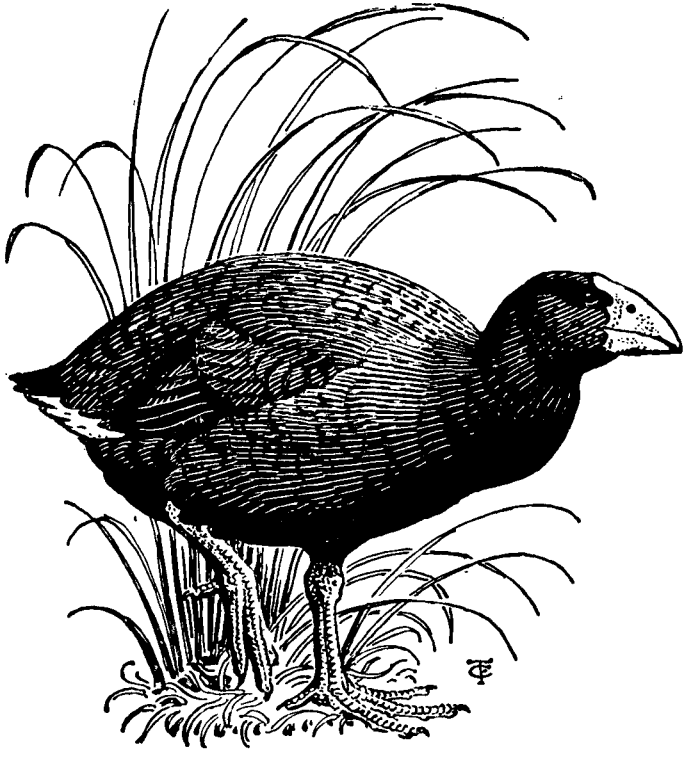
NOTORNIS

Quarterly Bulletin of

The Ornithological Society of New Zealand



Volume 7, Number Five : July 1957

NOTORNIS

In continuation of New Zealand Bird Notes

BULLETIN OF THE ORNITHOLOGICAL SOCIETY OF NEW ZEALAND
(Incorporated)

Registered with the G.P.O., Wellington, as a Magazine

Edited by R. B. SIBSON, King's College, Auckland S.E.7

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Contents of Volume 7, Number 5 : July 1957

NOTORNIS

VOLUME SEVEN NUMBER FIVE : JULY NINETEEN FIFTY-SEVEN

ANNUAL MEETING

In spite of gales, floods and blocked roads 44 members and friends attended the Annual General Meeting in Gisborne on the night of 17 May. This was very satisfying, though the great distance involved in travelling discouraged any South Island members from appearing. After the business of the meeting and supper Mr F. C. Kinsky showed his striking colour film of the birds of the guano islands of Peru.

The following were declared elected at the meeting to replace retiring officers: Mr P. C. Bull, President; Mr H. R. McKenzie, Treasurer; Mr G. R. Williams was re-elected as Secretary. Mr E. G. Turbott (North Island Vice-President) and Mr J. C. Davenport (Council member) were declared elected to fill the positions thus made vacant.

A vote of thanks was passed to Miss Noelle Macdonald on her retirement from the increasingly arduous post of Honorary Treasurer. Thanks were also expressed to Mr E. G. Turbott for his work as acting Secretary in Mr Brookfield's absence. Members then joined in a vote of appreciation of Mr McKenzie's work for the Society and his efforts in furthering the interests of all members during his term as President.

During the week-end the field excursions to part of the Motu Bush and the Muriwai Lagoon both took place under pleasant conditions, and though no startling observations were made a good variety of species was seen.

The Society and all who were present are grateful for the comprehensive and efficient arrangements made by Mr A. Blackburn, the Regional Organiser, and to Mr and Mrs J. M. Monckton, who were our hosts for morning tea at their home at Patutahi on the Saturday, and to those other Gisborne members who were so hospitable, too.

SEVENTEENTH ANNUAL REPORT, FOR THE YEAR 1956-7

OFFICERS, 1956-57 –

President: Mr H. R. McKenzie.
North Island Vice-President: Mr P. C. Bull.
South Island Vice-President: Mrs L. E. Walker.
Secretary: Mr F. M. Brookfield (Mr E. G. Turbott acting).
Treasurer: Miss N. Macdonald.
Editor: Mr R. B. Sibson.
Mrs O. Sansom, Dr R. A. Falla, Mr E. G. Turbott.

Mrs L. E. Walker (South Island Vice-President), Dr R. A. Falla and Mr E. G. Turbott (Council members) were re-elected at the last Annual General Meeting. Mr G. R. Williams was appointed by Council to the position of Secretary after the resignation of Mr F. M. Brookfield in late 1956.

The Society wishes to thank the retiring Secretary, Mr F. M. Brookfield, for his services, and Mr E. G. Turbott for so ably filling for 18 months the inter-regnum between Mr Brookfield's retirement from active duty and the election of the new Secretary. Miss Noelle Macdonald deserves the Society's gratitude for her service as Treasurer. During the absence overseas of the Editor of *Notornis,* Mr Turbott has kindly agreed to act in his place. And, as mentioned in the Hon. Librarian's report, our thanks are due to Mr R. V. Roberts, who has undertaken the binding of the first 42 volumes of *Emu* at his own expense. So far 31 volumes have been bound and the remainder will be bound when missing parts come to hand and time and material permit.

MEMBERSHIP

At the end of the financial year there were 767 members – 63 of these are life members and 65 overseas members. The increase in membership over the previous year was 7.6%. More details will be given in the Treasurer's report.

GENERAL ACTIVITIES

So that the Society may function more fully we hope that the roll of Regional Organisers will be filled and that the officers concerned will do their best to arrange group meetings and excursions. At present seven posts need to be filled, namely: North Auckland, Waikato, Bay of Plenty, Taranaki, Wairarapa, Marlborough and Westland. But though a lot depends on the Regional Organiser for the success of activities in the different areas, he cannot function without the support from his local members. So we ask for more wholehearted support from them. And all members are again besought to take part when they can in the various special enquiries concerning which many members must possess valuable information still to be imparted.

TREASURER'S REPORT, 1956-7

The membership of the Society seems to be at a fairly settled stage, quite a number leaving and a similar number joining. The roll consists of 480 ordinary members, 183 endowment, 40 junior, 63 life and 1 honorary life; total 767. This includes 46 in arrears for the current year and 29 for the previous year. Many of those in arrears have paid since 31/3/57, largely as a result of a standard letter sent out recently.

Stocks of publications are still hard to trace. Further adjustments have been made, resulting in three cases of small losses being shown in these accounts where no such loss has really occurred. Mr J. C. Davenport has made an indexed card ledger of back numbers of *Notornis* and this has been most helpful. Stocks of publications were not at first taken into account, but it is felt that since the Society has become incorporated they should be brought into the books.

The total sales of back numbers and other publications was £35 9/6. Some back numbers are out of print and Regional Organisers have been asked to try to buy in from members who leave the Society. A stock letter will be sent in future, asking for back numbers.

Donations totalled £19 1/6 last year and £15 5/- this year. The drop may be due to the raising of the subscription.

Purchases of Library literature have been placed in a separate account in the last two years. A valuation of the balance of library material must be made and brought into account.

The printing of *Notornis* has cost so much that the Council will need to take steps at once to find more funds, or to reduce the size of the publication. The latter seems the more feasible, but it would be a pity to reduce, as there is much material waiting to be printed.

Other costs, particularly printing, stamps and stationery, are high, and little can be done to make them less.

A brighter prospect is provided by the Christmas Card scheme, conceived, brought forward and put into effect almost solely by the fine effort of Mr B S. Chambers. Mr Chambers has plans for further good work and the Society has much cause to be thankful to him. It is suggested that the Society cannot reasonably rely on this source of income to meet annual expenses, as Mr Chambers cannot be expected to maintain this work year after year. If most of the money is placed in a capital fund, the interest will be an annual gain to the funds, while the capital will ensure financial stability.

The thanks of the Society are due to Messrs Chambers, Worth and Chambers for auditing the books and for doing much other work without remuneration.

NOELLE MACDONALD,
Hon. Treasurer.

INCOME & EXPENDITURE ACCOUNT FOR YEAR ENDED 31/3/57

EXPENDITURE						INCOME					
Printing *Notornis*				391	17 0	SUBSCRIPTIONS –					
Postages				41	11 2	For year 1956-57		380	10 0		
Printing and Stationery				53	4 11	Overdue £40 5/- and estimated to produce		20	0 0		
Addressograph Plates bought				3	16 0					400	10 0
General Expenses				8	15 6	DONATIONS –					
Ringing –						General		4	4 0		
Stock 1/4/56		42	9 7			Illustrations		2	10 0		
Purchases		43	10 2							6	14 0
		85	19 9			SALES –					
Donations	8 11 0					*Notornis*				2	0
Stocks 31/3/57	41 9 10					Exchange				11	1
		50	0 10			Interest P.O.S.B.				5	7 10
				35	18 11	Excess of Expenditure over Income				142	9 5
Brochure 'Bird Study'				13	0						
Losses (owing to adjustment of stocks) –											
Reports and Bulletins		1	9 0								
Checklist		2	6 6								
Back Numbers		10	2 9								
				13	18 3						
Depreciation				5	19 7						
				£555	14 4					£555	14 4

BALANCE SHEET FOR THE YEAR ENDING 31/3/57

LIABILITIES							ASSETS					
SUBSCRIPTIONS –							Subscriptions in arrears estimated to realise				20	0 0
Paid in Advance for 1957-58	32	12	6				STOCKS ON HAND –					
Paid in Advance for 1958	9	7	6				Printing and Stationery	16	5	0		
				42	0	0	Ringing Scheme	41	9	10		
Life Members 1/4/56	206	3	6				*Takahe*	6	6	0		
Plus paid in 1956-57	20	10	0				Reports and Bulletins (cyclostyled) Reprinted	75	16	0		
	226	13	6				Checklist	8	4	0		
Less transferred to Subscription A/c	27	10	0				Back Numbers	302	7	6		
				199	3	6	Brochure 'Bird Study'	12	7	0		
				241	3	6					462	15 4
SUNDRY CREDITORS				94	14	0	PLANT at Cost Less Depreciation –					
GENERAL RESERVE –							Addressograph Machine	12	2	7		
							Addressograph Plates	16	17	1		
Balance 31/3/56	506	10	8								28	19 8
Plus further stock of back numbers brought in	121	13	9				LIBRARY –					
							Purchases 1955-56 and 1956-57				11	15 2
	628	4	5				Sundry Debtors				20	0 0
Less loss for year	142	9	5				Loan to Card Committee				50	0 0
				485	15	0	CASH –					
							Bank of New Zealand	46	10	1		
				£821	12	6	P.O.S.B.	181	12	3		
											228	2 4
											£821	12 6

I report to the members of the Ornithological Society of New Zealand Incorporated that I have examined the books, accounts and vouchers of the Society for the year ended 31st March 1957 and certify that the above Balance Sheet is properly drawn up to show the true financial position of the Society at that date. I have accepted the values placed by your Treasurer on 'stocks on hand'.

D. N. CHAMBERS, Auditor.

(*Signed*) D. N. Chambers

CARD COMMITTEE ACCOUNTS

BALANCE SHEET AS AT 31 MARCH 1957

CURRENT LIABILITIES				CURRENT ASSETS			
Loan – Ornithological Society of New Zealand Inc.			50 0 0	Australia and New Zealand Bank Limited			275 4 8
ACCUMULATED FUNDS –				FIXED ASSETS –			
Balance 1/4/56	32 10 8			Printing Blocks – Cost	176 12 6		
Net Profit	290 10 0			Depreciation written off to date	79 5 8		
			322 11 6				97 6 10
			£372 11 6				£372 11 6

TRADING AND PROFIT AND LOSS ACCOUNT FOR YEAR ENDED 31 MARCH 1957

Opening Stock	53 18 0			Sales – 21,000 Cards		738 3 0
Add Cost of 16,000 cards purchased	166 4 6			Donations		1 7 8
				Profit on overprinting		16 9
Cost of Cards sold, 21,000			220 2 6			
Advertising	101 0 8					
Postages	12 8 1					
	113 8 9					
Packing Expenses	8 17 6					
Postages – General	5 10 3					
Sundry Services	15 18 2					
Stationery	19 7 6					
General Expenses	10 1 9					
			173 3 11			
Depreciation			57 0 2			
NET PROFIT			290 0 10			
			£740 7 5			£740 7 5

ANNUAL REPORT—CARD COMMITTEE

Your Committee has pleasure in presenting its report and accounts for the last financial year. At the same time it would like to thank all members and friends, especially members of the Forest and Bird Protection Society, who supported our project.

Direct sales from the Society together with the shop sales totalled about 21,000 cards for a return of £738 3/-. Other income was donations and over-printing commission of £1 7/8 and 16/9 respectively. A reference to the accounts shows the accounts as the expenses are incurred, chronologically. Advertising was very heavy at £113 8/9, but it is necessary to advertise to sell cards. Sundry services are services rendered by outsiders for both selling and administration. Depreciation is heavy, but, once used, the designs are no longer new, although the blocks are little worn. The net profit for year is £290 0/10.

The bank balance has risen and one of the loans of £50 has been paid off. All stock was sold. Accumulated funds have now risen to £322 11/6, of which £290 0/10 represents this year's profits.

Christmas 1957 is going to see new ideas again. Four new designs will be available on Christmas Cards with improved layout. Calendars with the same pictures will also be available, and so will Book-markers which are simply unique. All members will receive a note in the mail in August describing them in full. All these will be available for sale in August.

Again this year acknowledgement must be made to our artist, Mr A. C. Hipwell. The Committee made a small presentation to him at Christmas in appreciation of his work. The Committee's thanks also go to Mr P. Hawley for his help in packing of the cards. Much time was spent counting and packing, and to those who ordered cards we hope that they arrived in good condition. The Card Committee, which consists of the Convener, the Editor and the President, would be losing Mr H. R. McKenzie normally, because of the change of President, but at the request of the Convener he has agreed to accept nomination for the Committee. Mr McKenzie's help has been greatly appreciated, and I take this opportunity of thanking him as well as Mr R. B. Sibson for their help and advice.

B. S. CHAMBERS,
Convener.

LIBRARY REPORT, 1956-7

During the year 36 pamphlets and reprints have been added to the library. We have been most grateful to Mr R. B. Sibson for making two stacks of shelving for the library. These have eased the accommodation problem considerably, and periodicals can now be shelved satisfactorily. We are very grateful also to Mr R. V. Robers, who has undertaken the binding of *Emu* at his own expense. So far 31 volumes have been bound, the binding of the rest being held up because of a number of missing parts.

Twenty-eight items were borrowed by members during the year.

Following is a list of the periodicals received currently by the library:

Australia: *Emu; South Australian Ornithologist.* Belgium: *Le Gerfaut.* Borneo: *Sarawak Museum Journal.* Denmark: *Dansk Ornithologisk Forenings Tidskrifft.* France: *L'Oiseau et la Revue Française d'Ornitologie.* Germany: *Ornithologische Mitteilungen; Die Vogelwarte.* Great Britain; *Bird Study; British Birds; Country-side; Ibis; Ring.* New Zealand: *Forest and Bird; Notornis.* Norway: *Sterna.* South Africa: *Ostrich.* Switzerland: *Der Ornithologische Beobachter.* United States: *Auk; Bird Banding; Condor; Postilla; Wilson Bulletin.* Yugoslavia: *Larus.*

ENID A. EVANS,
Hon. Librarian

ANNUAL REPORT—NEST RECORDS SCHEME, 1956-7

To preclude possible uninformed criticism, action was taken during the year to legalise the scheme in accordance with the bird protection laws.

Contributors showed a slight increase. The following contributed to the Society's records:

Mesdames L. E. Walker, C. Parkin, R. P. Stoddart, W. H. Rolston, L. M. Renouf, Miss M. Sansom, Dr C. A. Fleming, Messrs B. D. Bell, L. C. Bell, H. D. Davidson, H. R. McKenzie,, S. S. McDonnell, H. L. Secker, R. V. Roberts, C. Parkin. Also W. H. Secker (non-member).

Accessions as at 31 March 1957 are as follows:

Yellow-eyed Penguin (2)
Little Blue Penguin (1)
White-flippered Penguin (7)
Little Grebe (1)
Grey-faced Petrel (1)
Gannet (2)
Pied Shag (2)
Reef Heron (5)
White-faced Heron (3)
Bittern (1)
Grey Teal (7)
Mute Swan (2)
Black Swan (3)
Paradise Duck (1)
Brown Duck (2)
Grey Duck (8)
Mallard (3)
Harrier (10)
Pukeko (6)
Black Oystercatcher (5)
Pied Oystercatcher (2)
Banded Dottrel (24)
N.Z. Dottrel (5)
Pied Stilt (24)
Black-backed Gull (26)
Red-billed Gull (2)
Black-billed Gull (7)
Black-fronted Tern (3)
Caspian Tern (2)
Fairy Tern (1)
White-fronted Tern (14)
Bush Pigeon (1)
Rock Dove (31)
Morepork (1)
Kingfisher (4)
Skylark (6)
Fantail (22)
Pied Tit (3)
Yellow-breasted Tit (1)
Northern Robin (5)
Whitehead (4)
Grey Warbler (13)
Song Thrush (182)
Blackbird (170)
Hedge Sparrow (38)
Pipit (6)
Bellbird (4)
Tui (1)
White-eye (28)
Greenfinch (6)
Goldfinch (20)
Lesser Redpoll (11)
Chaffinch (28)
Yellowhammer (4)
House Sparrow (26)
Starling (18)
White-backed Magpie (1)

H. L. SECKER,
Convener

7TH ANNUAL REPORT OF THE ORNITHOLOGICAL SOCIETY OF NEW ZEALAND RINGING COMMITTEE FOR THE YEAR ENDING 31 MARCH 1957

Compiled by F. C. KINSKY, Ringing Convener

INTRODUCTION

This report deals with all birds ringed and recovered between 1 April 1956 and 31 March 1957, as far as they were reported to the Convener within these dates. It also contains a small number of birds ringed and recovered before 1 April 1956, but which were not mentioned in previous reports. No distinction is made.

The Ringing Committee is happy to be able to advise that the number of species of protected birds, for which a general permit for ringing purposes has been granted by the Hon. Minister of Internal Affairs, has now been considerably enlarged, and the following protected species can now be ringed after obtaining a permit from the Ringing Committee:

All Albatrosses, Petrels, Prions and Shearwaters at sea*; Gannet; Little Black Shag; White-throated Shag; Pied Shag; Spotted Shag; Blue Heron; White-faced Heron; South Island Pied Oystercatcher; Northern Oystercatcher; Black Oystercatcher; Banded Dotterel; New Zealand Dotterel; Pied Stilt; Black Stilt; Black-backed Gull; Black-billed Gull; Red-billed Gull; Black-fronted Tern; Caspian Tern; White-fronted Tern; Shining Cuckoo; Long-tailed Cuckoo; Silvereye.

All species of birds included in the fifth Schedule of the Wild Life Act, i.e. all unprotected species of birds, may be ringed after obtaining a permit from the Ringing Committee.

Four species of birds are now being ringed by individual ringing operators under special permit, i.e. Northern Blue Penguin, Sooty Shearwater on land, Fairy Tern and Fantail. A special report on the ringing of these four species has to be supplied to the Hon. Minister of Internal Affairs every year.

For the purpose of investigation on the Northern Blue Penguin, a special flipper ring has been designed, which was manufactured locally. This type of ring is now being used as a trial and was found to be very satisfactory.

A batch of rings has been taken down to the Antarctic, including also flipper rings of the above design, but no report on ringing has yet been received from members of the New Zealand Antarctic Expedition.

The Ringing Committee is most grateful to the Dominion Museum for its help in having these special penguin rings made and for providing the necessary funds for their purchase, and to the Department of Internal Affairs for again providing a grant of £25 for the purchase of rings, which constituted a big help for this part of the Society's work.

RINGING OPERATIONS

Since the start of the Society's ringing scheme, 39 Ringing Permits have been granted.

During the period covered by this report, eight permits were cancelled and four new permits were issued, i.e. 35 members are now holding ringing permits.

The number of birds ringed during this year (5853) constitutes a record for New Zealand ringing, and is mainly due to Mr F. Abernethy's enthusiastic and admirable work done in ringing petrels at sea from a fishing vessel.

The number of birds recovered this year (357) also constitutes a record, which is partly due to the changed definition of the term 'recovery', agreed to by the Ringing Committee. A circular explaining this and some other minor changes in the ringing rules will be forwarded to all ringing operators in the near future.

The following Table A shows the results of the ringing operations conducted during the current year.

TABLE A

Name of Operator	*Number of birds ringed*	*Number of species ringed*
F. Abernethy	2437	7
D. Arthur	32	1
R. A. L. Batley	–	–
D. B. Bell	20	3
D. H. Brathwaite	–	–
P. C. Bull and co-workers	126	4
W. C. Clark	317	2
J. C. Davenport	773	2
Dr R. A. Falla	–	–
M. Fitzgerald	14	1
Dr C. A. Fleming	–	–
L. Gurr	2	1
Department of Internal Affairs (R. G. Williams)	30	1

*For the ringing of Albatrosses, Petrels, Prions and Shearwaters on land, i.e. in their nesting colonies, and for the handling of all other protected birds, not included in the above list, it is still necessary to obtain a special permit through the Ringing Committee from the Hon. Minister of Internal Affairs.

Name of Operator	*Number of birds ringed*	*Number of species ringed*
J. R. Jackson	58	1
F. C. Kinsky	151	1
Prof. B. J. Marples	–	–
Miss N. Macdonald	–	–
S. S. McDonnell	15	2
H. R. McKenzie	111	3
N. B. MacKenzie	88	4
D. Medway	394	1
R. A. Ringer	–	–
Mrs O. Sansom	25	1
H. L. Secker	58	2
R. B. Sibson	94	1
P. A. S. Stein	739	1
R. H. D. Stidolph	–	–
E. G. Turbott	–	–
C. H. Tyndale-Biscoe	–	–
D. A. Urquhart	46	1
M. A. Waller	164	1
H. G. Warburton	–	–
J. S. Watson	15	2
K. E. Westerskov	–	–
L. Wintle	–	–
Dr K. Wodzicki (and co-workers)	144	1
TOTAL for 1956-57	5853	29

All species of birds ringed and recovered during the period covered by this report and the grand totals of all birds ringed and recovered up to 31/3/1957 are shown in Table B below.

The species in this Table and in the following Recovery report are listed in order in which they appear in the Society's *Checklist of New Zealand Birds* (1953) and similarly the vernacular names used are those used in the *Checklist*.

TABLE B

Species	*Grand Total*		*1956-57*	
	Ringed	*Recovered*	*Ringed*	*Recovered*
Northern Blue Penguin	151	6	151	6
White-flippered Penguin	11	3	–	–
Wandering Albatross	33	1	2	–
Royal Albatross	377	14	3	–
Buller's Mollymawk	44	–	–	–
White-capped Mollymawk	144	–	143	–
Salvin's Mollymawk	1	–	1	–
Light-mantled Sooty Albatross	23	12	–	1
Giant Petrel	63	4	25	1
Cape Pigeon	1767	54	1685	54
Fairy Prion	51	–	–	–
Flesh-footed Shearwater	864	29	578	29
Buller's Shearwater	17	–	–	–
Sooty Shearwater	74	–	30	–
Fluttering Shearwater	5	–	–	–
Allied Shearwater	7	–	–	–
Grey-faced Petrel	26	–	–	–
Pycroft's Petrel	8	–	–	–
White-faced Storm Petrel	3	–	–	–
Diving Petrel	52	3	–	–
Australian Gannet	4365	204	883	60
Pied Shag	4	–	–	–
Little Black Shag	2	–	–	–

Species	Grand Total Ringed	Grand Total Recovered	1956-57 Ringed	1956-57 Recovered
White-throated Shag	7	3	–	–
Blue Heron	2	–	–	–
Black Swan	161	31	–	10
Paradise Duck	4	–	–	–
Grey Duck	4	–	–	–
Mallard	40	–	–	–
Mallard/Grey Duck - cross	1	–	–	–
Australasian Harrier	271	80	21	8
Pheasant	710	197	–	–
Californian Quail	22	–	–	–
N.Z. Banded Rail	4	–	–	–
Pukeko	4	–	2	–
Notornis	30	15	30	15
Pied Oystercatcher	1	–	–	–
Banded Dotterel	54	1	2	–
New Zealand Dotterel	10	5	–	–
Eastern Bar-tailed Godwit	1	–	–	–
Pied Stilt	42	2	9	–
Southern Skua	6	–	–	–
Southern Black-backed Gull	4117	212	759	39
Red-billed Gull	713	125	7	1
Black-billed Gull	3003	51	315	9
Caspian Tern	521	8	164	5
Fairy Tern	1	–	–	–
White-fronted Tern	2153	60	307	–
Kea	65	1	58	1
Shining Cuckoo	1	1	–	–
Long-tailed Cuckoo	1	–	–	–
Fantail	19	3	–	–
Grey Warbler	16	1	–	–
Song Thrush	220	33	57	7
Blackbird	755	172	91	48
British Hedge Sparrow	61	6	4	1
Silvereye	5880	254	432	65
Greenfinch	12	–	–	–
Goldfinch	44	–	32	–
Chaffinch	8	–	4	–
Yellowhammer	4	–	–	–
House Sparrow	61	–	54	–
Starling	127	5	4	2
White-backed Magpie	1	1	–	–
Magpie Sp.	1	1	–	–
North Island Kokako	3	–	–	–
TOTAL Numbers Ringed and Recovered	27,273	1598	5853	362

RECOVERIES

Signs and Abbreviations used in the following list:

§ = ringed.
+ = found dead, or found in sick condition and subsequently died.
‡ = shot.
† = retrapped and released.
O = retrapped on nest.
S = sight record.
D = approximate distance, in miles, from where ringed.
(15210) if under a ring number means that bird has been previously retrapped and reringed. The number in parentheses = original number.
A = length of time bird was ringed.
If ringed as fledgling = approximate age.

A: 2-5-7 = 2 years, 5 months and 7 days.
The initials at the end of every first line are those of the ringing operator (see Table A).

NORTHERN BLUE PENGUIN (*Eudyptula minor novaehollandiae*)

Six penguins were retrapped and released where ringed and their rings exchanged; 3 within 4 months, 2 within 5 months and 1 within 6 months after ringing.

LIGHT-MANTLED SOOTY ALBATROSS (*Phoebetria palpebrata*)

2A § 2/12/42 Campbell Island (Mt Beeman). Adult. J. H. Sorensen
O 8/12/56 where ringed. A: 14-0-6

GIANT PETREL (*Macronectes giganteus*)

18181 § 10/1/56 Cape Campbell 41 deg. 45 m. S — 174 deg. 14 m. E. Adult. F.A.
† 8/8/56 Castle Point 40 deg. 54 m. S — 176 deg. 13 m. E.
D 120 m. N.E. A: 0-7-29

CAPE PIGEON (*Daption capensis*)

Eight Cape Pigeons ringed in November, December, May and June at Cape Campbell were retrapped and released where ringed. (4 within 5 months, 2 within 6 months, 1 within 11 months and 1 within 12 months from ringing.)

Eighteen Cape Pigeons ringed in July and August at Castle Point were retrapped and released where ringed. (6 within 1 month, 9 within 2 months and 3 within 3 months from ringing.)

Details of the other recoveries, see below.

9662 § 20/9/56 Castle Point 40 deg. 54 m. S — 176 deg. 13 m. E. Adult. F.A.
† 6/11/56 Cape Campbell 41 deg. 45 m. S — 174 deg. 15 m. E.
D 120 m. S.W. A: 0-1-17

25404 § 19/6/56 Cape Campbell. Adult. F.A.
† 8/8/56 Castle Point.
D 120 m. N.E. A: 0-1-20

25465 § 20/6/56 Cape Campbell. Adult F.A.
† 28/8/56 Castle Point.
D 120 m. N.E. A: 0-2-8

25472 § 20/6/56 Cape Campbell. Adult. F.A.
† 23/7/56 Castle Point.
D 120 m. N.E. A: 0-1-3

25497 § 20/6/56 Cape Campbell. Adult. F.A.
† 4/10/56 Castle Point.
D 120 m. N.E. A: 0-3-14

25506 § 20/6/56 Cape Campbell. Adult. F.A.
† 9/8/56 Castle Point.
D 120 m. N.E. A: 0-1-20

25532 § 21/6/56 Cape Campbell. Adult. F.A.
† 10/8/56 Castle Point.
D 120 m. N.E. A: 0-2-20

25565 § 25/6/56 Cape Campbell. Adult. F.A.
† 28/8/56 Castle Point.
D 120 m. N.E. A: 0-2-3

25571 § 25/6/56 Cape Campbell. Adult. F.A.
† 9/8/56 Castle Point.
D 120 m. N.E. A: 0-1-15

25804 § 30/5/56 Cape Campbell. Adult. F.A.
† 8/7/56 Castle Point.
D 120 m. N.E. A: 0-1-8

25812 § 31/5/56 Cape Campbell. Adult. F.A.
† 21/7/56 Castle Point.
D 120 m. N.E. A: 0-1-21

25826 § 30/5/56 Cape Campbell. Adult. F.A.
† 10/7/56 Castle Point.
D 120 m. N.E. A: 0-1-11

25845 § 31/5/56 Cape Campbell. Adult. F.A.
† 17/9/56 Castle Point.
D 120 m. N.E. A: 0-3-17
25881 § 31/5/56 Cape Campbell. Adult. F.A.
† 22/7/56 Castle Point.
D 120 m. N.E. A: 0-1-22
26002 § 26/6/56 Cape Campbell. Adult. F.A.
† 17/9/56 Castle Point.
D 120 m. N.E. A: 0-2-21
26003 § 26/6/56 Cape Campbell. Adult.
† 22/7/56 Castle Point.
D 120 m. N.E. A: 0-0-28
26012 § 26/6/56 Kahou Rocks 41 deg. 25 m. S — 175 deg. 50 m. E. Adult. F.A.
† 28/8/56 Castle Point.
D 40 m. N.N.E. A: 0-2-2
26020 § 27/6/56 Kahou Rocks. Adult. F.A.
† 21/11/56 Cape Campbell.
D 80 m. S.S.W. A: 0-4-24
26028 § 27/6/56 Kahou Rocks. Adult. F.A.
† 23/8/56 Castle Point.
D 40 m. N.N.E. A: 0-1-27
26030 § 27/6/56 Kahou Rocks. Adult. F.A.
† 21/8/56 Castle Point.
D 40 m. N.N.E. A: 0-1-25
26041 § 2/7/56 Cape Campbell. Adult. F.A.
† 20/9/56 Castle Point.
D 120 m. N.E. A: 0-2-18
27169 § 24/7/56 Castle Point. Adult. F.A.
† 3/12/56 Cape Campbell.
D 120 m. S.W. A: 0-4-10
27245 § 31/7/56 Castle Point. Adult. F.A.
† 7/11/56 Cape Campbell.
D 120 m. S.W. A: 0-3-7
27288 § 1/8/56 Castle Point. Adult. F.A.
† 25/10/56 Kaikoura 42 deg. 25 m. S — 173 deg. 45 m. E.
D 170 m. S.W. A: 0-2-24
27417 § 23/11/55 Kaikoura. Adult. F.A.
† 18/6/56 Cape Campbell.
D 55 m. N.N.E. A: 0-6-25
27430 § 29/11/55 Cape Campbell. Adult. F.A.
† 10/9/56 Castle Point.
D 120 m. N.E. A: 0-9-11
27437 § 29/11/55 Cape Campbell. Adult. F.A.
† 28/8/56 Castle Point.
D 120 m. N.E. A: 0-8-29
27500 § 31/5/56 Cape Campbell. Adult. F.A.
+ 31/5/56 Found exhausted, Island Bay, Wellington 41 deg. 19 m. S — 174 deg. 45 m. E.
D 38 m. N.N.E. A: 0-0-0

FLESH-FOOTED SHEARWATER (*Puffinus carneipes hullianus*)

Nine Flesh-footed Shearwaters ringed at Cape Campbell during the months of January and February have been retrapped and released where ringed (4 within 1 month, and 5 within 2 months of ringing).

Twenty-one Flesh-footed Shearwaters have been retrapped after return from their winter migration, as follows:

31014 § 12/3/56 Cape Campbell 41 deg. 45 m. S — 174 deg. 15 m. E. Adult. F.A.
† 13/2/57 Castle Point 40 deg. 54 m. S — 176 deg. 13 m. E.
D 120 m. N.E. A: 0-10-30

31015	§	8/3/56 Cape Campbell. Adult.	F.A.
	†	5/3/57 Where ringed. A: 0-11-28	
13022	§	25/1/56 Cape Campbell. Adult.	F.A.
	†	14/3/57 Where ringed. A: 1-1-20	
13039	§	25/1/56 Cape Campbell. Adult.	F.A.
	†	13/2/57 Castle Point	
	D	120 m. N.E. A: 1-0-19	
13040	§	10/2/56 Cape Campbell. Adult.	F.A.
	†	15/12/56 Where ringed. A: 0-10-5	
13046	§	8/2/56 Cape Campbell. Adult.	F.A.
	†	10/1/57 Where ringed. A: 0-11-2	
13061	§	8/2/56 Cape Campbell. Adult.	F.A.
	†	26/3/57 Where ringed. A: 1-1-18	
13084	§	13/2/56 Cape Campbell. Adult.	F.A.
	†	12/2/57 Castle Point.	
	D	120 m. N.E. A: 0-11-30	
13094	§	14/2/56 Cape Campbell. Adult.	F.A.
	†	13/2/56 Castle Point.	
	D	120 m. N.E. A: 0-11-30	
30404	§	20/2/56 Cape Campbell. Adult.	F.A.
	†	28/3/57 Where ringed. A: 1-1-8	
30418	§	21/2/56 Cape Campbell. Adult.	F.A.
	†	14/2/57 Castle Point.	
	D	120 m. N.E. A: 0-11-24	
30447	§	23/2/56 Cape Campbell. Adult.	F.A.
	†	13/3/57 Where ringed. A: 1-0-19	
30454	§	23/2/56 Cape Campbell. Adult.	F.A.
	†	7/3/57 Where ringed. A. 1-0-13	
30462	§	28/2/56 Cape Campbell. Adult.	F.A.
	†	26/3/57 Where ringed. A: 1-0-27	
30464	§	28/2/56 Cape Campbell. Adult.	F.A.
	†	13/2/57 Castle Point.	
	D	120 m. N.E. A: 0-11-14	
30468	§	28/2/56 Cape Campbell. Adult.	F.A.
	†	5/3/57 Where ringed. A: 1-0-6	
30493	§	29/2/56 Cape Campbell. Adult.	F.A.
	†	12/3/57 Where ringed. A: 1-0-12	
31047	§	4/4/56 Cape Campbell. Adult.	F.A.
	†	12/2/57 Castle Point.	
	D	120 m. N.E. A: 0-10-8	
31064	§	12/4/56 Cape Campbell. Adult.	F.A.
	†	26/3/57 Where ringed. A: 0-11-14	
31072	§	14/4/56 Cape Campbell. Adult.	F.A.
	†	6/3/57 Where ringed. A: 0-11-21	

AUSTRALIAN GANNET (*Sula bassana serrator*)

Sixty Gannets have been recovered this year, 25 of which were recovered in Australia and the rest in New Zealand.

Two Gannets were recovered dead on or in the vicinity of their nesting colonies, 12 and 23 days after ringing. A number of adult Gannets originally ringed as chicks on Cape Kidnappers and Horuhoru, were retrapped, reringed and released again this year.

Two Gannets, 28702 and 17049, were recovered in an unusual way. The first was taken from a tiger shark, and the second was caught on a spinner and released without any harm having been done to the bird.

Details of these and all the other Gannets recovered appear below.

15202	§	15/1/51 Cape Kidnappers 39 deg. 38 min. S — 177 deg. 5 m. E. Juv.	K.W.
15302	†	22-23/1/57 Where ringed. A: 6-0-7	
15253	§	24/2/51 Cape Kidnappers. Juv.	K.W.
	†	22-23/1/57 Where ringed. A: 5-11-29	

15255 § 15/1/51 Cape Kidnappers. Juv. K.W.
15261 O 13/11/56 Where ringed. A: 5-10-29
15404 § 19/1/52 Cape Kidnappers. Juv. K.W.
† 22-23/1/57 Where ringed. A: 5-0-3
15407 § 19/1/52 Cape Kidnappers. Juv. K.W.
O 13/11/56 Where ringed. A: 4-9-25
15422 § 23/2/52 Cape Kidnappers. Juv. K.W.
15431 O 13/11/56 Where ringed. A: 4-8-21
15458
15447 § 2/2/53 Cape Kidnappers. Juv. K.W.
O 13/11/56 Where ringed. A: 3-9-11
15499 § 23/2/52 Cape Kidnappers. Juv. K.W.
† 22-23/1/57 Where ringed. A: 4-11-0
15559 § 30/12/52 Horuhoru 36 deg. 45 m. S — 175 deg. 11 m. E.
Adult. P.A.S.S.
+ 25/3/57 Off Awa-aroa (south coast of Waiheke Island), caught in fishing net.
D 15 m. S.W. A: 4-2-26
15991 § 1/1/55 Horuhoru. Juv. P.A.S.S.
+ 31/12/56 Shoalhaven Heads, N.S.W. 34 deg. 54 min. S— 150 deg. 42 min. E.
D 1600 m. E.N.E. A: 2-0-0
16128 § 28/1/52 Horuhoru. Juv. P.A.S.S.
† 27/11/56 Where ringed. A: 4-10-6
16183 § 28/1/52 Horuhoru P.A.S.S.
O 27/11/56 Where ringed. A: 4-10-6
16317 § 1/2/52 Horuhoru. Juv. P.A.S.S.
+ 28/10/56 Spencer's Bay, South Australia, 34 deg. S — 138 deg. E.
D 2580 m. W. A: 4-8-27
16325 § 1/2/52 Horuhoru. Juv. P.A.S.S.
+ 10/6/56 Pie Melon Bay, Waiheke Island.
D 8 m. A: 4-4-9
17049 § 27/12/54 Horuhoru. Juv. P.A.S.S.
† 20/1/57 12 m. out of Whitianga, Coromandel Peninsula.
D 44 m. E. A: 2-0-24
18580 § 27/12/54 Horuhoru. Juv. P.A.S.S.
+ 12/4/56 Fraser Island, Queensland, 25 deg S — 153 deg. E.
D 1800 m. N.W. A: 1-3-16
18819 § 22/1/55 Cape Kidnappers. Adult. K.W.
(15260) (originally § 15/1/51 juv.)
18820
(15252) O 13/11/56 Where ringed. A: 5-9-29
18821 § 22/1/55 Cape Kidnappers. Adult. K.W.
(originally juv. § 15/1/51)
O 13/11/56 Where ringed and reringed. A: 5-9-29
18826 § 14/1/56 Cape Kidnappers. Adult. K.W.
(15223) (originally juv. § 15/1/51)
O 13/11/56 Where ringed. A: 5-9-29
18833 § 15/1/56 Cape Kidnappers. Adult. K.W.
(15210) (originally juv. § 15/1/51)
O 13/11/56 Where ringed. A: 5-9-29
18860 § 18/2/56 Cape Kidnappers. Juv. K.W.
+ 15/4/56 Motukahakaha Beach, North Auckland.
D 300 m. N.W. A: 0-1-28
18980 § 8/1/55 Horuhoru. Juv. P.A.S.S.
+ 6/10/56 Tryphena, Great Barrier Island.
D 36 m. N.N.E. A: 1-8-28
19103 § 24/1/54 Horuhoru. Juv. P.A.S.S.
+ 27/2/57 Torere Beach, Bay of Plenty 37 deg. 57 m. S — 177 deg. 33 m. E.
D 160 m. S.E. A: 3-1-3

19860 § 14/1/54 Horuhoru. Adult. P.A.S.S.
O 27/11/56 Where ringed (reringed). A: 2-10-13
20007 § 19/1/54 Horuhoru. Juv. P.A.S.S.
† 27/11/56 Where ringed (reringed). A: 2-10-8
28257 § 3/12/55 Horuhoru. Juv. P.A.S.S.
+ 2/6/56 Augowrie, N.S.W., Australia
29 deg. S – 153 deg. 30 m. E.
D 1600 m. W.N.W. A: 0-5-25
28269 § 3/12/55 Horuhoru. Juv. P.A.S.S.
† 14/7/56 (ring removed)
Double Island Point, Queensland, Australia,
26 deg. S – 153 deg. E.
D 1750 m. N.W. A: 0-7-11
28281 § 3/12/55 Horuhoru. Juv. P.A.S.S.
+ 17/8/56 Saint Vincent Gulf, South Australia,
35 deg. S – 138 deg. E.
D 2530 m. W. A: 0-8-14
28401 § 7/1/56 Horuhoru. Juv. P.A.S.S.
+ 30/11/56 8 miles out to sea from Minnie Waters, N.S.W.,
29 deg. S – 153 deg. E.
D 1600 m. W.N.W. A: 0-11-23
28422 § 7/1/56 Horuhoru. Juv. P.A.S.S.
+ 3/12/56 Double Island Beach, Queensland,
26 deg. S – 153 deg. E.
D 1750 m. N.W. A: 0-11-26
28489 § 7/1/56 Horuhoru. Juv. P.A.S.S.
+ 12/11/56 Rottnest Island, West Australia,
32 deg. 30 m. S – 115 deg. 30 m. E.
D 3900 m. W.N.W. A: 0-11-5
28605 § 10/1/56 Horuhoru. Juv. P.A.S.S.
+ 7/4/56 Seal Rocks Beach, N.S.W.,
32 deg. S – 153 deg. E.
D 1700 m. N.W. A: 0-3-28
28610 § 10/1/56 Horuhoru. Adult. P.A.S.S.
O 10/1/57 Where ringed. A: 1-0-0
28702 § 20/1/56 Horuhoru. Juv. P.A.S.S.
+ 3/11/56 Port Macquarie, N.S.W.,
31 deg. 30 m. S – 153 deg. E.
D 1650 m. W.N.W. A: 0-10-14
28936 § 21/1/56 Bush Island. Juv. P.A.S.S.
+ 18/8/56 100 m. north of Brisbane, Queensland,
26 deg. S – 153 deg. E.
D 1750 m. N.W. A: 0-6-28
35218 § 22-23/1/57 Cape Kidnappers. Juv. K.W.
+ 8/3/57 Crescent Head, N.S.W.
D 1600 approx. W.N.W. A: 0-2-17
35542 § 24/12/56 Horuhoru. Juv.. P.A.S.S.
+ 25/3/57 Cronulla Beach, N.S.W., 34 deg S – 151 deg. E.
D 1650 m. W.N.W. A: 0-3-1
35574 § 24/12/56 Horuhoru. Juv. P.A.S.S.
‡ 9/2/57 Port Kembla, N.S.W., 34 deg. S – 151 deg. E.
D 1650 m. W.N.W. A: 0-1-16
35595 § 24/12/56 Horuhoru. Juv. P.A.S.S.
+ 23/3/57 Shelly Beach, near Thames.
D 36 m. S.S.E. A: 0-2-27
35652 § 29/12/56 Horuhoru. Juv. P.A.S.S.
+ 23/2/57 Waiheke Island.
D 9 m. S.W. A: 0-1-26
35752 § 29/12/56 Horuhoru. Juv. P.A.S.S.
+ 1/1/57 Amodeo Bay, near Coromandel.
D 16 m. N.E. A: 0-0-3

35753 § 24/12/56 Horuhoru. Juv. P.A.S.S.
+ 20/1/57 Pelican Point, N.S.W., 33 deg. S – 151 deg. E.
D 1600 m. W.N.W. A: 0-0-27
35757 § 29/12/56 Horuhoru. Juv. P.A.S.S.
+ 25/3/57 South of Sydney, N.S.W.,
33 deg. 30 m. S – 151 deg. E.
D 1650 m. W.N.W. A: 0-2-28
35800 § 29/12/56 Horuhoru. Juv. P.A.S.S.
+ 5/2/57 Port Kembla, N.S.W., 34 deg. S – 151 deg. E.
D 1650 m. W.N.W. A: 0-1-8
35968 § 8/1/57 Horuhoru. Juv. P.A.S.S.
+ 16/3/57 Red Bluff, Victoria, 38 deg. S – 148 deg. E.
D 1900 m. W. A: 0-2-8
35971 § 8/1/57 Horuhoru. Juv. P.A.S.S.
+ 24/2/57 Brighton Beach, Melbourne, Victoria,
38 deg. S – 145 deg. E.
D 2050 m. W. A: 0-1-16
35975 § 8/1/57 Horuhoru. Juv. P.A.S.S.
+ 6/2/57 Double Island Point, Queensland,
26 deg. S – 153 deg. E.
D 1750 m. N.W. A: 0-0-29
35988 § 8/1/57 Horuhoru. Juv. P.A.S.S.
+ 6/3/57 Shellharbour, N.S.W., 38 deg. S – 150 deg. E.
D 1700 m. W. A: 0-1-26
36005 § 8/1/57 Horuhoru. Juv. P.A.S.S.
+ 15/2/57 Near Warkworth.
D 40 m. N.N.W. A: 0-1-7
36019 § 8/1/57 Horuhoru. Juv. P.A.S.S.
+ 21/3/57 Newcastle Beach, N.S.W., 33 deg. S – 152 deg. E.
D 1600 m. W.N.W. A: 0-2-13
36074 § 8/1/57 Horuhoru. Juv. P.A.S.S.
+ 13/2/57 Island Beach, N.S.W., 35 deg. S – 150 deg. E.
D 1700 m. W. A: 0-1-5
36075 § 8/1/57 Horuhoru. Juv. P.A.S.S.
+ 6/3/57 Tabourie Beach, N.S.W.,
35 deg. S – 150 deg. 30 m. E.
D 1700 m. W. A: 0-1-26
36121 § 10/1/57 Horuhoru. Juv. P.A.S.S.
+ 26/1/57 Auckland.
D 30 m. W. A: 0-0-16

BLACK SWAN (*Cygnus atratus*)

Ten of the 161 swans ringed at Lake Ellesmere in January 1955 have been recovered this year. All of them have been shot on or around Lake Ellesmere during this year's shooting season.

AUSTRALASIAN HARRIER (*Circus approximans*)

One harrier ringed as an adult in June 1952 at Hynish, Hawke's Bay, was shot only a few miles away at Tikokino on 24/11/56.

13963 § 26/12/55 Pakowai, Hawke's Bay. Nestling. N. B. Mack
35 deg. 35 m. S – 176 deg. 52 m. E.
‡ April 1956 Near Clive, 39 deg. 35 m. S – 176 deg. 55 m. E.
D 4 m. E. A: 0-4-approx.
13966 § 6/5/56 Pakowai, Hawke's Bay. First year. N. B. Mack
‡ 18/6/56 Taradale, 39 deg. 32 m. S – 176 deg. 50 m. E.
D 4 m. N.N.E. A: 0-1-12
22812 § 31/5/54 Awatea Station, Hawke's Bay. Juv. J.S.W.
39 deg. 40 m. S – 176 deg. 37 m. E.
Found in exhausted state 4/2/57 near Marton,
40 deg. 05 m. S – 175 deg. 23 m. E.
D 75 m. S.W.

Taken to Wanganui, 39 deg. 55 m. S + 175 deg. 02 m. E, and liberated there 5/2/57.

+ 13/3/57 Near Marton.

D 20 m. S.E. A: 2-9-13

22816 § 2/6/54 Awatea Station, Hawke's Bay. Juv. J.S.W.

‡ 16/5/56 Near Masterton, 41 deg. S — 175 deg. 40 m. E.

D 126 m. S.S.E. A: 1-11-14

27007 § 13/4/55 Awatea Station, Hawke's Bay. Juv. J.S.W.

‡ 12/2/57 Tikokino, 39 deg. 50 m. S — 176 deg. 27 m. E.

D 15 m. S.E. A: 1-9-30

27010 § 16/4/55 Awatea Station. Adult. J.S.W.

‡ 10/5/56 Mangototara, 40 deg. S — 176 deg. 38 m. E.

D 25 m. S. A: 1-0-24

NOTORNIS (*Notornis mantelli*)

Of the 30 Notornis ringed in Takahe Valley and Point Burn during 1952, 1954, 1955 and 1957, 15 were seen again where ringed from within a few months to over 4 years after ringing.

SOUTHERN BLACK-BACKED GULL (*Larus dominicanus*)

Thirty-nine Black-backed Gulls were recovered this year, 36 of which were ringed on the Rangitoto Island colony, 1 in Bluff Harbour, and 2 on Baring Heads, near Wellington.

Recoveries from Rangitoto Island

Thirty in their first year, of which 3 were found dead on Rangitoto Island, 3 were found injured and presumably died, and 24 were found dead in Auckland or suburbs. Two in their second year, of which 1 was found dead on Rangitoto Island, and the other on Takapuna Beach, Auckland. One in its third year was caught off King's Wharf, Auckland, on a fishing line and released, and one in its fourth year was found dead on an Auckland beach.

An interesting and hitherto unexplained matter is the recovery of 3 rings placed on gulls in December 1952, 1953 and 1954 which were found in the colony — 2 (14939 and 22918) in December 1955 and 1 (26427) in December 1956. The rings were half opened, and well worn, and polished from the inside, proving that the birds must have worn them for at least one year. The rings must have opened up through some internal stresses in the metal, which caused them to slip off the bird's leg.

Recoveries from Baring Heads (Wellington)

One gull in its second year was caught tangled up in a fishing line in Wellington Harbour and released, and one in its third year was seen several times feeding in the back yard of a house in Melrose (Wellington).

Recovery from Bluff Harbour

13610 § 27/12/52 Tikore Island, Bluff Harbour. Juv. O.S.
46 deg. 34 m. S — 168 deg. 20 m. E.

+ 29/8/56 Near Gore, 46 deg. 05 m. S — 168 deg. 55 m. E.

D 45 m. N.E. A: 3-8-2

RED-BILLED GULL (*Larus novaehollandiae scopulinus*)

The only recovered Red-billed Gull this year was a bird ringed as a fledgling at Lake Grassmere in December 1956 and found dead where ringed only three weeks later.

BLACK-BILLED GULL (*Larus bulleri*)

Five of the nine Black-billed Gulls, all ringed as fledglings on the Ashley River, were found dead where ringed only a week or two after ringing.

The remaining 4 recoveries see below.

21577 § 29/11/55 Ashley River, 43 deg. 17 m. S — 172 deg. 40 m. E.
Juv. W.C.C.

+ 10/9/56 Pareora, 44 deg. 29 m. S — 171 deg. 11 m. E.

D 115 m. S.W. A: 0-9-12

21597 § 29/11/55 Ashley River. Juv. W.C.C.

+ 2/2/56 Oxford, 43 deg. 18 m. S — 172 deg. 12 m. E.

D 24 m. W. A: 0-2-4

21524 § 20/11/55 Ashley River. Juv. W.C.C.
+ 5/9/56 Kaiapoi, 43 deg. 23 m. S – 172 deg. 38 m. E.
D 7 m. S. A: 0-9-16
37609 § 10/11/56 Ashley River. Juv. W.C.C.
+ 16/12/56 Waikuku Beach,
43 deg. 17 m. S – 172 deg. 44 m. E.
D 2 m. E. A: 0-1-6

CASPIAN TERN (*Hydroprogne caspia*)

Five Caspian Terns ringed as fledglings at South Kaipara Heads have been recovered this year. Three ringed in December 1956 were found dead where ringed within 1 month.

12695 § 12/12/54 South Kaipara Heads. Juv. M.A.W.
36 deg. 26 m. S – 174 deg. 13 m. E.
+ 10/7/56 Muriwai Stream,
36 deg. 50 m. S – 174 deg. 25 m. E.
D 30 m. S.W. A: 1-6-28
30138 § 30/12/55 South Kaipara Heads. Juv. M.A.W.
+ 30/1/57 Near Pollok, Manukau Harbour,
37 deg. 10 m. S – 174 deg. 40 m. E.
D 50 m. S.W. A: 1-1-0

KEA (*Nestor notabilis*)

One Kea ringed 3 September 1956 on Arthur's Pass was found dead at roadside near place where ringed on 29 January 1957. Probably hit by car.

SONG THRUSH (*Turdus ericetorum*)

Seven Thrushes, all ringed in Lower Hutt, were recovered in Lower Hutt. Four were retrapped and released, where ringed; 2 were killed by cats, and 1 struck a window and died. Six birds were recovered within 1 year from ringing. No. 23421, ringed on 6/8/55, was already recorded in last year's report, but was retrapped and released again on 8/10/56, i.e. 1 year 6 months after ringing, and is therefore again included in this year's report.

BLACKBIRD (*Turdus merula*)

Forty-three of the Blackbirds recovered this year were originally ringed in Lower Hutt.

Twenty-six of the above were retrapped and released, where ringed, within 1 year from ringing. Several of these were retrapped and released more than once, and one, 20531, was retrapped at varying intervals and 9 times between 8/4/56 (date of ringing) and 3/2/57 (last time released).

Eight birds were found dead within 1 year of ringing in Lower Hutt; 3 of these were caught by cats, 2 were hit by cars, and 3 were found dead from unknown causes. The 9 remaining see below.

18065 § 1/8/53 Lower Hutt. Juv. male. P.C.B.
† 25/11/56)
† 8/12/56) Where ringed. A: 3-4-7
18073 § 2/11/53 Lower Hutt. Juv. female. P.C.B.
+ 7/12/56 Lower Hutt. A: 3-1-5
20515 § 23/2/56 Lower Hutt. Juv. female. P.C.B.
+ 3/5/56 Lowry Bay
D 3 m. S.S.E. A: 0-2-10
21012 § 11/1/54 Lower Hutt. Adult male. P.C.B.
† 26/11/56 Where ringed. A: 2-10-10
21047 § 25/7/54 Lower Hutt. Adult female. P.C.B.
† 1/8/54)
† 20/11/54)
† 4/12/54)
† 22/10/56) Where ringed. A: 2-2-27
24940 § 10/4/55 Lower Hutt. Juv. male. P.C.B.
† 26/6/55)
† 9/7/55)
† 2/10/55)
† 29/9/56)
† 8/12/56) Where ringed. A: 1-7-28

24954 § 3/7/55 Lower Hutt. Juv. female. P.C.B.
+ 7/5/56 Wainui-o-Mata.
D 5 m. S.E. A: 0-10-0
24957 § 31/7/55 Lower Hutt. Adult female. P.C.B.
† 8/8/55)
† 30/10/55)
† 12/11/55)
† 29/7/56) Where ringed. A: 0-11-29
24964 § 24/10/55 Lower Hutt. Juv. male. P.C.B.
† 26/11/56 Where ringed. A: 1-1-2

Five Blackbirds ringed in Khandallah, Wellington, were recovered this year. Three of these were found dead in the vicinity of where ringed, and 1 bird was seen where ringed.

24250 § 27/8/55 Khandallah. Adult male. S.S.McD.
S 30/3/56)
† 11/11/56) Where ringed. A: 1-2-15

HEDGE SPARROW (*Prunella modularis occidentalis*)

One Hedge Sparrow only was recovered this year, and was caught by a cat not far away from where ringed 4 months after ringing.

SILVEREYE (*Zosterops lateralis*)

Sixty-one of the recovered Silvereyes were originally ringed in New Plymouth.

Two of the above were killed by cats, and 1 found dead within 1 month after ringing. Forty-seven were retrapped and released from only a few days to within 2 months after ringing.

The most spectacular recovery, because of its age, is the following:

Marked ring § August 1953, New Plymouth. D.M.
† 28/7/56 Where ringed. A: 2-11-x. I.e., this is the oldest Silvereye recovered to date.

Four Silvereyes ringed in Lower Hutt were retrapped and released within 3 weeks of ringing.

STARLING (*Sturnus vulgaris*)

Two starlings were recovered this year, one of which was trapped (it fell down a chimney into the living room of a house) in vicinity of ringing station nine months after ringing, and was released. The second:

20664 § 29/1/55 Karori, Wellington. Adult. H.S.
+ 21/9/56 Brooklyn, Wellington.
D 2 m. A: 1-7-22

BIRDS RINGED OVERSEAS AND RECORDED IN NEW ZEALAND

(Extracted from 'Second Annual Report of the Australian Bird-Banding Scheme July 1955 - June 1956')

Two Giant Petrels ringed on Heard Island and Macquarie Island respectively were caught in New Zealand and released.

130-01028 § 7/2/55 Heard Island. Juv.
† 19/10/55 Castle Point.
D 4700 m. E. A: 0-8-17

130-09001 § 31/1/56 Macquarie Island, Juv.
† 24/4/56 25 m. S. of Timaru.
D 450 m. N.E. A: 0-2-24

EXTRACT FROM THE PRESIDENT'S ADDRESS

At Annual Meetings during my term of office as President I have drawn attention to the rights, duties and interests of, firstly, the members and, secondly, the regional organisers. At this meeting I will say a little about the Council. Members of Council are drawn from the ranks of the Society in accordance with democratic principles. They do not and must not expect to be treated as members of a leading upper class, but rather as working foremen, ready to give extra time, effort and money for the good of the whole body and its cause. The time and effort required of those in the busier executive posts are indeed a very large contribution, the extent of which can hardly be realised by those who have not had the joys and sorrows of such experience,

while unclaimed expenses and much free labour have, I can say with certainty, kept the Society from losing balance financially. The work has become so great that it is now necessary to have assistants for the Secretary and Treasurer. Those who help in this way, while not having the voting status of Council members, are rendering a most unselfish service. Cost in time, effort and money is incurred also by those who run special schemes and by others who undertake specific tasks. My term of office having now expired, I wish to state that, although it has been one of considerable difficulty, it has been a privilege and a pleasure to serve beside our Council members and their assistants. I would ask for no better comrades-in-arms.

Our future has to be taken very seriously by Council, Regional Organisers and members. I feel that, having attained a large membership, we should now aim at consolidation, while not making any special limit to numbers. Members with only superficial interest are dropping out, but are being replaced by many new ones of great promise. We cannot at present deal with a further large number enlisted merely for the sake of numbers, but we hope that we will always be able to welcome to our ranks anyone who wishes to share in this worthy and absorbing pursuit. Officers and members, by seeking out such useful persons, having them admitted to our ranks, and then keeping in touch with and helping them, will attain future success for the Society.

H. R. McKENZIE

LETTER

WHITE-WINGED BLACK TERNS IN BORNEO

In Borneo, unlike New Zealand, the White-winged Black Tern (*Chlidonias leucopterus*) has not yet been seen in the Northern summer (cf. R. B. Sibson, *Notornis VI*, 5, 1955: 139), but only in winter (R.B.S., *Notornis VI*, 2, 1954: 43, and C. A. Fleming, *Notornis VI*, 3, 1955: 69).

There are few old records of this bird, but many recent, which suggest that, like the Black-headed Gull (*L. ridibundus*), it may be increasing its total world range. In Borneo it is found in almost every possible habitat, unlike any other tern – and no other species penetrates so far inland. At Bario, in the furthest interior, the highest village in Borneo (3700 feet), it is a regular visitor from October to December. Its local name (Kelabit language) is 'Ut bario', the Wind Bird; it is believed that to see it settle is a bad omen – for in fact it does not settle in its short, diurnal, passage flight.

I have also seen the White-winged Black Tern far up the rocky Trusan River, at 1500 feet; as well as 200 miles up the Baram River. Nearer the coast, it has been seen over Kuching wharf (tidal) and racecourse (rain pools), the delta of the Sarawak River, and over the sea lagoon at Brunei (all winter records – Northern winter). Out at sea, it is regularly found off the small Turtle Islands of the South Sarawak coast, where there was a large party of 20 or so ranging over the sea from 24 to 26 September 1956. All birds have been winter visitors in the pale winter plumage. Both mature birds are found, and juveniles, which have the feathers of back and mantle brown, with dark shaft stripes and buffy fringes.

C. A. Fleming's account of the fish-eating display of the W.W.B.T. (*op. cit.*) is of interest, for all records in Borneo suggest that here its diet is basically arthropods.

The Turtle Island birds skim over the sea, picking off surface animals, which on dissection have proved to be *Gerridae* (Water Striders). In the Sarawak River, birds have been seen on floating logs, feeding on beetles and other insects. One specimen collected from the shore at Bako (7/10/56) was sitting on the sand flats with six Little Terns (*Sterna albifrons*), but whereas the latter had crops full of small fish, the W.W.B.T. had eaten one small red crab. An inland specimen, from Bario, had fed on dragonflies.

In a small way this bird is everywhere, and it is probably its insectivorous diet that allows it to cover such an extraordinary range, where other equatorial passage migrants of the *Laridae* depend principally on fish for food.

13/2/57

Sarawak Museum, *TOM HARRISSON*

DISTRIBUTION AND ABUNDANCE OF THE ROOK (*Corvus frugilegus L.*) IN NEW ZEALAND

By P. C. BULL
Animal Ecology Section, D.S.I.R., Wellington

1. INTRODUCTION

A preliminary survey of the distribution of rookeries in Canterbury and in Hawke's Bay was undertaken during the 1955 and 1956 breeding seasons, and the primary purpose of this paper is to report the results of this survey. As a secondary objective, an attempt has been made to bring together some of the information which exists on the distribution of rooks in earlier times. By combining these two sets of data, it is possible to get a picture of the distribution of rookeries in time as well as in space, and from this to identify some of the factors which have controlled the size and distribution of the rook population in New Zealand.

The rook, with its large size and gregarious habits, is a convenient species for field studies, and Lockie's (1955) work on this bird in Britain has demonstrated that such studies can contribute much towards obtaining a better understanding of the factors which control the size of bird populations. New Zealand provides unusual opportunities for studying the population dynamics of rooks because, unlike the situation in Europe, the species has a very restricted distribution and is non-migratory. Apart from its value as a contribution to scientific knowledge, a better understanding of the ecology of rooks in New Zealand is urgently required as a basis on which to plan more efficient control measures. The birds cause damage to crops growing in the vicinity of the rookeries, and, from 1915 onwards, reports of such damage have been received with increasing frequency. As a result, efforts are constantly being made to reduce the rook population, and most of the rookeries are disturbed every year by control operations, especially shooting. It is regrettable that, despite the natural suitability of rooks as a subject for ecological study and the desirability of such studies on economic grounds, the disturbance of rookeries, caused by the existing methods of control, make it very difficult to carry out a major research project on the population dynamics of this interesting but troublesome bird.

Despite these difficulties, it is still possible to collect useful information on several aspects of the ecology of rooks in New Zealand, and the present study, though incomplete in some respects, is published at this stage in the hope of interesting amateur ornithologists in the study of rooks and of stimulating local historians to bring forward additional information on the liberation and spread of the species.

2. MATERIAL AND METHODS

The present paper is based on two very different sets of data, the first being a compilation of various historical records relating to the past distribution of rooks, and the second the results of field surveys carried out by the writer since 1955. The methods used in collecting these two sets of data are presented separately below, together with information bearing on the reliability of the data.

(A) HISTORICAL DATA

Information on the past distribution and abundance of rooks was obtained from the various publications cited in the list of references, from newspaper clippings, and from the following five unpublished sources:

(i) Replies to questionnaires sent by Dr Wodzicki in 1952 and 1954 to farmers and other people interested in rooks.

(ii) Files of the Department of Internal Affairs (indicated in the text by the letters I.A.).

(iii) Notes provided by Drs R. A. Falla, D. Macmillan and K. Wodzicki

and by Messrs D. H. Brathwaite, M. B. Crequer and W. J. MacGibbon.

(iv) Letters or verbal information supplied by people living near the rookeries visited during the survey, or having an interest in the history of local areas. (Information supplied in writing is denoted in the text by the abbreviation *'in litt.'* and verbal information by 'pers. comm.').

(v) 'East Coast Naturalist', a manuscript in Alexander Turnbull Library.

In a few instances, information concerning the history of a given rookery was obtained from more than one source, and this provided an opportunity for testing the reliability of some of the historical data. The few comparisons that can be made between data obtained from different sources suggest that the information is fairly reliable with regard to general trends. For example, all accounts agree that, for many years, the only Christchurch rookery was located at Fendalton, and that the eventual decline of this rookery was accompanied by the development of several new rookeries and by an increase in the rook population. On the other hand, there are considerable discrepancies in such details as dates and numbers of birds. To quote some extreme examples, three correspondents give the date of abandonment of the Fendalton rookery as 'early twenties', 1936 and 1938 respectively; similarly, the year of establishment of a rookery near Paparua Prison was stated to be 1935 by one person and 1947 by another; finally, estimates of the total rook population of the Christchurch area in recent years have varied from two thousand to ten thousand. Discrepancies of this kind are often less serious than they might at first appear, because further investigation often reveals good reasons for placing more reliance on one observation than another. Of more importance is the probability that errors, similar to those reported above, also occur in some of the historical material that cannot be checked by reference to an independent source of information.

(B) RECENT SURVEYS

Replies to Dr Wodzicki's questionnaire provided a useful start for locating the rookeries, and valuable help was also given by Mr G. S. Barwell, Farm Manager at Paparua Prison, by members of Federated Farmers, and by officers of the Department of Agriculture. Rookeries reported in this way were visited, and interviews with farmers nearby often led to the discovery of yet other rookeries. A high proportion of the rookeries was ultimately located by a continuation of this process, and by observing the flight lines of the birds themselves. Once a rookery was discovered, its position was marked on a mile to the inch map published by the Lands and Survey Department. Sheet numbers and grid references, mentioned in the text below, refer to these maps. The sites of many of the Canterbury rookeries were photographed to assist in recognising any subsequent changes in the area occupied by the birds. The size of the rookery was assessed by counting the number of nests, and an attempt was made to learn something of its history from local residents.

The use of nest counts as an index of the abundance of rooks requires some explanation. Observers vary both in their ability to see partly-obscured nests and in their judgements as to the number present in a compact group of nests. If allowance can be made for errors of the above kind (observer error), nest counts, taken at the height of the nesting season, should provide a useful indication of the number of breeding pairs, but they take no account of non-breeding birds.

A preliminary estimate of observer error was obtained in Hawke's Bay when 11 rookeries, each of more than 30 nests, were counted by two or more observers simultaneously. From the figures obtained (Table 4), the standard deviation (s) of the proportional deviations was calculated to be 0.0648. This means that counts of a hundred nests might be expected

to vary between 81 and 119 (three times the standard deviation multiplied by 100 = ± 19). The value s = 0.0648 was obtained from data collected by people who had been working together, and a larger value would be expected for counts by observers having no opportunity to standardise their methods of counting. Conversely, successive counts by one person might have a smaller standard deviation.

Observers probably count fewer nests than actually exist in a given rookery, particularly when the nests are grouped close together, or are partly obscured by foliage and branches. This conclusion is suggested by a few figures which are available on the number of birds killed during control operations in certain Canterbury rookeries. Allowing three young per nest, a figure suggested by Lockie's (1955) work in Britain, four of these rookeries should have produced 105, 135, 417 and 789 young respectively. However, according to local farmers, the actual numbers of birds shot in the previous year were 170, 200, 580 and 2000 respectively, and nearly all of these were young birds. Even allowing for some optimism on the part of the shooters, it would appear that an appreciable number of nests were missed during the counting; farmers were emphatic that there had been no decline in the number of birds breeding in these rookeries. Similarly, the thousand rooks picked up after poisoning operations at Paparua in October 1956 (*Evening Post*, 12.1.57) is higher than would be expected from nest counts (321 and 472) made during the same month. The thousand birds picked up do not represent the entire population, because at least 30 survivors were seen, and many birds probably died on their nests or in other inaccessible places.

The relationship between the breeding population and the total population is unknown, although it is obvious that the latter will be considerably higher than the former immediately after the breeding season. By means of ringing, Giban (1947) was able to show that in France at least some rooks breed when they are only twelve months old, but he regarded this as a somewhat exceptional occurrence. If rooks usually take more than twelve months to reach sexual maturity one would expect to find a substantial non-breeding juvenile population. In this connection it is interesting that in 1946 the late E. F. Stead counted only 1700 nests in the Christchurch rookeries, yet spoke of a total population of 7000 birds (E. B. Davison in File I.A. 47/82). Similarly, M. B. Crequer wrote that about 2000 rooks were present at Islington Freezing Works in 1945, but that the nests numbered only 250 - 275 (1952 questionnaire). However, this latter example could be explained if birds breeding at Paparua visited Islington for food. The existence of a substantial non-breeding population would explain why, in 1956, more rooks were poisoned at Paparua than would be expected from the number of nests counted.

To summarise, nest counts tend to give a low value for the size of a rookery, and they are also subject to considerable observer error which can be measured. The counting is relatively simple to carry out, and it can be done at any time of the day during the height of the breeding season. The counts appear adequate for detecting gross changes in the size of a rookery, and this is sufficient for most purposes. Nest counts merely provide an indication of the number of breeding adults; the total rook population may also include substantial numbers of non-breeding juvenile birds.

3. RESULTS

Although the present work is concerned mainly with rookeries in the Hawke's Bay and North Canterbury districts, it may be useful to preface these more detailed studies with a review of what is known of the liberations and present distribution of rooks in New Zealand as a whole.

(A) GENERAL ACCOUNT

According to Thomson (1922) rooks were liberated in Nelson, Auckland and Christchurch between 1862 and 1873 (Table 1).

TABLE 1: LIBERATIONS OF ROOKS

Year	Place	No. of birds	Result
1862	Nelson	3	Stayed a few years, then disappeared
1862?*	Canterbury	?	Killed by cats
1869	Auckland	2	?
1870	Auckland	64	Last mentioned 1874; not doing well
1871	Christchurch	5	?
1873	Christchurch	35	Well naturalised, 1890; fairly common, 1916

*Rooks liberated by Mr Watts Russell about this time, poorly documented.

At the present time there are five isolated rook populations in New Zealand. These are referred to below as the Hawke's Bay, Pirinoa, Christchurch, Banks Peninsula and Peel Forest populations respectively. (Peel Forest is near Geraldine in Fig. 1.) Only one of these, Christchurch, can be traced directly to one of the liberations recorded by Thomson. However, there are reasons for believing that at least some of the remaining populations resulted from liberations rather than natural spread. For instance, Guthrie-Smith (1921), referring to Hawke's Bay, stated 'the few pair liberated near Hastings have, after many years, increased to a considerable rookery'. Likewise, Stead (1927) wrote of a rookery at Mt Peel, 'where there are a few pairs of birds which were taken there by Mr Dennistoun'. It seems likely that the rooks which now exist in the Peel Forest district are derived from this earlier rookery at Mt Peel Station. The origins of the Pirinoa and Banks Peninsula rookeries are unknown.

The Hawke's Bay and Christchurch populations have prospered, and these localities remain the main headquarters of the species in New Zealand (see Sections B and C below). The main Pirinoa rookery is in some tall eucalypts (Sheet N 165, grid 737096); a small offshoot of this rookery (grid 726211), established in 1956, was abandoned after shooting (J. M. Cunningham, *in litt.* 9.4.57). There may be other small ones on the west side of Lake Wairarapa and near Hinakura (Stidolph, 1943). Three birds appeared at Pirinoa in 1930, and their numbers gradually increased to reach 40 or 50 by 1943, even though a fair number were poisoned or shot (Stidolph, 1943). According to Mr H. Warren, the largest number of rooks seen in the district was 210 'a few years ago', but only about 120 were seen in 1956 (J. M. Cunningham, *in litt.* 9.4.57). In October 1956 the rookery contained 36 nests (J. M. Cunningham, pers. comm., 1956).

Three rookeries have been reported from Banks Peninsula, but their present status is unknown. A rookery on the south headland of Le Bons Bay was known to the late E. F. Stead (Davison, File I.A. 47/82), and two others were reported in replies to Dr Wodzicki's 1954 questionnaire, one at Long Lookout Point (Mr T. S. Craw) and the other at Okains Bay (Mr J. E. Thacker). Mr Thacker stated that rooks were first seen in the Okains Bay district in 1925, and that a rookery, containing several hundred birds in 1954, had existed there for about 25 years.

There are three rookeries in the Peel Forest district, but only one, the smallest, has been visited by the writer. It was situated in a dense plantation of *Pinus radiata* (Sheet S 91, grid 799055), some three miles south of Peel Forest Post Office, and contained about 50 nests. Two other rookeries, one of them large, are situated a mile or so to the west, and the total population of rooks in the district is said to be of the order of 2000 birds (J. Thatcher, pers. comm., 1956).

Rooks used to occur in a few districts where they are now absent. Apart from the early rookeries at Auckland and Nelson (Table 1), there was a rookery at Mt Biggs, in the Feilding district, but this was destroyed about 1925 (Dear, 1951). Between 1939 and 1950 a small number of rooks were seen regularly near Porirua, Wellington (K. R. Allen, pers.

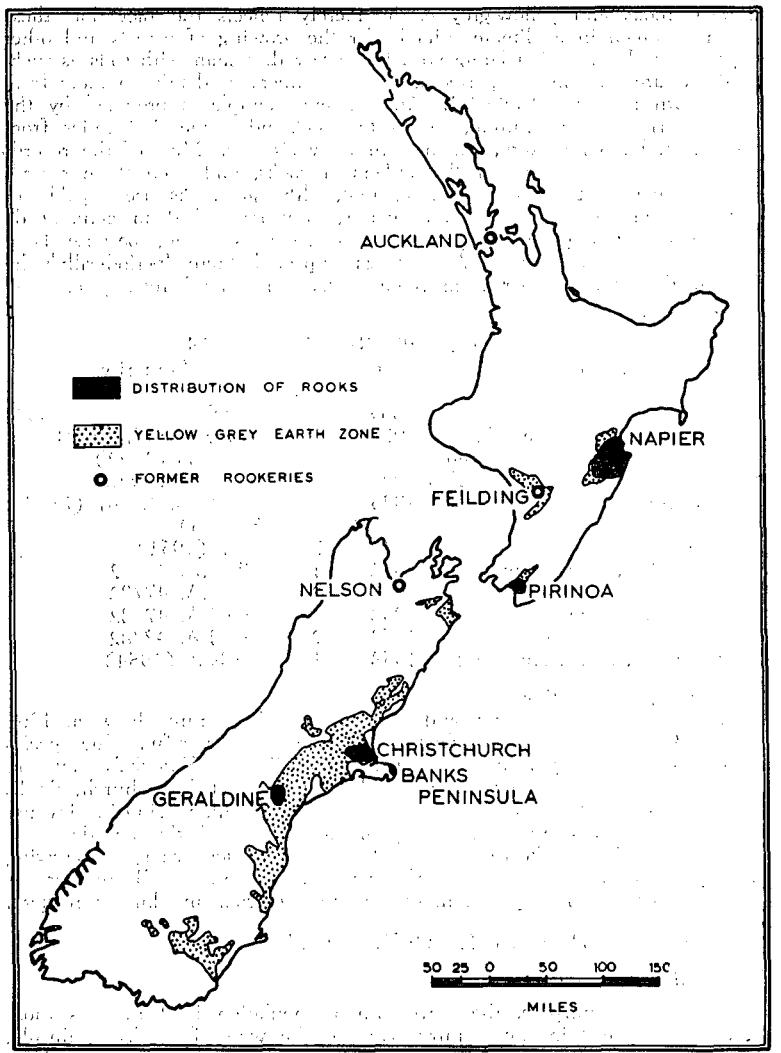

Fig. 1: Location of breeding populations of Rooks in New Zealand.

comm., 1956). During this period numbers increased from two to about five, but none were seen after 1950. Similarly, three rooks were frequently seen at Stoke, Nelson, about this time, but they disappeared in 1953 (J. Bullivant, *in litt.* 26.8.56). An article in the *Nelson Evening Mail* of 9.12.53 presumably refers to the same birds.

Fig. 1 shows the location of rook populations in relation to the distribution of a certain group of soils, the yellow-grey earths (Soil Map of New Zealand, 1948). It is interesting to note that, except for those on Banks Peninsula, all the known rookeries are located in or near the zone of yellow-grey earths, and even the rookery which used to exist near Feilding was on soils of this kind. It is probable that this apparent correlation

between rooks and yellow-grey earths merely reflects the fact that these soils are formed in a climate suitable for the growing of cereals and other crops, the real correlation being with land-use rather than with soils as such.

Rooks are sometimes reported in small numbers in districts remote from any known rookery (Table 2). An extreme example is provided by the specimen from Maungaturoto, in North Auckland, some 300 miles from the nearest known rookery, which is in Hawke's Bay. Most of the records in Table 2 refer to very small numbers of rooks, and even these records are infrequent. It seems, therefore, that, although rooks are capable of dispersing far from their breeding places, very few of them actually do this. The Feilding district provides a possible exception, because Dear (1951) stated that 'numbers' of rooks appeared there 'periodically'; he thought they came either from some undiscovered local rookery or from Hawke's Bay.

TABLE 2: DISPERSAL OF ROOKS

Locality	Year	No. of birds	Authority
Leeston, Canterbury	1869	1	*Lyttelton Times* (5.11.69)
Tutira, Northern Hawke's Bay	1907	6	Guthrie-Smith (1921)
Hicks Bay	before 1922	?	Thomson (1922)
Lake Taupo	before 1922	?	Thomson (1922)
Upokongaro, Wanganui	1935	1	M. J. S. Smart (*in litt.* 5.12.56)
Feilding	1949	?	Dear (1951)
Hunter Valley, Lake Hawea	1952	1	File I.A. 47/82
Wairoa district	1953	2	File I.A. 47/82
Ngongotaha, Rotorua	1953	1	File I.A. 47/82
Tauranga-Taupo River	1953	2	File I.A. 47/82
Maungaturoto, North Auckland	1953	1	Turbott (1954)

Summary of Distribution

Rooks were liberated in Auckland, Nelson and Christchurch between 1862 and 1873, but only the Christchurch liberation was successful. The species is now well established in two North Island districts (Hawke's Bay and Southern Wairarapa) and in three South Island ones (Christchurch, Banks Peninsula and Peel Forest), the main centres of population being in Hawke's Bay and near Christchurch; a rookery in the Feilding district was destroyed about 1925. Most of the rookeries are located in districts where the growing of crops is an important aspect of farm management. Small numbers of rooks are occasionally reported in districts remote from any known rookery.

(B) THE CHRISTCHURCH POPULATION

(a) Introductory Remarks

For the present purpose, the Christchurch population is defined as those rooks which breed in the country lying to the west of Banks Peninsula, and between the Waimakariri and Rakaia Rivers. No rookeries have been reported from the districts immediately north of the Waimakariri River, and the Banks Peninsula and Peel Forest rookeries, described in Section A above, appear to be discrete populations separate from the several rookeries, with overlapping feeding ranges nearer to Christchurch.

A preliminary investigation of the area was made on 21 and 22 August 1955, on which dates some of the outlying rookeries were still unoccupied. Further visits were made later in the breeding season (1 to 3 November and 16 November) to count the nests in the rookeries. Only limited information was collected during 1956, because the birds were disturbed by control operations – first the issue of a bounty on rooks, then an organised shooting drive, and finally a successful poisoning campaign. Mr K. H. Miers, of the Department of Internal Affairs, did some nest counts in early

October, just before the shooting, and the writer spent two days inspecting some of the rookeries at the end of October.

Information, of varying completeness and accuracy, was collected on forty-one rookeries which have existed in the Christchurch area at various times between 1872 and 1956 (Table 3), but only twenty of these rookeries were in use during the 1955 or 1956 seasons. The exact location of many of the abandoned rookeries is unknown, and there may be some duplication. For instance, 'Halswell', 'Lincoln-Prebbleton' and 'Prebbleton' may be three descriptions of the same rookery, or, alternatively, of the location of a single rookery at different periods. The columns in Table 3, listing the years in which rookeries were established or abandoned, represent approximations made by the author from the information available. Much of this information was supplied verbally and some of it was contradictory. The sources of information are too numerous for inclusion in the table, but most of them are mentioned elsewhere in the text. Mr Overton's rookery (No. 19 in Table 3) may be quoted as an example of the kind of approximations that have been made. In 1955 Mr Overton stated that his rookery had been in existence for many years, and he had known it personally for eight years, i.e. since about 1948. The rookery was apparently not known to Stead in 1947, but was in existence by 1951 (Davison, File I.A. 47/82). Its date of establishment has therefore been assessed as c. 1948, but of course it may have originated much earlier than this.

(b) Liberation and Early Spread (1871 - 1925)

According to Thomson (1922), five rooks were liberated 'in the gardens' in Christchurch in 1871, and a further 35 in 1873. By 1885 at least four rookeries were known, three of them near Cathedral Square and one at Fendalton; all are now deserted. The best known was the Daresby rookery, which dates from the 1870's, and was located in some tall bluegums (*Eucalyptus globulus*) on the property of the late Mr George Humphreys at Fendalton (D. Macmillan, *in litt.* 29.11.55). The Daresby rookery was much valued by its owner, who is reputed to have forbidden his employees to go near it during the nesting season (G. S. Barwell, pers. comm., 1956), and to have mentioned in his will his desire for its future preservation (*Christchurch Press,* 17.3.34).

The other three early Christchurch rookeries were located as follows:

(i) On the north side of Cathedral Square. These rooks were mentioned as early as 1872, a date which precedes the main liberation of 1873, and a few pairs still nested in the vicinity as late as 1899 (D. Macmillan, *in litt.* 29.11.55).

(ii) On Dr Prin's property, which is now the site of the City Council offices in Manchester Street. About 1884, rooks used to fly between this rookery and the one at Fendalton (*Christchurch Press,* 17.3.34).

(iii) On the property of J. P. Jameson, now occupied by St Mary's Catholic Presbytery in Colombo Street. This rookery was first established in 1880 (*Christchurch Press,* 17.3.34).

It is clear that, from the 1870's until the turn of the century, rooks were present both in the centre of the city and at Fendalton. The city rookeries seem to have been abandoned about the end of this period, and for the next twenty-five years or so the only occupied rookery near Christchurch appears to have been the Fendalton one. In the middle 1920's the bluegums began to die, and it was not long before some of the rooks were forced to use new nesting sites.

(c) Changes in Distribution (1925 - 1956)

As early as 1926, a few rooks had moved from the bluegums at Fendalton to some pines at Middleton, but no other rookeries were known at this time (Stead, 1927). The Fendalton rookery continued to decline during the following decade, and was finally abandoned between 1936 (D. Macmillan, *in litt.* 29.11.55) and 1938 (R. A. Falla, *in litt.* 1955). During this

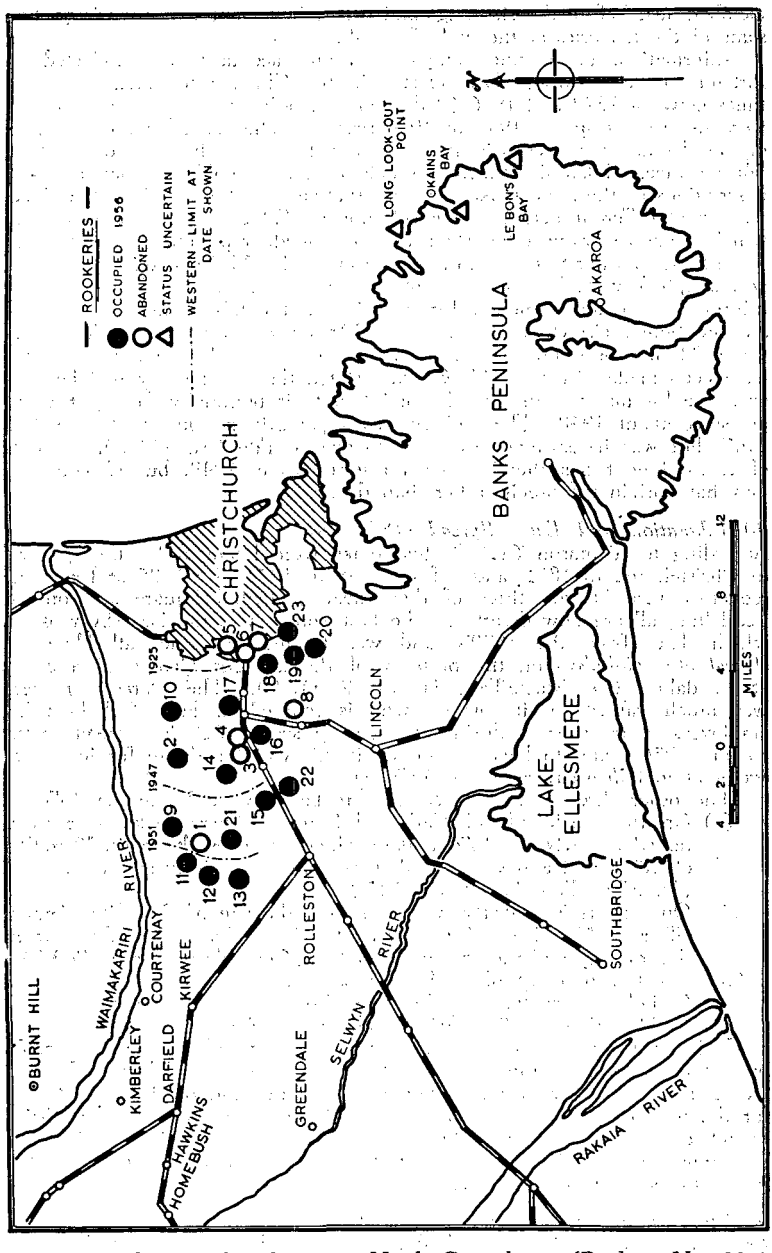

Fig. 2: Distribution of rookeries in North Canterbury. (Rookery No. 20 is incorrectly marked; it was occupied in 1955 but *not* in 1956.)

period several new rookeries were established in pines (probably *Pinus radiata*) at St Andrew's College and Templeton (D. Macmillan, *in litt.* 29.11.55), Sunnyside Mental Hospital (R. A. Falla, *in litt.* 1955), Paparua Prison (G. S. Barwell, pers. comm., 1955) and at Islington (M. B. Crequer, 1952 questionnaire).

The distribution of rookeries near Christchurch about 1946 - 47 is indicated by some notes made by Dr Wodzicki and Mr E. B. Davison following independent visits to the late E. F. Stead, who was a well-known authority on birds in Canterbury. At least 13 rookeries, scattered over an area of some 60 square miles, were occupied in or near Christchurch at this time (Table 3), and their western limit is bounded by a line running through Yaldhurst, Paparua, Islington and Halswell. This represents a considerable extension of the breeding range from the single rookery at Fendalton in 1925 (Fig. 2).

In July 1951 Davison collected further information on the distribution of rookeries by interviewing local farmers in the Christchurch area. Two new rookeries had been established since 1947, one on Mr Overton's farm opposite Mt Magdala on the Lincoln Road, and the other on Mr Watson's property near West Melton (File I.A. 47/82). The second of these represents a further western extension of the breeding range of the species. Four rookeries were abandoned between 1947 and 1951 (Table 3).

Finally, the distribution of rookeries in 1956 is supplied by the author's recent survey. A total of 19 rookeries were occupied in 1956 (Table 3), and these all lie to the west of the city and to the south of the Waimakariri River; the western limit of distribution is bounded by the West Coast railway, and the southern one by an east-west line running through Rolleston (Fig. 2). Three of the new rookeries are located to the west of any known in 1951, and the breeding range of the species now occupies an area of the order of 100 square miles. It is possible that some additional rookeries still remain to be discovered in outlying districts. For instance, there are unconfirmed reports of rookeries at Burwood (east of Christchurch city) and at Kimberley (G. S. Barwell, pers. comm., 1956), but the writer was unable to discover anything about these rookeries during brief visits to the districts concerned in October, 1956.

In Fig. 2, lines have been drawn to indicate the probable western limit of rookeries in 1925, 1947 and 1951 respectively, the 1925 line being based on Stead (1927), the 1947 one on Stead's unpublished material, as reported by Davison and Wodzicki, and the 1951 line on data collected from local farmers by Davison in that year. These lines must be regarded as approximate, because some rookeries probably existed for several years before they were reported. However, most of the older rookeries tended to be concentrated near Christchurch, while many of the newer ones are further to the west (Table 3 and Fig. 2). The three rookeries to the west of the 1951 line were not reported by Davison, and local residents state that two of them (Nos. 11 and 12 in Fig. 2) were certainly not established until 1952 (Messrs Fairburn and Wilson, pers. comm., 1955). It seems clear, therefore, that, since about 1925, the breeding range of the rooks near Christchurch has been steadily extending westwards. The dotted lines in Fig. 2 provide a rough indication of the rate of spread, which, over the whole period, is something of the order of a mile every two years, but probably faster after 1947 than before it. There has been no corresponding spread to the north or south (Fig. 2); indeed, with the disappearance of rookeries in the Halswell - Prebbleton area (Table 3) there has been a slight contraction in the southern boundary of the breeding range.

(d) Changes in Numbers

The earliest estimate of the Christchurch rook population is provided by Mr W. J. MacGibbon, who stated (*in litt.* 24.5.55) that 'forty years ago', i.e. about 1915, 'the main rookery was on the Humphrey's property on

TABLE 3: LOCATION AND HISTORY OF CHRISTCHURCH ROOKERIES

NAME OF ROOKERY	Reference No. (Fig. 2)	MILE TO INCH MAP Sheet No.	MILE TO INCH MAP Grid Ref.	Year Established	Year Abandoned	Stead (1946)	NEST COUNTS Bull (Nov., 1955)	NEST COUNTS Miers (Early Oct. 1956)	NEST COUNTS Bull (Late Oct. 1956)
Cathedral Square	–	S 84	003563	1872	c.1900	N.O.	N.O.	N.O.	N.O
Fendalton	5	S 84	965575	c.1873	1938	N.O.	N.O.	N.O.	N.O.
Colombo Street	–	S 84	003564	1880	?	N.O.	N.O.	N.O.	N.O.
Manchester Street	–	S 84	004564	c.1880	?	N.O.	N.O.	N.O.	N.O.
Sunnyside A	7	S 84	968538	c.1929	1930	N.O.	N.O.	N.O.	N.O.
Sunnyside B	18	S 84	962537	c.1930	S.O.	}	165	214	N.I.
Sunnyside C	18	S 84	959539	c.1930	S.O.	} 500	155	136	N.I.
Sunnyside D	18	S 84	958536	c.1930	S.O.	}	185	215	N.I.
Islington 'Works', A	4	S 83	884553	c.1930	c.1953	200	N.O.	N.O.	N.O.
Islington 'Works', B	4	S 83	884553	c.1930	c.1953	100	N.O.	N.O.	N.O.
St Albans	–	S 84	*	1934	?	N.I.	N.I.A.	N.I.A.	N.I.A.
Paparua A	14	S 83	853568	c.1935	S.O.	N.I.	206	314	237
Paparua B	14	S 83	844570	c.1935	S.O.	N.I.	57	158	64
'Bell's'	8	S 84	905510	1938	1939	N.O.	N.O.	N.I.	N.I.
'Mrs King's'	2	S 75	872612	c.1945	1953†	150	N.O.	20	N.I.
'Mould's'	15	S 83	834527	c.1945	S.O.	N.O.	139	114	90-111
Yaldhurst	–	S 83	*	1927–46	1947-50	150	N.O.	N.O.	N.O.
Sunnyside Orphanage	–	S 84	*	1927–46	?	N.I.	N.I.A.	N.I.A.	N.I.A.
Mt Magdala	–	S 84	*	1927–46	1947-50	150	N.O.	N.O.	N.O.
Halswell	–	S 84	*	1927–46	1947-50	25	N.O.	N.I.	N.I.
Sockburn	–	S 84	925553	1927–46	?	40	N.I.A.	N.I.A.	N.I.A.
Lincoln-Prebbleton	–	S 83	*	1927–46	1947-50	N.I.	N.O.	N.O.	N.O.
Hornby	–	S 84	*	c.1945	?	50	N.O.	N.O.	N.O.
Hornby Pipe Co.	17	S 84	909552	c.1946	S.O.	150	26	N.I.	N.I.
Lawford Farm	21	S 83	789551	c.1948	c.1950†	N.O.	N.I.	94	N.I.
'Mackays'	1	S 83	793595	c.1948	c.1951	N.O.	N.O.	N.O.	N.O.
Islington C	16	S 83	886544	c.1948	S.O.	N.O.	18	N.I.	N.I.
St Joseph's Home	6	S 84	962548	c.1948	c.1954	N.O.	N.O.	N.I.A.	N.I.A.
'Overton's'	19	S 84	954521	c.1948	S.O.	N.O.	65	48	49
'Robinson's'	13	S 83	748556	c.1950	S.O.	N.O.	206	172	136-184
Prebbleton	–	S 83	*	1951	1954	N.O.	N.O.	N.O.	N.O.
'Watson's'	–	S 83	*	1951	?	N.O.	N.O.	N.O.	N.O.
Templeton	3	S 83	875552	c.1951	c.1954	N.O.	N.O.	N.I.A.	N.I.A.
'Fairburn's'	11	S 75	774606	1952	S.O.	N.O.	45	57	48
'Wilson's'	12	S 83	748586	1952	S.O.	N.O.	35	71	N.I.
'Northcott's'	9	S 75	799619	1953	S.O.	N.O.	30	70	N.I.
Harewood	10	S 76	907624	1953	S.O.	N.O.	30	45	N.I.
Henderson's Road	20	S 84	965510	1955	1956	N.O.	9	N.O.	N.O.
'Cheeseman's'	22	S 83	841519	1955–56	S.O.	N.O.	N.I.	78	N.I.
Cashmere	23	S 84	985511	1955–56	S.O.	N.O.	N.I.	N.I.	10
Paparua C	14	S 83	865575	1956	S.O.	N.O.	N.O.	N.I.	20
TOTAL	–	–	–	–	–	1515	1371	1806	–

* Exact location in doubt
† Reoccupied in 1956 (Miers)
N.O. Not occupied
N.I. Not inspected
N.I.A. Not inspected, believed abandoned
S.O. Still occupied

Fendalton Road, where my observations would indicate there would be approximately 400 birds'. This may be a conservative figure, because Mr MacGibbon's estimate of the Canterbury rook population in 1955, 'between 1500 and 2000' (*in litt.* 24.5.55), is well below those of other observers. The number of rooks at Fendalton about 1926 is given by Stead (1927) as 'perhaps a thousand birds'. According to Dr D. Macmillan, who was closely associated with Stead, an estimate made by Stead about 1944 was 'perhaps as many as 4000 or as few as 2000' (D. Macmillan, *in litt.* 29.11.55). On the other hand, Davison's notes (File I.A. 47/82) state that in 1947 'there are a total of 1700 nests counted, and Mr Stead considers this a very accurate count', and again, 'E. F. Stead gave the number of rooks around Christchurch in 1947 as 7000' (File I.A. 47/82). An even larger population is suggested by Dr R. A. Falla, who wrote (1947) 'during an organised campaign of destruction of Canterbury rooks, about 5000 birds, representing half the breeding population, were killed by shooting and poisoning in the 12-month period up to 31.8.46'. The 1955 and 1956 surveys were limited to nest counts, and no estimates were made of the sizes of flocks. However, allowing for nests which were overlooked, the nest counts shown in Table 3 would suggest a breeding population of the order of 5000 birds, but the total population, including non-breeding birds, might be considerably higher than this, perhaps as many as 7000 birds. Mr G. S. Barwell (pers. comm., 1955) stated that some 6000 rooks roosted at Paparua in the winter of 1955. On the basis of the rough estimates quoted above, it would appear that from 1926 to 1947 the rook population increased from about 1000 to a figure somewhere between 7000 and 10,000 birds. This fairly rapid increase in the population does not appear to have been maintained, for the 1956 estimate falls within the range of those made in 1947.

Nest counts probably provide a better indication of changes in the size of the rook population than do estimates of the numbers of birds. However, nest counts are available only for the years 1946, 1955 and 1956 (Table 3), and even these counts are difficult to interpret. Stead's 1946 counts have been variously reported as totalling 1700 (Davison, File I.A. 47/82) and 1515 (Wodzicki, File A.E.S. 4/2/3); Wodzicki supplies totals for each rookery (Table 3), but Davison only a grand total, which appears to include rookeries at Paparua and Le Bons Bay, which are not mentioned by Wodzicki. In view of these facts, 1600 nests would appear a reasonable total figure for the Christchurch area in 1946. The writer's total of 1371 nests in 1955 (Table 3) should perhaps be increased to 1500, since he did not visit two rookeries where Miers counted 172 nests the following year. Similarly, Miers' total of 1806 nests might be increased to 1880 to include nests in four small rookeries which he did not visit, but which were counted by the writer in either 1955 or 1956 (Table 3). The available nest counts, adjusted as above, are therefore 1600 in 1947, 1500 in 1955 and 1880 in 1956. The 1947 figure of 1600 nests falls within the range of the two recent counts, and, allowing for observer error (about $\pm$ 300 nests), no great significance can be attached even to the difference between the 1955 and 1956 counts. On the basis of nest counts, therefore, it would appear that the breeding population has not increased significantly during the last decade. This result is in agreement with the conclusion drawn from an examination of the available estimates of the total population.

These conclusions conflict with the opinion of many local farmers, who consider that the rook population has greatly increased during recent years. For example, Mr Overton stated (pers. comm., 1955) that during the last eight years the population at his rookery had been increasing by about one-third each year. It must be admitted that the available nest counts and estimates of the rook population are so few, and subject to such large errors, that they might fail to reveal anything but a large change in the

size of the rook population. The possibility of some increase in the rook population in recent years cannot be ruled out on the basis of the data described above, but the substantial increase reported by many farmers may be deceptive. Individual rookeries may increase in size, due to the arrival of adult birds from other rookeries which have been disturbed by control measures. Similarly, new rookeries may become established without any increase in the total population (Table 3), and this matter is discussed further in the next section.

(e) Some Effects of Control Operations

Towards the end of 1956, large numbers of rooks were killed at Paparua by officers of the Department of Agriculture who were testing the effectiveness of a new poison, sodium fluoracetate (1080). However, during the period covered by the present paper, the main methods of control have been shooting the birds at their rookeries and cutting down the trees used for nesting; poisoning, trapping and various scaring devices have been tried occasionally, but with limited success. Control measures were applied sporadically until about 1945 and with considerable vigour and co-ordination thereafter. These measures have had two main effects: they have resulted in the death of a considerable number of rooks, and they have caused the birds to extend their breeding range.

Large numbers of rooks have been shot in the Christchurch area each year since 1945, but it is mostly the young birds that are killed. Falla's (1947) figure of 5000 birds destroyed during the year ending 31 August 1946 is probably above the average for the post-war years, but, according to information supplied by local farmers, the annual kill frequently amounts to some two to three thousand young birds. The effect of this mortality on the rook population as a whole is uncertain, and the matter is considered further in the discussion (Section 4 below).

The cutting down of trees in which rookeries are located has an obvious effect in dispersing the birds, because they are frequently forced to move considerable distances to find other trees which are suitable for nesting. Rookeries were abandoned at 'Mrs King's', Lawford Farm and 'Mackay's' (Table 3) after trees had been cut down or topped at these places. The birds from 'Mrs King's' moved to Harewood about 1953 (Mr MacArthur, pers. comm., 1955), a distance of about two miles, but by 1956 at least twenty pairs of rooks were again nesting at 'Mrs King's', and the Harewood rookery also remained occupied (K. H. Miers, pers. comm., 1956). Similarly, the Lawford Farm rooks moved to 'Robinson's' about 1950 (T. Fairburn, pers. comm., 1955), again a distance of about two miles, but in 1956 rooks nested at both Lawford Farm and 'Robinson's' (Table 3). The trees at 'Mackay's' were cut down about 1951 and the birds established two new rookeries at 'Fairburn's' and 'Wilson's' (T. Fairburn, pers. comm., 1955), which properties are respectively one and two miles from 'Mackay's'. In each of the three examples mentioned above, the cutting down of nesting trees has resulted in the eventual establishment of two rookeries instead of one, and also in an increase of about two miles in the breeding range of the species. The subsequent re-occupation of two of the abandoned sites may be explained by the conservative nesting habits of rooks and by subsequent growth of unfelled trees near the site of the old rookery. The fact that the protected rookery at Fendalton persisted for some fifty years without giving rise to any daughter-rookeries suggests that those at 'Mrs King's', Lawford Farm and 'Mackay's' would have done likewise if they had been left undisturbed.

The shooting of birds at the rookeries sometimes causes the rooks to find new nesting sites elsewhere. According to Mr Bell (pers. comm. 1955) a rookery which became established near his homestead about 1938 was vacated within a year as a result of shooting. Mr M. B. Crequer, in replying to Dr Wodzicki's 1952 questionnaire, supplied a detailed account of a similar experience at Islington. About 1930 a rookery became estab-

lished at the Freezing Works, and flourished until about 1945. Shooting was then started because the rooks were thought to have driven away the gulls which formerly were very numerous and served a useful purpose in removing pieces of offal from the drainage ponds. About 2000 rooks were present in 1945, and the nests (250 - 275) were confined to one end of a clump of trees. During 1945, 434 rooks were shot; the old rookery declined in size, but two new ones appeared nearby. In the third year of shooting there were 97 nests in the old rookery and 45 in the new ones. Continued shooting broke up the rookery still further into four small rookeries with a total of about 60 nests, but many other birds moved further afield to establish new rookeries at Hornby Mental Hospital, Islington Main Road, Sockburn By-products Company, St Joseph's Boys' Home, Templeton Golf Links and Lawford Farm. By 1953 the Freezing Works rookeries had all been abandoned; the fates of the daughter-rookeries are summarised in Table 3. The shooting at Islington (1656 birds killed 1945-50) apparently caused the birds to establish a considerable number of new rookeries, but later there was a redistribution between the rookeries, the less-favourable ones being abandoned and the more favourable rapidly increasing in size.

In other instances rookeries have persisted despite frequent shooting, for example the rookeries at Sunnyside, Paparua, 'Wilson's' and 'Fairburn's' (Table 3). The important factors in deciding whether or not shooting will cause a rookery to be abandoned are probably the suitability of the trees for nesting purposes and the length of time the rookery has been established. The Islington rookery was located in some rather stunted trees, and at Prebbleton shooting was started within a few months of the birds' arrival.

(f) Miscellaneous Observations

There has been a change in the kind of trees preferred by rooks for nesting purposes in the Christchurch area. This was first noted by Stead, who stated (1927), 'Rooks have hitherto nested almost exclusively in bluegums (*Eucalyptus globulus*) in Christchurch. At first they nested in the extreme tops of the trees, but the heavy winds so often dislodged the nests or their contents that the rooks took to building on more solid branches. Owing to diseases, the bluegums are rapidly dying out, and the rooks are now being forced to take to other trees, and are already occupying some pines at Middleton. I have never known them to nest here in either oaks or elms, their favourite trees in England.' Information collected during the recent survey confirms Stead's observations. Of 28 rookeries in which the kind of tree was known, five were in eucalypts (mostly *E. globulus*), twenty in pines (mostly *Pinus radiata*) and three in mixed plantations, two (Sunnyside B and 'Mould's' in Table 3) of conifers (*Pinus* and *Cupressus*), and one of pines and eucalypts ('Robinson's'). Three of the five rookeries in eucalypts (Cathedral Square, Manchester Street and Fendalton) were established before 1900, one (Sunnyside A) was established about 1929, but soon abandoned (A. R. Andrews, pers. comm., 1955), and one ('Cheeseman's') was established in 1955 or 1956 in some unusually tall and healthy-looking trees. All of the 23 rookeries in pines or mixed plantations were established after 1926. Most rookeries are situated in fairly tall trees which provide a good view over the surrounding country and have few branches at lower levels; such trees are usually in isolated groups ('Fairburn's' and 'Mould's'), sometimes in long shelter belts (Paparua and Sunnyside D) and occasionally in small plantations ('Robinson's' and 'Wilson's'). It is probable that the situation and form of trees are of more importance than the actual species as such. Losses of nests and contents through the effects of strong winds, as mentioned by Stead (1927), are not confined to eucalypts; considerable losses sometimes occur when the birds nest in 'the taller whippy tops of younger pines', and in one instance 500 young rooks were found on the ground under a rookery after a strong

wind (Davison in File I.A. 47/82).

Nothing has been recorded concerning the breeding season of rooks in New Zealand. In England the species is normally single-brooded and begins breeding in late March or early April; incubation takes 16 to 18 days and fledging 29 to 30 days (Witherby *et al.*, 1943). On 21 August 1955 birds were carrying nesting material at Paparua and Sunnyside, but some of the outlying rookeries were still unoccupied. On 1 November most of the rookeries contained well-feathered young, many of them out of the nest and a few already flying. Using Witherby's fledging period of 29 to 30 days, this would suggest that hatching had occurred about 1 October. In 1956 birds were building at Paparua and at 'Mould's' on 7 September, but apparently not yet laying. On 1 October Mr Miers found that at 'Robinson's' rookery, several of the nests contained newly-hatched young, but many others still had eggs. On 30 October a few young had just begun to leave the rookery at Paparua (G. S. Barwell, pers. comm., 1956). The above observations suggest that laying begins about the middle of September and that the eggs hatch early in October; some birds nest later, possibly as a result of the destruction of earlier nests. In both 1955 and 1956, hatching began about 1 October in the Christchurch area, and this is nearly three weeks ahead of the Pirinoa rookery in the Wairarapa, where, according to Mr H. Warren, hatching occurred about 20 October 1956 (J. M. Cunningham, *in litt.* 9.4.57).

The only detailed information available on clutch size and hatching success of rooks in New Zealand was obtained by Mr M. B. Crequer, who examined forty nests at Islington before and after hatching. Clutch size varied from two eggs to five eggs, the relative frequency being eight clutches of two eggs, ten of three, twenty-one of four, and one of five (M. B. Crequer, *in litt.* 21.7.56). The mean clutch size is 3.4, which is lower than the figures reported by Lockie (1955) in Britain, 4.3 in early clutches and 3.5 in late ones; it is likely that some of the clutches counted by Crequer were incomplete, so his figures must be regarded as minimum ones. Crequer found that, after hatching, eight nests had two young, thirty had three, and two had four, but there were still some unhatched eggs in some of the nests. On the basis of Crequer's two counts, 84½% of the eggs hatched, and this is very similar to Lockie's figures, which varied from 82% to 88%, depending on the size of clutch.

More information is required on the seasonal movements of rooks. In spring the birds are distributed among the various occupied rookeries listed in Table 3, but many of these rookeries are deserted after the breeding season. According to Mr G. S. Barwell (pers. comm., 1955), a large part of the Christchurch rook population congregates at Paparua about the end of March (up to 6000 birds have been seen) to roost in a plantation of pines behind the prison; this roosting plantation is quite separate from the shelter belts in which the birds nest. The rooks leave the roost soon after daybreak and return to Paparua again in the evening. The winter flock breaks up into the various breeding flocks during August. Mr Barwell's observations are supported by Mr Mould, who stated that, although birds visit his rookery during the day, they do not roost there in winter (pers. comm., 1956). It is possible that there is another small winter roost at Sunnyside, but this requires confirmation. It is interesting that Paparua and Sunnyside, which are the oldest surviving rookeries, are also the largest centres of the rook population in both spring and winter. In spring the three sub-rookeries at each of these two places together contain 57% of all the nests counted in the Christchurch area (Table 3). During the nesting season rooks appear to forage within a few miles of the rookery; and even in winter, judging by the localities where the birds are seen, the feeding areas usually lie within a radius of less than ten miles of the roosting place. Occasionally odd birds or small flocks are seen further afield. According to Mr Fairburn, rooks have been reported in varying numbers

from Burnt Hill, Kimberley, Darfield, Homebush, Hawkins, Greendale, Kirwee, Courtney and Sumner (Fig. 2). He has twice seen dead rooks on the road near Hinds. Mr Copp, of Crop Research, D.S.I.R., stated that rooks occasionally appear at Lincoln, but only in small numbers. Rooks were recorded at Darfield as early as 1947 (H.S.G. 1948). Except for the record from Burnt Hill, rooks do not appear to have been observed north of the Waimakariri River.

(g) Summary

Rooks were liberated in Christchurch in 1871 (five birds) and 1873 (thirty-five birds), and rookeries were soon established in eucalypt trees in the centre of the city and at Fendalton, but only the Fendalton one was occupied after 1900; it contained 400 birds in 1915 and 1000 in 1926, but the trees were already dying and the site was abandoned by 1938. By 1947, thirteen new rookeries, distributed over some sixty square miles and containing about 1600 nests, had been established in pines to the west of the city. A further spread to the west was observed in 1951, and again in 1956, when the most distant of the nineteen occupied rookeries (distributed over an area of about 100 square miles) was some fifteen miles to the west of Fendalton. Control measures, especially shooting and tree felling, may have had some effect in limiting the rate of population increase (only 1500 to 1880 nests were counted in 1955 - 56), but have probably accelerated the spread of rooks. The change from eucalypts to pines as preferred nesting trees is discussed, and limited observations are presented on breeding season, clutch size, hatching success, winter roosts and feeding range.

(C) THE HAWKE'S BAY POPULATION

(a) Introductory Remarks

Information on the present distribution of rookeries in Hawke's Bay was collected during two brief visits to the district in October 1956 and February 1957 respectively. The information collected, together with additional data obtained during subsequent correspondence with local residents, is summarised in Table 4. The table lists a total of 29 rookeries, and at least 26 of these were occupied during 1956, two (Poraiti and Otane) are of uncertain status, and one (Patoka) was definitely abandoned some years ago (H. E. Crosse, *in litt.* 14.2.57). The Poraiti rookery was reported by Mr R. Williams (D. H. Brathwaite, *in litt.* 5.12.56), and the Otane one by Mr E. A. Bloxham (pers. comm., 1957), who was uncertain of its exact location and present status. No counts are available from these two rookeries, nor from the ones at Glencoe and near Awatea which were reported by Mr E. Clarkson (pers. comm., 1957). All the other rookeries were counted, the one on the north side of Bluff Hill, Napier, by Mr J. Turnbull (D. H. Brathwaite, *in litt.* 5.12.56), the ones at Waipukurau and Mangarouhi by Mrs R. Giblin (*in litt.* 28.1.56), and the one at Mangakuri by Mr S. R. Williams (*in litt.* 17.3.57). Nests in the remaining twenty rookeries were counted by the author, seventeen of them in October 1956 and three (Atua, Taheke and Clareinch) in February 1957, when the birds were no longer present. For ease of reference, the Hawke's Bay data are presented below under the same headings and in the same order as in the account of the Christchurch population.

(b) Liberation and Early Spread (1871 - 1925)

The earliest reference to rooks in Hawke's Bay is supplied in an account of the introduced birds of Scinde Island (Hutchinson, 1900), where it is stated 'wanderers from the Puketapu rookery flap over the island at times'. The origin of this Puketapu rookery is uncertain. Thomson (1926) suggests that the rooks, originally liberated in Auckland, eventually moved to Hawke's Bay, but Guthrie-Smith (1921) stated that some rooks were liberated near Hastings. This latter view is still held by some Hawke's Bay residents, who believe that the original liberation was made at Fernhill. However, Mr V.

TABLE 4: HAWKE'S BAY ROOKERIES

NAME OF ROOKERY	Serial No. Fig. 3	MILE TO INCH MAP Sheet No.	Grid Reference	NEST COUNTS (MID - OCTOBER 1956) A	B	C	D	Mean
Hospital, Hastings (A)	1	N.134	241229	104	104	99	–	102
Fernhill	2	N.134	182274	47	48	–	55	50
Marine Parade, Napier	3	N.134	334380	11	11	11	–	11
Irongate Road	4	N.134	185227	306	300	269	–	292
Valley Road (A), Maraekakaho	5	N.134	087168	132	141	126	–	133
Valley Road (B), Maraekakaho	6	N.134	079148	–	6	–	–	6
Raukawa	7	N.134	082104	38	36	33	–	36
Longlands	8	N.134	226175	–	61	61	–	61
High School, Hastings (B)	9	N.134	257205	6	6	–	6	6
Dartmoor	10	N.124	128402	48	46	–	42	45
Rissington	11	N.124	139442	134	140	–	142	139
Okawa (A)	12	N.134	120328	37	31	–	36	35
Okawa (B)	13	N.134	098334	75	90	–	86	84
Roy's Hill	14	N.134	123217	184	188	–	192	188
Maraekakaho Road	15	N.134	112207	17	16	–	17	17
Havelock North (A)	16	N.134	296178	1	1	–	–	1
Havelock North (B)	17	N.134	288182	9	9	–	–	9
Waipukurau	18	N.146	995725					3†
Mangarouhi	19	N.146	066703					9†
Glencoe	20	N.134	005155					?†
Near Awatea	21	N.134	986155					?†
Atua	22	N.141	238808					c.20*
Taheke	23	N.141	990089					c.20*
Clareinch	24	N.146	268735					c.10*
Napier	25	N.124	330410					c.7†
Mangakuri	26	N.141	303807					20†
Poraiti	27	N.124	260403					?
Otane	28	N.141	058905					?‡
Patoka	29	N.124	?					a

* Post breeding counts: 16 February 1957
† Reported by local residents
‡ Existence in doubt
a Abandoned (1948)

Hill, the present owner of the property on which the Fernhill rookery was situated, is emphatic that rooks were not introduced by his late father, but that they appeared of their own accord in the early years of the century, and established a rookery in a plantation of eucalypts behind Mr Hill's house. This information, together with Hutchinson's remark, suggests that the Puketapu rookery was established before the Fernhill one, and, since Thomson's suggestion of natural spread from Auckland seems improbable, it is likely that the birds reached Puketapu by human agency.*

As early as 1915, rooks were sufficiently numerous near Sherenden for a local farmer to request the lifting of protection, and in 1917 similar representations were made by orchardists near Hastings (File I.A. 47/82). Thomson (1922) recorded that a rookery had 'for long existed in Puketapu', and that one had started in Petane (just north of Napier and now called Bay View). A rookery at Rissington has been in existence for thirty-five years or more (Mr Absolom, pers. comm., 1956) and one at Maraekakaho for about twenty-five years (M. F. Greenwood in the 1952 questionnaire). The distribution of rookeries in the 1920's thus extended from Napier to Rissington and then south at least as far as Maraekakaho and Hastings.

(c) Changes in Distribution (1925 - 1956)

Apart from the information outlined in the previous section, nothing was known of the distribution of rookeries in Hawke's Bay until the author's survey was carried out in 1956. Fig. 3 shows that the Hawke's Bay rookeries are clustered in two groups, a large northern one centred on Hastings and a much smaller southern one in the Waipukurau - Elsthorpe area. On present knowledge, the two groups are separated by some 20 miles of country in which only one rookery (Otane) has been reported, and the exact location and status of this one are in doubt.

The 22 rookeries in the northern group extend from Rissington in the north to Raukawa in the south, and from the sea at Napier in the east to a distance of some 20 miles inland near Maraekakaho in the west. This distribution is substantially the same as that already reported as existing in the 1920's, and thus, during the last thirty years or so, there appears to have been no significant increase in the range of the species in this northern area. The establishment of a rookery at Patoka during the last war represented a temporary northward extension of the range, but the rookery gradually declined in size and was abandoned about 1948 (H. E. Crosse, *in litt.* 14.2.57).

The five known rookeries in the southern group (Waipukurau - Elsthorpe area) are all fairly small (Table 4), and most of them are of recent origin. The Mangarouhi one was established about 1952 and the Waipukurau one a year later (Mrs R. Giblin, *in litt.* 28.1.57). According to local residents, the Atua and Clareinch rookeries are both less than ten years old. The oldest of these southern rookeries appears to be the one at Mangakuri, which has been in existence for 'many years' (S. R. Williams, *in litt.*, 17.3.57). Although it is possible that these five rookeries developed from some unrecorded liberation, their small size and comparatively recent origin strongly suggest that they represent a southern extension of the northern group. Assuming that in 1925 the southern limit of distribution of the Hawke's Bay rookeries was in the vicinity of Maraekakaho, the new Waipukurau and Mangarouhi rookeries represent a southern extension of the range by some twenty-six miles in twenty-eight years, or about one mile per year. This is a maximum rate of spread because it is quite possible that rookeries existed south of Maraekakaho even in 1925. Thus, the Hawke's

*According to Mr O. R. Bostock, a very old identity of Fernhill, rooks were first brought to Hawke's Bay by the Acclimatisation Society, who released them at Meeanee. These birds soon moved to Puketapu, where they increased in numbers and then established a second rookery at Fernhill (O. R. Bostock, pers. comm., 15.5.57).

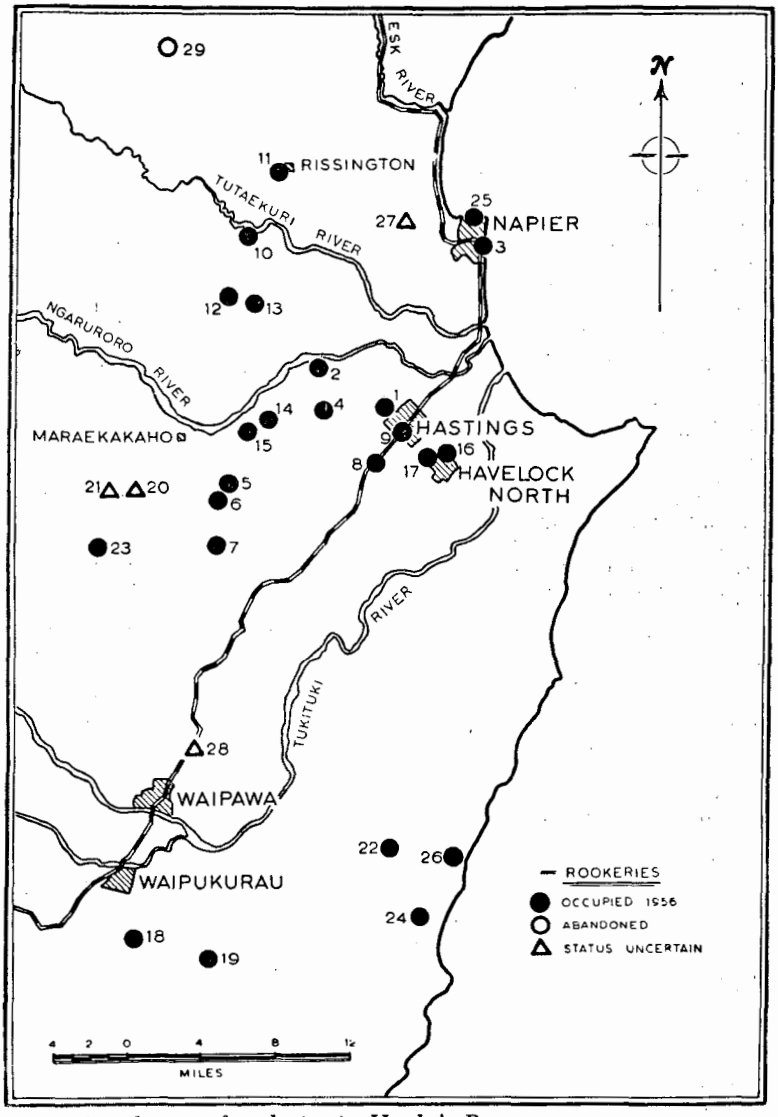

Fig. 3: Distribution of rookeries in Hawke's Bay.

Bay rook population has been extending its breeding range to the south only slightly faster than the slow westerly spread of the Christchurch population described in Section B (c) above.

(d) Changes in Numbers

No estimates of the size of the Hawke's Bay rook population in past years have been found, but some indication of the size of the breeding population in 1956 may be obtained from the nest counts summarised in Table 4. The twenty-three rookeries for which counts are available contain a total

of 1304 ± 253 nests (Table 4), but this is a minimum figure. Allowing for nests which were overlooked in the counting, and also for the four uncounted rookeries, a total breeding population of the order of three or four thousand adult birds is indicated.

The northern group of rookeries alone contains a total of at least 1242 ± 241 nests distributed among twenty-two rookeries, and these are distributed over an area of some 300 square miles, which is about three times the area occupied by the twenty Christchurch rookeries with a slightly larger number of nests, 1371 ± 267 to 1806 ± 351 (Table 3). Inclusion of the southern group of Hawke's Bay rookeries in these figures would greatly increase this difference in density between the Hawke's Bay and Christchurch rook populations.

Although the available data are inadequate to demonstrate any changes in the size of the rook population as a whole, there have been considerable fluctuations in the number of birds breeding at individual rookeries. However, most of these changes are associated with the application of control measures, and, for this reason, it is convenient to describe them in Section *(e)* below.

(e) Some Effects of Control Operations

In Hawke's Bay, as in Canterbury, rook control has involved mainly shooting drives and the felling of trees in which rookeries are located. For many years these activities were carried out sporadically by individual farmers, but, after the last war, a Rook Extermination Committee was formed in Hastings by local farmers and by firms concerned with the freezing and canning of vegetables (M. F. Greenwood, 1952 questionnaire); control activities were then applied with more vigour and co-ordination. Over the years these control operations have caused changes in the size and location of rookeries; some of the older ones have declined in size, but several new ones have been established.

A few years after its establishment at the beginning of the century the original Fernhill rookery contained 'thousands' of birds, but the population began to decline during the early 1920's; this decline, which finally resulted in the rookery being abandoned, coincided with the cutting down of trees and the holding of shooting drives organised by the County Council (Mr V. Hill, pers. comm., 1957). There has also been a decline in the number of rooks breeding at the Maraekakaho and Dartmoor rookeries (numbers 5 and 10 in Table 4). Mr M. F. Greenwood stated that his rookery (No. 5) had declined as a result of shooting (650 young birds were shot in 1950) and the cutting down of some trees. According to Mr Lowry, the number of birds in the Dartmoor rookery (No. 10) had been reduced from over 3000 to about 500 by regular shooting and poisoning. It is also possible that loss of suitable nesting sites has been a contributing factor in the declines of certain rookeries. At Dartmoor, several nests were located in dead trees which could not remain standing many more years. Similarly, several of the poplar trees occupied by nests in the Longlands rookery (No. 8) were dying from the top. At Rissington, however, the cutting down of trees merely resulted in some of the rooks moving to other trees across the river, and the total population has remained roughly constant for a period of some 35 years (Mr Absolom, pers. comm., 1956).

Among new rookeries, the one near Hastings Hospital is of interest on account of the rapidity of its growth. According to a local resident, the first rooks appeared about 1954, and six pairs nested; there were many more birds in the following year and more still in 1956 (102 nests, Table 4). Increases of such magnitude can only be explained by the arrival of adult birds from other rookeries, and it is perhaps significant that shooting drives were being held in the district shortly before the hospital rookery was established. Several other small rookeries also came into being about the same time. The Okawa rookery (No. 12) was first occupied about 1954

(Mr Lowry, pers. comm., 1956), the Napier one (No. 3) also about this time (D. H. Brathwaite, pers. comm., 1956), and the Mangarouhi and Waipukurau ones in 1952 and 1953 respectively (Mrs R. Giblin, *in litt.* 28.1.57). The Roy's Hill rookery (No. 14), which is alleged to be of long standing, was deserted in 1955 (B. Slade, pers. comm., 1956), but reoccupied in strength in 1956 (Table 4). Shooting and tree-felling at the original Fernhill rookery caused first a splitting up of the rookery into sub-rookeries, and then final abandonment of the site (Mr V. Hill, pers. comm., 1956); the present rookery behind the Fernhill Hotel probably represents a modern remnant of the original large one on Mr Hill's property half a mile away.

(f) Miscellaneous Observations

Of the twenty-nine rookeries listed in Table 4, twelve are in eucalypt trees, four (Nos. 1, 2, 4 and 14) in both eucalypts and pines, one (No. 11) in eucalypts and poplars, two (Nos. 8 and 10) in poplars and pines, and one (No. 3) in Norfolk Island pines; in nine rookeries (Nos. 18 - 21 and 25 - 29) the kind of trees involved is unknown. Thus, in Hawke's Bay, four different kinds of trees are used by rooks for nesting, but, unlike the situation in Canterbury, most of the rookeries are in eucalypts.

On 15 October 1956 the breeding season was already well advanced in Hawke's Bay; most of the eggs appeared to have hatched and a few young birds were already fluttering about in branches near the nests. This observation suggests that rooks in Hawke's Bay may start laying a week or so ahead of those in Canterbury.

Large communal winter roosts occur in Hawke's Bay as well as in Canterbury. According to Mr Absolom (pers. comm., 1956), in winter large numbers of rooks – more than the number breeding at the rookery – roost in a plantation behind his home near Rissington. A second roost is probably located between Maraekakaho and Tikokino, because a flock of about one thousand rooks was seen in this area at dusk on 16 February 1957.

(g) Summary

The origin of the Hawke's Bay rook population is unknown, but a rookery existed at Puketapu in 1900, and by the middle 1920's there were others near Napier, Rissington, Fernhill, Hastings and Maraekakaho. In 1956 at least twenty-six rookeries, mostly in eucalypts, were occupied, and twenty-four of these contained a minimum of 1304 $\pm$ 253 nests; rookeries recently established in the Waipukurau - Elsthorpe area represent a southern extension of the breeding range which is much larger, though less densely populated, than that of the Christchurch population. A post-war intensification of control measures has been accompanied by changes in the distribution of the rook population, and by the establishment of several new rookeries. Winter roosts occur near Rissington and in the Maraekakaho - Tikokino area.

4. DISCUSSION

The restricted distribution and slow rate of spread of rooks in New Zealand (Figs. 1 and 2) are of particular interest. Many other passerine birds, introduced about the same time as the rooks, soon spread to all parts of the country (Thomson, 1922) and subsequently to many of the outlying islands (Williams, 1953). It is unlikely that rooks have already filled all the habitats which are suitable to them in New Zealand because the species has a wide distribution in Europe, and, although it prefers agricultural country, it is generally distributed throughout the British Isles in places where trees exist (Witherby, *et al.*, 1943). In New Zealand the differences between, for example, central and southern Hawke's Bay or between Christchurch and Timaru are unlikely to constitute barriers to the spread of such a species. Indeed, there is good evidence that rooks are in fact increasing their breeding range in Hawke's Bay and Canterbury, but the rate of spread – one mile per year or less – is very slow. It is evident from Table 2

that, under New Zealand conditions, individual rooks have considerable powers of dispersal. Why then is the spread of the species in New Zealand so slow? A provisional answer to this question may be obtained from the history of some of the early rookeries.

Rooks survived at Nelson and Auckland for a few years after their liberation, but they finally disappeared (Table 1). In Auckland, where a large number of rooks were liberated, some of the birds died from disease, and it was suggested that the climate was too warm (Thomson, 1922). Early liberations in Christchurch were also unsuccessful, but the species eventually became established after the liberation of a substantial number of birds in 1873. Rooks soon appeared in remote parts of the country (Table 2), but few, if any, of these vagrant birds were able to establish new colonies. Rookeries in the centre of Christchurch were abandoned by the turn of the century, and for many years the carefully protected Fendalton rookery was the only one in the district. The number of breeding birds at Fendalton apparently remained fairly constant for a large part of the period during which the rookery was occupied, and perhaps the number of young that could be reared was limited by the availability of food within convenient flying distance of the rookery. The rooks apparently showed a very strong tendency to return to the bluegums at Fendalton for nesting, and for many years any dispersal of young birds that may have occurred failed to result in the establishment of new rookeries. Eventually the trees began to die and the birds were gradually forced to move to new nesting sites in pine trees at Sunnyside, Islington and Paparua. Perhaps as a result of the new food supplies now available, or the more secure nesting sites provided by the pine trees, each of the new rookeries increased in size. Some years later, a similar fragmentation process was repeated at Islington, where the break-up of a large rookery was caused by persistent shooting. Numerous small rookeries were at first formed, but many of these were soon abandoned, the birds presumably moving to join other rookeries in more favourable sites. The history of the Hawke's Bay rookeries is less complete, but shows a similar trend. For many years the only known rookeries were located at Puketapu and Fernhill, and the eventual disruption of these by shooting led to the formation of several new rookeries.

From the above summary it seems that three sets of factors have been important in controlling the distribution and rate of spread of rooks in New Zealand. These are the behaviour of the bird, the influence of man and the nature of the environment. Unlike most other introduced passerines, the rook is a gregarious species at all seasons of the year, engaging in communal displays (Witherby, *et al.*, 1943), nesting in colonies, feeding in flocks, and in winter occupying large communal roosts. It seems probable that an integrated flock of certain minimum size is a necessary component of an optimum environment for the species. Secondly, the birds have a strong tradition of breeding in the same place in successive years, provided they are undisturbed. The long persistence of single rookeries of large size at Fendalton, Puketapu and Fernhill provides a striking demonstration of the importance of traditional nesting places to both the adults and young of the species. Although some birds disperse far from the main rookeries (Table 2), these individuals rarely succeed in establishing new rookeries. The need for a flock of a certain minimum size may explain the failure of some of the early introductions involving the liberation of only a few individuals; the eventual disappearance of the few birds which were resident for several years at Porirua and Nelson (Section 3A) may have a similar explanation. Admittedly, some rookeries contain very few nests (Nos. 6, 9 and 16 in Table 4), but such rookeries are usually of recent origin and may have been started by birds driven from older rookeries by human disturbance, as at Islington. Such rookeries are often soon abandoned (Nos. 3 and 6 in Table 3), or increase in size at a much faster rate than would

be expected from reproduction (No. 1 in Table 4), thus implying that the rookery is being swelled by immigrants from less favourable rookeries.

Human influence affects the distribution and spread of rooks in several ways. Pre-European New Zealand contained few suitable habitats for rooks, but the clearing of bush and scrub, the planting of introduced trees for shelter and the growing of crops, especially cereals, have changed large areas of the country into a condition resembling the normal habitat of the species in Europe. Man has also been important in determining the points of liberation. The present rook population in the Christchurch district has certainly developed from birds liberated there by man (Thomson, 1922), and the Hawke's Bay and Peel Forest populations probably have a similar history (Section 3A). The origin of the Pirinoa and Banks Peninsula rookeries is unknown, but the influence of man cannot be excluded absolutely even from these. Thus the modern distribution of the species still reflects strongly the pattern of the original introductions, although subsequently there has been some natural spread into districts adjacent to the points of liberation. Finally, man has an important influence in increasing the rate of spread. The adoption of control measures involving the disturbance of nesting birds has sometimes caused the fragmentation of large rookeries much sooner than would be expected by natural means. The protected Fendalton rookery existed for over fifty years before the death of the trees forced the birds to establish new rookeries; at Islington the same result was achieved by man's influence in less than twenty years. In both instances the fragmentation of the single large rookery was apparently followed by a substantial increase in the total rook population. It might be thought that the large number of young birds shot at the Christchurch rookeries would be important in controlling the growth of the rook population, yet many farmers consider that the birds have continued to increase at an alarming rate, a view which is not supported by the data presented in this paper. However, even if the growth rate of the population has declined since 1947, this could be explained by factors other than the effects of human control. It is well known that, given a favourable environment, many animal populations follow the same growth curve. This involves three components: a slow initial phase of increase, then an extremely rapid one, and finally a gradual levelling-off, often with minor fluctuations. The Canterbury rook population seems to have passed through the first two of these stages, the period of rapid increase occurring between 1935 and 1950. The population density is now comparable to that characteristic of many parts of Britain (see below), and one might therefore expect a decline in the rate of increase. The large number of young birds shot may be doing no more than forestalling natural mortality. This interesting and important point is worthy of detailed study.

The influence of the environment on the distribution of rooks in New Zealand is largely unknown. Certainly the species appears to tolerate a wide range of conditions in Europe, but it is possible that some of the less favourable environments are populated mainly by birds reared in nearby favourable ones. It is perhaps significant that the relatively large number of rooks liberated in the sub-tropical climate of Auckland should have failed to survive (Table 1)*, because in Europe rooks occur mainly in areas with sub-arctic to temperate climates and reach the Mediterranean only

* This statement is based on Thomson (1922), whose last reference to rooks in Auckland is 'not doing well' in 1874. However, information recently supplied by Mr E. G. Turbott (*in litt.* 16.4.57) shows that rooks probably survived in Auckland until about 1905, and that they were quite numerous in the 1880's. Rookeries were known at Newton Road, Carlton Gore Road, Cowie Road and near Government House, and there were probably two others in the Auckland Domain and near St Mary's Hall, Parnell, respectively; these six rookeries were not all in use simultaneously.

in winter (Witherby, *et al.*, 1943). The New Zealand rookeries are all situated on the drier eastern side of the country (Fig. 1), and, except for Banks Peninsula, are in districts where cropping is an important aspect of farming practice. The distribution of this kind of farming is considerably greater than that of rooks in both Hawke's Bay and Canterbury, and, other factors being equal, an eventual further extension in the range of the birds is therefore to be expected in the future. On the basis of population density, the Christchurch district appears to be no less favourable to the birds than are many parts of the British Isles. According to Witherby, *et al.* (1943), the average density of rooks' nests over extensive areas of the British Isles is sixteen per square mile, and this is well within the range of nest counts (fourteen to eighteen per square mile) made over the hundred square miles where rookeries occur in the Christchurch district (Table 3). The New Zealand environment has necessitated some modification in the nesting habits of rooks. In the British Isles, the birds usually nest in tall deciduous trees (J. S. Watson, pers. comm., 1957), but such trees are rare in many districts in New Zealand, and were probably still more so before 1900. So far as is known, the first rookeries established in New Zealand were in introduced eucalypt trees. These remain the favourite nesting trees of rooks in Hawke's Bay, but in Canterbury most of the rookeries are now in pines, the change-over occurring with the break up of the Fendalton rookery in the late 1920's. Mr C. M. Smith has pointed out (*in litt.* 8.3.57) that the sequence of tree introductions to New Zealand and the time it took for introduced trees to grow to a height and form acceptable to rooks for nesting purposes may have been important in determining which species would be utilised for rookeries. From information supplied by Mr Smith it would seem that eucalypts, especially blue-gums, *E. globulus*, are likely to have been the trees most generally available to rooks before about 1900. The change over to pines (mainly *P. radiata*) in Canterbury may have been brought about, at least in part, by a widespread epidemic caused by a scale insect which attacked certain species of eucalypts, but especially *E. globulus*. The reason for the persistence of rookeries in eucalypts in Hawke's Bay is unknown; possibly the epidemic was less severe there, or perhaps in addition to *E. globulus* there were other eucalypts more resistant to scale insect attacks.

In an earlier paragraph it was suggested that human control activities had caused an increase in both the distribution and abundance of rooks. The available data are inadequate to prove that this has in fact occurred, and another explanation for the observed facts is possible. It may be that rooks have required a considerable time to adapt themselves to the New Zealand environment, and that they are only now reaching a stage which enables them to increase their range. A phenomenon of this kind appears to have occurred in the myna (*Acridotheres tristis*), which, after many years of restricted distribution, has recently shown a remarkable ability to populate new country in the Auckland Province (Cunningham, 1948). However, this recent spread of the myna may be due, at least in part, to a change in the environment (land development and closer settlement), but, in any event, the necessity for a lengthy period of adaptation to the New Zealand environment is perhaps more to be expected for the tropical myna than the temperate rook. Further, the disturbance at the rookeries has certainly coincided with an increase in the range, and possibly also in the abundance, of rooks – even though these cannot at present be proved as cause and effect. Data on the number of young reared by rooks nesting in colonies of different size would be most useful in obtaining a clear understanding of the factors involved.

To sum up, the slow spread of rooks in New Zealand is thought to be due mainly to the conservative nesting habits of the bird and to the presumed requirement of a certain minimum number of individuals before a rookery can become established. The number of birds originally liberated

and the nature of the environment into which they were released are probably also important. The shooting of birds at rookeries, and the cutting down of trees used for nesting are regarded as favouring both the spread of the bird and the increase of the total population. In reaching these conclusions, it has been necessary to rely heavily on rather limited and subjective historical data. The conclusions are therefore of a tentative nature, and are advanced at this stage so that they can be tested. However, until better information is available, it would seem wise for the authorities concerned with rook control to abandon the system of bounties and such other control activities as involve disturbing the birds at the rookeries, and, where control is clearly necessary, to concentrate on the poisoning methods which have been used recently with such conspicuous success by the Department of Agriculture in Canterbury.

5. SUMMARY

Rooks, originally liberated in Auckland, Nelson and Christchurch between 1862 and 1873, are now established in Hawke's Bay (28 rookeries), southern Wairarapa (1), Christchurch (19), Banks Peninsula (3) and near Peel Forest (3 rookeries). The Hawke's Bay and Peel Forest populations are probably derived from subsequent liberations.

The existing rook populations are located on the eastern side of the country and mostly in districts where grain is grown (yellow-grey earths).

The Hawke's Bay population (1242 nests counted over 300 square miles) is less dense than the Christchurch one (1371 to 1806 nests over 100 square miles).

The Christchurch population has increased from 1000 birds (one rookery) in 1925 to 7000 - 10,000 birds (thirteen rookeries) in 1947, and then remained at about this level, but with nineteen rookeries.

Control operations, especially shooting and tree-felling, have been important in causing a reduction in some large rookeries, the establishment of several small new ones, and a slow increase in the breeding range of the species, to the south in Hawke's Bay and to the west near Christchurch.

The restricted distribution and slow rate of spread are attributed to the behaviour of the species (gregarious habits and use of traditional nesting places), the restricted distribution of liberations and the nature of the environment (climate and land-use).

The Christchurch rookeries were all in eucalypts until about 1926, but later ones are mostly in pines, the change over following an epidemic in eucalypts; eucalypts remain the favourite nesting trees in Hawke's Bay.

Limited data are presented on breeding season, clutch size and the location of winter roosts.

6. ACKNOWLEDGEMENTS

It is a pleasure to acknowledge the generous assistance given by the many people, mentioned individually in the text, who have contributed information to this paper. Special thanks are due to Mr M. B. Crequer, Dr K. Wodzicki and the Wildlife Branch of the Department of Internal Affairs, each of whom made available original material which was to have been the subject of separate papers. In addition, Dr Wodzicki initiated the present work and would have carried it out had not sickness prevented him. I am grateful to Dr P. Whittle, Applied Mathematics Laboratory, for assistance in calculating the errors of nest counts, and to Mr R. H. Taylor, Animal Ecology Section, for drawing the maps (Figs. 1 - 3).

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REVIEW

THE ORNITHOLOGISTS' GUIDE, edited by Major-General H. P. W. Hutson, 1956. pp. i-xix and 1-287 (British Ornithologists' Union, London, 21/.)

There was a great need for a comprehensive guide to various aspects of bird study because, except for the collecting manuals of the British Museum, there was little which could serve as a guide to the field man. Dr O. S. Pettingill's *Laboratory and Field Manual of Ornithology** came nearest to the goal, but this book has been designed for both the laboratory student and the field worker. The task undertaken by General Hutson as editor was ambitious, because it aimed to cover adequately all the modern techniques of bird study. This was achieved by mustering an unusually large team of experts (46) from many lands, most of them specialists in their own right.

The Guide is divided into the following nine sections: General, Geographical Aspects, General Behaviour, Breeding, Protection, Study Techniques, Suggestions for Special Study, and Regional and General Information. Each of these main sections contains 4 to 20 original articles, most of which are written by acknowledged authorities in various techniques. Each article has some key references for further reading, and it is pleasing to see cross-references throughout the text, resulting in a reduction of unavoidable repe-

*Reviewed in *Notornis* 7, 2: 64.

tition to a minmum. The greatest significance of the book lies in the fact that it not only covers most of the most important facets of the theory and practice of bird study, and surveys our present state of knowledge, but also points out where there are at present worthwhile opportunities for further study. The two final sections containing regional and general information will be welcomed by travelling ornithologists or those requiring overseas contacts for their work.

In a publication of the scope outlined above, some shortcomings are almost inevitable. Thus one wonders why some world regions have been treated adequately, while others – such as the Far East, including the Malayan region, and even Australasia – seem less well covered, perhaps owing to the lack of contributors interested in those areas. Also, it may be pointed out that the regional information is often out of date and the spelling, particularly of foreign names, often leaves much to be desired.

K.A.W.

OBITUARY

It is with regret that we have to announce the death on 16 May 1957 of Dr W. R. B. Oliver. A full obituary will appear in a later issue.

RELIEF FOR HUNGARIAN ORNITHOLOGISTS

This was discussed at the Annual General Meeting, and the following letter has since been received from Dr K. Wodzicki:

Sir: During the short-lived revolution in October 1956 the Hungarian Ornithological Institute in Budapest was gutted; one hundred thousand volumes of the Institute's library and 40,000 bird skins of their national collections were burnt; further, the news reaching us from the neighbouring countries and from Hungary itself is that the homes of some ornithologists have been destroyed and that the material existence of all of them is precarious. Polish, German and recently British ornithologists have tried to help their Hungarian colleagues by collecting money, from which parcels containing clothing, underwear and footwear could be sent, and from which perhaps some of their needs of standard ornithological periodicals could be met. The address of the Hungarian Ornithological Institute and the names of its seven members are in the hands of our Treasurer, to whom any contributions may be sent. The experience of Polish ornithologists regarding parcels has been that if the parcels are sent through the Red Cross to the recipients, care of the Hungarian Red Cross, they are delivered.

Wellington, 31/5/57 *K. WODZICKI*

SHORT NOTES

GREY DUCKLING KILLED BY PARADISE DUCKS

On 29/1/57 in Takahe Valley I disturbed a brood of five Grey Ducklings (*A. superciliosa*) about a week old, as I walked along the shore of Lake Orbell. They swam away from me into deep water and then, calling as they went, set course for a parent bird some hundred yards further out. Indirectly between them and their objective was a family of Paradise Ducks (*Tadorna variegata*) composed of parents and four well-grown young. Attracted by the sight of the ducklings and, no doubt, by their pipings as well, the adults set course to intercept the brood and upon reaching it (it made no attempt, until too late, to avoid contact) attacked it viciously with wings and bill. They were joined by

their immature birds which did the same and within two minutes four of the five Grey Ducklings had been sunk without trace – indeed, one at least was held beneath the water's surface by a Paradise Duck until it drowned.

Throughout all this the parent Grey Duck stayed where it was and could not be heard even to utter a protest, though its bill was open at times. The surviving duckling then made off to shore again and was soon in the shelter of the marginal vegetation.

I was rather surprised by the ferocity of the attack and prompted to wonder whether Paradise Ducks, which are almost always present on the lake, have been responsible for attacks on other species in the past – for example, N.Z. Scaup and Blue Duck which are often to be seen either on the lake or, in the case of the Blue Duck, in the Tunnel Burn.

– G. R. WILLIAMS

[According to Delacour (*Waterfowl of the World,* I, p. 246), Paradise Shelducks in captivity are notorious for their exceedingly bad temper! – Ed.]

COOT ON THE HEATHCOTE RIVER

On 28/3/57 I saw an Australian Coot (*Fulica atra australis*) swimming in the Heathcote River at St Martins, Christchurch. I was informed about it nearly three weeks ago when it was further down the river; and from the description given me then, presumed it was a stray Dabchick. When I found the Coot it was half a mile further up the river from where it was first reported. It was swimming with Grey Ducks and Mallard, nearby being two Mute Swans (*C. olor*) and a domestic goose. The Coot was rather timid, but appeared to be in good health, its plumage being quite bright.

G. GUY

A ROCK WREN'S NEST ON THE MACKINNON PASS

For some seasons I have been guiding on the Milford Track. Prompted by Guthrie-Smith's account (*Sorrows and Joys of a New Zealand Naturalist,* pp. 143-148) of the nest of a Rock Wren (*Xenicus gilviventris*) which he found on the Mackinnon Pass some twenty years ago, I decided to search that area again and succeeded in finding a nest in November 1956.

25/11/56. About 150 yards from the top of the zig-zags at the eastern end of the pass Mr Roy Kelly and I came across a female Rock Wren. She hopped among the tussock for a while at the edge of the track, then flew up on to a big outcrop of rock. She hopped and flitted around there fussily, disappearing and reappearing but sticking to the immediate area. The male bird appeared from the direction in which we had come and gradually approached. He seemed distressed at our being there, but after a minute or so he worked his way along through the scrub around the edge of the rock. Finally after some minutes he disappeared behind a 'lily' leaf and behind the *Dracophyllum.* The female in the meantime had disappeared over the top of the rock. We were at a distance of about fifteen feet from where the male bird disappeared, so after waiting a couple of minutes to ascertain whether he was staying where he was – presumably on the nest – and not wishing to disturb them too much, we carried on over the pass to the monument.

On the way back I went within a couple of feet and saw the entrance hole. Both birds flew from the nest when I approached. The nest was placed in the roots of a rocky outcrop. It was well hidden, with the entrance behind a small bush of *Dracophyllum uniflorum.* Two mountain daisies (*Celmisia coriacea*) and a mountain buttercup (*Ranunculus lyalli*) grew alongside; a patch of foliose lichen and moss grew thickly on the rock. The nest itself was well constructed and compact. Dry strips of *Astelia* and snowgrass (*Danthonia*) were the main materials. One strong 'guy rope' of *Danthonia* was woven into the top of the entrance hole. This 'guy rope' went straight out from the nest through the small *Dracophyllum* and bent downwards at right angles. Moss, lichen and some feathers were interwoven while a few feathers lined the nest. The feathers used were Kea and Kiwi. Feathers were used sparingly.

30/11/56. Both birds left the nest as I passed on the way up. There was no noise from youngsters. On the way back down off the pass there was no sign of parent birds.

2/12/56. There was a fair coating of snow over the pass including the area where the nest was. No sign of parent birds either on trip up or down. There was a drift of snow about four feet deep in front of the nest, so I did not look inside.

5/12/56. When within a few feet of the nest I was happy to know that snow had not affected the birds as I heard a faint 'peep, peep, peep'. There were three chicks that I could see, or rather one neck and head nearest the entrance hole and two more heads lower down and further back in the nest. As far as I could see, they were bald on head and neck and still had their eyes shut. They could have been a day or two old by their size and the one nearest the entrance was stretching up its neck although not opening its beak. There was only one parent bird near the nest that I could see. On the way up, however, I saw one Rock Wren just above Moraine Creek, three-quarters of a mile below the nest. I could not think that it was one of the nesting pair, so far away when they have such poor powers of flight. No doubt it was one of another pair.

9/12/56. There was no sign of the parents on the way up. I had a look in at the nest but the entrance hole was blocked from the inside by a Kea breast feather. Although I couldn't see the chicks they appeared to be lively, making a bit of a noise, and there was much movement within the nest. On the way down I was with one of the tourists and we saw one of the parent birds, with an insect, waiting to enter the nest. It was somewhat distressed at our presence, so we moved on.

12/12/56. Whether it has any bearing or not on the disappearance of the chicks, I must now mention the behaviour of a Kea which I met on the way up. About 250 yards down from the Rock Wren's nest this Kea came gliding in and landed on a flat rock about ten feet away. It was limping round on a damaged foot with its two back toes curled forward. There was a ribbonwood beside the rock and the Kea started nipping off the ends of the shoots about three inches long, nibbling and then dropping them. I watched for a while, then walked on, with the Kea keeping pace, a bit behind or ahead. When we reached the nest the Kea was ahead and landed on a flattish rock four to six feet away from the wren's nest. He appeared to be excited, hopping around in circles, calling out, cocking his head to one side and peering towards where the nest was. When I had a look into the nest it was empty. There had been hardly enough time for the chicks to mature even if they were ten days old. There was no sign of chicks or of parent birds. On consideration later on, I thought the entrance hole appeared enlarged.

When there had been no sign of the birds for about a fortnight, I took the nest and sent it to the Southland Museum. Its measurements were: horizontal circumference, 15 inches; vertical circumference, 14 inches; diameter of enlarged entrance, 1½ inches, but about one inch at first. It appears to be considerably smaller than the nest which Guthrie-Smith discovered and dissected.

PETER HOWARD

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