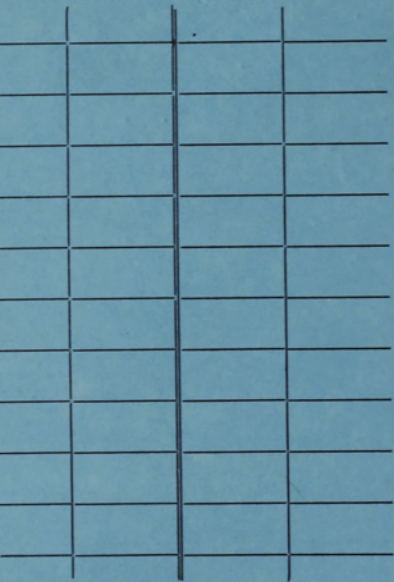
6 NOV 1977

East Coast Bay SS 11
30 JUL 1978

NAENAE COLLEGE
Mrs Robertson

22/8/80

0 D 1579/80.



598.29931

Nº 362678

STEAD, E.F.

Life histories of N.Z. birds.

4/9/50

1083

2760

12 Young
It. Fawc,
19 Southfield Rd.

6836

7/3/67.

~~19. October~~
~~S. Brown~~

227

E. Maria Hansby
432 Massey Rd.

HQ 21.5.77

Orchard
13 Oct.

Brands.

21.12.63.

8218 9-5-69

598.29931 Stead, Edgar F. (Edgar
STE Fraser),
1932 1877-1949
Life histories of New Zealand
birds
by Edgar F. Stead.

598.29931

STE

3 6 2 6 7 8



HQ

N.Z. GOVERNMENT
NATIONAL LIBRARY SERVICE

STE

598.29931
STE
1932

THE LIFE HISTORIES OF
NEW ZEALAND BIRDS * F. F. STEAD