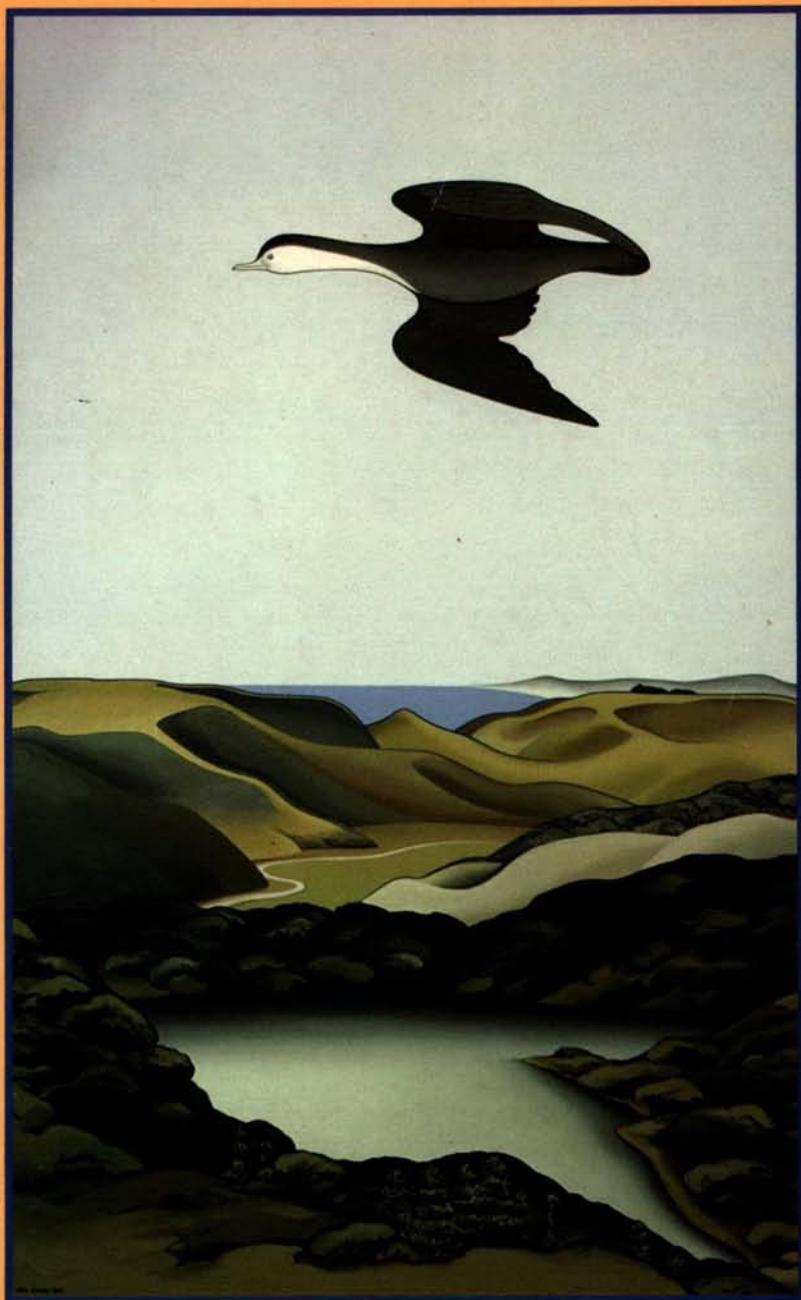


A Flying Start

Commemorating Fifty Years of the
Ornithological Society of New Zealand
1940-1990



Compiled and edited by

B. J. GILL & B. D. HEATHER

A Flying Start

Commemorating Fifty Years of the
Ornithological
Society of New Zealand
1940 – 1990

Compiled and edited by
B.J. Gill & B.D. Heather



Random Century
in association with
Ornithological Society of New Zealand Inc.

Random Century New Zealand Ltd
(An imprint of the Random Century Group)

9-11 Rothwell Avenue, Albany
Private Bag, North Shore Mail Centre
Glenfield, Auckland 10
New Zealand

Associated companies, branches and representatives throughout the world.

First published 1990

© Ornithological Society of New Zealand Inc. 1990

ISBN 1 86941 080 7

Printed and typeset by SRM Production Services Malaysia

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, storage in any information retrieval system or otherwise, without the written permission of the publisher.

Supplement to *Notornis* volume 37.

For enquiries about joining the society, write to:

Membership Secretary
P.O. Box 12397
Wellington

Contents

| | |
|--|-----------|
| List of Contributors | vii |
| Introduction | ix |
| SECTION 1: HISTORY OF THE SOCIETY | 1 |
| Beginnings and development | 3 |
| Officers and award winners | 8 |
| Bird banding | 11 |
| Nest Record Scheme | 15 |
| Beach Patrol Scheme | 20 |
| Atlas Scheme | 24 |
| Wader counts | 27 |
| Role of the amateur | 29 |
| Notornis | 31 |
| OSNZ News | 33 |
| Library | 34 |
| SECTION 2: REMINISCENCES | 37 |
| Maida Barlow | 39 |
| Beth Brown | 41 |
| P.C. Bull | 44 |
| David Crockett | 47 |
| J.M. Cunningham | 49 |
| Lou Gurr | 53 |
| Barrie Heather | 57 |
| Marshall Laird | 59 |
| R.M. Lockley | 62 |
| B.J. Marples | 64 |
| Ron Scarlett | 66 |
| R.B. Sibson | 69 |
| E.G. Turbott | 74 |
| SECTION 3: ORNITHOLOGICAL REVIEWS | 77 |
| Fifty years of ornithology in New Zealand | 79 |
| Recent bird research at the New Zealand subantarctic islands | 84 |
| Evolution, extinction and the subfossil record of New Zealand's avifauna | 93 |
| Physiological research on New Zealand birds | 101 |
| Genetic studies of New Zealand birds | 104 |
| Bird art in New Zealand | 107 |
| Bird photography in New Zealand | 110 |
| Ornithology in New Zealand universities | 112 |
| University studies of bird vocalisations in New Zealand | 117 |
| Birds and the Maori | 120 |
| The significance of Captain Cook's voyages for New Zealand ornithology | 122 |
| The 19th-century bird collectors | 128 |
| Reischek's New Zealand bird collection | 130 |
| King's College Bird Club | 133 |
| Royal Forest and Bird Protection Society | 135 |
| New Zealand Wildlife Service | 138 |
| Ecology Division, DSIR | 142 |

| | |
|--|-----|
| An Australian perspective on New Zealand ornithology | 146 |
| Search for the Taiko | 148 |
| The Royal Albatrosses of Taiaroa Head | 150 |
| The Gannets of Cape Kidnappers | 152 |
| The waders of the Miranda Coast | 154 |
| The birds of Farewell Spit | 156 |

| | |
|-------------------------------|-----|
| SECTION 4: BIOGRAPHICAL NOTES | 159 |
|-------------------------------|-----|

| | |
|--------------------|-----|
| G.E. Archey | 161 |
| C.A.D'A. Blackburn | 162 |
| G.A. Buddle | 163 |
| W.L. Buller | 165 |
| A.T. Edgar | 166 |
| R.A. Falla | 168 |
| O. Finsch | 170 |
| C.A. Fleming | 172 |
| G.R. Gray | 175 |
| W.H. Guthrie-Smith | 177 |
| J.F.J. Haast | 178 |
| F.W. Hutton | 180 |
| H.R. McKenzie | 181 |
| J.C. McLean | 184 |
| P.M. Moncrieff | 185 |
| W.R.B. Oliver | 186 |
| T.H. Potts | 188 |
| A.T. Pycroft | 189 |
| A. Reischek | 191 |
| L.E. Richdale | 194 |
| G.R. Williams | 196 |
| R.A. Wilson | 198 |
| K.A. Wodzicki | 199 |

| | |
|---|-----|
| APPENDIX – Ornithological Theses from New Zealand Universities, 1939-89 | 201 |
| REFERENCES | 209 |

Contributors

- R. Adams**, Wellington; former Director, NZ Wildlife Service.
- M.L. Barlow**, Invercargill; OSNZ Regional Representative, Southland; former OSNZ Councillor.
- B.D. Bell**, Wellington; former OSNZ Regional Representative, Marlborough and Wellington; OSNZ President; former Senior Conservation Officer, NZ Wildlife Service.
- D.H. Binney**, Auckland; Senior Lecturer, School of Fine Arts, Auckland University.
- B. Brown**, Papakura; former OSNZ President and former Regional Representative, South Auckland.
- P.C. Bull**, Lower Hutt; former OSNZ President; Scientist, Ecology Division, DSIR (retired).
- J.F. Cockrem**, Palmerston North; Scientist, Ecology Division, DSIR.
- R.O. Cossee**, Silverstream; Banding Officer, Department of Conservation.
- D.E. Crockett**, Whangarei; OSNZ Vice-President and Regional Representative, Northland.
- J.M. Cunningham**, Eastbourne; former OSNZ Secretary-Treasurer.
- C.H. Daugherty**, Wellington; Lecturer in Zoology, Victoria University.
- S.J.J.F. Davies**, Perth, Australia; former Director, Royal Australasian Ornithologists' Union.
- R.K. Dell**, Wellington; Director, Dominion Museum (retired).
- R. Galbreath**, Naikē, near Huntly; historian.
- J.A. Gibb**, Lower Hutt; Director, Ecology Division, DSIR (retired).
- B.J. Gill**, Auckland; OSNZ Councillor; Curator of Birds, Auckland Museum.
- A.J. Goodwin**, Clevedon; OSNZ Regional Representative, South Auckland; former OSNZ Hon. Librarian.
- L. Gurr**, Palmerston North; former OSNZ Councillor and Regional Representative, Nelson; Reader in Zoology, Massey University (retired).
- J.M. Hawkins**, Nelson; OSNZ Councillor and Regional Representative, Nelson.
- B.D. Heather**, Silverstream; OSNZ Hon. Editor (*Notornis*); former Regional Representative, Southland.
- G. Hutching**, Wellington; Editor of *Forest & Bird*.
- P.F. Jenkins**, Auckland; Associate Professor of Zoology, Auckland University.
- M. Laird**, Paparua, Northland; Director, Research Unit on Vector Pathology, Memorial University of Newfoundland, Canada (retired).
- R.M. Lockley**, Auckland; natural history author.
- B.J. Marples**, Old Woodstock, Oxford, England; former OSNZ President; Professor of Zoology, Otago University (retired).
- D.G. Medway**, New Plymouth; OSNZ Regional Representative, Taranaki; historian.
- P.R. Millener**, Wellington; Osteologist, National Museum.
- G.J.H. Moon**, Auckland; natural history photographer.
- R.G. Powlesland**, Wellington; Scientist, Department of Conservation.
- N. Prickett**, Auckland; Archaeologist, Auckland Museum.
- C.J.R. Robertson**, Wellington; Scientist, Department of Conservation.
- H.A. Robertson**, Silverstream; OSNZ Councillor; Scientist, Ecology Division, DSIR.
- P.M. Sagar**, Christchurch; OSNZ Councillor and Hon. Editor (*OSNZ News*); former Regional Representative, Canterbury.
- R.J. Scarlett**, Christchurch; Osteologist, Canterbury Museum (retired).
- R.B. Sibson**, Auckland; former OSNZ President, Regional Organiser (Auckland) and Hon. Editor (*Notornis*); Classics master, King's College (retired).
- I. Thwaites**, Auckland; Librarian, Auckland Museum.

S.J. Triggs, Wellington; OSNZ Hon. Secretary; Scientist, Department of Conservation.
E.G. Turbott, Auckland; former OSNZ President; Director, Auckland Museum (retired).
J. Warham, Christchurch; Reader in Zoology, Canterbury University (retired).
K.E. Westerskov, Dunedin; Associate Professor of Zoology, Otago University (retired).

Introduction

In most Western countries, the local birds are better known biologically than any other group of animals or plants. This is due in no small part to the blossoming of ornithological societies — associations that, in the course of organising an enjoyable pastime for their members, channel the energy of the membership into worthwhile corporate projects, such as schemes to record nests and map bird distribution. In this book we celebrate 50 years of organised birdwatching by the Ornithological Society of New Zealand Inc., which was inaugurated in May 1940. However, it is more than just the history of one small society — we also look back on the general progress of ornithology in New Zealand from the importance of birds to the prehistoric Maori, to Cook's voyages, through to the auspicious year of 1990, the 150th anniversary of New Zealand nationhood. This book is a Recognised Project of the New Zealand 1990 Commission/Te Komihana O 1990.

Several times during the 1980s, the Ornithological Society Council discussed the possibility of a jubilee publication to commemorate the Society's 50th anniversary in 1990. In May 1987, B.J. Gill was asked to begin planning for a volume containing a history of the Ornithological Society of New Zealand, a list of past officers, accounts of the Society's main projects and reminiscences from founding members. Later in 1987, C.J.R. Robertson suggested that such a publication be expanded, by inclusion of general essays, into a broad celebration of New Zealand ornithology. B.D. Heather agreed to co-edit such a venture.

B.J. Gill and C.J.R. Robertson drew up a list of proposed topics and possible authors, which was submitted to the Council. Some 60 members — and non-members — were invited to contribute. About 45 of these promised a total of 80 contributions, of which a pleasingly high proportion was received. Only a few people let us down, and this accounts for some of the uneven treatment inevitable in a book of this sort. The reviews of university work relied on appeals for information to zoology or biology departments, some of which failed to respond. There is a general difficulty with reviews in that limitations of space prevent the mention of every deserving luminary in a field. The omission of names is of course not intended as a slight.

We thank the contributors, all of whom freely gave their time and effort for no reward besides the satisfaction of helping a worthwhile project. We also thank Richard Wolfe for suggesting the title, Auckland Museum for institutional support to B.J. Gill while he worked on this project, the Auckland Museum library for permission to reproduce photographs, the New Zealand Lottery Grants Board for some assistance with publication costs, and David Ling and Harriet Allan of Random Century for cheerfully overseeing production of this book.

B.J. Gill & B.D. Heather

Section 1

History of the Society

Planning in 1938 and 1939 led to the formation of the Ornithological Society of New Zealand at an inaugural meeting in May 1940. The following contributions describe or relate to the history of the Society, and of its various schemes and endeavours, during the past 50 years.

Beginnings and Development

Origins

In the 1930s a handful of professional ornithologists and dedicated amateurs scattered throughout New Zealand kept up irregular contact. They had in common an interest in the serious study of birds in the field. Several were members of the Royal Australasian Ornithologists' Union (RAOU), which was founded in 1901. In January 1938 R.A. Falla (Director, Canterbury Museum) had drawn up a 'List of Ornithologists in New Zealand'. There were 15 names: A.H. Watt (Te Kao, Northland); G. Archey, C.A. Fleming and E.G. Turbott (Auckland); B. Sladden (Taneatua, Bay of Plenty); R.A. Wilson (Bulls); R.H.D. Stidolph (Masterton); A.S. Wilkinson (Kapiti Island); T. Cockroft, W.R.B. Oliver and A.C. O'Connor (Wellington); Mrs P. Moncrieff (Nelson); L.W. McCaskill and E.F. Stead (Christchurch); and G.M. Turner (Stewart Island). Falla sent to each a circular in which he stated:

... I have taken the liberty of giving your name to Professor B.J. Marples, Department of Zoology, University of Otago, as one likely to be interested in the proposed formation of a New Zealand Ornithological Society. Professor Marples, who has given much time and thought to the matter of preliminary organisation, will shortly be writing to give you a full account of the proposed activities and organisation. He feels that he has not been long enough in New Zealand nor met enough of the local workers to make a direct approach without some form of introduction and I have therefore much pleasure in commending his proposals to your attention. (OSNZ files)

So, it was through 'correspondence between interested people in different parts of the Dominion' (Minute Book, vol. 1) that the possibility was considered of establishing a local organisation for bird study, as distinct from bird protection, which was already championed by the Royal Forest and Bird Protection Society (founded in 1923).

B.J. Marples, who was Professor of Zoology at Otago University, having emigrated from Britain in 1937, became Organising Secretary. His first circular was headed 'A Proposed Ornithological Society of New Zealand':

Several ornithologists in New Zealand are of the opinion that the time is ripe for the institution of some organisation or society in this country for the purpose of co-ordinating the activities of bird watchers, bringing them into touch with one another and promoting interest and research in field ornithology... There must be many people scattered about New Zealand who are interested in birds, and whose observations are never published and so are lost to other bird watchers... Such things as the dates of nesting, the arrival and departure of migrants, local movements, song, the occurrence of unusual species and the position, size and variations of nesting colonies at once suggest themselves... (OSNZ files)

Notes sent in by members would be published as an annual report. Marples saw, as other possible activities of the society, bird ringing and special investigations by the far-flung membership with results combined into a general report by a national organiser. The response to this and later circulars was positive. By 1939 Marples had begun to enrol members at a subscription of 5 shillings. Marples had stressed in his circulars that no special qualifications were required of members beyond the ability to recognise common birds and the interest to observe them and make accurate notes. War broke out soon after these preliminaries had begun, but 'it was felt desirable not to postpone matters for this reason' (OSNZ files). The roll of members stood at 34 by May 1940.

Establishment

The Society was established formally at an inaugural general meeting held at 2.30 p.m. on Friday 24 May 1940 at Canterbury Museum. Falla chaired the meeting with Marples as Secretary-Treasurer. Six others were present: Miss M. Gordon, G. Guy, L. McCaskill (Christchurch Training College), P.J. O'Brien (Preparator, Canterbury Museum), E. Percival (Canterbury University College), and E. Stead.

A draft constitution had been circulated to members and this was adopted with minor amendment. The Society was to be called the Ornithological Society of New Zealand. Its object was

... to encourage, organise and carry out field work on birds on a national scale. The collecting of specimens of birds or their eggs plays no part in the activities of the society, which is concerned with the study of living birds in their natural state. Though in favour of bird protection the society is not actively concerned with this work, which is the province of an already existing body. (Minute Book, vol. 1)

Ordinary members would pay an annual subscription of '5 shillings or whatever shall from time to time be decided upon'; life members donated at least 5 pounds. School groups could count as one member by paying one subscription. The Secretary-Treasurer reported that, after payments for stationery and postage, cash in hand stood at £6-9-3. A provisional committee (Falla, Marples, and L.E. Richdale) was formed to conduct elections for a committee for 1940-41. There was general discussion of topics for special investigation, of bird ringing, and of the suggestion that the society 'compile lists of ornithological literature and collect notes and photographs of New Zealand birds.'

In 1940 the Society issued an 'Annual Report' for 1939-40 (33 pages of duplicated typescript). It listed some 60 members (including 3 school groups) and gave the elected officers as: President — Falla, Vice-president (North Island) — Oliver, Vice-president (South Island) — Stead, Secretary-Treasurer — Marples. Four regional organisers were listed: Wellington (Stidolph), Auckland (Fleming), Christchurch (Falla) and Dunedin (Marples). The report noted: 'With some members already on active service and all affected by the present conditions of war and the uncertain future we cannot hope to do much more than keep the newly formed Society alive.'

The bulk of the report was given over to 'Summarised Reports' — a systematic listing of members' bird observations, which continue today as 'Classified Summarised Notes' — and 'Summary of Special Investigations'. The latter was a sequence of 15 'special studies which deserve more extended notice'. Marples and Fleming reported on their 'banding experiments' with Silvereyes. P.C. Bull described the fate of a dozen Skylark nests he had observed near his home in Mangere. The serious student of birds in New Zealand now had a local repository for observations and records.

Early Years

The Society's second meeting began at 2 p.m. on Saturday 21 June 1941 at the Dominion Museum, Wellington. Falla presided with some 10 other members present. Fleming was elected to a new position of Recorder, and R.B. Sibson replaced him as Regional Organiser for Auckland. The President particularly welcomed Dr K. Wodzicki, Consul-General for Poland, 'an ornithologist of considerable experience of modern research in Europe' (Minute Book, vol. 1). Wodzicki addressed the meeting, stating:

... that it was solely due to his ornithological interests that he was able to be present in New Zealand, as he had been attending an ornithological congress abroad during the invasion of Poland. He brought greetings from the British Ornithologists' Club whose monthly meeting he had attended in London just before his departure for New Zealand. They had asked him to tell all kindred bodies in Australasia that they were 'carrying on' in spite of war conditions. Ornithologists abroad were interested in New Zealand, first because of its unique isolated avifauna and secondly because of the opportunities for the study of introduced European birds in a new environment.

The meeting adopted 4 special studies: movements of the Banded Dotterel, distribution and abundance of the Dabchick, the Silvereye, and clutch sizes of introduced birds. Regarding the last, Wodzicki 'recommended that a large number of documented observations be made, so that, if necessary, the results should be amenable to statistical treatment.'

Falla, Oliver, and Fleming held a committee meeting at the Dominion Museum on the Monday after the AGM. They decided that the Society should join the RAOU, the AGM having noted the desirability of having a copy of the *Emu* available to members on loan. The committee resolved to attempt to produce a quarterly bulletin instead of an annual report. 'If all goes well such a bulletin might eventually grow into something rather like *British Birds*,' (Minute Book, vol. 1).

The second (and last) annual report (for 1940-41; 27 duplicated typescript pages) appeared in 1941, with format and content much as before. Membership was now about 70. The annual reports were succeeded by more regular bulletins, the first probably appearing in 1941, the second and third in May and October 1942. 'We hope that the more frequent publication will bring members more into touch with one another, and make the Society more united and active. Don't merely read the publications when they arrive; follow up the suggestions and make others of your own; write articles; ask questions; and, if possible, take part in the co-operative efforts' (Bulletin 1). Bulletins 1 and 2 contained short notes, such as 'Some observations on Black-billed Gulls' by Sibson; Bulletin 3 contained 'Summarised Classified Reports' (the systematically arranged bird observations sent in by members).

The next meeting was a special general meeting of 9 people at 4 p.m. on Wednesday 9 December 1942 at Canterbury Museum. The balance in hand was now £40-16-10. The meeting agreed to have further bulletins typeset and printed, because 3 per year would cost 'not much more than £25, about £5 in excess of our present cost of duplicating' (Minute Book, vol. 1). The bulletin was to be renamed *N.Z. Bird Notes* (changed to *New Zealand Bird Notes* in July 1946).

The Society's first printed publication — *N.Z. Bird Notes* volume 1, number 1 — was issued in January 1943. Another special topic for investigation — the spread and distribution of magpies — was announced, but members were reproached for their disappointing response to the earlier topics. *N.Z. Birds Notes* appeared every few months despite war-time difficulties. By December 1943 membership was about 160; by September 1944, about 180.

With the war-time disruption receding, the Society held its third AGM on 25 May 1946 at the Dominion Museum. Inevitably for a growing society, constitutional amendments began to dominate proceedings. A ringing subcommittee (J.M. Cunningham, Wodzicki, and Sibson) was elected to consider the possibility of extending Silvereye banding to include other species. There was discussion of the Society assisting in a census of gannets. Membership stood at 240. Clearly the Society was established and could look ahead to a sound future.

Later Years

From the late 1940s to the present, the Society has enjoyed a loyal membership and an impressive record of activities and achievements. The following highlights or points of interest are taken from minutes of the annual general meeting, special general meetings, the Committee (now Council) and various subcommittees (e.g. Ringing) (Minute Books, vols. 1 & 2).

1947. The Committee decided to send free copies of *New Zealand Bird Notes* to 12 lighthouse keepers. Requests from other societies to join in pressing for the protection of gannets on White Island, and for the protection of Karioi and Waipoua forests were declined.

1948. The Editor had material on hand with which to increase the size of *New Zealand Bird Notes*, but the production cost was absorbing the whole current revenue. There was reluctance to increase the subscription above 5 shillings.

1949. *New Zealand Bird Notes* was being exchanged overseas for many bird journals, forming the nucleus of a useful Society library. The Secretary was empowered by the Department of Internal Affairs to issue permits to members to allow them to ring certain species. Expenditure up to £50 was agreed to purchase rings from a United States company.

1950. The name of the Society's journal was changed to *Notornis* by a resolution of the AGM in May.

1951. The AGM in May resolved to seek incorporation of the Society and appointed a subcommittee to draft a new constitution. The Society had reached the point where it was desirable for 'policies to be laid down by a comparatively small committee of experienced ornithologists, and for their decisions to be put into effect by an increasing number of organisers . . . keeping in touch with their local members, encouraging their work and collecting their notes for publication.' 'As for incorporation, this was a protection to members, which was necessary with expanding activities . . .'

1952. The Committee appointed an editorial consultative subcommittee 'to advise the editor, at his request, on the acceptance of doubtful records and the publication thereof'. The AGM authorised publication of a checklist of New Zealand birds, which a subcommittee had prepared.

1953. A special general meeting in January adopted a revised constitution, and later that month the Society was incorporated under the Incorporated Societies Act 1908. The 'Committee' became the 'Council'.

1955. The Council considered a letter from a member 'suggesting the printing of special Christmas cards for members of the Society to buy and send to their friends'. In 1958, 28 000 such cards were sold, despite criticism of the standard of printing.

1958. The Council proposed setting up a subcommittee to produce a field guide to New Zealand birds. The first organised Field Study Course was held at Blenheim during the Labour Day weekend.

1959. There was a call for the Beach Patrol System to be revived. The field guide subcommittee was firmly set on the notion of an illustrated guide published commercially with royalties accruing to the Society. On a recommendation from the Ringing Subcommittee, the word 'banding' was to replace 'ringing' in the Society's activities.



Figure 1. Participants at the 50th anniversary AGM and conference held on 3 June 1989 at Whangaparaoa Army Camp, Northland. Photo: Kowhai Photography.

1961. Arrangements were proceeding with Collins Publishers for production of a field guide to New Zealand birds illustrated by the British artist Chloe Talbot-Kelly, working from specimens at the British Museum (Natural History).

1962. An expedition to the Antipodes or Kermadec Islands was suggested as a celebration of the Society's 25th anniversary in 1965.

1963. Responsibility for running the Banding Scheme was passed to the Dominion Museum. In 1965 the Council approved a donation of £80 to be used by the museum 'for supplementary purposes additional to the Museum banding scheme'.

1964. The journal *Notornis* had become so successful that the numbering of parts was changed to allow 1 volume of 4 parts per year.

1965. 25th Anniversary Year. The Society's Kermadec Islands expedition had departed in November 1964, but was abruptly curtailed by a volcanic eruption on Raoul Island. The expedition was successfully completed from November 1966 to January 1967.

1966. *A Field Guide to the Birds of New Zealand and Outlying Islands* by Falla, Sibson, and Turbott was published by Collins (London). This landmark in local ornithological publishing had been prepared under the Society's auspices. It was to sell remarkably well and provide significant income to the Society from the royalties that the authors kindly made over to the Society. Membership stood at a little over 900.

1968. The Council agreed to apply to have the Society affiliated as a member body of the Royal Society of New Zealand. The Checklist Committee completed the first draft of a new checklist of New Zealand birds.

1970. Membership reached 1000. After a successful pilot scheme, the Council decided to implement a 3-year Distribution Mapping Scheme co-ordinated by P.C. Bull. This was to become a highly successful project involving the membership in field work for 10 years. The new checklist was published.

1976. Council decided to produce a quarterly newsletter in addition to *Notornis*.

1980. Council resolved to start a Moulting Recording Scheme to be co-ordinated by Ben D. Bell, and to establish, in memory of the late Sir Robert Falla, the Falla Memorial Award for outstanding contributions to New Zealand ornithology.

1985. The award for excellence among junior members, which began in the 1960s as the Bailey Prize, was renamed the A.T. Edgar Junior Award in memory of the late A.T. Edgar.

Concluding Remarks

As the Society enters its 50th year it can be proud of its achievements. It has been true to the objectives laid down in Professor Marples' first circular — bringing New Zealand bird-watchers into contact, co-ordinating their activities and promoting field research. In *Notornis* — now well established in the world-wide family of bird journals — the Society has answered that early need for an outlet for the records and observations of New Zealand bird-watchers. The Society has given us a checklist, a field guide, and an atlas. That all this has been achieved by volunteers — far-flung regional organisers and a small council that meets only twice a year — is remarkable. A recurring theme in all the Society's minutes is a natural reluctance to increase subscriptions lest membership decline. Yet the cost of *Notornis* swallows up the entire income from subscriptions, and the Society would have stagnated financially but for the income from greetings card sales and the generosity of the field guide authors in making over their royalties. These royalties have supported a Projects Assistance Reserve from which small grants (totalling some \$24,000 in the last 4 years) have been disbursed to support ornithological field projects by amateur, student, and professional researchers. The society now looks to the possibility of the surer footing that might be gained by a move towards paid staff in a proper central office, all to be funded by pursuing grants and corporate sponsorship. I hope that the writer of the Society's 100th anniversary history in 2040 can report as favourably then as I do now.

Officers and Award Winners

Note: Officers for 1939-40 were unofficial in the sense that the society was not inaugurated until May 1940. There were no Annual General Meetings, and therefore no elections of officers, between the second AGM in June 1941 and third AGM in May 1946.

PRESIDENTS

| | | | |
|---------|---------------|---------|---------------|
| 1939-46 | R.A. Falla | 1960-67 | A. Blackburn |
| 1946-48 | B.J. Marples | 1967-71 | G.R. Williams |
| 1948-49 | C.A. Fleming | 1971-75 | F.C. Kinsky |
| 1949-52 | E.G. Turbott | 1975-80 | Brian D. Bell |
| 1952-54 | R.B. Sibson | 1980-83 | R.B. Sibson |
| 1954-57 | H.R. McKenzie | 1983-89 | B. Brown |
| 1957-60 | P.C. Bull | 1989- | Brian D. Bell |

NORTH ISLAND VICE-PRESIDENTS (to 1966-67)

| | | | |
|---------|-----------------|---------|---------------|
| 1939-46 | W.R.B. Oliver | 1952-54 | H.R. McKenzie |
| 1946-47 | R.H.D. Stidolph | 1954-57 | P.C. Bull |
| 1947-49 | E.G. Turbott | 1957-58 | E.G. Turbott |
| 1949-52 | C.A. Fleming | 1958-67 | R.A. Falla |

SOUTH ISLAND VICE-PRESIDENTS (to 1966-67)

| | | | |
|---------|--------------|---------|---------------|
| 1939-46 | E.F. Stead | 1952-54 | I. Tily |
| 1946-48 | R.A. Falla | 1954-62 | L.E. Walker |
| 1948-52 | B.J. Marples | 1962-67 | G.R. Williams |

VICE-PRESIDENTS (from 1967-68)

| | | | |
|---------|---------------------|---------|---------------|
| 1967-68 | A. Blackburn | 1977-81 | M.L. Falconer |
| 1968-71 | F.C. Kinsky | 1981-83 | B. Brown |
| 1971-75 | Brian D. Bell | 1983-85 | R.B. Sibson |
| 1975-77 | J.B. Hamel (acting) | 1985- | D.E. Crockett |

SECRETARIES

| | | | |
|---------|------------------|---------|-------------|
| 1939-46 | B.J. Marples* | 1973-74 | J.A. Fowler |
| 1946-53 | J.M. Cunningham* | 1974-78 | P.D. Gaze |
| 1953-57 | F.M. Brookfield | 1978-79 | H.A. Best |
| 1957-62 | G.R. Williams | 1979-88 | R.S. Slack |
| 1962-67 | A.T. Edgar | 1988- | S. Triggs |
| 1967-73 | B.A. Ellis | | |

*Secretary-Treasurers

TREASURERS

| | | | |
|---------|---------------|---------|-----------------|
| 1953-57 | N. Macdonald | 1981-84 | G.M.H. Peterson |
| 1957-66 | H.R. McKenzie | 1984-87 | D.F. Booth |
| 1966-71 | J.P.C. Watt | 1987-89 | W.L. Ormond |
| 1971-81 | H.W.M. Hogg | | |

EDITORS

| | | | |
|---------|---------------------------|---------|--------------|
| 1939-43 | R.A. Falla & B.J. Marples | 1955-64 | R.B. Sibson |
| 1943-44 | B.J. Marples | 1964-65 | B.D. Heather |
| 1944-46 | R.A. Falla & B.J. Marples | 1965-72 | R.B. Sibson |
| 1946-47 | B.J. Marples | 1972-78 | E.W. Dawson |
| 1947-55 | R.H.D. Stidolph | 1978- | B.D. Heather |

COUNCILLORS (from 1953-54)

| | |
|-----------------|-----------------|
| Barlow, M.L. | Heather, B.D. |
| Bell, Ben D. | Jackson, R.W. |
| Bell, Brian D. | Kinsky, F.C. |
| Blackburn, A. | Mackenzie, N.B. |
| Boyce, F.H. | McGrath, D. |
| Brown, B. | Merton, D.V. |
| Bull, P.C. | Nieuwland, F. |
| Crockett, D.E. | Onley, D.J. |
| Davenport, J.C. | Reed, S.M. |
| Falconer, M.L. | Robertson, H.A. |
| Falla, R.A. | Sagar, P.M. |
| Gaze, P.D. | Sansom, O. |
| Gill, B.J. | Sibson, R.B. |
| Gurr, L. | Sutton, R.R. |
| Hamel, J.B. | Turbott, E.G. |
| Hawkins, J.M. | Walker, L.E. |

REGIONAL ORGANISERS (to 1952-53)

| | |
|--------------------------------------|-------------------------------|
| Davenport, J.C. — Auckland | Marples, B.J. — Otago |
| Dawson, E.W. — Canterbury | Robertson, F.H. — Hawke's Bay |
| Falla, R.A. — Canterbury, Wellington | Sibson, R.B. — Auckland |
| Fleming, C.A. — Auckland, Wellington | Stidolph, R.H.D. — Wellington |
| Gurr, L. — Otago | Tily, I. — Otago |
| Guy, G. — Canterbury | Walker, L.E. — Otago |

REGIONAL ORGANISERS/REPRESENTATIVES (from 1953-54)

| | |
|--|---------------------------------------|
| Andrew, I.G. — Manawatu | Cook, H. — Wairarapa |
| Armstrong, B.R. — Canterbury | Cooper, W.J. — Southland |
| Ashby, B. — Nelson | Cowie, J.A. — Marlborough |
| Austin, H.W. — Wanganui | Crocker, T. — Waikato |
| Barlow, M.L. — Southland | Crockett, D.E. — Northland, Far North |
| Bartle, J.A. — Wellington | Crosier, P. — Canterbury |
| Bell, Brian D. — Marlborough, Wellington | Cunningham, J.M. — Wairarapa |
| Black, M.J.S. — Volcanic Plateau | Davenport, J.C. — Auckland |
| Blackburn, A. — Gisborne | Davies, L.J. — Manawatu |
| Blomfield, C.D. — Volcanic Plateau | Dawson, D.G. — Canterbury |
| Boeson, B.W. — Wairarapa | Dawson, E.W. — Canterbury, Wellington |
| Booth, D.F. — Auckland | Day, M. — Volcanic Plateau |
| Boyce, F.H. — Nelson | Day, R. — Waikato |
| Brathwaite, D.H. — Hawke's Bay | Dear, E. — Manawatu |
| Breen, M. — Taranaki | Delaney, F. — Marlborough |
| Brown, B. — South Auckland | Dennison, T. — Wairarapa |
| Cairns, K. — Wairarapa | Douglas, J. — West Coast |
| Clark, L.K. — Marlborough | Edgar, A.T. — Far North |
| Clark, W. — Canterbury | Edlin, L.C. — Wanganui |

History of the Society

- Ellis, B.A. — Otago
Falconer, M.L. — Wellington
Foord, M.R.R. — Otago
Fowler, J.A. — Wellington
Gollop, A.H. — Wellington
Goodwin, A.J. — South Auckland
Graham, E. — Canterbury
Grant, P. — West Coast
Guest, R. — Canterbury
Gurr, L. — Nelson
Hadden, D.W. — Waikato
Hamel, J.B. — Otago
Harper, P.C. — Wellington
Harrow, G. — Canterbury
Hawkins, J.M. — Nelson
Heather, B.D. — Southland
Henley, J.C. — Gisborne
Hilton, J.E. — Canterbury
Hogg, M.J. — Auckland
Howell, L. — Far North
Innes, J.G. — Volcanic Plateau
Jackson, J.R. — Canterbury, West Coast
Jackson, R.W. — Volcanic Plateau
Jenkins, P. — Marlborough
Kennington, S.R. — Marlborough
Lambert, R.E. — Taranaki
Latham, P.C.M. — Bay of Plenty
Lauder, C.S. — West Coast
London, H.D. — Bay of Plenty
Macdonald, M.G. — Taranaki
Macdonald, R.W. — Wanganui
Mackenzie, N.B. — Hawke's Bay
McKenzie, H.R. — South Auckland
McLintock, R.V. — Bay of Plenty
McMillan, D.G. — Northland, Far North
McRae, C. — Hawke's Bay
Medway, D.G. — Taranaki
Nieuwland, F. — Waikato
North, B. — Marlborough
O'Shea, M. — Wanganui
Oates, K. — Wellington
Packer, T.J. — Wairarapa
Randle, G. — Wanganui
Reed, S.M. — Auckland
Reese, P. — Canterbury
Ringer, R.A. — Auckland
Rowe, S. — Waikato
Sagar, P.M. — Canterbury
Scadden, C.E. — Wairarapa
Schweigman, P. — Otago
Seddon, B. — Waikato
Shailer, L.C. — Manawatu
Sim, D. — Wairarapa
Slack, R.S. — Wellington
Smith, C.A.L. — Southland
Smith, R.F. — Otago
Soper, M.F. — Nelson
Sutton, R.R. — Southland
Taylor, M.J. — Auckland
Templer, M.L. — Waikato
Thomas, R.N. — Wellington
Todd, K.V. — Hawke's Bay
Traill, R.H. — Stewart Island
Twydle, W. — Hawke's Bay
Wagener, L.J. — Auckland
Walker, L.E. — Otago
Webber, S.C. — Nelson
Westerskov, K.E. — Wellington
Weston, R.M. — Bay of Plenty
Wheeler, R.W. — Taranaki
Wilkins, D. — Waikato
Williams, M. — Wellington
Williamson, W.A. — Otago
Wright, A.C. — Otago

RECIPIENTS OF THE FALLA MEMORIAL AWARD

Note: The award was instituted in 1981. Awards are made for the preceding year.

| | | | |
|------|---------------|------|-----------------------|
| 1980 | H.R. McKenzie | 1985 | P. Child (posthumous) |
| 1981 | A. Blackburn | 1986 | P.C. Bull |
| 1982 | A.T. Edgar | 1987 | Brian D. Bell |
| 1983 | R.B. Sibson | 1988 | E.G. Turbott |
| 1984 | M. Barlow | 1989 | B.D. Heather |

Compiled by B.J. Gill & B.D. Heather

Bird Banding

In most countries, bird banding (ringing), and marking of animals in general, is an important research tool for biologists and ornithologists. Banding and other marks for identification are extensively used to establish movements, mortality rates, longevity, habitat use, etc. of individuals under study. The idea of marking individual birds is very old. The Greeks and Romans, knowing that swallows and pigeons returned to their roosts, sent information by tying coloured threads and messages to the birds' legs. Marco Polo wrote of falcons in China about 1300 AD: 'Each bird belonging to the Sovereign and the Barons has a tablet of silver on its feet so that, wherever caught, it can be returned to him.' During the 19th century, various naturalists used strings, coloured threads, silver wire, and 'indelibly' marked birds to identify individuals under study. It was not until 1899, though, that the systematic marking of birds for scientific study of habits and movements began. A Danish schoolteacher, Hans Christian Mortensen, used numbered zinc bands to mark storks, teal, starlings, and other birds in Denmark. Soon this example was adopted in other countries, the first national schemes were set up, and now millions of birds are banded each year.

Although bird banding started more recently in New Zealand, the use of banding techniques was reported as early as 1891 by T.W. Kirk who 'fastened a bit of red stuff around the leg of each' of the fledging sparrows he was studying. In 1911, the Southland Acclimatisation Society banded and released 100 Mallards they had imported. Bird banding and marking techniques were practised on a larger scale in New Zealand in the 1930s and many of the early banders became prominent members of the Ornithological Society of New Zealand.

In 1936 L.E. Richdale banded Yellow-eyed Penguins in Otago and shortly after that his first Royal Albatross at Taiaeroa Head. His research in the albatross colony continued for many years. One of the original 'Richdale birds', a female banded as a breeding adult in 1937, is the oldest known banded bird in the world. In 1989, she was still alive, aged at least 61 years — these birds start breeding only after at least 9 years. B.J. Marples probably pioneered passerine banding in New Zealand; as early as 1938 he banded Silvereyes (and later Bellbirds) in Dunedin. In 1939, C.A. Fleming banded Grey-faced Petrels on Hen Island, and P.C. Bull banded Fairy Prions as early as 1940, soon to be followed by R.H.D. Stidolph (passerines in Masterton), J.H. Sorensen (albatrosses and other seabirds on Campbell Island), H.L. Secker (Starlings, Blackbirds and Song Thrushes in Wellington) and J.M. Cunningham (mainly Silvereyes in the Wairarapa). These early banders lacked the sophisticated bands and tools we use today. P.C. Bull for instance used pieces of cigarette tins, which he rolled around the legs of his prions. Sorensen cut up aluminium pots, and others used pieces of aluminium with numbers scratched on them. Some used budgie rings.

The increased use of various methods during the 1940s resulted in a confusing array of home-made bands and no clear instructions for the general public to report recoveries. As early as at the inaugural meeting of the OSNZ in 1940, the idea of forming a Ringing Scheme was mooted. It was not until 1946, however, that more positive steps were taken. A committee was formed with J.M. Cunningham as convener and K.A. Wodzicki and R.B. Sibson as members. In 1947, R.A. Falla joined the committee, and his addition proved invaluable. He managed to obtain a government grant of £50, used to purchase 17 000 bands in a range of sizes from the Gey Band & Tag Co. in the United States. The official scheme of the OSNZ finally started in 1950, and record keeping became centralised.

During the first years relatively few birds and species were banded annually. The first summary of banding under the new scheme, compiled by J.M. Cunningham, stated that

'the first bird ringed was a Silvereye on February 27, 1950'. In 1950, 837 birds were banded. The total number of birds banded in New Zealand, for which full details were then available, rose to 6787; the number of species to 34. Cunningham also produced the report for the second year. Although only 2797 birds were reported banded, the number of species increased to 42.

During the next 3 years P.C. Bull was convener. In this period the grand total of birds banded under the scheme increased steadily. A highlight for 1954-55 was the recovery of 6 New Zealand White-fronted Terns in Australia. The dispersal of juvenile Australasian Gannets across the Tasman to Australia had already been established in 1953. The report also mentioned financial assistance from the Department of Internal Affairs. No sum was disclosed but in the next 2 years the Society received grants of £25 annually for the purchase of rings, 'which constituted a big help for this part of the Society's work'.

In the seventh year (1956-57) F.C. Kinsky had taken over as convener and in his annual report he stated: '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'. Abernethy banded 2437 birds of 7 species that year. The grand total of birds banded under the scheme had risen to 27 273; the number of species to 66. In his 1958 report Kinsky mentioned an offer from the Internal Affairs Department to supply all the bands for the Ornithological Society's Ringing Scheme, an offer that was accepted. In the same report year the scheme made contact with ringing stations in Australia, Britain, France, Germany, Switzerland, and South Africa and arrangements were made to exchange banding reports.

By 1959, the total number of birds banded had risen to 40 637 and the number of species to 76. It was another record year for the scheme: 8448 birds were banded. Kinsky stated that, 'The large number of birds banded this year is mainly due to the tireless and enthusiastic work done by Mr B.D. Bell, who heads this year's list not only with the number of birds banded (2684) but also with the number of species banded (14).' Mr C. Huntley, a new member, was also mentioned: 'Mr Huntley, who only started banding this year, caught and banded 66 Giant Petrels and 849 Cape Pigeons at the Tory Channel Whaling Station during a period of 6 weeks last winter.' An interesting fact is that Kinsky, who in earlier reports used the words 'ring' and 'ringing' (still used by European schemes), changed his terminology in this report to 'bands' and 'banding'!

In the early reports excessive band wear was frequently mentioned. By 1959, however, the problem seemed to be solved by a change of manufacturers. In his 1960 report Kinsky stated: 'New bands received from I.O. Mekaniska, Bankeryd, Sweden were used for the first time this year, and were very satisfactory in use'. The Society was also considering a change from aluminium to monel bands, but funds were insufficient. 'Prices of monel bands will not allow us a complete change over at the present time, but efforts will be made to include a small number of these bands in our next order, mainly to be used on burrowing petrels.' Further improvements followed. In 1959, Kinsky had started to use stainless steel (a first in the world) for the flipper bands on the Little Blue Penguins he had under study. These bands were hand-made locally. Later, from about 1967, the use of stainless steel was extended to most other bands. This example was soon followed by many schemes around the world.

The 1962 report mentioned that 'While it is expected that the current banding scheme will continue under other direction in the future, this report is the last that will be issued under the full authority of the Ornithological Society of New Zealand.' Indeed, on 1 April 1962, the Society handed its Bird Banding Scheme (under which 94 487 birds had been banded) over to the Dominion Museum. The new arrangement, however, lasted only until 1967.

Apart from the Ornithological Society, acclimatisation societies had started banding game birds in 1911. The North Canterbury Acclimatisation Society banded Black Swans on Lake Ellesmere from 1935, but unfortunately they did not use individually numbered bands and made no effort to study the individual birds. The Wildlife Branch of the Department of Internal Affairs started banding Mallards and Grey Ducks on a large scale

in 1947 and later banded other game birds like pheasants and quail. These bandings provided valuable data later for the duck studies of K.H. Miers and the pheasant studies of K.A. Westerskov.

The development of parallel banding schemes in New Zealand prompted a rethink about banding in general. As a result on 1 April 1967, all banding was brought under one umbrella, the Wildlife Branch (later the New Zealand Wildlife Service), as the New Zealand National Banding Scheme. C.J.R. Robertson, who had taken over the banding administration at the Dominion Museum in 1964, was transferred with the scheme. During the 17 years that he directed the scheme (I took over in January 1982), many changes took place. The most dramatic was without doubt the introduction of computer-based data management. Initially the merger created many administrative problems. Not only were the schemes basically different, but the number of birds banded and recovered increased dramatically. This put quite a strain on the staff of the Banding Office. Marked delays were experienced during the late 1960s, when staff had to cope with the conversion of the game bird data as well as the archival non-game records and current records. The relationship with the Department of Internal Affairs lasted exactly 20 years, ending when the tasks of the Wildlife Service were taken over by the newly created Department of Conservation on 1 April 1987.

Before the National Banding Scheme was set up in 1967, the Dominion Museum had started to convert its recovery data to punch card storage for future computer analysis. The Wildlife Branch already used the computer facilities of Treasury. The first computer file of recovery records held under the Banding Scheme was kept at the Government Engineering Computer Centre of the Ministry of Works. Recovery data were coded by the Banding Office staff and converted to punch cards by the computer centre. From these punch cards the records were entered through an initially simple input programme into the file. Gradually this programme was upgraded to allow for more sophisticated use, and the database continued to grow at a rate of about 5000 to 10 000 records a year.

In the early 1980s, the punch cards were phased out in favour of magnetic tapes. The ultimate aim is to convert the dataset, which holds details for all birds recovered, to species or family files that will be kept on a microcomputer, allowing easier access and greater flexibility in data handling. By March 1989, the file held records for nearly 150 000 birds. During the existence of the Banding Scheme well over a million birds of 225 species have been banded. (The millionth was banded in 1987!) Species of which more than 50 000 have been banded are, in descending order, Red-billed Gull, Mallard, Black-backed Gull, Paradise Shelduck, Black Swan, Pheasant, Silvereye and Canada Goose.

Over the years many marking techniques, used in addition to the official bands, have been developed. Colour bands were used in the early 1940s by C.A. Fleming, the pioneer of this technique in New Zealand. Many present studies depend on the use of colour bands for observing individual birds. Other special markers are neck collars, wing tags, nasal saddles, streamers, web tags, and back tags, all of which have been used at one time or another for the study of birds in New Zealand.

Bands and other markers have greatly helped us to get an insight into the habits and peculiarities of our bird life. Many interesting and sometimes vital facts have been discovered through recoveries reported by members of the public and banding operators, in New Zealand and overseas. We have learned that many species travel well beyond New Zealand's territory. Sooty Shearwaters, for instance, travel to Japan and the west coast of the United States. The longest distance recorded under the scheme is the nearly 13 000 km that Antarctic Skuas clock up during their migration to Japan. Other long distance travellers, of course, are the members of the albatross family with recoveries in the South Atlantic, Chile, and Argentina, and Gannets with their early life travels to Australia. White-fronted Terns and Banded Dotterels go to Australia too. Many foreign birds make landfall in or near New Zealand. Some are regular visitors like Giant Petrels, albatrosses and Cattle Egrets. Others, like a Brown Booby that was banded near Johnston Island in the North Pacific and recovered near Okarito, are rare enough to create some excitement in the Banding Office.

History of the Society

We now have an insight into such matters as pair bonds and life expectancies of many species. We can effectively manage birds like waterfowl thanks to our knowledge of population dynamics, gathered through extensive banding research. With well over a million birds now banded in New Zealand we are likely to increase our knowledge even more in the future.

Roderick O. Cossee

Nest Record Scheme

The Nest Record Scheme began in 1950, with the aim of becoming the central collection for standardised information on the breeding of New Zealand birds. Up to April 1989, 20 086 cards had been received, covering 136 species (Table 1).

The OSNZ scheme was initiated by John Cunningham, who based the design of the standard (white) nest record card on the card then being used by the British Trust for Ornithology. The card format remained unchanged until 1985, when a new design was introduced to increase the amount of data collected and allow easier computer analysis. In the early 1960s a (pink) colonial record card was designed to record single visits to the nests of colony-nesting species.

During the 39 years of the scheme, 6 members have acted as organiser: John Kirg 1950–53, Hallam Secker 1954–61, Colin Claridge 1962–65, Molly Neill 1966–68, David Crockett 1969–85, and Hugh Robertson 1986–present. The role of the organiser has been to distribute, receive, number, and register cards, lend them for analysis, and write an annual summary of data collected. These reports appeared in *Notornis* until 1979 and in *OSNZ News* thereafter.

The number of cards contributed each year has varied from 7 in 1952, when the scheme was in its infancy, to 1087 in both 1972 and 1983 (Figure 2). Since 1964, 500–800 cards have been received in most years, but they do not always refer to nests found that year because cards have been filled in, from data stored in notebooks, about nests found in earlier years (as early as 1921).

It is rather disappointing to note that, over the 39 years, only 581 members or friends have filled in cards; this is only about half the current membership. Nearly 45% of the cards are from the 18 members who have sent in more than 300 cards (Table 2).

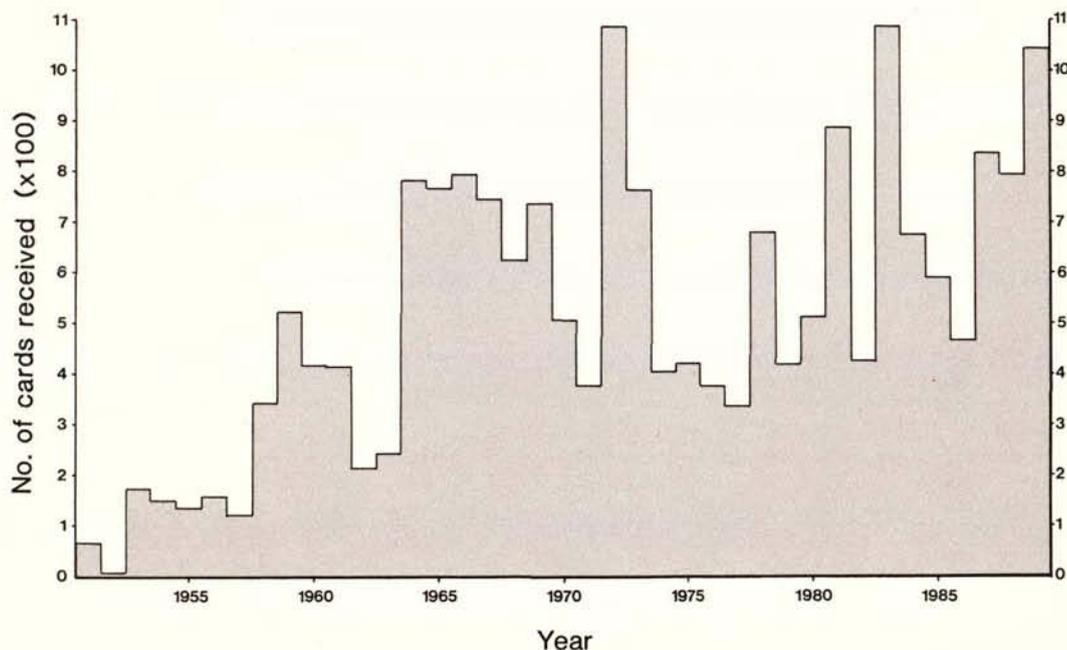


Figure 2. Number of Nest Record Cards received in each of the 29 years 1951–89 inclusive.

Table 1. Number of Nest Record Cards received, divided into 5-year intervals.

| | 1950-55 | 56-60 | 61-65 | 66-70 | 71-75 | 76-80 | 81-85 | 86- | Total |
|-------------------------------|---------|-------|-------|-------|-------|-------|-------|-----|-------|
| Brown Kiwi | - | 1 | 1 | 5 | 2 | 4 | - | 2 | 15 |
| Great Spotted Kiwi | - | 1 | - | - | - | - | 1 | - | 2 |
| Yellow-eyed Penguin | 1 | 5 | 4 | 1 | - | 9 | 4 | 15 | 39 |
| Adelie Penguin | - | - | - | - | 75 | - | - | - | 75 |
| Blue Penguin | - | 21 | 47 | 2 | 18 | 8 | 19 | 3 | 118 |
| Rockhopper Penguin | - | - | - | - | 1 | - | - | - | 1 |
| Crested Penguin | - | 1 | 1 | - | 1 | - | - | - | 3 |
| Crested Grebe | - | - | 2 | - | 1 | 39 | 18 | 15 | 75 |
| Dabchick | 1 | - | - | - | 1 | 5 | 15 | - | 22 |
| Hoary-headed Grebe | - | - | - | - | - | 1 | - | - | 1 |
| Australian Little Grebe | - | - | - | - | - | 2 | - | - | 2 |
| Wandering Albatross | - | - | 11 | - | - | - | - | - | 11 |
| Black-browed Mollymawk | - | - | - | - | 1 | - | - | - | 1 |
| Grey-headed Mollymawk | - | - | - | - | 1 | - | - | - | 1 |
| Light-mantled Sooty Albatross | - | - | 4 | - | 2 | - | - | - | 6 |
| Giant Petrel | - | - | - | - | 4 | - | - | 2 | 6 |
| Cape Pigeon | - | - | - | - | - | 35 | - | - | 35 |
| Grey-faced Petrel | 1 | 7 | 4 | 1 | 1 | 3 | 1 | - | 18 |
| Kermadec Petrel | - | - | 1 | - | - | - | - | - | 1 |
| Pycroft's Petrel | - | - | 1 | 4 | - | - | - | - | 5 |
| Black-winged Petrel | - | - | - | - | - | - | - | 1 | 1 |
| Chatham Island Petrel | - | - | - | - | 1 | - | - | - | 1 |
| Fairy Prion | - | 4 | 10 | - | - | - | - | - | 14 |
| Black Petrel | - | - | 1 | - | - | - | - | - | 1 |
| Flesh-footed Shearwater | - | 1 | - | - | - | - | - | - | 1 |
| Sooty Shearwater | - | - | 3 | 1 | 1 | 2 | - | - | 7 |
| Fluttering Shearwater | - | 6 | 1 | - | - | 3 | - | - | 10 |
| Little Shearwater | - | 1 | 2 | - | - | 3 | - | - | 6 |
| White-faced Storm Petrel | - | - | 5 | - | 3 | - | - | - | 8 |
| Diving Petrel | - | 4 | 54 | - | 1 | - | - | - | 59 |
| Red-tailed Tropicbird | - | - | - | 1 | - | - | - | - | 1 |
| Gannet | 2 | 2 | - | - | - | 6 | 167 | 3 | 180 |
| Black Shag | - | 13 | 32 | 19 | 10 | 17 | 10 | 4 | 105 |
| Pied Shag | - | 10 | 9 | 2 | 2 | 6 | 21 | 7 | 57 |
| Little Black Shag | - | 1 | - | - | - | 5 | 6 | - | 12 |
| Little Shag | - | 4 | 7 | 3 | 16 | 22 | 15 | 6 | 73 |
| King Shag | - | 6 | 12 | 1 | 2 | - | 5 | - | 26 |
| Spotted Shag | - | 3 | 2 | - | 4 | 9 | 37 | 1 | 56 |
| White-faced Heron | 1 | 4 | 3 | 6 | 5 | 3 | 10 | 11 | 43 |
| Reef Heron | 2 | 7 | 12 | 10 | 7 | 4 | - | - | 42 |
| Bittern | 1 | 1 | - | - | - | 2 | - | - | 4 |
| Royal Spoonbill | - | - | - | - | - | 4 | 2 | 4 | 10 |
| Mute Swan | - | 3 | 6 | - | 1 | 2 | 3 | 4 | 19 |
| Black Swan | 1 | 12 | 24 | 12 | 14 | 30 | 41 | 296 | 430 |
| Canada Goose | - | 9 | 10 | 2 | 5 | 11 | 9 | 25 | 71 |
| Domestic Goose | - | - | - | 2 | - | 1 | 9 | 3 | 15 |
| Paradise Shelduck | - | 4 | 2 | 1 | - | 6 | 14 | 5 | 32 |
| Mallard | 3 | 25 | 5 | 36 | 17 | 29 | 47 | 40 | 202 |
| Grey Duck | 5 | 11 | 37 | 33 | 8 | 9 | 11 | 8 | 122 |
| Grey Teal | 7 | 2 | - | - | 2 | 5 | 2 | 1 | 19 |
| Brown Teal | 2 | - | - | - | - | - | - | - | 2 |
| Shoveler | - | 5 | 6 | 1 | 4 | 3 | - | 1 | 20 |
| Blue Duck | - | - | - | 1 | - | - | - | - | 1 |
| Scaup | - | 6 | - | - | 1 | 17 | 7 | 3 | 34 |
| Harrier | 9 | 28 | 10 | 5 | 13 | 7 | 24 | 6 | 102 |
| NZ Falcon | - | 2 | 2 | 1 | 2 | 1 | 6 | 2 | 16 |
| Chukor | - | - | 1 | - | 1 | 1 | - | - | 3 |
| Brown Quail | - | - | - | 4 | 1 | - | 1 | - | 6 |

Nest Record Scheme

| | 1950-55 | 56-60 | 61-65 | 66-70 | 71-75 | 76-80 | 81-85 | 86- | Total |
|------------------------------|---------|-------|-------|-------|-------|-------|-------|-----|-------|
| California Quail | - | 5 | 8 | 5 | 7 | 2 | 4 | 1 | 32 |
| Pheasant | - | 4 | 4 | 11 | 5 | - | - | 2 | 26 |
| Banded Rail | - | - | 2 | 2 | - | 1 | 1 | 2 | 8 |
| Weka | - | 3 | 3 | 6 | 3 | 1 | - | - | 16 |
| Marsh Crake | - | - | - | - | 1 | - | 1 | - | 2 |
| Spotless Crake | - | - | - | 5 | 3 | - | - | 1 | 9 |
| Pukeko | 5 | 39 | 25 | 45 | 58 | 34 | 58 | 52 | 316 |
| Coot | - | 2 | 2 | 7 | 5 | 32 | 14 | 4 | 66 |
| SI Pied Oystercatcher | 2 | 21 | 72 | 13 | 12 | 23 | 23 | 59 | 225 |
| Variable Oystercatcher | 4 | 12 | 29 | 23 | 31 | 34 | 80 | 40 | 253 |
| Chatham Island Oystercatcher | - | - | - | - | 9 | - | 14 | - | 23 |
| Spur-winged Plover | - | 3 | 23 | 6 | 2 | 33 | 60 | 91 | 218 |
| NZ Dotterel | 4 | 14 | 25 | 17 | 36 | 50 | 93 | 12 | 251 |
| Banded Dotterel | 20 | 43 | 77 | 28 | 115 | 77 | 102 | 135 | 597 |
| Black-fronted Dotterel | - | - | - | - | 8 | 4 | 28 | 6 | 46 |
| Shore Plover | - | - | - | - | 12 | - | 53 | - | 65 |
| Wrybill | - | - | 8 | 1 | 4 | 29 | 29 | 9 | 80 |
| Subantarctic Snipe | - | - | - | - | 1 | 1 | 1 | 6 | 9 |
| Pied Stilt | 13 | 51 | 104 | 78 | 84 | 118 | 83 | 141 | 672 |
| Black Stilt | - | 1 | 1 | 4 | 2 | - | 4 | 2 | 14 |
| Southern Skua | - | - | 1 | 1 | 43 | 3 | 27 | 33 | 108 |
| Black-backed Gull | 8 | 42 | 148 | 225 | 42 | 122 | 136 | 97 | 820 |
| Red-billed Gull | 1 | 18 | 16 | 72 | 24 | 87 | 37 | 25 | 280 |
| Black-billed Gull | - | 16 | 73 | 14 | 31 | 16 | 55 | 13 | 218 |
| Black-fronted Tern | 1 | 11 | 158 | 38 | 17 | 26 | 166 | 60 | 477 |
| White-winged Black Tern | - | - | - | - | 2 | - | - | - | 2 |
| Caspian Tern | 2 | 5 | 12 | 21 | 35 | 32 | 148 | 9 | 264 |
| Antarctic Tern | - | - | 3 | - | - | 9 | 4 | 68 | 84 |
| Fairy Tern | 1 | 1 | 5 | 2 | 3 | 8 | 5 | 1 | 26 |
| White-fronted Tern | 7 | 24 | 44 | 39 | 22 | 27 | 62 | 11 | 236 |
| White Tern | - | - | - | 1 | - | - | - | - | 1 |
| Grey Ternlet | - | - | 5 | - | - | - | - | - | 5 |
| NZ Pigeon | 1 | 2 | 12 | 14 | 2 | 14 | 5 | 20 | 70 |
| Rock Dove | 10 | 36 | 12 | 7 | 4 | 3 | 7 | 13 | 92 |
| Kaka | - | 2 | 2 | 5 | 1 | 1 | 1 | 5 | 17 |
| Kea | - | 9 | 36 | 9 | 9 | 1 | 17 | - | 81 |
| Red-crowned Parakeet | - | 3 | 1 | 5 | 2 | 2 | 2 | 32 | 47 |
| Yellow-crowned Parakeet | - | - | 2 | 2 | - | - | - | 1 | 5 |
| Shining Cuckoo | - | 2 | - | 1 | 5 | 1 | - | 3 | 12 |
| Long-tailed Cuckoo | - | - | - | - | 1 | - | - | 2 | 3 |
| Morepork | 1 | - | 3 | 6 | 3 | 5 | 2 | 3 | 23 |
| Little Owl | - | 6 | 7 | 1 | 2 | 2 | 3 | 3 | 24 |
| Kingfisher | 3 | 11 | 22 | 30 | 9 | 19 | 24 | 9 | 127 |
| Rifleman | - | 14 | 26 | 70 | 19 | 31 | 9 | 16 | 185 |
| Rock Wren | - | 1 | 6 | 4 | 2 | - | - | 2 | 15 |
| Skylark | 6 | 50 | 26 | 19 | 32 | 29 | 39 | 39 | 240 |
| Welcome Swallow | - | - | 59 | 118 | 117 | 128 | 151 | 178 | 751 |
| Pipit | 1 | 14 | 7 | 12 | 35 | 6 | 6 | 8 | 89 |
| Dunnock | 23 | 28 | 36 | 58 | 47 | 18 | 35 | 38 | 283 |
| Fernbird | - | - | 7 | 13 | 8 | 38 | 15 | 11 | 92 |
| Brown Creeper | - | 1 | 1 | - | 3 | 8 | 2 | - | 15 |
| Whitehead | 4 | - | 2 | - | 6 | 1 | 1 | - | 14 |
| Yellowhead | - | 8 | 4 | 2 | 4 | - | - | 3 | 21 |
| Grey Warbler | 11 | 16 | 26 | 40 | 47 | 24 | 39 | 16 | 219 |
| Chatham Island Warbler | - | - | - | - | 1 | - | 177 | - | 178 |
| Fantail | 11 | 27 | 40 | 100 | 47 | 86 | 79 | 108 | 498 |
| Tomtit | 4 | 14 | 12 | 16 | 22 | 17 | 72 | 19 | 176 |
| Robin | 4 | 16 | 4 | 2 | 284 | 5 | 96 | 3 | 414 |
| Song Thrush | 132 | 207 | 222 | 670 | 394 | 149 | 293 | 414 | 2481 |
| Blackbird | 124 | 194 | 228 | 582 | 302 | 187 | 208 | 419 | 2244 |

| | 1950-55 | 56-60 | 61-65 | 66-70 | 71-75 | 76-80 | 81-85 | 86- | Total |
|---------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Silvereye | 22 | 23 | 32 | 69 | 74 | 60 | 59 | 55 | 394 |
| Stitchbird | - | - | - | - | - | - | - | 1 | 1 |
| Bellbird | 3 | 5 | 4 | 6 | 10 | 10 | 31 | 43 | 112 |
| Tui | 1 | 4 | 3 | 21 | 10 | 14 | 9 | 11 | 73 |
| Yellowhammer | 2 | 14 | 6 | 12 | 22 | 3 | 12 | 13 | 84 |
| Cirl Bunting | - | - | - | 1 | 3 | 1 | 3 | 4 | 12 |
| Chaffinch | 12 | 33 | 31 | 100 | 79 | 45 | 44 | 33 | 377 |
| Greenfinch | 4 | 33 | 22 | 31 | 61 | 41 | 38 | 59 | 289 |
| Goldfinch | 17 | 133 | 61 | 147 | 252 | 82 | 138 | 76 | 906 |
| Redpoll | 6 | 10 | 18 | 24 | 17 | 13 | 8 | 26 | 122 |
| House Sparrow | 16 | 48 | 188 | 259 | 45 | 35 | 28 | 30 | 649 |
| Starling | 9 | 57 | 60 | 96 | 209 | 101 | 164 | 48 | 744 |
| Myna | - | 8 | 4 | 10 | 6 | 6 | 7 | 6 | 47 |
| Saddleback | - | - | 3 | 4 | - | 10 | 30 | - | 47 |
| Magpie | 1 | 7 | 2 | 22 | 9 | 40 | 15 | 16 | 112 |
| Rook | - | - | - | 1 | - | 1 | - | 2 | 4 |
| Total | 532 | 1561 | 2417 | 3407 | 3051 | 2320 | 3662 | 3136 | 20086 |

Table 2. Major contributors to the OSNZ Nest Record Scheme

| | |
|-----------|--|
| Over 700: | Don Hadden, Hugh Robertson, Paul Sagar, Mike Soper |
| 500-699: | Bob Cowan, Jim Hilton, Dick Jackson, Colin O'Donnell, Bob Stidolph |
| 300-499: | Peter Bull, Brian Chudleigh, Jack Cowie, Dave Dawson, Chris Lusk, Don Merton, Ray Pierce, Peter Reese, Hallam Secker |

These major contributions are principally from keen junior members, from bird photographers, or from people whose records span many years of ornithological activity. The number of cards sent in is not necessarily a good measure of the value of the contribution because a few cards from nests that have been studied closely can be more valuable than 100 cards with only 1 or 2 visits to each nest. As the aim of the scheme is to build up a large database on *all* species, every card, whether from one or many visits to a nest, adds to the information about the breeding biology of the species.

Of particular value are cards from detailed studies of one species. Some examples include the following: Gannet (Elsbeth Waghorn), Black Swan (Teri Meis), Black-backed Gull (Ian Granville, Steve Lawrence, Ormond Torr, and Greg Walsh), Black-fronted Tern (Jack Cowie), Kea (Ray Jackson), Chatham Island Warbler (Dave Crouchley, Mike Dennison, Allan Munn, and others working on the Black Robin project), Fantail (Mary Powlesland), Robin (Doug Flack and Ralph Powlesland), Goldfinch (Percy Campbell and Norman Mackenzie), and House Sparrow (Dave Dawson).

Song Thrush (2481 cards) and Blackbird (2244) make up about 24% of all records. Other leading species are Goldfinch (906), Black-backed Gull (820), Welcome Swallow (751, but only since 1964), Starling (744), Pied Stilt (672), House Sparrow (649), Banded Dotterel (597), and Fantail (498). For a further 32 species, over 100 cards have been received, and for 35 of the 136 species in the scheme fewer than 10 cards have been received. Seabirds are particularly poorly represented in the collection because many members do not have ready access to offshore nesting locations, and burrow nests are difficult to inspect.

The data in the scheme have been used extensively for inclusion in reference books, by university students, and in private, scientific, and management studies. Because the data have been stored on cards, summary statistics are difficult to calculate, and so in 1986 the OSNZ Council decided to transfer the data to computer for ease of analysis and for extra security. In the history of the scheme, only 1 set of original cards (Red-crowned Parakeet) has been lost by a borrower. Until the cards are computerised, photocopies are being sent out or cards must be inspected under supervision at Ecology Division, DSIR. Data for Blackbird and Goldfinch have been loaded on to government computers and Song Thrush data have been coded ready for input. Once the records are computerised, they can be analysed more easily and thus provide better feed-back from the Scheme.

H.A. Robertson

Beach Patrol Scheme

Seabirds are abundant around our coasts. Every year thousands die close enough to the shore to be washed on to beaches. Ornithologists were aware of this even last century, but their records were limited mainly to reporting rare species or large wrecks. With the establishment of the Ornithological Society of New Zealand in 1939 and the publication of *New Zealand Bird Notes* and *Notornis*, records of seabirds found dead on beaches steadily increased. The concept of a Beach Patrol Scheme was suggested by John Cunningham in 1951, and quickly adopted. Cunningham designed a beach patrol card and a specimen record card that, apart from some modifications to increase the information sought, have changed little since.

The objectives of the scheme are to:

1. Provide information on the species of seabirds washed on to New Zealand's coasts, where they are from and in which months they occur.
2. Record variations in the mortality of seabirds, particularly large wrecks, and associated factors such as meteorological conditions and the condition of the birds.
3. Increase the chances of recovering banded birds.
4. Increase the collections of seabirds in museums, particularly of species rarely found about New Zealand.
5. Provide specimens for anatomical, biometric, genetic, parasitological, and moult studies.
6. Provide an opportunity for members to learn how to identify the many similar seabirds.

The scheme therefore provides data and material which are used by those interested in seabird anatomy, taxonomy, genetics, distribution, movements, population changes, parasites, moult, and the relationship between distribution and food sources.

Beach patrollers travel along a section of beach and collect all dead birds, whether seabirds or not. Remains of birds range from complete specimens to wings, feet, or just pieces of skin and feathers. At the end of the patrol, or along the way, the collection is sorted and recorded on a beach patrol card. The birds whose identity is certain and which are not wanted are disposed of well above the highest tideline. The main information recorded on the beach patrol card is the name of the beach patrolled, the distance travelled, the date, and the number of birds of each species found (Powlesland & Imber 1988).

Seven members have prepared the annual summaries of beach patrolling results during the 39 years of the scheme: Peter Bull and Brian Boeson 1939-61, Brian Boeson 1962-63, Mike Imber and Brian Boeson 1964, Peter Roberts 1965-66, David Crockett 1967, Mike Imber and David Crockett 1968, Mike Imber 1969, Dick Veitch 1970-80, and Ralph Powlesland since 1981.

Although a few patrols in 1943, 1948, and 1949 were recorded on beach patrol cards, it was not until 1951 that members regularly undertook beach patrols. During 1951 to 1954, up to 300 km were travelled annually, but then followed a 3-year period when little patrolling was done. After discussions at the Society's 1958 AGM, the scheme was revived with Peter Bull as convener. Patrolling gradually increased from 121 km in 1958 to 1563 km in 1964, followed by less in the next 3 years. However, after 1968, beach patrolling became a regular ornithological activity of many members, an average of 3995 km being patrolled each year between 1970 and 1987 (range 2576-5852 km). In total, 87 279 km have been travelled by patrollers from 1943 to 1987.

Beach patrolling is a year-round activity, but the greatest monthly distances travelled are in July to September and the least in February and March (Figure 3). Except for November, this effort reflects the numbers of birds found per month. Whenever large numbers of birds are found, regular beach patrollers then patrol beaches that are otherwise infrequently searched. This increase in patrolling is particularly evident straight after a

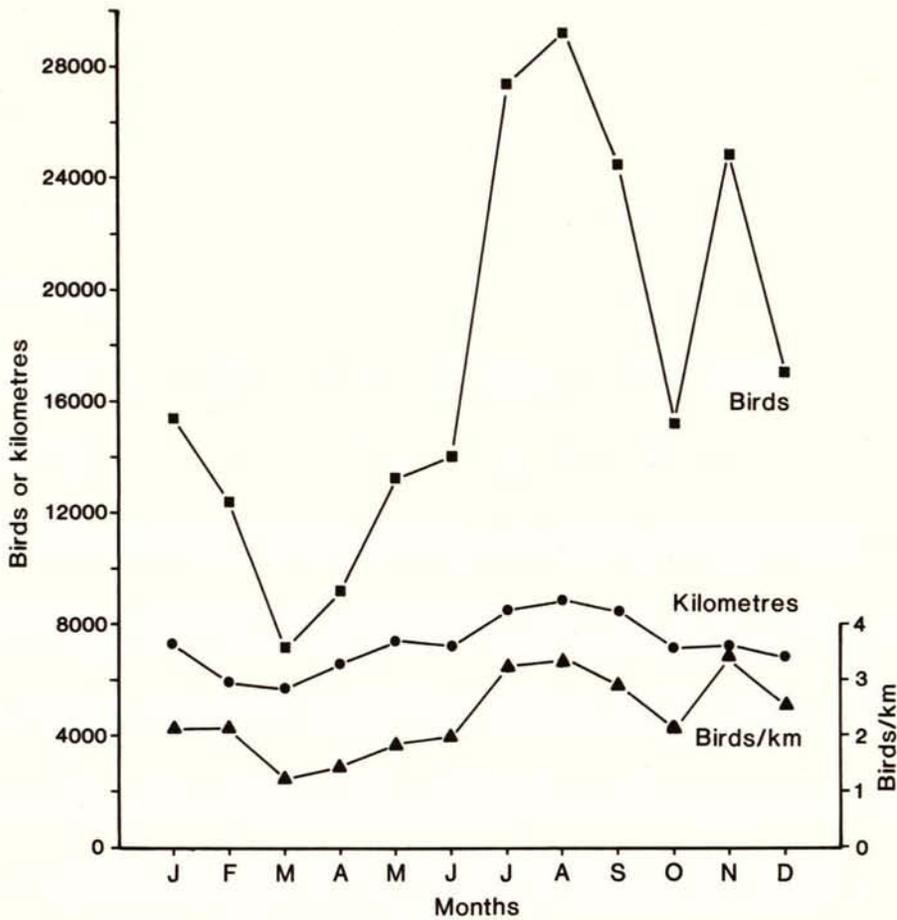


Figure 3. Monthly averages of dead seabirds recovered, distance travelled and birds recovered per km, 1943-87.

wreck of birds or very stormy weather, such as after the April 1968 'Wahine' storm (Kinsky 1968). Also, people who seldom take part in beach patrols are stimulated to do so when word gets about that they are likely to find many birds.

In the 1940s and 50s most patrolling was by Auckland, Bay of Plenty, Taranaki, and Wellington members, but since 1960 beaches of all coasts have been patrolled (Table 3). The amount of patrolling done on each coast has varied markedly from year to year. Although this reflects partly the number of active members living near beaches and the efforts of a few members who were particularly keen on patrolling, I believe the major stimulus for members to continue frequent patrols has been the thrill of finding a variety of species on most patrols. The North Island west coast, which includes Auckland West, Taranaki, and Wellington West beaches, has proved more rewarding for patrollers over the years than other sections of the New Zealand coastline, both in the number of birds found per kilometre and in the variety of species found. In addition, patrollers have done much patrolling on Auckland East and Bay of Plenty beaches each year. Limited patrolling has been done in most months for many years on Canterbury North, Canterbury South, Otago, Southland, and Wellington South beaches. Along the other coasts patrolling has generally been irregular.

From 1943 to 1987, 209 204 dead seabirds were found. During 1970 to 1987, although the kilometres travelled per year has varied two-fold between 2576 and 5852, the number

of dead seabirds found per year has ranged from 3994 to 28 380. The years when more than 10 000 birds were found (1974, 1975, 1978, 1984, 1985, 1986) were notable because of wrecks of 1 or more species. Most wrecks are of immature birds, found in emaciated condition after several days of rough weather, such as the wreck of Salvin's Prions (*Pachyptila salvini*) in 1966 (Harper & Fowler 1987) and of Kerguelen Petrels (*Pterodroma brevirostris*) in 1981 (Imber 1984). Factors thought to contribute to seabird wrecks are: young may be in poor condition on leaving their burrows, prey may become scarce for long periods, rough weather may hinder access to prey, persistent winds may blow a species out of its usual feeding zone so that it has to compete for prey types that it is poorly adapted to catch, or persistent onshore winds may force birds towards land (which they normally avoid).

Ninety species have been found by Society members and friends during the 45 years of beach patrolling. For 10 species, 5000 or more birds have been found. The most frequent species, the Fairy Prion (*Pachyptila turtur*) (39 038), is recovered every month from most coasts and occasionally in wrecks of thousands. The Sooty Shearwater (*Puffinus griseus*) (31 013) is wrecked in large numbers in some years, but only for part of the year because it is absent from New Zealand waters from June to September. The Little Blue Penguin

Table 3. Distance patrolled (km) during various periods of the Beach Patrol Scheme for each coast.

| COAST | YEARS | | | | | | | TOTAL |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 43-59 | 60-64 | 65-69 | 70-74 | 75-79 | 80-84 | 85-87 | |
| Auckland West | 329 | 1007 | 2604 | 6601 | 9676 | 9297 | 7187 | 36701 |
| Auckland East | 73 | 151 | 421 | 2007 | 3049 | 3568 | 1588 | 10857 |
| Bay of Plenty | 109 | 690 | 143 | 403 | 1614 | 1159 | 903 | 5021 |
| East Coast N.I. | 2 | 59 | 2 | 118 | 68 | 376 | 426 | 1051 |
| Taranaki | 23 | 435 | 613 | 573 | 959 | 723 | 666 | 3992 |
| Wairarapa | 2 | 25 | 34 | 43 | 101 | 74 | 84 | 363 |
| Wellington West | 424 | 1937 | 3246 | 3163 | 1925 | 2010 | 1635 | 14340 |
| Wellington South | 109 | 378 | 267 | 783 | 1817 | 701 | 512 | 4567 |
| North Coast S.I. | 1 | 167 | 19 | 177 | 256 | 131 | 167 | 918 |
| Westland | - | 24 | 134 | 85 | 180 | 179 | 62 | 664 |
| Canterbury North | 75 | 561 | 27 | 583 | 281 | 718 | 309 | 2554 |
| Canterbury South | - | 68 | 60 | 411 | 604 | 809 | 205 | 2157 |
| Fiordland | - | 8 | - | 3 | - | - | - | 11 |
| Otago | 14 | 750 | 131 | 301 | 244 | 273 | 396 | 2109 |
| Southland | - | 169 | 65 | 273 | 550 | 344 | 46 | 1447 |
| Outlying Islands | - | 4 | 5 | 46 | 290 | 145 | 37 | 527 |
| TOTAL | 1161 | 6433 | 7771 | 15570 | 21614 | 20507 | 14223 | 87279 |
| No. of years | 17 | 5 | 5 | 5 | 5 | 5 | 3 | 45 |

(*Eudyptula minor*) (24 602) is found regularly on most coasts and occasionally in large wrecks. The Fluttering Shearwater (*Puffinus gavia*) (13 065) and Diving Petrel (*Pelecanoides urinatrix*) (10 895) both inhabit coastal waters and are sometimes wrecked in large numbers. The Black-backed Gull (*Larus dominicanus*) (7447) is regularly recovered, but in small numbers each month. The other 4 leading species are oceanic birds recovered from New Zealand beaches in small numbers in most years, but with occasional large wrecks — Salvin's Prion, 8510; Antarctic Prion (*Pachyptila desolata*), 5980; Short-tailed Shearwater (*Puffinus tenuirostris*), 5190; and Narrow-billed Prion (*Pachyptila belcheri*), 5125.

New species or subspecies have been discovered on beach patrols: Buller's Shearwater (*Puffinus bulleri*) was first described from a beach-wrecked specimen found in 1884, but its breeding place was not discovered until 1915 (Falla 1924). Similarly, Hutton's Shearwater (*Puffinus huttoni*) became known to beach patrollers in New Zealand many years before its breeding place was discovered in 1965 (Falla 1965, Harrow 1965).

Some rarities to New Zealand were first detected by beach patrollers with critical eyes. To them we can attribute the only records on the New Zealand mainland of the Adélie Penguin (*Pygoscelis adeliae*), Bird of Providence (*Pterodroma solandri*), Stejneger's Petrel (*P. longirostris*), Manx Shearwater (*Puffinus puffinus*), Antarctic Skua (*Stercorarius maccormicki*) and White-tailed Tropic-bird (*Phaethon lepturus*).

R.G. Powlesland

Atlas Scheme

The Atlas Scheme, or Bird Mapping Scheme as it was originally called, has been one of the Society's most successful enterprises, in terms of both the information obtained and the number of people involved. The objective, finally achieved in 1985, was to publish an atlas showing the detailed distribution of New Zealand birds. The methods used are fully described in the atlas itself (Bull *et al.* 1985) and so are mentioned here only briefly. The present account reviews the history of the scheme, examines some of its achievements, and considers what might be attempted in the future.

From its earliest days the Ornithological Society has sought to collect reliable and detailed information on bird distribution. This is evident in the introduction to the Society's first annual report (for 1939–40), which encouraged members to send in locality lists that, collectively, could be used to 'give some fair indication of the distribution and status of native and introduced birds'. Members took up this challenge enthusiastically and regularly sent in lists of the species seen about their homes or the places they visited. The lists were subsequently cut up and rearranged so that all records of a given species were grouped together; each year's records were then published in the Society's journal under the heading 'Summarised Classified Notes', later with the first 2 words reversed. Although this practice served the Society well for some 30 years, it had some defects. In particular, records tended to reflect the distribution of the observers as much as that of the birds and, for common species, observers were often uncertain as to what was new and worth recording. What was needed was a series of maps that would show at a glance the localities from which a species had been recorded and those from which it had not. The Society's Bird Mapping Scheme attempted to fill this need.

How the Scheme was Run

The method was essentially that used by Perring & Walters (1962) for their *Atlas of the British Flora* and later, in New Zealand, by Wardle & MacRae (1966) to show the distribution of the tree *Weinmannia racemosa*. The Ornithological Society invited its members to visit as many as possible of the 10 000-yard squares of the then national grid (marked on Lands and Survey maps of the time) and to compile a list of the bird species present in each square. There were 1614 of these squares in the North Island, 2016 in the South Island, and 45 squares covering Stewart Island and its smaller neighbours.

After promising results from a preliminary trial late in 1969 (Bull 1970), the Society's Council agreed to sponsor the scheme for 5 years (later extended to 10 years). Special cards were printed and distributed to field observers. Once bird lists were available from nearly every square, maps could be produced showing, for each species of bird, the squares in which that species had been found and those in which it had not. This, in broad outline, was the simple concept, but the practicalities proved to be far from simple.

Within an area slightly greater than the United Kingdom (population over 56 million), New Zealand has a population of only 3 million, and so a shortage of ornithologists, relative to the number of squares to be visited, was to be expected. Furthermore, many of these squares were in remote areas, often mountainous or bush-clad and without roads. In the event, some 800 people contributed to the scheme, completing almost 19 000 cards. This in itself provided problems. First, the 800 contributors were not all equally skilled in field identification of birds, and so a checking system had to be devised. A greater problem, however, was how to handle the data that came in. With 19 000 cards, each containing several items of information about each of up to 30 or more species of birds, the mass of data soon exceeded anything that could be handled manually by the members of a comparatively small amateur society. These problems were largely overcome when the directors of the New Zealand Wildlife Service and the Ecology Division of DSIR,

appreciating the value of the data being collected, agreed that their organisations would provide clerical assistance, technical advice, and computing facilities.

The problem of checking the accuracy of records was handled at 2 levels. The cards were sent first to the appropriate OSNZ regional representative, who could be expected to know the individual abilities of the people in his/her region and to recognise identifications that were unusual enough to need checking. The cards then went to Ecology Division, where P. Gaze checked them again and then arranged for the data to be coded for entry into the computer. Finally the coded sheets went to the Wildlife Service, where C.J.R. Robertson arranged and supervised the computer services and the techniques for tabulating the data and producing the maps.

Results

Field work began in September 1969 and by the end of 1976 one or more lists had been compiled for 85% of the squares. It was then decided to produce a provisional atlas, partly for people needing the information urgently for management or research purposes and partly so that field observers could see what they had done and what remained to be done. This publication (Bull *et al.* 1978) stimulated renewed activity among field workers so that, when data collection officially ended late in 1979, cards were available from 96% of the 3675 squares. The average number of cards per square was 5.3 and 1 square (N2312, Wellington) had 174 cards which together recorded the presence of 56 species. The average number of species per square was 31 in the North Island and 27 in the South Island plus Stewart Island; the greatest number of species (111) was reported from the mouth of the Manawatu River (square N2722), where 140 cards were completed during the 10 years.

The Blackbird, listed on 12 124 cards, was the most often recorded species, followed by the Chaffinch (11 111 cards); in terms of area of distribution, this order was reversed, Chaffinches being recorded from 3284 squares and Blackbirds from 3259. Interestingly, these 2 species are among the 3 most numerous species on British farmland as recorded by the Common Bird Census (O'Connor & Shrubbs 1986). Also of interest, among New Zealand flycatchers, Fantails (only subspecifically distinct from Australian ones) have a much wider distribution than the Tits (endemic species), which, in turn, have a wider distribution than the Robins (endemic subgenus), indicating that the species that have been in New Zealand the longest are the least able to tolerate changes in the environment. The field cards provided much information on habitat preferences, numbers, seasonal changes, and breeding, but these data have not been analysed.

Presentation of Results

The only birds not mapped were oceanic species, some of the rarer northern hemisphere migrant waders and a few very rare or local endemic land birds such as Kakapo and Takahe. The oceanic species and the rarer migrant waders were omitted because better data are available elsewhere in bird logs of mariners and in reports on local harbour surveys. Every species listed on a card is included in the tables and on the microfiches accompanying the atlas.

Although the distribution maps are clear, they do not show how often a species was recorded from a square or whether its presence was seasonal. These and other data are available, however, on the microfiches. Thus, a user can rearrange the data in ways more appropriate for particular lines of research or, if necessary, refer back to the original field cards (now held in the Banding Office of the Department of Conservation). Thus the publication, although having most of the attributes of an atlas, is also a major data base for future research. The owner therefore has the best of both worlds.

Uses of the Atlas

The atlas has many uses. One of the most important is as a baseline from which to measure changes in distribution and to some extent changes in relative abundance. Such changes also provide early warning as to the identity of species in need of better protection

or, sometimes, better control. Detailed information about distribution is needed to help assess, for example, likely effects on local birdlife of proposed industrial or other environmentally disturbing developments or the risks to rare birds of poisoning campaigns against pests.

The data also make possible interesting studies on how the distribution of certain species is affected by such environmental factors as rainfall, altitude, season, and vegetation. Some of the data have already been used for such purposes, for example, by Hamel (1972) in studying the influence of rainfall on the distribution of Pipits and Skylarks, by Dawson (unpublished) in estimating the minimum area of forest required for the survival of certain species of birds, by Spurr (1979) in checking the danger to birds of aerial poisoning of possums, and by many people preparing environmental impact reports. Bird-watchers, too, find the atlas useful as a guide to the species likely to be present at some intended holiday destination and in suggesting which ones would be worth recording as being unusual in the district.

A valuable aspect of the Atlas Scheme, not fully appreciated at the outset, was its beneficial effect on the Society itself in promoting a corporate purpose and more field activity. The challenge of providing bird lists from new squares, or better lists from squares already visited, added a mildly competitive element and a clear purpose for field outings. Discussions at evening meetings of the Society's branches and published annual reports stimulated the field workers.

The Future

One major value of the atlas, to be a baseline from which to measure changes in bird distribution, can be realised only by repeating the work. A major difficulty, however, is that modern maps have a grid system marked in metres instead of yards. Thus, to compare data from a later survey with the data collected in 1969-79, metric grids will have to be fitted over the earlier maps. However, although the new squares will not correspond exactly with the old ones, the amount of displacement of any one square will be too small to affect the overall pattern of distribution.

Another problem is that resources, both human and material, are limited. In 1969-79, enthusiasm for the Mapping Scheme resulted in an appreciable decline in contributions to the Society's other activities such as the Nest Records Scheme. Therefore, surveys of distribution on a national scale should not be repeated too frequently and, equally important, should be started only when resources for processing the resulting data are assured. In the meantime, however, the detailed data on microfiches provide a baseline against which the results of future local or single species surveys can be assessed. Local investigations, such as that of Hamel (1972), which compared the breeding distribution of Skylarks and Pipits in relation to rainfall in Otago, need far fewer resources than would be needed to produce a new atlas for all species nationwide. As it may be some time before a full atlas survey can be repeated, it is important that the Ornithological Society continues to publish 'Classified Summarised Notes' so that unusual sightings or local changes in distribution or numbers between surveys do not go unrecorded.

The Society and its government-funded collaborators have good reason to feel pleased that they were able to collect and publish such a valuable set of data, even though it may be some time before the financial climate allows the work to be repeated, thus realising its full potential. In the meantime the data are available and will increase in value.

P.C. Bull

Wader Counts

Counting waders has been a major preoccupation of OSNZ members since the early days of the Society. The first report of regular counts at one site discussed the results of 12 monthly counts at the Waikanae Estuary in 1941–42 (Kirk & Wodzicki 1943). This was followed by a more comprehensive report (Wodzicki 1946). Subsequently, counts of waders were undertaken at many other coastal sites.

The most extensive series comes from Manukau Harbour and the Firth of Thames, where counts began in 1951 and, since 1960, have continued each summer and winter (Veitch 1978). Results from these counts have been the subject of several papers in *Notornis*, authored by Ross McKenzie and Dick Sibson.

Other sites to receive regular attention over several years are Whangarei Harbour, Manawatu Estuary, Nelson Haven, Farewell Spit, Avon-Heathcote Estuary, Washdyke Lagoon, Lake Wainono, Aramoana (Otago Harbour), and the Southland lagoons and estuaries. Many other areas have been thoroughly surveyed at least once, usually during an OSNZ field study course.

These counts and surveys provided valuable information on the number and sometimes seasonal occurrence of waders at many sites. However, there was no reliable information about population sizes on a national basis. Estimates of population size had been made for several migratory species (Veitch 1977) and at least 4 resident breeding species (Pied Oystercatcher, Baker 1973; NZ Dotterel, Edgar 1969; Wrybill, Sibson 1963; Black Stilt, Pierce 1984). Most of the estimates for migratory species needed substantiating, however, because although they were based on counts made at major sites, not all counts were made at the same time of year or even within the same year.

The impetus for initiating national wader counts in New Zealand came from the establishment of the RAOU wader studies programme in 1981. Australia and New Zealand have several major migratory species in common, and many of our Banded Dotterels migrate across the Tasman for the winter. Therefore both countries would obviously benefit by having at least some of their national wader counts coincide. Consequently a proposal to make national wader counts was put to the OSNZ Council in May 1982. The aims of the project were to:

1. Estimate the number of migratory and some resident breeding species.
2. Highlight the important sites for different species.
3. Indicate habitat preferences of different species.

A pilot study was completed in several regions in January 1983 and the first national wader count was completed in November 1983. National counts were then made each summer (November/December) and winter (June/July), and so by July 1989 12 counts had been completed, 6 for each season.

The project has always been popular, and 200–250 members assisted with each count. With a consistent effort from most regions, totals for each species can be compared reliably over several summers or winters. Particularly pleasing were the efforts made in regions with few members but large areas to cover, for example, Far North, Bay of Plenty, West Coast, and Southland. Members from Southland also deserve special thanks for their efforts during the cold, short days of winter.

From the past 6 years' national wader counts, a great deal of information has accumulated on the numbers and distribution of migratory and some resident breeding species. With the consistent coverage of most regions, we can examine trends in the populations of our waders. The counts show the numbers of each migratory species reaching New Zealand and also reflect the breeding success of these species each year, as

indicated by the percentage of the birds counted in summer that remains the following winter. Our results indicated, for example, that Lesser Knots and Turnstones had above-average breeding success in the boreal summer of 1986, whereas Bar-tailed Godwits did better in 1987. Therefore our wader counts are of international as well as national interest.

P.M. Sagar

Role of the Amateur

Amateur ornithologists, driven by their love of birds and bird study, have been the life force of OSNZ since its inception. In some aspects the role of the amateur has not changed over the years; in others there have been marked changes.

Amateur members have always outnumbered professionals and organisations so much that the Society could not have survived without them financially, socially, or in achieving its aim of studying birds.

Most council members, officers, and regional representatives have been amateurs. Some of these jobs are enormously demanding. Think for a moment of the time, knowledge, dedication, and wide range of skills it takes to edit *Notornis*; to be an effective president of a society with such scattered membership; or to compile 'Classified Summarised Notes'. 'When an amateur takes on a job for the Society, it is done as a hobby and given full attention and enthusiasm' (B. Heather, in a letter). Conveners of special schemes (Nest Records, Beach Patrol) and publications (Checklist, Atlas), especially in recent years, have been mainly professionals, yet almost without exception these people have done most of the work in their own time. It has had nothing to do with their jobs, and they have often been helped by committees, husbands or wives, or informal groups of amateurs.

As an amateur you are unpaid and out of pocket, but you are free to choose what you do and when you do it. You have no boss. You may lack a purpose, a goal, or a commitment. Your level of interest can range from casual to a consuming passion. You have to fit your bird work around other commitments, to family, job, and other interests. The fieldwork gets done only when you can grasp the time, the weather, your boots and your gear, and *go*. This opportunist use of time means that much amateur work is solitary. You lack the pleasure of good company, shared experiences in the field, load-sharing, and the safety of numbers in remote places. Yet solitude can be both balm and solace, especially when humanity and humanity's ills have been pressing too close.

Many amateurs underrate what they do and are reluctant to write up their findings. They are not under career-induced pressures to publish. But — and it's a big but — when you expose your work through publication you take the same responsibilities and face the same criticism as professionals, but with no institutional backing and often few or no colleagues to help, or talk your problems over with. These are just some of the unchanging aspects of the amateur role. What of the changes, in 50 years?

Glance through some of the early *New Zealand Bird Notes*, and you will see that what was right for those times would never do today! It's easy, in 1989, to think of some 1949 work as 'amateurish'. In fact most of what was published was then new knowledge. Except for some naturalist writers (Guthrie-Smith, Edgar Stead), recorded bird study got off to a late start in this country. As Barrie Heather has reminded me: 'In the 40s and 50s almost anything we did was new information. "Sib" (R.B. Sibson) could 'discover' Firth of Thames; we could visit offshore islands about which little or nothing was known; almost any bird distribution work and habitat records were new. The growth of the Wildlife Service and the DSIR Ecology Division, and the acceptance of birds as a subject worthy of student study at university, changed a lot of that.'

The sometimes haphazard discoveries of the past have been superseded by study plans and formal research, although there is still a place for the lucky break, the inspired clutching at the fortuitous evidence. (Remember Brian Gill's bird counts on regular, otherwise mundane, car-trips [Gill 1977]? Or my Thrush/Blackbird count in a city park, when lots of worms and all the birds were out on a calm evening after a 2-day storm [Barlow 1983]?) Of course you must recognise the opportunity, know when and how to take it, and be prepared. No binoculars? No notebook? No evidence.

Amateurs still observe and record, question and speculate, but the questions are

becoming more sophisticated, the speculating harder to prove. A study does not have to be large to be useful. Barrie Heather again reminds me that there is value in small-scale, long-term work that can reveal trends, local changes, habitat differences. (Walter Jackson and Malcolm Olsen's Cattle Egret note for Horowhenua [Jackson & Olsen 1988] is a good recent example.) But data collection, leading to proof or answer, usually needs to be systematic and sizable.

This has led to another major change, the popularity of the collective study. Collective studies are not new to OSNZ. Fleming and Wodzicki co-ordinated the 1946-47 Gannet survey (Wodzicki & Fleming 1946), and John Cunningham's 1948-50 Myna study summarised the findings of more than 100 observers (Cunningham 1951). But both the number and scope of collective studies have grown rapidly in recent years. They may well become the main activity for amateurs in the next 50 years. Some people are more likely to get out into the field when part of a team than when working solo. The carrot is that you are expected to perform because you are part of a camaraderie-at-a-distance with others who are similarly quartering the riverbeds or trudging (perhaps springing!) along the coast in other parts of the country. You know that the large sample of the collective study is likely to give a definitive result. You must not think that collective study robs amateurs of all freedom, initiative, or responsibility. Certainly you forgo the creative thrill of working out a study, the creative effort of analysis and writing-up, and the pain and satisfaction of authorship. Yet many of the amateur's freedoms of choice are retained: you can choose when, where, and how to work. You remain free to analyse your own results for its local value. As well as contributing to new knowledge through bird study (and isn't that what OSNZ is all about?), collective studies can give many amateurs living in remote places a feeling of belonging that city members gain from meetings and group outings.

Changing education patterns over the last 50 years mean that many people now have basic and post-basic training in one or other of the sciences. Still far more men than women take these courses. This training must affect the role of the amateur in the next 50 years. People should be better equipped to handle more complex ways of collecting data. As computers become commonplace tools, storage and analysis of data will be simpler and take less time. Standards should rise. So should expectations: expectations of one another, of the Society, and of your own bird-work.

Notornis papers are much more often written by professionals than they used to be simply because professionals have more opportunity to do detailed original research than amateurs have. There is, and must continue to be, a place in *Notornis* for original, competent amateur work. *OSNZ News* provides an informal avenue for publication by all members, whether 'super-scientist, keen field naturalist, dabbler or merely an interested passenger in a canoe' (to quote *OSNZ News* No. 1's editorial in 1977). Too few amateurs have taken up this opportunity to share their bird interests, whether by snippet or saga. Is this because you undervalue your own work, or because of laziness?

A clarion call for the next 50 years? Right!

To the amateur: You are essential to OSNZ and to bird study in New Zealand. Use your opportunities, value your freedoms, and don't underrate your skills.

To the Society: Amateurs must continue to be drawn into collective studies, to have the right to do individual study, or to do no study at all if that is their choice. Given a sufficient standard of research and authorship, the amateur's right to publication in the Society's journal must not be whittled away. The Society must continue to encourage creativity in bird study by amateurs, for good science is a creative activity. OSNZ will be a vital, vibrant Society only as long as its amateur members are in good heart.

Notornis

An ornithological society, by definition, publishes a journal. Bird study has little value if the results are not published, and so an ornithological society that is actively doing or fostering worthwhile study has a journal that is always overfull.

As bird study grows and changes, so does the journal, which, if any good, reflects the variety and depth of study going on in the country at the time. Therefore, over the 50 years 1939–1989, *Notornis*, including its forerunner *New Zealand Bird Notes*, has changed as bird study has changed in New Zealand.

In the 1940s and 1950s, birds received little mention in university courses and theses on birds were few. Birds had no part in school syllabuses outside primary school nature study; secondary school pupils heard of them only when a staff member ran an active club, such as the King's College Bird Club. The NZ Wildlife Service and the Ecology Division of DSIR were in their infancy. The few other professional ornithologists were in the major museums.

Thus, in its first years, also a time of war, OSNZ's membership was small and its published results came from a small core of keen people. The material for the first reports and bulletins was collected largely by Charles Fleming, put together by Brian Marples and Bob Falla as editors and issued in cyclostyled form. 'Classified Summarised Notes' appeared frequently as a way of bringing together the modest observations of a growing number of members; co-operative studies began to flourish with nationwide banding of Silvereyes and inquiries, collated by Lance McCaskill, into the status of magpies and an invasion of Spine-tailed Swifts.

This sort of work, co-operative study combining the greater and lesser efforts of all observant members, has continued for 50 years as a major strength of OSNZ, giving *Notornis* a singular New Zealand quality that has not been lost despite great changes in other respects.

1946–55 were the Masterton years. Bob Stidolph, an experienced journalist and field naturalist, supported by his close friend John Cunningham, skilfully edited the journal, which became a recognised publication of standing. The journal was called *Notornis* from mid-1950, and a cover design of a *Notornis*, commissioned from eminent British artist C.F. Tunnicliffe, has been used on OSNZ publications and letterheads since 1952. This was a period of intensive, largely amateur, activity, when so much could be learnt that was new knowledge, often in fields that later became the work of government agencies.

On this sound foundation was built the Sibson contribution. While RBS was editor, 1955–71, ornithology grew rapidly in New Zealand; the Wildlife Service and Ecology Division grew apace; university zoology departments gave more recognition to birds as topics for advanced study; birds became an official part of the syllabus for senior secondary school biology.

The editor's workload increased, as did the size of the journal; more submitted papers required the scrutiny of referees; the field covered became more 'professional' in the sense that more papers came from people who were trained biologists, sometimes even employed to do their study full time. *Notornis* became what it has been ever since — a journal of high international stature based on a strong local content.

The succeeding editors, Elliot Dawson in 1972–78 and Barrie Heather since 1978, carried the RBS standard forward, each setting his own criteria for what he would or would not accept, developing new policy here and there, and struggling to keep abreast of the steady flow of new and revised manuscripts and to get each issue out reasonably on time.

Since 1958 (vol. 8), *Notornis* has been printed in Gisborne. Derived from an association with Archie Blackburn as a public accountant, the relationship between OSNZ and Te

Rau Press is a tradition in itself. We have passed from hot press to computer typesetting and are now using contributors' floppy discs, when they are in suitable form.

Until his death in 1984, Archie Blackburn was assistant editor, handling the many day-to-day decisions a printer needs, particularly near to publishing time, carefully reading the final proofs of every issue, and giving sound advice to both printer and editor.

Each volume has a comprehensive index. This thankless task has, most recently, been skilfully done by Tim Lovegrove for nearly 20 years.

In its mixture of major papers, shorter papers, and short notes, *Notornis* has encompassed all bird groups and all aspects of bird study, whether morphology, parasites, ecology, migration, behaviour, or subfossils. Whether of local, Australasian, or international importance, provided an article is new and original and about birds in or related to the New Zealand region, it is *Notornis* material. No distinction is made between individual or co-operative studies done as members' hobby activities and official projects by government departments, universities, or museums.

Although *Notornis* is concerned mainly with the birds of the New Zealand region, it is not parochial. It often includes studies from outside the region, mostly on birds closely linked with ours, such as petrels and terns of the southern Indian and Atlantic Oceans, South American cormorants, and Antarctic penguins, and skuas. New Zealand bird-watchers have always taken a great interest in the birds of the South-west Pacific islands, and so *Notornis* has become a primary journal for work on Pacific island birds.

The editor has a delicate task of steering a middle course, not between scientific and popular, but between the interests of international readers and the interests of local readers. Critics often forget that the editor does not choose the content of the journal; he does his best, with what he has received and has ready for publication, to provide every 3 months an issue that is varied enough for everyone to find something of interest.

A reader who expects *every article* to be to his or her particular taste in subject matter or readability is being unfair. Nevertheless, writers and editor owe it to the readers of the journal to make everything as comprehensible and interesting as the subject matter allows.

Producing a concise, clear, logical, and readable article is hard work. Few can do it easily; much of what is published is very different from the manuscripts originally submitted. Every article goes to at least one referee, who tests that it is new, original, and up to date, is logically presented, and has sound argument and analysis. OSNZ owes a great deal to the work of referees, and to the contributors, most of whom accept advice and critical comment with good grace in the interests of good science and better reading.

Notornis has an enviable record for a short lead-time for articles to be published, compared with many journals; this is largely due to the prompt co-operative work of editor, referees, and contributors.

Notornis is received by all OSNZ members, who in turn support its existence by their subscriptions, as well as by their contributions to field studies and to published results. The general nature of *Notornis* is not likely to change greatly; nor can its appearance change greatly by, for example, having colour plates, as long as subscriptions remain low (compared with those of similar societies), other forms of income are not available, and production and quality standards have to depend on voluntary spare-time editors.

B.D. Heather

OSNZ News

The decision to produce a Society newsletter was made by the Council at its November 1976 meeting. Events moved rapidly and the first issue of *OSNZ News* appeared as a supplement to the December 1976 *Notornis*.

The Society was very fortunate that Barrie Heather was available and willing to become the first editor of *OSNZ News*. Under his capable leadership the newsletter gained the immediate support of members and rapidly developed a distinctive style and content. It was always envisaged that the newsletter should be informal; indeed there was even a thought (reluctantly abandoned) to call it *Notornis Droppings!*

In his editorial in the first issue, Barrie outlined ideas on possible subjects for future issues. These included Council news; members' activities; reports on outings, surveys, censuses; promotion of national schemes; reports of birds and bird behaviour of interest; requests for help with projects; members' advertisements; what the professionals are doing; publications — brief notice of new books and papers of interest; OSNZ library — its contents and encouragement to use it; and summary accounts of the ornithological year. Such topics fill the pages of current issues.

In May 1978 Barrie Heather was elected editor of *Notornis* and so, after overseeing the production of *OSNZ News* 7, he handed over to Paul Sagar, who continues in this role.

Members' support of the newsletter has been exceptional, and many members have contributed to it at one time or another. Initially an 8-page issue was produced, but the amount of material received outgrew the space available so regularly that from June 1988 12 pages were produced.

It has always been emphasised that *OSNZ News* is the members' newsletter, compiled from the material sent in by them. This material arrives on the editor's desk in a variety of forms, ranging from typescript to handwritten notes on a page from a field notebook and reports dictated over the telephone. Sometimes material is sent as a definite contribution to the newsletter, but other times it is extracted from letters sent to the editor. It is all very acceptable, no matter how or in what form it is received.

Because *OSNZ News* attempts to be topical, contributors send material right up to, and even beyond, the deadline for each issue. Thus there is always a last minute rush to compile an issue in time for it to be sent out with *Notornis*. The approach of each deadline is always an exciting time for the editor!

The 50th issue of *OSNZ News* appeared with the March 1989 issue of *Notornis*. The contents of these first 50 issues reflect the development of the OSNZ and ornithology in New Zealand generally since the mid-1970s.

P.M. Sagar

Library

Before the OSNZ was formed, results of bird studies in New Zealand were often published in the Australian journal *Emu*. One of the most well-thumbed *Emu* volumes in the OSNZ library contains Sir Charles Fleming's paper on the birds of the Chatham Islands (1939). Not surprisingly, at the Society's first AGM in 1941, the possibility was discussed of the Society joining the RAOU so as to receive copies of *Emu* that could be available for loan to members. Rules were drawn up and the Secretary handled loan requests. In 1948, a list of 95 library items was published in *New Zealand Bird Notes*. Any could be borrowed by members 'on application to the Secretary and on payment of postage'.

Exchanges of journals between the Society and overseas organisations were arranged. E.G. Turbott, ornithologist and later Director of Auckland Institute and Museum, handled much of this work and in due course the Museum Library became the home of the Society's collection. From 1950, the Museum Librarian, Enid Evans, acted as librarian for the Society until pressure of work forced her to seek a replacement in 1965. In 1952 a journal circulation scheme was set up, initially for Wellington and Dunedin members. A library committee of 4, chaired by Mr Turbott, was appointed to handle reviews, exchanges, and purchases. Few books have, in fact, been bought; most have been donated by members, received for review, or exchanged for *Notornis*. Binding of important journals began in 1952. Two students at King's College, Bruce and Stuart Chambers, carried out the work and the King's College Bird Club made a donation towards costs. Later R.V. Roberts bound the back issues of *Emu* at his own cost. Two handsome bookcases built by R.B. Sibson in 1956, in response to a plea from Miss Evans, are still in use.

In 1962 the collection of 700 was swelled by the donation of several thousand reprints from Dr H.G. Deignan of the U.S. National Museum. The daunting task of cataloguing these was undertaken by Kitty Bernreider, a refugee from Communism who arrived in New Zealand with almost nothing. She taught German at Baradene College, and when she started birding in Auckland, Jim Prickett, with typical generosity, gave her a pair of binoculars. During the next 2 years she typed 963 filing cards. Meanwhile Enid Evans was being helped by Margaret McIntyre in overseeing the OSNZ library.

When Hetty McKenzie took over, a catalogue of books and reprints had been printed, and all borrowing was by post, the journal circulation having been stopped. Until ill-health forced her to give up the work in 1975, Hetty faithfully dealt with members' and interloan requests (which kept increasing), as well as, for much of the time, despatching *Notornis* from home, and dealing with inquiries for back numbers.

In the following period, when Anthea Goodwin handled library affairs, rising postage costs severely reduced borrowing by members. In 1985 the journal circulation scheme was reintroduced, and proved popular — by 1987 some 60 journals and newsletters were available. The annual grant of \$25 to replace lost items has seldom been used. A new catalogue of the collection was produced in 1976 and is updated periodically. The stencils were typed by Maxine McKenzie, and Sylvia Reed helped print 200 copies on the Museum's Gestetner.

In 1987, Kathy Barrow took over as Society Librarian. The circulation list and interloan inquiries increase, and new exchanges of foreign periodicals for *Notornis* are occasionally arranged. Shortage of space recently forced the Museum Library to repossess the room where the OSNZ and another society had stored their library. After discussion the Society's Council and the Museum Librarian (Ian Thwaites) agreed that the OSNZ library should be progressively integrated with the Museum's collection of bird literature.

Physically the housing arrangements for the OSNZ library at Auckland Museum have never been ideal, but the collection has at least been secure. At present the OSNZ

periodicals are stored on high shelving accessible by ladder. OSNZ members have access to the Society collection during the Museum Library's opening hours. Other Museum Library users can consult the collection with permission, but may not borrow. The pooling of resources between the 2 libraries is mutually beneficial. Museum Library staff have processed numerous inter-library loan requests for the Society, and assisted many visiting Society members with advice on the availability of journals. The Society is mindful of its debt to Auckland Museum for its support over 40 years and for the friendly co-operation of its library staff.

Auckland Museum itself maintains one of the major collections of ornithological literature in the country. It currently has over 1500 ornithological books and receives some 30 ornithological journals by subscription or exchange (with the Museum *Records*). The library has acquired important ornithological items since its inception. Authors such as Gould, Mathews, Gray, and Godman are represented, and ornithological art is represented by such things as the colour plates of Descourtiz and Mivart. The library has acquired a comprehensive range of current taxonomic and descriptive works. It also houses collections of the work of respected bird photographers like G.A. Buddle, Noel Gleeson, and Olaf Petersen, and several important cinema films made by New Zealand naturalists during the 1930s (for example, *The Cruise of the "Will Watch"* and *In Quest of the King Shag*).

In an era of continuing inflation, periodical subscriptions have always been difficult to maintain. The journal *Condor* cost \$US10 in 1970, but now costs \$US160 for a library subscription. Many overseas libraries are doing away with exchange agreements, and it is a tribute to the high standard of *Notornis* that the OSNZ continues its exchanges unabated. The Museum Library receives several letters each year from libraries forced to abandon exchanges, usually for financial reasons. The tragedy is that very often journal runs are abandoned and library resources further diminished. The strength of New Zealand's bird literature holdings owes much to the Society's ability to maintain exchanges because the OSNZ library holds the only New Zealand sets of several journals.

A.J. Goodwin & I. Thwaites

Section 2

Reminiscences

Several founding members of the OSNZ, or members of long standing, have provided the following reminiscences. These contributions give insights into what bird-watching was like in the Society's early days. They describe the human side of the people and events that are covered more factually in other sections.

Maida Barlow

A request for reminiscences puts you firmly in your place, among the old. Did they ask any 30-year-olds, I wonder? Or 50-year-olds? I prefer looking forward to looking back, except when pulling a dinghy.

I think of the people more than the birds: my mother, Olga Sansom, OSNZ foundation member, and her birdy friends. Most of them seemed to be rangy, long-striding men with questing spirits. Even the slighter ones, like Bob Falla, could cover a lot of ground, physically and mentally, in a short time. They brought out the best in me. I wanted to do well for them, be a part of their enthusiasm, by feeding it or responding to it. Now, I get this from the young.

My bird-watching began on walks to school along Taieri Plains roads lined with hawthorn hedges. Each summer I thought I knew what the birds were up to, under those scented shades, and each winter many unguessed-at nests taunted me and my lack of summer observation. It was a game that the birds always won.

In my family there was a holy respect for science. My grandmother at Stewart Island went to great trouble to collect, preserve, and send away craneflies, shells, and seaweeds to various exalted authorities. My mother seldom wore jewellery but always had a hand-lens on a cord around her neck. She taught us how to look things up. 'You don't have to know all about a thing. You do have to know where to look it up.' Often there was no answer, even in the Definitive Literature. (We knew about that!) Then, as now, I sometimes tried to find the answer myself.

Once at Stewart Island I went down to meet the boat with my mother. Professor Marples had asked her to 'look after' one Professor Papenfuss, a name I'll never forget. All we knew about him was that he was a wader expert. Tall and stringy for sure, I thought. The people streamed off the ferry, but the only one who filled that bill was Geoffrey Orbell. One passenger wandered down the gangway, a rotund little man, looking a bit lost. 'Can it possibly . . .?' But it was, and within a few hours my ideas about ornithologists were again revised — they could also be quiet and kind and could doze off a bit.

Field work was difficult, especially transport. It was all right at Stewart Island where sea and shore birds were all around us and we had a small boat and friends and relations with bigger ones. We'd cut through rafts of Sooty Shearwaters, tens of thousands of them, gorged and rocking on the water, one of the bird-sights of the world; or pick a good day to make the difficult landing at Whero Rock with Mr Richdale's provisions. 'Step *only* there!' Every peg marked a burrow. To break through the thin crust was disaster to the work, and the place was littered with pegs. How he hated visitors! He needed the supplies though, was courteous and quiet, and seemed to relax only as the last of the human chain leapt thankfully back into the surging dinghy. 'If you ever get *really* interested in birds, study one species and study it thoroughly', he told me. Words, to me alone! An accolade!

In Invercargill, in wartime and with no car, we biked. Out to the airport, checking pioneer Spur-winged Plovers and looking for sandpipers on Lake Hawkins (now reclaimed and gone); following up reports of oddities that usually proved to be Australian vagrants. On some longer trips — to Wyndham, say — we'd take a train as far as Edendale, putting the bikes in the guard's van. How easy it is now to take for granted such things as a 4-wheel-drive vehicle, *any* vehicle, a watch with a big second hand, Vernier callipers, light-weight binoculars, and waterproof gear.

Who remembers the dawn chorus records? I think this was an international record of the time and order in which bird species first called, on a pre-ordained day. This again I did with my mother. We would get up at about 3.30 a.m., bike to a park, and wait under rhododendrons for the first calls. The first half-dozen species were easy enough, but even



Figure 4. (Left to right) Maida Barlow, Olga Sansom and Roger Sutton, Mason Bay, Stewart Island, November 1968.

after that it was surprising how quickly you 'got your ear in' and blotted out the early starters. I learned to distinguish between Greenfinch and Long-tailed Cuckoo calls, between Bellbird and Tui. Apart from the identification, I remember being very anxious about the Big Ben kitchen clock that I'd brought along. Was it *exactly* right? The night before, and again later in the day, I'd have my ear glued to the wireless, listening through static for the right time. One year I wrecked the exercise by tripping the clock's alarm and setting up a cacophony of ducks and finches long before their time. 'This year's vigil aborted due to an artefact' my mother wrote on her report. So I learned the importance of precise observation and on-the-spot recording; of sending one's record to the right place; and of managing one's gear competently. Our geographical advantage in the south of New Zealand was hammered home: 'Unless there's someone down at Campbell Island or the Antipodes, we're the first people in the world to hear the birds greet the new day.' How privileged I felt!

In the 1950s I moved to South Auckland, met Ross and Hetty McKenzie, and joined the Miranda/Karaka/Mangere-sewage-ponds/Ness Valley field trips with Ross, Dick Sibson, and their Clevedon and ex-King's College Bright Young Things. Some of them are still around — Anthea Goodwin, Barrie Heather — not so young but still pretty bright. For me it was a starburst of ornithological and personal enlightenment, interwoven with Ross's Old Testament wisdom and irreverent wit, Sib's erudition, and Hetty's love and good food. I can say, with Julian Huxley, it was a time when birds became 'the very breath in my nostrils'.

Years pass, priorities shift, but birds and bird-people are always somewhere in life's kaleidoscope, now dominating the pattern, now squeezed to an outer facet. But they are shining there, beckoning. Writing can be a pleasure or a chore. This piece began as a chore but somewhere along the way it underwent a sea-change. A pleasure, to reminisce? It must be later than I think.

Beth Brown

Having joined OSNZ in 1963, I cannot claim to be a very early member because my membership spans only half the Society's 50 years. My first outing, in June 1963, took me to Seagrove, Manukau Harbour, for the winter wader census, and also my first Asiatic Black-tailed Godwit, a magnificent bird in full breeding plumage. Taken firmly under H.R. McKenzie's wing, I was soon hooked on birds. I sometimes wonder how Ross put up with me — his patience was enormous. Within a month I had done a dreadful thing in getting out of the wrong side of a car (the birds' side) and compounded the crime by slamming the door. Gentle explanation cured me for life, but that particular flock of birds had gone and the whole party missed out. I learned quickly.

The thing that meant most to me in the early years was the acceptance by senior members of my need to learn and their unstinting help and guidance. There was no bar between the big guns and beginners such as me. Was the bird seen at Miranda Ponds that day a Marsh Sandpiper as suspected? 'Yes', said R.B. Sibson when I described it by telephone that evening. We have been friends ever since. What books should I get to learn about waders? 'Condon and McGill, Serventy and Whittell' said A.T. Edgar in a charming letter, and another valued friendship followed.

One soon learned, and especially on Field Study Courses. What a wonderful institution these have been, taking one from end to end of New Zealand. The field work during the day was interesting and sometimes arduous, but what bliss to sit to one side at the end of the day and hear of other times and other trips from old hands such as Sandy Edgar, Dick Sibson, Archie Blackburn, Fred Kinsky, Brian Bell, and Barrie Heather.

The first of several stays at Farewell Spit came in 1967. It was a revelation. A



Figure 5. Beth Brown, 1987.

formidable record for that time was 38 Red-necked Stints. There were 13 356 Godwits, 8920 Knots, 4 Grey-tailed Tattlers, 25 Whimbrels, a Greenshank and the almost pre-historic sight of 35 Far-eastern Curlews flying over the bleached bones of a great whale. There was also a water shortage and as Dick Sibson, my husband John, and I cleaned our teeth in a miniscule ration of water from the almost empty tank, RBS surmised that people had been doing the unthinkable by having 'secret washes in tents'.

It took me years to see a Grey Plover properly. Three times I saw only 'bits'. Came the day on another occasion at the Spit when Dick Sibson, Anton Habraken, and I rounded the end of a dune, during one of those seemingly endless walks for which the place is famous, to find riches indeed. Not one, but 4 Grey Plovers got up, flew around, called and obligingly settled nearby. We had all fallen to our knees, whether in thank-offering or to stalk, no one would admit. Tony set off ploverward through the thick mud on elbows and knees, camera upraised. Concurrently a Grey-tailed Tattler got up and circled, calling sweetly. I imitated and the bird continued to circle and call while we remained on our knees. It was one of those rare and special times one never forgets.

Other Spit memories are of the 2 'long shanks', John Kendrick and Myk Davis, tearing up and down great dunes to rugby-tackle and band Black-backed Gull chicks. John was filming the expedition and there were counts to do, but somehow it was all fitted in. Then there was another summer that turned bitterly cold. Two Wildlife Officers went off for stores from Takaka and at our request brought back heavy woollen shirts for Sandy Edgar and me. We put them on and did a celebration waltz all around the woolshed. We probably wore them to bed as well. One had one's personal sheep pen but the ground draught was fierce.

Meals on the Spit were sometimes 'different'. Goldy Hartley-Smith of Wildlife fed us a hot and peculiarly solid rice/raisin mix for very early breakfast. It took fortitude to consume but really did last us well through a long, hard day.

On the first young members' trip to the Spit, lunchtime came when we were out on the dunes. We had lime juice in a splendid brass container, cabin bread, and sardines. With no opener available, Hugh Robertson proffered his pocket knife. When asked what it had last been used for he replied that it had 'only cut up a nice little rat'. I insisted that it be well washed in a tide pool, to Hugh's wonderment, and lunch proceeded.

Thinking of the first stay at Jack Taylor's hospitable farm at Ward reminds me of Little Owls in the morning sun, drowsy afternoons with Cirl Bunting calls and, higher up, Brown Creepers and Falcons. In the night came the dramatic bursting of Sylvia Reed's hot water bottle. 'Funny', said Sylvia. 'It's only two years since I picked it up on a West Coast beach patrol'.

On Little Barrier Island I was ecstatic to find Kakapo 'chew' and a distinctive dropping on the Thumb Track. Hearing and tape-recording a pair of Kokako with their 2 young on the same track, but high up, was especially good. This would have gladdened the heart of Ross McKenzie, who had advocated the transfer of the species to the island but sadly did not live to see it happen.

A tropical cyclone hit the island early in the 1980s. Much damage occurred, particularly in the low kanuka forest. It was odd to see branches of pohutukawa blowing past the bunkhouse horizontally. The swallows left the uneasy perching place provided by the ranger's clothesline and clung desperately to the grass below. The dinghy upended on the boulders had to be rescued with ropes in case it became airborne — tricky work in the conditions. We also had the unusual experience of eating heart of nikau palm. One had fallen and Geoff Moon, having disappeared with the chainsaw, returned with a great chunk of the clear, sweet, nutty flesh — a delicious treat.

Cuvier Island, once safely reached, was usually pure delight, but after a rough wet crossing and a particularly trying landing one day, I found more was in store. I ascended the uncomfortably steep lower farmland in rain, pack well laden on back, and when almost to the fence dividing farm from regenerating forest, met a bull standing uphill from me and squarely in the track with his ladies behind him. He did not look pleased and so I warily side-tracked, climbed the fence, and bush-bashed back to the track.

One day Ross McKenzie and I had been at Kairito in the Firth of Thames and, returning through a narrow paddock, met 5 restive bulls. I did not feel brave and we were moving at Ross's pace — he had an artificial leg and walked with the aid of 2 sticks. As we kept going, 1 bull pawed and snorted as we came near. Ross remarked that he did not like the look of it and, when close, bent, picked up a good-sized clod and flung it at the bull. This distraction worked, the bulls moved over and we gained the far fence thankfully. I have avoided bulls ever since.

We made 4 birding trips to Fiji, the first an official OSNZ one, with about 40 people. Our group of 12 or 13 was led by Dick Sibson. We camped in the Nausori Highlands, Kadavu Island, and lovely mountainous Taveuni. The yodelling Giant Honeyeater disturbed our dreams, but was most people's favourite for sheer volume of sound as well as its large size. The shimmering Silktail was a never-to-be-forgotten experience. I was drowned in the sounds and spent much time tape-recording. Here the Fiji Warbler was most responsive as I could not see it at all until I played its call. Our camps were tremendous fun always. We invented a special dish called Bulimacau Sweet Pea. Bulimacau is, of course, corned beef, and the tins had a label with a beast wearing a hibiscus behind its ear. In the Highlands dwelt the cleanest mongoose in all Fiji. He had to be; he ate most of our bar of soap.

Possibly the most beautiful places we camped in were on Vanua Levu, during the later visits. One was Kubulau, which proved to be everyone's ideal of the perfect palm-fringed shore. Inland and up a river was another grand site where the larder for things needing to be kept cool was in the stream between massive, buttressed roots of tall trees. A little flood one night re-arranged this and next day found us picking up precious supplies well downstream.

Sailing out of Suva into the dawn of a calm day by large catamaran was magnificent, as were the prospects of new people, places, and birds. Looking back over the packed years is equally fascinating and enjoyable, for memory evens out the difficulties, leaving mainly the good and, inevitably, the funny, etched clearly on the mind.

P. C. Bull

My introduction, early in 1940, to the then forming New Zealand Ornithological Society came about through brief prior acquaintance with Charles Fleming and Dr R.A. Falla (in later years respectively Sir Charles and Sir Robert) who, together with Professor Marples, Dr Oliver, and Messrs Stead and Stidolph, were prime movers in the formation of the Society. For me, a life-long, though somewhat disorganised, interest in birds suddenly became purposeful and exciting. What had been a somewhat lonely hobby for a farmer's son quickly became anything but lonely. I was invited on field trips, introduced to new study techniques such as banding, helped in identifying species I did not know, pressed to join in co-operative studies, and generally made to feel that my observations, modest though they were, could be combined with those of other people to form something that was much more valuable than any of its parts; in later years the Society's *Atlas of Bird Distribution* was to be a good example of this.

That year, 1940, I was introduced by Charles Fleming, then living in Auckland, to the art of trapping and banding Silvereyes, a practice started a year or so earlier by Professor Marples in Dunedin. We had no central banding office in those days and people had to make their own bands and keep in contact with one another as best they could. I used bands of the Fleming model, which consisted of light metal strips cut from the containers in which photographic films used to come. Numbers were either scratched on the strips or pricked on with the point of drawing compasses, and the strip was then bent with pliers into an open circle. Coloured celluloid bands, designed for cage birds, were occasionally available from pet shops so that colour combinations could be used to identify individual birds without recapture. The first coloured bands used by Charles Fleming were cut from coloured celluloid toys. Later, at Campbell Island, Jack Sorensen cut up aluminium pots to make bands for albatrosses. It was not until 1950 that John Cunningham, on behalf of the Society, put banding on a properly organised basis with a central register of banding, official stationery to record banding and recoveries, and serially numbered bands in several sizes with a Dominion Museum return address.

Beach patrolling was another activity on which I was soon hooked. Again it was Charles Fleming who introduced me to the sport. He needed a frequent supply of fresh prions for the MSc thesis on which he was then working, and this led to monthly trips up Muriwai Beach by car. Live birds (mainly terns and waders) were counted and dead ones (mainly petrels) gathered up and brought home to be measured or made into skins; most of the counts and finds were recorded in the Society's early reports. It still amazes me how the Fleming car survived those trips over patches of treacherously soft sand in the days before 4-wheel-drive vehicles. Only once did we come near to disaster. We (Charles, Dick Sibson, myself, and Peg Chambers, later to be Lady Fleming) had stopped far up the beach for lunch, which we ate in the car because of a heavy shower of rain. When it was time to go, the car wouldn't! A panicky inspection showed all 4 wheels sunk to their hubs and the heavy car resting on its running boards. With an incoming tide, we would have lost the car if it hadn't been for an abundance of stranded timbers that served both as spades and a firm track to safer ground. We later learnt that these timbers were probably from the New Zealand ship *Turakina*, which had been sunk in the Tasman by the German raider *Orion* a few weeks before (August 1940). I have another less stressful recollection of car trouble at Muriwai in post-war times. Several smart-looking cars were bogged in soft sand near the exit from the beach. Then, down the beach came 1-legged World War I veteran Ross McKenzie in his faithful but elderly Chev, well known to ornithologists of the time. With a brave turn of speed, adjusted by hand throttle, he passed all the bogged cars and reached firm ground amid the cheers of ornithologists and looks of disbelief from other car owners.

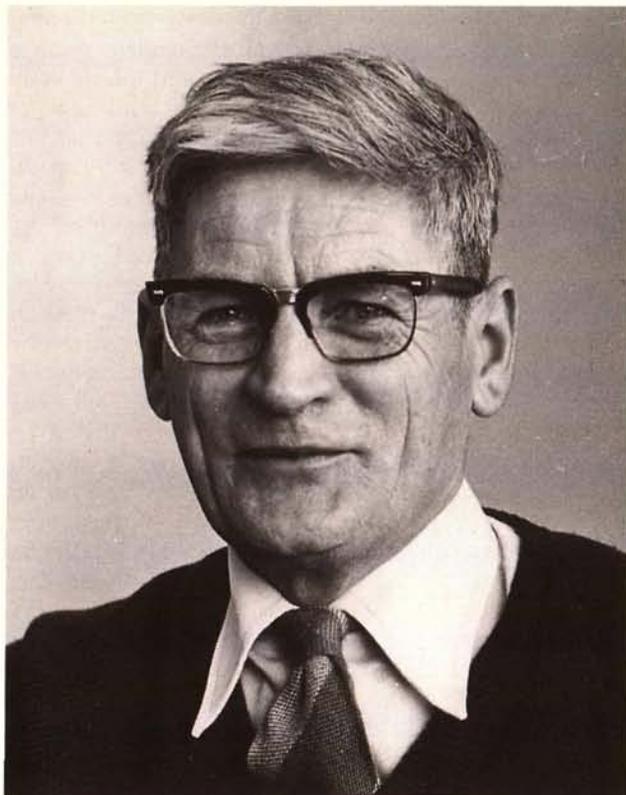


Figure 6. Peter Bull, ca. 1980.

For me, 1940 ended on a high note. I was invited to accompany Graham Turbott and Majors R.A. Wilson and G.A. Buddle on a camping trip to Aorangi, the southern island of the Poor Knights. (See *Emu* 41:56-68). This not only was my first visit to a petrel island (an unforgettable experience) but it also allowed me to enjoy the company and ornithological wisdom of the Auckland Museum ornithologist and 2 of the Society's unforgettable senior characters — the 2 majors. Wilson had accompanied Edgar Stead on many of his island trips and, apart from playing Dr Watson to Mr Holmes, seems to have assumed the office of camp commandant. He soon made it clear that camp commandant was to be his function on Aorangi. He insisted on loading an old kitchen table aboard the launch (described by Buddle as a 'narrow gutted little beast'), which duly transported us safely from Tutukaka to Aorangi, its uncomfortable rolling motion made worse by the table. Ashore, Wilson took charge in true army style — no gaping at new birds till the tents were up, latrines dug, and supplies of drinking water secured; no wandering around in the morning till breakfast was prepared and eaten, dishes washed, and supplies of fresh water replenished. Apart from his super-efficiency around camp, he was an active and pleasant companion in the field, a great taker of notes, and had an endless stream of stories from past island trips with Stead. He could also be very generous as I was to discover some years later when he sent me, out of the blue, the 2 volumes of Murphy's *Oceanic Birds of South America* inscribed 'in memory of our island trips'. Buddle, a survivor of Gallipoli but badly gassed in France, was quieter but no less of a character. Cheerful and determined but patient in pursuit of good bird photographs, his only concession to ill health was a single pre-dinner nip from his 'little bottle of sin' (whisky). This trip provided my first realisation, later to be amply confirmed, that the many ornithological benefits of belonging to OSNZ are at least equalled by the spiritual inspiration to be gained from some of its great personalities, and by the friendships the Society seems to engender. So much for 1940.

I spent the next 4¹/₂ years with the Royal New Zealand Navy where, despite some problems, bird-watching was still possible; indeed it prevented seemingly endless periods on watch at sea becoming too boring. Once again OSNZ members, and particularly R.A. Falla, were more than helpful with suggestions of what to look for and how to identify, and with invitations to home hospitality and bird trips (petrol permitting) whenever I had leave ashore. One attempt to repay some of this hospitality came unstuck. Dr Falla, then Director of Canterbury Museum and about to leave for a stint of coast watching at the Auckland Islands, had a live Nelly on his hands and I, then a junior officer on a minesweeper based in Lyttelton, offered to take the bird on board and release it when we were at sea next day. I had reckoned without the Captain, an ex-trawler-skipper, wise in the ways of the sea and aware of the ill fortune to be expected from having an albatross-like bird as a passenger (shades of the Ancient Mariner). No way was I to be allowed to have that bird on board, not even to the harbour entrance. Fortunately, Dr Falla, himself an experienced man of the sea, was very understanding and the Nelly was later released from a local beach.

Through OSNZ I had heard about and joined RAOU, whose members I was to discover were equally friendly and helpful. At one stage I found myself in Sydney on an extended period of sick leave. Here Dom Serventy and Keith Hindwood took me under their wings and, despite their busy and war-restricted lives, made sure I saw the local birds and enjoyed the hospitality of their homes. There was an interesting sequel to my last day's birding with Keith Hindwood. Later that night, when I had left for Melbourne, Keith had a visit from the police who were investigating a report that a sailor had been seen to change out of uniform into civilian clothes and, with binoculars and camera, to disappear with another man into a swamp behind the airport. Fortunately, Keith was a well-known citizen who had little difficulty in convincing the police that camera-equipped ornithologists, as well as spies, were prone to frequent swamps. In Victoria, where I spent several months at Flinders Naval Depot, the ornithologists were equally friendly and hospitable. I remember, particularly, Charles Bryant, Roy Wheeler, and Jack Jones, but there were others, and together they made sure that I never had a spare day's leave without an offer of a bird trip or a meal. Such was, and I believe still is, the fraternity of bird-watchers, whether OSNZ or RAOU.

David Crockett

In the mid-40s the Canterbury Museum, where Dr Falla was Director, was a mecca for ornithologists. On a visit to the museum to see Dr Falla you could guarantee to find a local ornithologist or an overseas visitor. While enjoying a talk and a cup of tea, you would learn of the important events current in the world of birds. I can remember meeting such ornithologists as Edgar Stead and his friend Jim Shand, Guthrie-Smith, and Robert Cushman Murphy from the United States. Although OSNZ had no regular meetings or field trips, individual members visited key areas and communicated their observations through *New Zealand Bird Notes*.

Groups of ornithologists joined in the meetings and trips organised by the Canterbury branch of the Royal Forest and Bird Protection Society run by Lance McCaskill. Lance instigated one of OSNZ's earliest surveys, the distribution of the White-backed Magpie. Regular monthly trips to all corners of Canterbury and the West Coast organised by the field club section of the Canterbury branch of the Royal Society were used by OSNZ members to visit traditional and historic areas of ornithological importance. Monthly evening meetings of both the Field Club and Forest and Bird had many speakers of ornithological interest, especially relating to the Subantarctic and Antarctic.

After a bird project undertaken in Standard Two at Linwood North School, I formed a bird club. We met after school in the packing shed of a local market gardener and horticulturalist. After Dr Falla talked to the group at a meeting arranged by my teacher, Sydney Day, we were soon taken under his wing and encouraged with Saturday morning meetings at the Canterbury Museum and with visits to the Botanical Gardens. I like to believe this was his way of creating a junior membership for the Ornithological Society. Dr Falla gave me the address of the Secretary and I joined OSNZ in 1950.

Before leaving to take up his position as Director of the Dominion (now National) Museum, Dr Falla introduced me to beach patrolling, an interest I have maintained to the present day.

Two ornithological events I vividly remember from this time. One was the rediscovery of the Takahe, the great interest this generated, and the naming of the Society's journal *Notornis* to mark the event. The other event was the excavation of the Pyramid Valley moa swamp. My taking part in this activity introduced me to a new dimension of ornithology — the subfossil avifauna of New Zealand. Roger Duff, Ron Scarlett, and Jim Eyles shared their knowledge and enthusiasm with the younger members.

In 1950 the books available to the ornithologist were limited to Perrine Moncrieff's *New Zealand Birds and How to Identify Them*, W.R.B. Oliver's *New Zealand Birds*, W.B. Alexander's *Birds of the Ocean*, and the Forest and Bird publications *Forest Inhabiting Birds* and *Birds of the Sea and Shore*. The appearance of the *Checklist of New Zealand Birds* under the convenership of Charles Fleming in June 1953, and the second edition of Oliver's book (1955), enriched the literature to a growing band of ornithologists.

I experienced my first AGM in 1951, when ornithologists from throughout the country converged on Christchurch. Sibson, McKenzie, Davenport and other eminent ornithologists with their interest and enthusiasm continued to nurture the development of young members like me. During this time I can remember a co-ordinated count of birds on the Heathcote-Avon, Waimakariri, and Ashley estuaries. This was an early attempt at a local census, now a regular feature with our national wader counts.

During the early 50s the Nest Record and Beach Patrol Schemes were developing and I began taking part with great interest. At that time bird-banding, pioneered in New Zealand by Lance Richdale (albatrosses and penguins) and Charles Fleming (waxeyes), was organised by OSNZ. In Canterbury, Wally Clark and Elliot Dawson were banding White-

fronted Terns, and Ken Rowe of Rangiora was banding a range of species inhabiting the braided rivers.

The ocean beach between the Waimakariri River and New Brighton Spit always held a fascination for me, and was accessible by bicycle. Regular patrols produced a wide range of seabirds and their corpses provided many skeletons for the museum bone collection.

Lake Ellesmere, with its vast expanse of shoreline and varied habitat, had produced many new records of migrant waders for New Zealand during Stead's visits and became a challenge to ornithologists. Without the tidal influences, flocks of waders were hard to locate, the direction of the wind being more important than tides. First Canterbury sightings of new immigrant species, like the White-faced Heron, Spur-winged Plover and Welcome Swallow were recorded in this area — Australian species moving in to fill the ecological vacuum caused by the great changes related to pastoral development.

As I built up my collection of seabird skeletons, especially petrels, from regular patrols, Ron Scarlett guided me to identify a large collection of petrel bones from the middens and sandblows in the Chathams. In 1952 Charles Fleming introduced me to the story of the enigmatic Taiko as a possible explanation for a large number of bones of a petrel not matching a known species. This began a lifetime interest, which culminated in the rediscovery of the Taiko (*Pterodroma magentae*) on 1 January 1978.

A mystery of that time was the location of the breeding grounds of Hutton's Shearwater, the corpses of which were turning up regularly on Canterbury beaches. I visited Motunau Island in 1952, thinking it a possible breeding area, but without success. Brian Bell was searching the islands in the Marlborough Sounds at the same time. The mystery was solved in 1965 when Geoff Harrow found Hutton's Shearwaters breeding high in the Kaikouras.

During my long-term membership of the OSNZ, I have met a host of interesting ornithologists and have travelled widely to follow up my interest in birds. As a Nest Record Convener, RR and Vice-President it has been a privilege to serve the Society. My taking part in the OSNZ's 25th anniversary expedition to the Kermadecs remains a highlight of my ornithological experiences.

J.M. Cunningham

It is an honour to be associated in this publication with the illustrious company of such of my friends as Bull, Gurr, Marples, Sibson and Turbott. So many of my other ornithological contemporaries have passed away, but I treasure memories of field outings and correspondence with Stidolph, Falla, Fleming, McKenzie, Richdale, Buddle, Wodzicki, Sorensen, Oliver, Wilkinson, Stead and others. All these have influenced me and played a part in the success of the OSNZ. I am sure, however, that the 'younger generation' now taking part in the Society's affairs will uphold and advance the standards and, may I say after 50 years, the traditions of the Society.

My interest in ornithology has been inextricably mixed with the OSNZ. I knew nothing of birds when young, but enjoyed watching the antics of a tame magpie in Christchurch. It used to go to sleep while sunning itself on my shoulder. It was fed with diced meat and was so jealous that it would not allow any other bird near its saucer. I clearly remember it attacking a bird that had the audacity to attempt to purloin a piece of meat. With one jab it pecked a hole in the bird's skull: I was told later it was a Starling.

My real interest, however, started in November 1937 when I idly remarked about a bird I had seen on the lawn in Masterton. My father promptly gave me a copy of Moncrieff's book *New Zealand Birds*. I identified the bird as a Whitehead and this dramatic news reached Stidolph, who came post-haste to check such a remarkable fact. Whether it is a tribute to the value of the book or my dubious powers of observation I leave readers to decide. The bird was a Hedge Sparrow! Suffice to say that I favourably reviewed a subsequent edition of Moncrieff, which was an inspiration to many young ornithologists.

Stidolph taught me most of what I know about bird-watching. We enjoyed many expeditions and holidays together, and I regret that when the OSNZ was formed in mid-1940 I did not then see any reason to join. Not long after, however, I did and began noting the birds seen and heard in my garden (see OSNZ Bulletin III, 1941, (p. 6, reprint p. 79) and Cunningham 1943). This daily recording I continued in Masterton for 18 years and then in Day's Bay, Wellington, for 12 years. I regard this as the most valuable



Figure 7. John Cunningham, 1985.

ornithological study I made. A preliminary paper on the Grey Warbler and Song Thrush was read to the XIth Ornithological Congress in Switzerland in June 1954 (Cunningham 1955). After a year or two I had to choose between buying a book about native plants and Oliver's *New Zealand Birds*. I am glad I chose the latter for, together with Moncrieff, it was the foundation of a valuable and varied library.

Next, some memories of individual members. Wodzicki said to me that the first requirement of an ornithologist in New Zealand was to be able to distinguish readily a Pipit from a Skylark and a Black-billed from a Red-billed Gull, both juvenile and adult. It was he also who said to me soon after his arrival from Poland, 'I intend to make my mark on New Zealand ornithology.' At an ornithological lunch in Wellington, the waitress, confused as to who had ordered what sweets, turned to the rather swarthy Wodzicki and said, as the rest of us exploded into laughter, 'Oh, you're the chocolate delight.'

After the AGM of 1953 one of the field trips was to Onoke Spit in Palliser Bay. I organised transport and asked Lady Gunson to return to Wellington in Oliver's car. I was completely nonplussed when she protested 'but he smells so much'. I hadn't until then realised he had dug several teeth out of the decaying carcass of a sperm whale with his bare hands! At the time of a wreck of seabirds including dozens of mollymawks on Onoke Spit in February 1947 I rang him — he was still Director of the Dominion Museum — and asked if he would make a radio and newspaper request for the public to search beaches for additional specimens, which he did. I also published the facts in the *Free Lance*, which the editor headed 'Petrel Patrols'. It was this that led me to name the scheme which became the Society's Beach Patrol Scheme. I drafted the beach patrol and specimen record cards and took them to Wellington for Falla's comments. He was enthusiastic and made no alterations. The scheme was submitted to the Committee on 1 August 1951 and adopted immediately. R.K. Dell was the first Organiser and B.W. Boeson catalogued the cards. Most patrols were made during the period 1951–54, then the scheme lapsed. After discussion at the AGM in 1958 it was revived with Bull as Organiser. Since his first definitive report (Bull & Boeson 1961b) reports have appeared regularly as the scheme has flourished.

In Masterton I found a Starling roost of about 80 000 birds and asked Marples' advice. In return he sent me several reprints of published articles by H.G. Alexander and others, demonstrating his encouragement of budding ornithologists. Stidolph was a competent editor of a semi-scientific but 'popular' journal with years of experience as a journalist. Originally, on 25 May 1946, he and Marples were appointed joint editors of *N.Z. Bird Notes* (at the same time as I was elected Secretary-Treasurer of the Society). He took this as lack of confidence in his ability and refused, but fortunately changed his mind when appointed sole Editor a few weeks later. I well remember when his first issue [2(1)] was to go to press the following day and he found that contributions were 2 pages short. Could I help? Yes, and by midnight I had written 2 articles to fill the 2 pages. With every issue he edited he asked me as Treasurer if the finances could afford so many pages and photographs. We jointly prepared every copy for posting, at first by rolling it because the Society could not afford envelopes (which, however, we used from January 1947 at the cost of 35 shillings).

Once I wrote to Sorensen to tell him his subscription was long overdue. When paying he replied that he thought that members serving their country should be allowed extended time to pay. At that time, such was wartime security, I had no idea he had been on the 'Cape Expedition' — coast watching on the Auckland and Campbell Islands — and out of reach of mail for many months. About the same time, knowing that Falla was to go to 'an island' during the war I was curious to know where it was. All he would divulge was that it was indeed inhabited, leading me to believe it was a tropical Pacific paradise. These members and Fleming made the most of their enforced stay on these Subantarctic islands and Sorensen ringed many seabirds in that time. He generously provided the Society with his records, which were meticulously accurate and legible.

The name of the Society's journal *Notornis* was suggested by Fleming. There had been informal discussion over cover design and name for some time. When the Society could

afford it, the first cover, very conservative, appeared in October 1947. Later Stidolph wanted to use a picture of a native Pigeon as a typical colourful New Zealand bird. I prevailed on him to use a Takahe instead and photographed the cover of his copy of the second edition of *Buller's Birds* for this purpose. It was used from July 1949 to April 1952, after which a scraper-board drawing by C.F. Tunnicliffe appeared and is still in use. In payment Tunnicliffe was recorded as a fully paid life member. In the meantime various suggestions were made for a change of title from *New Zealand Bird Notes*, which had been used from January 1946 (following *N.Z. Bird Notes* which commenced in January 1943 after the 2 annual reports and 3 bulletins). One suggestion by Gurr was 'Kakapo', a distinctive New Zealand bird. However at the Committee meeting of 13 May 1949 Fleming, out of the blue, nominated *Notornis* and this received immediate acclamation. It was accepted with enthusiasm by the AGM next year, though not unanimously, voting 22-6 with the Hon. Librarian begging it not be called 'The Notornis'. This of course was at the time of public excitement over rediscovery the previous November of the Takahe or *Notornis*.

Countless members will remember with affection that indomitable Ross McKenzie who did so much to kindle enthusiasm in the Society. After a field trip to Kapiti, on landing from a small boat he fell, and his artificial leg (result of 1914-18 war injuries) doubled back at an alarming angle. A spectator, thinking his leg was broken, offered help, but none other than a private room in which to re-adjust the leg was necessary. The spectator was so impressed, saying that any society that could attract such stalwart people as McKenzie deserved to be supported. Result: 1 new member! (Much the same happened when I was getting legal help to incorporate the Society: the lawyer would not accept a fee but paid to join!)

The Society's Ringing (now Banding) Scheme has flourished since its inception in 1950. A history of ringing in New Zealand up to then was published in the *Emu* (50:189) and the first annual summary was in *Notornis* (4:40). The value of ringing in migration studies was soon proved when 2 Gannets ringed at Kidnappers were recovered off Australia. Sorensen's ringing records were provided to the Society. How he made his rings I do not know, but Richdale obtained his aluminium from old saucepans donated to the War Effort! Fleming described to me how he made his trap to catch Silvereyes, saying no doubt I could improve on it. I replied, rather unkindly, that I could, but his paper (Fleming 1943) remains a classic. Stidolph and I used to catch and ring hundreds of Silvereyes. He used a simple wire cage with a stick holding it up. Every time enough birds (usually a dozen) were at the bait he pulled a string to drop the cage over the birds. Sugar was rationed during the war, but I was able to get a special permit to buy some water-damaged sugar to make sweetened water to use as bait — and also a petrol ration to travel while studying Silvereye migration in the South Island!

In the early years, Committee business was by correspondence and meetings were rare — usually at the time of the AGM. To meet the constitution, meetings often had to be held during field outings. Some unlikely places that I can remember were at Lake Pounui in southern Wairarapa (25 May 1947), Kaihua Motor Camp (26 May 1951), and Victoria Square in Christchurch (17 May 1952).

The Society has always rightly been conservative in granting Honorary Life Membership. However, a popular decision was to elect Dr Robert Cushman Murphy on 28 May 1948 in recognition of the stimulus he had given to New Zealand ornithology during his recent visit to the country. The Snares Islands Expedition 1947 (Fleming 1948) was organised by Falla primarily because of Murphy's visit. In that year I attended a public lecture at the Dominion Museum at which Murphy said he had come to New Zealand to meet Falla 'the only man in the world who knows more about seabirds than I do'. He thought he saw a Blue-wattled Crow — impossible — in a bush reserve and asked how far it was from Elwyn Welch's home. 'About two miles as the crow flies' brought much laughter. (It was Welch of course who had the first Takahe chicks in captivity. Welch was used to hatching eggs under clucky bantams and in one case by hatching a pheasant egg against his skin while he was in hospital. He carried pheasant eggs for a day

while on a tractor to see if the vibrations would prevent their hatching. They did not and so he felt confident to recommend Takahe eggs be flown from Fiordland to his home and the clucky bantams he had waiting).

Probably all readers can recall coincidences they have experienced. When in London in 1954 I was watching New Zealand Paradise Ducks in Regents Park when a bystander said he knew of an ornithologist who had gone to New Zealand a few years before and was working at a place in the North Island with a difficult-to-pronounce Maori name but beginning with a 'W'. He was certainly amazed when I said 'I presume you are talking about John King.' King was working at Waingawa near Masterton and I arranged for him to be the first to handle the Nest Record Scheme, which commenced in October 1950.

I think the first Society field trip was after the 1947 AGM. These have now become regular events, as with local members' meetings which Regional Representatives (then known as Regional Organisers) have organised, in many cases monthly. Probably the first was in Masterton on 12 August 1950 when Stidolph and I held a meeting for members and the public, at which Falla spoke. Similar public meetings were continued for some years.

Membership of the OSNZ has provided me with many happy occasions and friendships with a large number of ornithologists and their families here and overseas.

Lou Gurr

As a boy I lived near a small remnant of native bush on the southern outskirts of Dunedin, and this was where I spent most of my waking hours when not at school. Nature study as taught in the schools at that time was negligible and few books on New Zealand nature were available to me. Any information on birds or other animals was gleaned from the nature pages of the *Boy's Own Paper*. This, of course, was often inappropriate for it pertained to the northern hemisphere.

My interest in birds was kindled first-hand via direct observation, and yes, by finding nests and collecting eggs. I also caught and kept cage birds and bred Goldfinches and Canaries. This was the norm for boys with any interest in natural history in the 1920s and 30s. To collect birds' eggs one had to know about nesting habits, and to trap birds, know their daily distribution and behaviour. This was the foundation for my life-long involvement with ornithology, especially bird behaviour.

Perhaps the dearth of ornithological information available in my youth, in contrast to what is available today, made me appreciate and pursue it, when it did become available. This started when I went, in 1939, to Otago University as Laboratory Assistant for Professor Marples in the Department of Zoology, with time off to do 2 subjects per year towards a BSc.

The excitement of discovering the extent of the animal kingdom, far from dimming my interest in birds only heightened it, especially as I learnt more about their life and diversity. This was paradise indeed for me. It came as a surprise that so much still awaited to be discovered about even the commonest of birds in New Zealand. The advent of the OSNZ and the ferment of interest thus generated gave impetus to go out and fill the gaps. The Society persuaded New Zealanders that the amateur can make significant contributions to the science of ornithology, especially if individual discoveries are collated and recorded. The feeling of breaking new ground and of making worthwhile contributions to knowledge was the pervading spirit of the early days of the Society and remains my strongest impression of ornithology in the 1940s.

Working with Professor Marples, the Secretary-Treasurer, meant that I was party to discussions about the aims, objects and progress of the Society. Although details are now hazy, the feeling of being part of an active group of ornithologists is still fresh in my mind. I heard about the doings of other groups, especially those at Auckland, Christchurch, and Masterton, and how they were developing their own character, as we were in Dunedin. I saw the production of the first 'Classified Summarised Notes'. These were assembled by cutting the appropriate sections from the members' reports and assembling them in boot boxes (one per species) — a simple but effective procedure with an economy of effort. Typing the assembled data was a herculean task for the Secretary-Treasurer, especially when he typed it all with one finger on a very small portable typewriter balanced on his knees.

L.E. Richdale was beginning his monumental work on the Royal Albatross and Yellow-eyed Penguin at this time, and his occasional lectures to the Royal Society, together with superb black and white photographs of the birds, were an inspiration to us. His only lecture to the class of senior zoology students, however, was not so memorable. It consisted of a long discourse on the virtues of used envelopes, cut open so that the exposed, unused surface could be used for record storage. The important account of the unusual behaviour of an unfaithful male penguin was only briefly mentioned in the last 10 minutes of the lecture. A curious mixture for students, of pragmatic and titillating information, but it did little to further the cause of ornithology with us.

Although the zoology and botany students at Otago University numbered only about 20 in the early 1940s, we founded the Otago University Biological Society with Professor

Marples as Patron and myself as its first President. Its first co-operative field project was naturally an ornithological one — mapping the Starling roosts in the vicinity of Dunedin. Our group had an alarming experience on the roof of the Otago Museum as it swayed about in an earthquake as we were observing the roosting Starlings at tree-top level. I shall never forget the startled sparrow that shot out of the guttering beneath my feet and the whole flock of Starlings flying up as 1 bird from the roost when the earthquake started.

The Dunedin Naturalists' Field Club, a long-established and active group, enthusiastically took up the recording and study of the birds of the district. Mrs I. Tily was particularly active. She joined in the White-eye trapping and ringing programme. She also contributed extensive records of her own observations, and collated those of the DNFC. These related societies were a valuable catchment for the burgeoning OSNZ. They served to unite the local members.

The co-operative projects on the other hand gave coherence to the Society at the national level. The White-eye investigation, especially the banding aspect, was possibly the most successful of the projects for dedicated, serious members in the Society's formative years. The classified notes provided the means by which all members could contribute to the sum of knowledge of birds. Continuing as it has done for the whole life of the Society I consider that it has proved its single most significant co-operative undertaking.

As little as 13 years after the formation of the Society, W. R. B. Oliver, in the second edition of *New Zealand Birds* had this to say: 'The journal of the Ornithological Society of New Zealand, *Notornis*, has been an invaluable source of information on distribution within New Zealand and for records and additions to the avifauna.' The impact of this information greatly enhanced the 'live bird' content of his book and illustrates the cumulative effectiveness of sustained small observations.

At the personal level, my first faltering steps started in 1939, with a study of a nesting Blackbird. I was lucky enough to choose a very tame bird and I was able to push her off the nest each day at 10.00 a.m., take her eggs into the laboratory, weigh them, and return them to the nest, all within 10 minutes. I subsequently learned that about 10.00 a.m. was the usual time when she naturally left the nest and that she was normally off the nest for about 10 minutes. Thus the disturbance I caused was minimal and so she did not desert the nest. A happy discovery! When the chicks hatched I treated them likewise and mapped the pterylae and recorded the rate of feather growth.

The results of this study were written up and submitted for publication in the first annual report, where it is noted that 'A study of nesting blackbirds has been submitted by Mr R. (*sic*) Gurr, Dunedin, but owing to the present difficulty of reproducing his graphs and sketches its publication has been held over.' Such prompt writing up and submission of a study deserved a better fate than that! It did, however, 'hook me' on Blackbirds.

With daily personal contact with Professor Marples and his philosophy of observing and noting birds that one lived with, along with books like James Fisher's *Birds as Animals*, Nicholson's *How Birds Live*, and James Fisher's *Watching Birds* — a Pelican Book that became my bible — I started to study Blackbirds seriously. Central to this was the 'affair' I had with the territory owner of our backyard. He had just acquired his territory, for he was a first-winter male when I caught him, banded him, and painted the top of his head white for easy identification. This started a love-hate relationship between us that lasted for the whole 5 years of his life. There was no facet of his life that I did not pry into. He was part of my family and I of his. I even intruded into the nest of his mate, using a device made from a fruit can, fencing wire, and other odds and ends. With the sensor of this apparatus in the nest outside my bedroom window and the recorder at my bedside, I could see and automatically record the incubation pattern of his mate. It recorded every move the sitting bird made. It was so sensitive that it could detect and record even the breathing pattern of the sitting bird when it went to sleep and settled more heavily on the eggs. Not quite silicon chip technology, but remarkably efficient!

This behavioural study of the Blackbird was the basis of my thesis for MSc submitted in 1945. Incredible as it may seem today, the submission of a zoological thesis with no



Figure 8. Lou Gurr, 1977.

anatomical or histological content was, in those days, a foolhardy venture. It was the first zoological thesis with a major behavioural content to be submitted at the University. It came off, however.

The 'do-it-yourself' and 'make-do' of the wartime 1940s largely shaped the pattern of ornithology of the day. The quite extensive Banding Scheme that arose out of the White-eye investigation resulted in several thousand birds of a number of species being banded under the direction of Professor Marples. He made the bands out of scraps of old aluminium pots and photographic film containers and numbered them all by hand. The amount of precious aluminium so used could only have affected the war effort a trifle, but it did advance the cause of ornithology and the morale of early OSNZ members. It certainly had a profound effect on my professional career because, when on leave from military service in Blenheim, I was taken to a mixed Red-billed Gull and White-fronted Tern colony on the Boulder Bank at Nelson. Having some Otago University rings with me, I ringed 33 gulls and some terns. This started a life-time study of the gulls at Nelson, leading to Oxford University and work with Niko Tinbergen, to Newfoundland, Canada, the United States, continental Europe, South Africa, and Australia.

In 1948, the rediscovery of the Takahe sparked a great burst of concern with our vanishing species. This not only awakened the public to the plight of these endangered species, but also set in train the employment of ornithologists to study and manage them. Applied ornithology was launched. The Society, after much deliberation, all by correspondence (some of these pedantic and slightly pompous letters I still have and smile about when I read them again), settled for *Notornis* as the name for our journal. I was disappointed that my preference for 'Kakapo', a much more strikingly unusual bird than the *Notornis*, was not chosen. The recent discovery of the Takahe with the publicity that it generated undoubtedly influenced the choice. However, I did win assent to the commissioning of a better representation of *Notornis* to adorn the cover of the journal from vol. 5 onwards.

These impressions and memories I count it a privilege to relate for they remind me of the debt I owe to the Society for the contribution it has made to my understanding of the birds around me, and the many lasting friendships formed with its members. I salute the memory of those passerines in the small remnant of bush in Dunedin who suffered the loss of their first clutches of eggs to that marauding young boy. You awakened a sense of wonderment that has never dimmed.

I pay tribute now to the Blackbirds I have known in England and Europe; you have lightened my tread and nourished my soul when far from home. To the Blackbirds in my own backyard, you continue to comfort my old age as I sit in my chair with my evening drink and watch you through the french window of my lounge. You battle for your territory, court and mate, and forage for food for yourselves and your offspring. In the garden when I am near enough to you I hear your sad soliloquy at the end of the breeding season as you enter the autumnal silence. In March, I also savour your musing subsong as you practise and rehearse the full song of the coming season. In mid-July, as regularly as clockwork, you give your first faltering bursts of mellow full song and remind me that my wife's birthday is imminent. Then I give thanks to the wisdom and foresight of those early settlers who imported and acclimatised such supreme songsters. You adorn our countryside.

Especially, I pay tribute to the gulls. You have tolerated, albeit cantankerously, my intrusion into your colonies for thousands of hours, as I have peered into your most intimate activities. I have trapped you, measured and photographed you. Hundreds of you still bear the bands I have put on you at the beginning of your life. Salutations and apologies. Our harbours and coastlines would be empty without your bustling, screaming flocks. I bless you each time I see your graceful white forms as you wheel in a clear blue sky and I hear your plaintive cry.

Barrie Heather

For me, the 1940s were R.B. Sibson and the King's College Bird Club. I recall no sense of OSNZ being a new or burgeoning force. In the sheltered environment of boarding school, OSNZ and birdwatching were facts of life — accepted and acceptable. Sib was a popular master, and the weekly lunch-hour meetings of the Bird Club were always well attended. In my 5 years (1944–48) I must have absorbed a great deal while Sib's spontaneous dissertations ranged over all bird groups, many parts of the world, all parts of New Zealand, and many personalities of local, international, and historical ornithology, and into literature and the classics. He always seemed to be up to the minute with what people were doing and seeing all over New Zealand, and the keenest of us hung on every word.

In everything, the feeling was that bird study was fun — hard work, but always enthralling and often exciting — and that it encouraged a great spirit of camaraderie among those who did it.

But the meetings were only a minor benefit of being in the Bird Club. Above all, you



Figure 9. Barrie Heather with Buller's Shearwater, Poor Knights Islands, summer 1955-56. Photo: O. Petersen, Auck. Mus. collection.

went out and *did* things — a strong attraction to boarders who were otherwise severely restricted in when they could leave the college grounds. Within range of borrowed bicycles were choice parts of the Manukau Harbour, especially the Puhinui wader roost and the causeway to Puketutu Island. We lacked optical aids, but so what? We could get away from school at weekends and spend hours sludging through the mud to be among waders, experiencing the thrill of massed godwits and oystercatchers and hoping for some incredible rarity. I recall my first such outing and seeing my first Wrybills, my favourite wader ever since. I recall cycling alone to Self's Pool, a swamp-filled volcanic crater, and finding my first nests of Bittern and Pukeko. I recall also Sib shouting at a roosting godwit flock his version of a Whimbrel call, as we schoolboys smirked knowingly at one another in the background (but several years later, to my chagrin, I heard this Sibsonian call from a passing flock of godwits and so saw my first Whimbrel solo!).

On his weekend trips to Muriwai, Pakiri, Karaka, and the Firth of Thames, Sib always took a full car. We were no doubt useful as well as keen — racing up Muriwai Beach, competing to find the 'best' wrecked seabirds, or acting as shepherds sent out through mud or salicornia to coax small waders in to where the noble lords, RBS and HRMcK, waited, long brass telescopes supported on knees or by a stout stick.

Those were the good old days in the Firth of Thames, when the Miranda limeworks kept open the shell-extraction pits on the foreshore and on both sides of the road north to Taramaire; ornithological cars were distinctive, proceeding in a zig-zag from pool to pool, bristling telescopes on one side and then the other. Species new to New Zealand were then under debate; I recall hearing learned dispute on whether awkward birds were indeed Little Terns, Large Sand Dotterels, and Pectoral Sandpipers.

At the end of the school year, after public exams, the chosen ones were taken to an offshore island for a week — I qualified for Little Barrier in 1947 and Hen in 1948. At last, in 1949, having left school, I was 'allowed' to join OSNZ (regarded as a privilege) and even made it on my own to 'Classified Summarised Notes' instead of being submerged in King's College Bird Club — I have been a persistent advocate of 'Classified Summarised Notes' ever since.

After the Bird Club years, I had largely to fend for myself, soon finding I knew a great deal less than I had thought. But I had been well inoculated with the benign bird-watching virus and have never been in danger of throwing it off.

I applaud the heyday of the enlightened amateur (in the sense of not formally trained in sciences) and my good fortune at being here to share in it — the early stimulus, by correspondence and in the field, of John Cunningham and the lifelong friendship and generous hospitality, for me and all my family, of Archie and Mollie Blackburn, Sandy and Aileen Edgar, Ross and Hettie McKenzie, Dick and Joan Sibson, and Bob and Nora Stidolph. I am conscious that their combined wisdom and their enjoyment of their hobby have moulded my outlook on bird study, writing, and editing, and I am grateful for that.

Marshall Laird

In due evolutionary sequence, reptiles preceded birds in my affections. Thus in 1928, having secured a skink on our Brooklyn lawn, I established it in a clandestine bottle; where, unhappily, it faded away. This was not for lack of attention. It was simply due to a 5-year-old's faulty assumption from the nature of the habitat that lizards eat grass. Soon afterwards, the Great Depression necessitated family relocation at Waiwhetu, in a then-countrified Hutt Valley affording better opportunities for nature study than it does today. Having learnt to recognise the commoner native and introduced birds there, opportunities to inspect them at closer quarters were provided by return to Wellington in spring 1933. For there, at the cost of a longish walk or a penny tramfare, the zoo and the somewhat dustily faded stuffed birds of the Dominion Museum were available. The latter, still a fine example of Victorian display arrangements, was to be closed in 1936 when transfer of its collections to the now ageing and notoriously damp building on Mount Cook was effected from the original Museum Street premises. To reach these, you walked up from the Cenotaph past Parliament Grounds, circumnavigating Old Government House, the site of the present Beehive and one-time location of the failed potato crop of the Ngatiawa Rangatira, Honiana Te Puni, whose 1840 declaration that the place was 'good for nothing' (Ward 1929) merits immortalisation. The only Museum Street display that I can remember with clarity over the years was one of the few with any claims to ecological representation of a kind that I have since seen in various nineteenth century northern hemisphere collections; it featured a rat on its back, all four feet clutching a hen's egg to its belly, being tugged off by its tail by a partner in crime.

As to the birds, I remember only their ranks in close-packed old-fashioned glass cases. It was nonetheless this assemblage of our own and other avifaunas that stimulated my making further enquiries at Wellington Public Library, then still in the 1893 building on the corner of Mercer and Wakefield Streets. Guthrie-Smith (how nice it seemed to be able to write of one's own huge bird preserve, Tutira!) and Stead were represented, but the book that I contributed to wearing out through repeated borrowings was the first edition (1930) of Oliver's *New Zealand Birds*. I believe that it was in my third year at Wellington College and the second of what is now the National Museum, Mount Cook, that I plucked up the courage to intrude my teenage self on Dr W.R.B. Oliver, the Director, who was kind enough to introduce me to Buller's *History of the Birds of New Zealand* (1875, with the hand-coloured Keulemans plates). Two years later (1939) he was to become North Island Vice-President of the newly formed New Zealand Ornithological Society. Although the first membership list includes the names of a number of old acquaintances, I myself was not to join for another decade. Besides, my prime interest had switched to entomology, a contributory factor perhaps having been my initial disappointments in bird photography — an elderly folding Kodak with an advanced case of bellows-degeneration having provided nothing better than verichrome negatives with light streaks and perhaps a dot-sized kingfisher away up on a telegraph wire. There was also the barrier presented by OSNZ's 5 shilling nominal subscription as I entered New Zealand government (State Forest) employ at 80 pounds a year, while part-timing towards a BSc at Victoria University College. Of course, too, World War II was changing the course of many of our lives, in my case from forestry to medical entomology, in which connection I duly served in the Pacific (mainly New Britain, Papua New Guinea) as RNZAF Entomologist.

Mosquito research and control there, with emphasis on malaria and its anopheline vectors, led to meeting a member of an Australian army unit also stationed at Jacquinot Bay, Allen Keast. His ornithological expertise, companionship, and binoculars led to my first acquaintance with Shining Starlings, Cuckoo-shrikes and, above all, a host of Pigmy Parrots high above us in the forest canopy one memorable day. There was also a never-to-

be-forgotten occasion when, while out on mosquito survey in a bush valley, some suspicious sounds ahead ended with the vegetation parting to reveal, not an enemy patrol, but a Dwarf Cassowary. By now, too, my interests extending to avian blood parasites, I was beginning to shoot a few examples in search of cases of mosquito-transmitted bird malaria.

After the end of hostilities, my wartime mosquito research became an MSc (Hons) thesis, and I proceeded to tackle the newly established University of New Zealand PhD — on blood parasites. Those of birds were primarily in my mind, and armed with the proper permit for taking small numbers of a broad selection of native species, and a .22 rifle (this being before the days of Japanese mist nets), I proceeded to collect specimens and prepare heart-blood films — most of which, except for a few from introduced birds of European origin, proved depressingly negative. My personal collecting efforts were augmented in 1947 by visits to duck-shooters' camps around Lake Wairarapa. A light avian malaria infection was discovered, probably due to a strain of the widespread *Plasmodium relictum* identified from the above exotics and thought to have been accidentally imported in the original stock and transmitted by some New Zealand mosquito. This discovery led to the design and distribution to Acclimatisation Societies of a pocket-sized blood-slide kit, in time for the 1948 shooting season. Although much material was submitted, all of it was free from infection. It was beginning to seem as if New Zealand had a notably low incidence of avian blood parasites. The final straw with this part of my graduate dissertation came on a day in the Tararuas. Just as I was taking aim at a Fantail it took off before I could fire. Next moment it was sitting companionably on my foresight, chattering as it peered at me along the barrel! Enough was enough, and by this time, anyway, I had discovered a rich and previously unknown haematozoan fauna in New Zealand marine fish; a circumstance solving the problem of my PhD, which was awarded in 1949.

Among other even more notable events of that year were visits to Campbell and Macquarie Islands aboard (shades of H. Guthrie-Smith!) HMNZS *Tutira*. This exercise was in search of a bird malaria parasite found a few years earlier in penguins elsewhere. Its presence on Macquarie would indeed have made headlines because there are no mosquitoes whatsoever on this remote Australian dependency, and the many species of *Plasmodium* of man and many other vertebrates were and still are known to be transmitted by mosquitoes alone. In the event, Macquarie's populous penguin colonies yielded no blood parasites whatsoever. Later, further investigations revealed that occasional infections that had been reported from the Spheniscidae were probably due to the ready infection of non-immune birds; acquired either from mosquitoes already-parasitised (e.g. from passerines) biting them during the penguins' seasonal dispersal northward or after being carried off for display in zoos.

In 1949, though, and again in 1952–54, RNZAF assignments in the tropical Pacific brought me better luck. This was particularly so with the discovery of *Plasmodium relictum* in both a New Zealand Shining Cuckoo at the northern end of its migration route, and a resident Broad-billed Flycatcher, shot at an altitude of c. 540 m in the interior of Guadalcanal, Solomon Islands, while my wife and I were doing a human malaria survey there in 1953. This of course reopened the question of the likelihood of avian malaria — which, I must hasten to add, is *not* transmissible to humans or other mammals through any mosquitoes of New Zealand or elsewhere — having been accidentally brought here early on with 'Old Country' birds. While all relevant data were published long ago, the question still remains open.

By now it will have become obvious that my growing interests in human diseases transmitted by insects, and bird malaria, were just not going to be catered for by remaining in New Zealand. So with two other acquisitions of that vintage year, 1949 — my wife, Elizabeth, and OSNZ membership — I took my just-gained University of New Zealand DSc abroad . . . after Fiji to university work in Singapore, Montreal, and (after 1961–67 as Chief of the World Health Organisation's Environmental Biology Unit at Geneva, Switzerland) back to Canada. This time it was to the Memorial University of

Newfoundland, St John's; our home for 16 years until 'retirement' to rural Northland three decades after departure overseas.

In the interim, my ornithological interests (fuelled by continuing to receive *Notornis* over the years) led to the publication of a couple of oceanic bird logs and records of the Australian Pelican from Vanuatu and the Solomons. Professionally, there were also numerous papers concerning bird malaria and its epidemiological significance. An article that I shall always value particularly highly among my amateur contributions, though, concerned Tokelau birds (Wodzicki & Laird 1970). It was prepared in co-authorship with an unfailingly enthusiastic and kindly friend and colleague, the late Dr Kazimierz Antoni z Granowa Wodzicki, OBE, whose first public address in Wellington I had had the privilege of attending, when early events of World War II nullified his representation of Poland here. In the very cold winter of 1963, I was taken in my then-WHO capacity to a one-time aristocratic hunting lodge in the Polish sector of Bialowieża Forest (the last refuge of Europe's bison, the Wisent) near the Soviet border. When I commented on a wall-plaque quoting from pre-war writings of Kaz about his pioneer studies of bird navigation, my host — a distinguished ecologist, partisan hero, and Communist — assured me that Count Wodzicki's return would always be warmly welcomed. Some time later it indeed was. Afterwards my 1963 host wrote commenting that Kaz spoke Polish with a New Zealand accent. At the time of his Wellington lecture, his English was limited but his eloquence and eagerness made him understandable as he described his amateur investigations with head-attached magnets to elucidate why a powerful Nazi radio transmitter had misdirected rather a lot of racing pigeons. Were Kaz still with us, he would certainly, as an OSNZ member from 1940, have had an important and very human contribution to make to these half-century reminiscences.

R.M. Lockley

On my first visit to New Zealand in 1961 I wrote, 'A magnificent land of scenic beauty, of hope, excitement and open discovery, of nature's clean rapid changes and slow majestic design, as well as the astounding clumsy sad ugly wounds wrought by man and his machines, his flocks and herds, his foolish introductions.' And here is more of that mixture of admiration and criticism of a middle-aged naturalist's first impressions.

I had come not as a casual tourist, but to find out why my daughter, lately married to a Bay of Plenty farmer, wrote happily about her life there, where Kokako, kiwi and Blue Duck nested in the deep gorge on their land. Moreover, I had corresponded with some of New Zealand's ornithological pundits as a result of my early studies, begun in 1928, on the seabirds of the remote island of Skokholm off the south-west coast of Wales.

The pre-war British studies of marked birds stimulated the enthusiasm for bird banding in New Zealand; notably the long-term studies by L.E. Richdale (1940-50) on Royal Albatross, penguins and petrels in the South Island and Charles Fleming's inspired study of Silvereyes banded in his Auckland garden (Fleming 1943). These and other researchers had long written to welcome me to New Zealand; and in that summer of 1961-62, I had the good fortune to be guided to some of the scenes of their studies.

I love small islands and New Zealand is a mass of them, famous for seabirds and some peculiar flightless species evolved in isolation. On reaching Wellington I was immediately sent off by Robert Falla to join a select party, led by Ken Miers and Colin Burrows, to fly in a float-plane from Te Anau to Lake Orbell in Takahe Valley, to help count and band the remanent Takahe surviving in the Murchison Mountains. In perfect weather I was put on banding terms with flightless Takahe, kiwi, weka and (one) Kakapo. Kea came to supper in the mountain hut, and Blue Duck and their charming ducklings swam in the same cascades each time we took a dip in the burn. Ranging the mountains and valleys I saw a richer mixture of both endemic and exotic species than I have encountered elsewhere in New Zealand.

In my diary I wrote,

Takahe Valley is a glorious, wild place, the man-made world shut out from its pristine beauty, its glacial lake alive with dragonflies helpfully hunting the noxious sandflies, where Paradise Ducks and the bright-eyed native Black Scaup swim tamely with their half-grown broods. Other new species to me are Native Pigeon and Falcon, Morepork, Yellowhead, Brown Creeper, Rifleman, Robin, Tomtit, Kaka and Kakariki. And two cuckoos which screeched, but said not a single *cuckoo*. Yet it was strange to hear the familiar songs of some European birds — Song Thrush, Blackbird, Dunnock, Chaffinch, Yellowhammer, and the twitterings of large flocks of Redpolls mingling with the bell-like notes of native Tui and Bellbird.

We watched wapiti and red deer on the heights, where the alpine plants are charming — unusual daisy species, gentians, violets, harebell and senecio. But in general the alpine meadows here lack the brilliant colour of their European counterpart.

Robert Falla took me to the island sanctuary of Kapiti, demonstrating his famous trick of feeding a wild Kaka perched on his head. Weka and Robin pecked around our feet. And if you sleep, as we tried to do, on the little islet just offshore, brown rats run over you, surviving from Kapiti's whaling days a hundred years ago; but unfortunately eating the eggs and young of Sooty Shearwaters and White-faced Storm Petrels, which we had come to band. Fred Kinsky took me to Somes Island in Wellington Harbour, where his marked Blue Penguins were deep in moult, naked blue-black pincushions but hiding warm and dry in waterproof cavities.

In the Bay of Islands I helped Sandy Edgar band young Welcome Swallows, newcomers to New Zealand and attuned to nesting under bridges. With Chris Robertson in the Bay of Plenty we shot wild goats on the sheer cliffs of Whale Island, part of the Wildlife Service plan to exterminate alien mammals troubling the nesting petrels and other endemic fauna and flora (now successfully achieved). Then we moved on to band large numbers of Gannets nesting in small groups under trees on the rocky foreshore of sulphurous White Island. To avoid marking the same bird twice we dabbed with red paint the golden topknots of those Gannets we banded. Bay of Plenty fishermen subsequently reported on their short-wave radios the presence of a new species of seabird — the scarlet-crowned *moana-manu* (albatross).

I felt much at home on White Island, where in place of Skokholm mice the rather larger kiore rat came to feed on our scraps at suppertime. Accustomed to Welsh muttonbirds (Manx Shearwaters) nesting on windswept treeless islands, I greatly admired the accuracy with which the White Island muttonbird (*Pterodroma macroptera*) homed from the sea after dusk, crashing down through the tall pohutukawa trees immediately above their nest-burrows.

Having lived in New Zealand since 1971, I do not miss the windy, wet Welsh climate. I am content in old age to bask in the sunny Auckland climate, with a splendid view from my windows of the dreaming islands of the Hauraki Gulf — still rich in the petrels of my early studies. Out in my garden, I do miss the great variety of summer and winter migrants of British gardens and woodlands. Comparisons are invidious, but walks in typical New Zealand forests produce so few native species.

Nature abhors a vacuum. There is a bright hope in the flow across the Tasman of Australian species colonising New Zealand, species adapted to the vacant ecological niches of open cultivated land created within the last 150 years. I enjoy the Welcome Swallow in my garden, almost identical with the migrant *Hirundo* nesting in the old farm buildings at Skokholm, but delightfully resident in Auckland all the year. There is pleasure, too, in the introduced finches feeding and nesting in my weedy garden, where Goldfinches alight to drink and bathe from water-lily pads. I am less happy at the sight of the introduced Myna and Australian Magpie, rapacious to raid the nests of the smaller birds.

A word of praise for the OSNZ journal *Notornis*, its news supplement and their voluntary editors. We get just the right mixture of original studies and serious observation, lacking the boring plethora of graphs and tables of some overseas ornithological journals, which I find unreadable.

Looking back on my travels in search of birds from the Arctic to Antarctica and Macquarie Island, although a natural nostalgia draws me to return at intervals to my native (wet and windy) Wales, increasing contentment keeps me at home in sunlit and uncrowded New Zealand.

B.J. Marples

Although I was closely involved in the early days of the Society, my memories of those days are very vague, and all I have to offer are some personal anecdotes about bird matters that may be of some small interest.

I arrived in New Zealand in 1937, aged 29. It was an incredible experience, especially for a biologist, to arrive at the other side of the world in a country where both the geology and the ecosystem were unfamiliar, except, surprisingly enough, for some very familiar garden birds. My father was a keen ornithologist and so from my earliest days I was very much involved with birds. In those days there were huge winter Starling roosts, 2 or 3 of them not far from Oxford, and I was delighted when I arrived in New Zealand to find a Starling roost in Dunedin. I remember sitting on the roof of the museum with a group of students, counting the flocks as they came in, when there was an earthquake. Not what we were accustomed to in Dunedin, and especially surprising to a newcomer. In another winter, when there was an eclipse of the sun at the right time, it was possible to measure a change in roosting time in relation to the earlier dusk.

The seabirds on the Otago Peninsula, especially the penguins, were a special thrill. Distinguished visitors were usually anxious to see them. On one memorable occasion I was returning along the rocks with an overseas visitor when a specially large wave broke over and drenched him. We had to pause at the first hotel on the way home for a drop of rum as an antidote, and it was a very good prescription.

Before the war, Richdale was starting his remarkable work on the Royal Albatross and the Yellow-eyed Penguins. I used to go down the Peninsula sometimes and help him catch

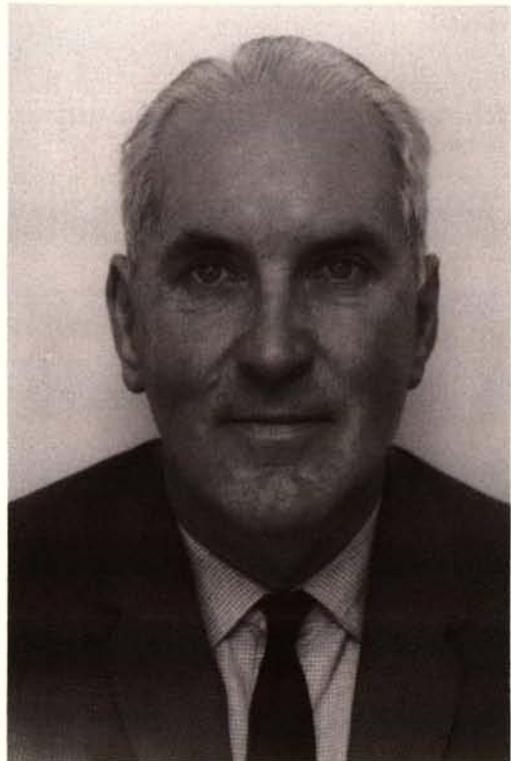


Figure 10. Brian Marples.

these for banding. I also went with him on 2 of his early trips to Stewart Island, and we camped for the first time on the tiny island, Whero, where he later did so much work. The weather was not very good, confining us at times to the tent, and I am pleased to say that I was able to catch by hand 5 species of petrel while still in a sleeping bag. On Bench Island I woke up one morning to see a Weka standing on top of Richdale, and it pecked at his eyelid as he woke up. The Weka used to reach up and take things out of the frying pan, but after Richdale had caught and weighed them they would walk past a few feet away, without deigning to notice us.

At one time during the war, I took an interest in some stilts in a small marshy inlet at Taieri Mouth, where the water was never more than about 6 inches deep. One day the police arrived. Apparently I had been photographed and reported for planning an enemy submarine base. They were easily appeased, shot a few rabbits, ate up our small supply of cake, and departed. Another memory of Taieri Mouth is of a night spent on the island catching and ringing muttonbirds. The sky was clear with the most wonderful comet with a long tail.

Looking through back numbers of *Bird Notes* and *Notornis* I have been delighted to see that the 'Classified Summarised Notes' are still being published. They were started in 1939 in the first of the old cyclostyled *Bulletins*, and their importance was stressed in *Bulletin* III. I have always been impressed with the value of these notes, even though they may seem rather casual. People often say that they are interested in birds but 'not able to do the clever things you ornithologists do'. They could easily make simple records that, if continued, would before long show interesting and valuable results. Here, in Woodstock, I have graphs going back 17 years of the birds in the garden, mostly seen through the bathroom window. They show marked seasonal changes and other, more interesting changes, extending over several years.

In Dunedin the Bellbirds had 3 distinct calls which were easily noted every day. It was soon clear that one went on all the time while the other 2 were seasonal, concerned with breeding. All one needs for this sort of recording is a sheet of cardboard hung up somewhere handy, a pencil on a string, and no time or trouble. I am very bad at recognising bird calls, but it was soon obvious that the Bellbird calls I was recording were recognisable but different only a few miles apart. How fascinating it would be to map the dialects.

Now there are tape recorders and other remarkable gadgets, but in those days apparatus had to be improvised. At the university we had a contraption, made out of an old alarm clock and an empty fruit tin, which recorded when a bird entered or left its nest. Lou Gurr used it a lot in his valuable work on nesting Blackbirds. Jiro Kikkawa had a remarkable extractor attached to a long pole, consisting of a mirror and a pair of tongs worked by a string. With this he could remove and replace nestlings from a high-up nest so that he could weigh them regularly without disturbance.

In those days Dunedin was more isolated from the North Island than it is now, but we were able at times even then to entertain fellow members from the north and show them some birds that were unfamiliar to them. Our trips to the north for an AGM were a thrill to us, and I am sorry now that England is too far away for visits to be possible. Not to mention *anno domini!* It is wonderful that the Society has reached its 50th Jubilee in such a flourishing condition, and I trust that it will continue to increase until the next one and beyond. I'm sure it will.

Ron Scarlett

I am not sure when I joined the Society — it was some time after 1940. I have always delighted in watching birds. As a youngster, unlike many of my contemporaries, I did not collect birds' eggs — hence there were large gaps in my oological knowledge. I thought it unfair to the birds to purloin their eggs.

In my early teens I began collecting fossil shells in the Karamea district, and a few years later acquired my first bird skeleton, of a Grey Duck that died on our farm at Umere. It was about that period, also, that I began pestering Dr Benham, at Dunedin, with questions on fossil shells, and Dr Falla, at Christchurch, about birds. Both were helpful. In 1937 I cycled over to Christchurch to begin university studies with Provisional Matriculation — I was a fortnight off the age of 27 — and I became friends with Bob and Molly Falla. In my spare time I haunted Canterbury Museum, doing odd jobs, such as cleaning loess from pottery models of hill forts sent by Rewi Alley from China, or helping Roger Duff — whom I had met at a League of Nations Union meeting soon after his return from Samoa — in setting up displays. Before I joined the Museum, 2 sub-adult albatrosses were sent to the Museum, within a day or so of each other, which had apparently been blown ashore at North Canterbury, and Dr Falla and I fed them balls of rather high mincemeat. We wore gloves, one holding the bill open, the other forcing the meat down the throat. In a few days, the birds picked the meat from the ground. When recovered, they were released at sea from a dinghy. We dealt similarly with storm-tossed Sooty Shearwaters.

A badly oiled Little Blue Penguin came in. It staggered around in circles. Dr Falla and I cleaned it as well as we could, and he took it home. The next time I saw it, it was clean and healthy, under Molly Falla's expert nursing. They made a film of it, which ends with its head bobbing away in the distance, after its release in Lyttelton Harbour.

In January 1940 Dr Falla gave me a job at the Museum for a month as a relieving custodian. One custodian was on holiday, another had retired, and so Phil Graham and I sprinkled damp sawdust on the wooden floors of the old building and swept it up, and polished the glass cases, before opening to visitors. The pay was £4 per week, and as a hard-up part-time student, I welcomed it.

During that time, and subsequently, I learned more about birds from Dr Falla, as well as from books. He had been pleased when, before I met him, I reported a Shining Cuckoo that had over-wintered at Granity.

My acquaintance with Edgar Stead, which was not extensive, began when he visited Pyramid Valley moa swamp, North Canterbury, during one of our early digs. Realising that Stead's knowledge was extensive, one lunch hour I asked him about stopping places of Black Swan as they migrated from Lake Grassmere, Marlborough, to Lake Ellesmere, Canterbury, and he reeled them off, non-stop. Not long afterwards, he died. Some time later, when I had joined the Canterbury Museum staff, I was in charge of his bird skin and egg collections, and his very helpful egg diary.

I mentioned to Charles Fleming that there were more misshapen eggs of *Puffinus griseus* than normal, and Charles said, 'Oh, yes, Edgar used to collect the odd-shaped ones when fresh, blow them, eat the contents for breakfast, and keep the eggs.'

Charles had many good stories and there were others about him. One, related to me by Graham Turbott, concerned the time when Turbott, Fleming, and Falla, out together, found a maggotty tern. 'Ah,' said one, 'Even a tern will worm'. Each attributed the remark to one of the others. Then there was the one about the American geologist in the Antarctic, who had been pecked by a magpie in his youth. He hated birds, so he left no tern unstoned.

I came to know Dr Oliver very well in the latter years of his life. When he was preparing the 2nd edition of *New Zealand Birds* he would come to Canterbury Museum to

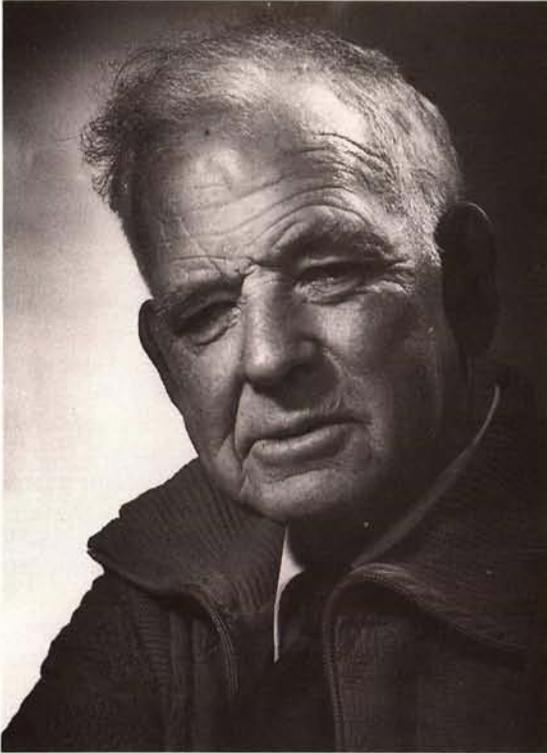


Figure 11. Ron Scarlett, ca. 1978.
Photo: F.E. McGregor.

examine bird skins and eggs, which were then in my charge. He was a delightful companion and a considerable scientist. I have many endearing memories of him — a humble and truly lovable man. He often consulted me about various aspects of the birds he was describing in his book, although I was young in the game. I gave him many subfossil localities of New Zealand birds, some of which he used in *New Zealand Birds*.

Few people could describe a bird skull as well as Dr Oliver. The descriptions of skulls in his moa monograph (Oliver 1949) are masterly. I felt complimented when he asked me to review this bulletin for *Notornis*. I pointed out to him that, on his own criteria, his placement of *Pachyornis* in his moa classification was, in my opinion, erroneous. He listened carefully to my argument, and replied, 'I believe you're right, Ron. That means *Pachyornis* will have to be in a group of its own.' I said, 'Suits me,' but after all, he retained his original classification in the 2nd edition of *New Zealand Birds*.

In the latter book he renamed *Chenopsis sumnerensis* Forbes as *Cygnus chathamicus*. I pointed out to him that, even if Forbes' original description left something to be desired, he (Oliver) had published a sufficient, valid description, using Forbes' name, on page 230 in the first (1930) edition of *New Zealand Birds*. Oliver beamed at me in delight, exclaiming, 'Now, this will make a nice case for the International Commission, won't it?' Some years later, I told George Gaylord Simpson, then a member of the International Commission on Zoological Nomenclature, and he laughed, 'We've made some bloody silly decisions at times, but we're not as mad as that!'

I once walked along the beach from the New Brighton pier to Burwood Forest with Dr Oliver. It was a most rewarding and interesting walk. We covered many topics. Oliver was a mine of information. For example, I remarked that, no matter how good Captain F.W. Hutton was on other matters, he was hopelessly wrong in some of his bird bone identifications — a subject on which I felt strongly, as Hutton's misidentifications led me astray at times, until I learned better. Oliver leaped to his defence. 'Ah, yes, that was because he tackled too many things — but he was good at describing a living bird' — with which I had to agree. That walk still brings back pleasant memories.

I have great respect for the osteological work of Henry Ogg Forbes, one-time Director of Canterbury Museum. For his day, he was an outstanding osteologist, as well as being a capable scientist in other fields. Apart from von Haast's moa bones, Forbes laid the foundations of Canterbury Museum's osteological collections. He seldom made mistakes. His book, *A Naturalist's Wandering in the Eastern Archipelago*, is still very readable.

Among the more memorable bird experiences I have had were my first sightings of Black Oystercatchers, on the northern side of Kohaihai Bluff, in the Karamea district, in the early 1930s. Years later, in the course of many trips between the Kohaihai and Heaphy Rivers, I established that there were 4 pairs in the 12 miles of beach between the 2 rivers, an average of 3 miles of beach to each pair.

Another memorable experience was visiting a wildlife reserve at a salt works a few miles out of Adelaide. As well as wrens in the bushes, I saw a greater congregation of sea and shore birds — many of them known to me only as skins or pictures until then — than I had seen before. I had a similar experience later, when, as the tide came in on a mud-bank at an island off the NSW coast, the masses of birds crowded together in a densely packed mass. That same island provided a splendid view of nesting sea-eagles.

On Sohano, up the Buka Passage, Solomon Islands, in July 1967 I saw a kingfisher, *Halcyon sancta*. It was a different subspecies from our New Zealand bird, but my eye could not tell that. It was like a breath from home. On Buka, the day I left, I saw also a magnificent sea-eagle. Another thrill was seeing, in 1978, my first American Robin in the streets of Calgary, Alberta.

A highlight was on 5 January 1973 when, with David Crockett's party, I saw the first two Chatham Island Taiko fly over our net at Tuku Valley. Then, 14 years later, on 2 January 1987, I held a Taiko in my hands, at the camp at the Tuku, before it was ringed and released. A lovely petrel, quiet and tame — unlike snapping, vicious Sooty Shearwaters.

R.B. Sibson

When I arrived in New Zealand in the spring of 1939, a small group of dedicated bird-watchers had already taken the first steps towards establishing an Ornithological Society. Among the initiators were B.J. Marples of Dunedin; R.A. Falla and E.F. Stead of Christchurch; Perrine Moncrieff of Nelson; W.R.B. Oliver of Wellington; R.H.D. Stidolph of Masterton; G.E. Archey, G.A. Buddle, C.A. Fleming, and E.G. Turbott of Auckland. Among those named in a first list of members (1939-40) are bird-watchers resident from Aupori Peninsula in the north to Stewart Island, not a bad start for a fledgling society.

In November 1939 an exhibition of the bird photographs of G.A. Buddle was held at Auckland Museum. By the standards of those days he was a nature photographer of world class, as is clear from his book *Bird Secrets*, which could not be published until 1951. Somehow it had become known that I could tell a sparrow from a starling, so I was invited to the opening of the exhibition; and met some of the founders of the OSNZ. That exhibition was a mark of growing public interest. Major Geoff had photographed birds from Canton Island and the Kermadecs to New Zealand's more distant subantarctic islands.

The viewing over and the photographer duly complimented, Charles Fleming asked me what birds I had not yet seen. I mentioned Tui and pipit. As a resident junior housemaster at King's College, Otahuhu, I was lucky to be working in a pleasantly green setting amid a variety of shrubs and big trees. The isthmus there is so narrow that not far away on one side was Tamaki River where Banded Rails flitted among the mangroves, and even nested in overgrown kumara pits on Middlemore golf course, and on the other were the upper reaches of Manukau Harbour with its creeks and broad inter-tidal flats. With Caspian Terns and Pied Stilts virtually on my doorstep or even at times directly overhead, a promising tally of shore-birds was quickly underway; but I was concerned that my list of alien songbirds exceeded by far that of native passerines. I was soon to learn that in the 1930s Tui were rather rare in the suburbs of Auckland. Being familiar with some of Europe's many species of pipit, I was eager to see a Groundlark, as it was commonly called, because it is a New Zealand race of Richard's Pipit, a scarce autumn visitor from Siberia to western Europe which had eluded me.

'Jump in the car,' said Charles; and taking Graham Turbott, R.A. Falla's youthful successor as ornithologist at Auckland Museum, we set off for the estuary of the Tamaki. At that time, it was a rural area approachable only by rough lanes, but now it is a reserve, Tahuna Torea, ringed by expensive suburbs. We found no pipits but we did hear the metallic call-note of a Dunnoek, another European that in 1939 was only just beginning to invade Auckland from the south.

Like many others I owe much to the knowledge, enthusiasm, and generosity of Charles Fleming. Within a month of our first meeting, I was able to show him some of my local trophies: 2 Bittern nests with full clutches at a Papatoetoe crater-lake; 2 Harrier nests with well-fed youngsters on the saltmarsh below Puhinui; a Fernbird calling in the scrub; a breeding colony of Little Shags; and out on the foreshore a small flock of Least Golden Plovers.

During the next year Charles and I made frequent trips together. He introduced me to the great sandhills of Mangawhai and to the shady rivulets near Waipu, where flocks of Brown Teal persisted. As he was working on his thesis on the phylogeny of prions, he was an ardent beachcomber and I soon fell under the spell of visits to Muriwai. The cherry on the icing of one patrol was a handsome white Nelly freshly ashore. On another occasion we came upon 5 Black-fronted Terns, such rare visitors from the South Island that Charles could hardly believe his eyes. They were quietly resting on the beach near the Muriwai stream.

His studies for degrees in both arts and science completed, Charles went south to join the Geological Survey and a little later the Cape Expedition, which became a long but scientifically rewarding vigil on subantarctic Auckland Island. With little or no warning I was informed that I was to succeed him as Regional Organiser in Auckland for the fledgling OSNZ and asked to answer a letter of enquiry from a certain Ross McKenzie of Clevedon.

Meanwhile, from time to time the youthful Peter Bull was reappearing in Auckland. When the outbreak of World War II had cut short his intended course at Cambridge University, he had returned to New Zealand and joined the navy. As a boy he had become an expert finder of birds' nests on the family farm at Mangere. We were all the more pleased to see him on his leaves from naval service because he had a car and every aspect of ornithology stirred his eager and critical interest. One day in April 1942, when he had taken Graham Turbott and myself to Muriwai, we found 10 specimens of a *leucoptera* petrel hitherto unknown in New Zealand. After long study and much discussion, they were shown to belong to the subspecies from New Caledonia. During a short leave in August 1943, he found among the Puketutu Wrybills an enigmatic dotterel that finally proved to be New Zealand's first record of *Charadrius leschenaultii*, an Asiatic species that is now expected annually and sometimes overwinters.

As a schoolboy, R.A. Falla had realised the thrills and value of beachcombing on Auckland's long west coast. The study of 'waifs of the storm' became a tradition, which was faithfully maintained by a few zealots until it developed ultimately into the well-organised monthly patrols in which many Aucklanders now take part.

Professor Marples was a tall genial man who on his visits to Auckland loved to visit quiet tidal bays where mixed waders could be seen en masse. Once at Andrew's Bay, beside the Puketutu causeway, as the tide neared the full, he commented happily on the zonation — Banded Dotterels and Wrybills with their feet dry, Knots along the tideline, Godwits up to their thighs in the shallows, and Stilts on the outer fringe — a scene fortunately still typical of many inlets in the Auckland Isthmus.

During the 1940s a rare pleasure was to visit Auckland Museum to meet perhaps Gilbert Archey or Graham Turbott and other members of the staff in their cramped and cluttered back-rooms. It was a valued privilege also to have access to the many trays of tubenoses and waders in the skin collection.

Thanks to the devoted efforts of its first editors during the difficult years of World War II, *N.Z. Bird Notes* was set fairly on its feet. In 1946 Bob Stidolph of Masterton became editor. Besides being a professional journalist, he was an avid bird-watcher and collector of fine bird books. He edited the valuable Kapiti diaries of Arthur and Amy Wilkinson; and after his retirement wrote a notable local book *The Birds Around Us*, which in a review earned him the title of 'The Gilbert White of the Wairarapa'. Under his wise direction, which lasted for almost a decade, the journal prospered and widened its scope. After a very rewarding expedition to the Snares Islands in 1947, Edgar Stead generously bore the expense of a special issue that included photographs of the distinctive Snares Fernbirds and Black Tits.

Another Masterton man who served the Society with strenuous devotion in its early years was John Cunningham. As Secretary-Treasurer he was a firm believer in getting things done and he gave unsparingly of his time for 7 formative years while the Society was spreading its wings. Annual General Meetings followed by local excursions on the next day had customarily alternated between Wellington and Christchurch. On a very cold windy day in May 1953 we were taken on the initiative of John Cunningham to the Wairarapa, where the faithful braved a full-blooded gale to view a huge stranded sperm whale, detectable from afar both by eye and nose. Under such conditions the presence of a Southern Bonxie was hardly surprising. AGMs, which are still in May, have been held successfully in many centres. They have become important social occasions, enabling members to make new friends and to learn something of the birds and problems of other regions.

Realising how much there was to do, the elected officers of the Society were not lacking

in initiative. In 1946 a subcommittee consisting of Dr K.A. Wodzicki, John Cunningham and myself was appointed to investigate the possibilities of setting up a ringing scheme. JMC was its energetic convener. In due course 17 000 rings of different sizes were ordered. Some were lent to the Australians for banding Giant Petrels on Heard Island. Although the metal of the early rings was rather soft, they proved their worth when, for example, a Hen Island Pycroft's Petrel was recovered 7 years later within a few metres of its place of banding; and White-fronted Terns banded as pulli were recovered in south-eastern Australia, and, much later, 2 at least provided longevity records of a quarter of a century.

Another bold project was the Gannet Census, conducted by Charles Fleming and Kazio Wodzicki. Their comprehensive report (Fleming & Wodzicki 1952) proved the maturity of New Zealand ornithology; and put this country in the forefront of such studies.

As memories of World War II dimmed, the late 1940s were a time of hope and action. In 1948 Charles Fleming, while on a visit to Britain, persuaded the now world-famous artist C.F. Tunnicliffe to make a black and white sketch of a Takahe; and this is the emblem which has adorned the front cover of *Notornis* since 1952. For in 1948, after Dr Orbell's dramatic rediscovery of this primitive and flightless rail, the title of *New Zealand Bird Notes* had been changed to *Notornis*, the first issue under this name being dated July 1950.

In this same decade, in the light of recent developments in taxonomy and of many far-travelling migrants or stragglers being found in New Zealand for the first time, the Council decided that an authoritative checklist was needed. Accordingly a committee of six was appointed, with Charles Fleming as convener. He was not an unwilling work-horse. To me fell the pleasant and not too formidable task of 'doing the waders'. When the *Checklist* was published in 1953 it was widely acclaimed, becoming a sort of bible to many aspiring young bird-watchers and introducing them to some of the mysteries of scientific nomenclature. It was masterminded by its convener, bearing throughout the stamp of his thoroughness and breadth of learning. Needless to say it proved indispensable when later checklists or amendments were being prepared.

In 1950 it was my good fortune to be named as the delegate of the OSNZ at the first post-war International Ornithological Congress, which was based at the University of Uppsala, Sweden. My wife and I, being those who had travelled farthest to be present, were welcomed with special warmth. The tenth congress was a friendly, fruitful, and stimulating experience. The Swedes were admirable hosts and had thoughtfully planned a choice of excursions that offered a tempting variety of scenery and birds. Much lingers vividly in the memory.

As far back as the 1890s there had been hints that ornithology in the Firth of Thames might be unusually rewarding. But this southern extension of the Hauraki Gulf had been neglected for over half a century, until in July 1941 Bill Ridland, scientist, mountaineer, and schoolmaster, and I spent 2 days exploring the western shore on bicycles through Miranda and then east to Thames across the Hauraki Plains. Three weeks later we invited Ross McKenzie of Clevedon, an amateur botanist of some distinction but a new recruit to ornithology, to join us on a second foray. He claimed to know nothing about birds, but he was very quick to learn. That day's excursion marked a turning point in his life. From then on watching birds or discussing birds with anyone interested became the core of his existence. In the years to come, with his wonderfully competent and seemingly indefatigable wife, Hetty, he would set out on what became known as 'Ross's missionary journeys' as a result of which the OSNZ gained many new members. His regular patrollings with long brass telescope of the southern shore of Manukau Harbour and the west coast of the Firth became legendary. He did not neglect the Hunua Range with its declining population of Kokako; and he was among the first to recognise the threat to the endemic forest birds from Australian possums and Eurasian black rats. So sharp was his sight that many came to know him as Old Hawkeye. He was the first to find in New Zealand a Terek Sandpiper (1951) and a Gull-billed Tern (1955). In later years he shared the first sightings in this country of several other wanderers from arctic regions.

For more than 40 years Ross's services to OSNZ were inestimable. Solid work held no terrors for him. A canny Scot, he skilfully nursed the Society through times when the finances were tenuous. Thus, for example, he and Hetty undertook for some years the posting of *Notornis* from Clevedon, after new issues had been delivered from Gisborne in bulk. A new experience would spark his sense of humour. On a visit to Muriwai in August 1941 when a Nelly was disturbed as it attacked the long dead carcass of one of its brethren on the beach, and tried to savage the shin of one of the bystanders, an ecstatic Ross observed that the bird had too much sense to tackle his wooden leg. In a timely presidential address (1955) Ross stressed the need for working members, loyal to the Society, helpful to their fellows, enjoying the fun and interest of the game, and putting this scene on a high plane in public opinion.

The birds found on the 2 first visits to Miranda in 1941 strongly stimulated the study of shorebird migration. We learned that the endemic Wrybilled Plover was not the very rare bird it was supposed to be, for in 1 flock alone we estimated that there were at least 1000 birds. We had in fact rediscovered the wintering ground of a highly specialised riverbed breeder, which largely disappeared from the South Island for more than half the year. We also learned that the broad inter-tidal flats of the southern end of the Firth are a vital winter feeding ground not only for thousands of native stilts, oystercatchers, and dotterels but also for flocks of subadult godwits and Lesser Knots, whose numbers in some winters also ran into thousands. Experience now shows that few summers pass in the Firth without the presence of mixed flocks of small dotterels, sandpipers, and stints to tantalise the expert and bewilder the learner. Several arctic migrants have been first recorded in New Zealand at the Firth, and some of them are proving to be regular annual visitors. Consequently the Miranda coast has become renowned for the quantity and quality of its shorebirds and is recognised as an area of international importance. In 1974 the Miranda Naturalists' Trust was founded to cast a benevolent and critical eye over all aspects of its natural history.

With the retirement of Bob Stidolph, the writer of these meandering memories was asked to edit *Notornis*. It was a challenge that I accepted with some diffidence. And so, recalling the words of the Wenceslas carol, 'In his master's steps he trod', I knuckled down to a new and agreeable, though seemingly endless, task that occupied much of a busy schoolmaster's spare time for the next 17 years, except in 1964 when Barrie Heather took over while I was watching birds overseas. I must mention the help I received from a new generation of accomplished bird photographers, among whom were Fred Kinsky, Geoff Moon, James Prickett, Mike Soper, and Donald Urquhart. *Notornis* was able to widen its horizons as material was submitted from islands of the tropical Pacific to Antarctica. Ron Scarlett's papers on his researches in archaeo-ornithology were always welcome. My dealings, first with Pilgrim Press of Auckland and then for many years with Te Rau Press of Gisborne, were always cordial and helpful. The OSNZ owes a big debt to Archie Blackburn for his unobtrusive but vigilant subeditorial activities at Gisborne.

In the mid-1950s, rising costs threatened to curtail some activities of the Society. But a group of Aucklanders, relying on the business acumen of Bruce Chambers, initiated a Christmas Card Scheme. Our first artist was the gifted and versatile A.C. Hipwell, whose standing was such that he won the Kelliher Art Prize in 1957. He was a very happy man when he could sit by a pool or near the sea-shore, sketching waders or waterfowl. He was succeeded by Avis Acres whose birds form part of a typical New Zealand landscape. Much is owed to these 2 generous artists whose skill ensured the success of the Christmas Card Scheme, even if the colour printing of those early years fell rather below the best modern standards. Bands of volunteers packed and posted the cards, and the profits over 30 years helped to maintain the quality of *Notornis* and made a substantial contribution to the coffers of the Society. At a later stage the Card Committee used reproductions of notable historic paintings of New Zealand birds. These too were well received. Many of the cards issued by the Society have become collector's items.

Half a century is a long time in the life of an active and unrepentant ornithophile in a land where seasonal changes are marked by annual migrations of birds, which always carry

with them for the initiated an air of expectation, even if they do not always bring something new. I set out to stress some things that I judged were significant. If my recollections seem overlong and tedious I can justify myself by saying that I have seldom been far from the heart of the action.

E. G. Turbott

The stage was set for ornithology in the 1930s with the appearance of W.R.B. Oliver's *New Zealand Birds* (1st edition, 1930): up to then the aspiring ornithologist had to wrestle with scattered references and uneven literature or had to go back to Buller or even to the first explorers. Hutton and Drummond's *The Animals of New Zealand: An Account of the Colony's Air-breathing Vertebrates* (1904), previously the main general account, was useful but limited. 'Oliver' was an up-to-date coverage and review and at last launched New Zealand birds as a subject for systematic study. Oliver's book was not meant as a major contribution to field study, yet even here the inclusion of numerous unpublished observations by the caretaker of Kapiti, A.S. Wilkinson, and his wife Amy, on food and breeding habits provided new information and indicated fruitful fields for work. By including moa and other subfossil birds, Oliver also introduced general bird students for the first time to palaeornithology.

This is not to say that much important work had not been published before the unification provided by Oliver: in field ornithology alone H. Guthrie-Smith's first 3 bird volumes (the first, *Birds of the Water Wood and Waste*, in 1910) were eagerly read, both for their life history information and for their contribution to the enjoyment of bird study; and the monumental *Tutira* (1921) was a major ecological as well as ornithological document.

Although field guides had yet to be invented, incipient 'guides' were already appearing in Britain. New Zealand, too, had its guide on the British model: *New Zealand Birds and How to Identify Them*, by Perrine Moncrieff (1925) (identification was on size, Rifleman to Royal Albatross).

But perhaps the most important influence on the growth of ornithology at this time was that of 2 leading figures of the day, E.F. Stead in Canterbury and R.A. (later Sir Robert)



Figure 12. Graham Turbott, 1979.
Photo: Vahry Photography Ltd.

Falla in Auckland. Both were well-known and respected ornithologists, and both contributed generously in different ways to the spread of ornithological information among the growing body of keen amateur enthusiasts.

Edgar Stead's influence was especially on the migrant waders of Lake Ellesmere and coastal Canterbury and the birds (especially the petrels) of the offshore islands. With his friend and constant associate on island expeditions, Major R.A. Wilson of Bulls, Manawatu, he made numerous trips to the Stewart Island area and to Hen Island and elsewhere. His extensive field results were condensed into his *The Life Histories of New Zealand Birds* (1932) and into several papers describing rare waders from Lake Ellesmere. His views and assistance were widely sought, and he greatly influenced bird study at the time, particularly in the South Island. A visit to 'Ilam', in Christchurch, with its stately garden — Stead was also a world authority on the propagation of rhododendrons — was an experience, combined, of course, with a glimpse of the Stead collections in their fire-proof annexe. The collections, on his death in 1949, became the basis of Canterbury Museum's outstanding study series and gallery displays of New Zealand birds. Many details of Edgar Stead's field work and of his views on aspects of New Zealand ornithology are given in R.A. Wilson's *Bird Islands of New Zealand* (1959).

Bob Falla's influence was probably wider, for he was not only in succession a teacher, a Training College lecturer and a museum ornithologist, but also a charismatic figure as ornithologist to Mawson's 1929–31 Antarctic expedition (BANZARE). He began his ornithological career as a young amateur field worker — especially on petrels — in the 1920s, making launch trips to the northern offshore islands with Bernard Sladden of Taneatua and W.M. Fraser of Whangarei; his first notable contribution was to record the Poor Knights breeding ground of Buller's Shearwater. He became Auckland Museum's first Ornithologist in 1931, continuing his museum career as Director of Canterbury Museum (1937–47) and of Dominion (now National) Museum (1947–66).

Falla was a prolific lecturer — his popular talks on birds and natural history, illustrated with slides and films, to clubs, groups, and organisations may well have established an all-time record! This was in addition to numerous newspaper articles and to the daily interviews and telephone enquiries inherent in a museum post.

Yet to many amateur ornithologists, and particularly to the younger bird enthusiasts of the day, his personal guidance and inspiration were his special contribution in the 1930s. He was generous of his time and quick to recognise a potential recruit to ornithology. He always welcomed others on his field trips — a walk to Muriwai from Waimauku railway station and on up the beach, or a launch trip on the Gulf. To me, then a university science student, the high point was an invitation from him to join the Auckland Museum's 1934 expedition to the Three Kings and other northern offshore islands in the ketch *Will Watch*: Dr W.R.B. Oliver and Captain G.M. Turner (of Stewart Island) were other ornithological members of the party, and so was Charles Fleming (still at school)! As might be expected, identification of petrels at sea was a main activity during the *Will Watch* trip, and W.B. Alexander's *Birds of the Ocean* (1928) — the first successful seabird guide and prototype of the many field guides to come — was much in use.

In the late 1930s, and following the lead of Falla and Stead, younger field naturalists began to organise trips to the northern offshore islands; Bob Falla himself joined several of these as well as continuing with his own field trips. Major G.A. Buddle was also at this stage taking up bird photography again, and trips organised by him included, as well as Major Wilson, several of the younger ornithologists (Charles Fleming, Peter Bull, and myself). This period, too, saw the comprehensive ornithological 6 weeks (November 1937 – January 1938) exploration of the Chathams by Charles Fleming and myself.

In the War years, 1939–1945, bird study was for most wholly or partly interrupted: yet the decision to establish wartime coast-watching stations on Auckland and Campbell Islands led to a call on Falla's extensive knowledge of the subantarctic and he in turn encouraged recruitment to the 'Cape Expedition' of people with natural history interests. Cape Expedition members with ornithological interests, in addition to Falla himself, were R.H. Balham, C.A. Fleming, J.H. Sorensen and E.G. Turbott — but it was a measure of

Falla's influence that field observations on subantarctic natural history were contributed by nearly all expedition members.

The 1940s began, of course, with the founding of the Ornithological Society of New Zealand. There was a worldwide trend towards banding studies, and this was reflected in one of the Society's main aims, that of organising a banding scheme in New Zealand (the British term 'ringing' was at first used, but finally 'banding' as used in the United States was adopted). Professor B.J. Marples had already begun trapping and banding Silvereyes in Dunedin, partly to clarify possible migration, but also for life history studies. Similar work on Silvereyes was undertaken soon afterwards by J.M. Cunningham in Masterton, while Charles Fleming in 1939–1942 made a pioneer banding study of Silvereyes at his home in Auckland (Fleming 1943). His colour bands were at first made from celluloid toys, later replaced by avicultural 'finch rings'. Fleming's work was inspired by the work of Margaret Morse Nice on the Song Sparrow in America, the pioneer study of a single species based on banding (part 1 was published in *Trans. Linnaean Society of New York*, 1937).

Interest in life history and behavioural studies based on banding was greatly stimulated among all bird students at this time by the publication of David Lack's *Life of the Robin* (1943) and R.M. Lockley's studies on the seabirds of Skokholm, especially his *Shearwaters* (1942). The most detailed New Zealand project in this period (other than Richdale's, below) was that of L. Gurr on the Blackbird in Dunedin (Gurr 1954).

L.E. Richdale of Dunedin, who had been working independently, before the Society's founding, on the Royal Albatrosses of Taiaroa Head, the Yellow-eyed Penguin, and various petrels, continued his studies until the 1950s. His meticulous life history and population studies based on banded birds, published in a lengthy series of papers and in several books, quickly gained worldwide recognition. Richdale's body of work was outstanding and his is probably still the best-known name in New Zealand ornithology overseas.

While banding studies were a strong preoccupation in the early 1940s, interest also quickly grew in New Zealand's extensive list of migrant waders, both summer visitors from the Northern Hemisphere and internal migrants. R.B. Sibson, who came to New Zealand in 1939, brought with him an encyclopaedic knowledge of British waders and of field identification techniques, and his infectious enthusiasm quickly resulted in a keen Auckland field group. One of these, Ross McKenzie, soon became a recognised authority on the waders of Manukau Harbour and the Firth of Thames, and field studies initiated and encouraged by Sibson and McKenzie continued to attract a growing band of enthusiasts, and to be the main activity for many Society members in the Auckland area and throughout New Zealand.

With the end of the war, field work could start again — for me this meant a lengthy visit to the Three Kings and several visits to Little Barrier and other northern islands. More ambitious Society projects were being planned, including the Gannet census. Of much significance to the future of ornithology, too, were the expansion of research activities by the Wildlife Service of the Department of Internal Affairs and the establishment in 1948 of a new unit, the Animal Ecology Section (later Ecology Division) of DSIR. Through these agencies, an increased number of professional workers was added to the 'workforce', an expansion leading to much of today's broadly based ornithological research activity.

The Society's formative years culminated in the issue of the first full *Checklist of New Zealand Birds* in 1953 (C.A. Fleming, Convener). The checklist summarised more than 20 years of careful recording by individuals and by organised groups, bringing distributions and important references up to date since Oliver's book in 1930. Attitudes to taxonomy, too, had altered since 1930, and the list using modern trinomials represented current views on the limits of genera and on subspecies. Note, however, that the *Checklist* was preceded in 1946 by an outline list prepared by B.J. Marples and issued by the Society: the list was trinomially based and as a result the use of trinomials for New Zealand birds was for the first time fully accepted.

Section 3

Ornithological Reviews

The following contributors have produced short essays reviewing an aspect of ornithology, or of the development of ornithology in New Zealand, in which they are expert.

Fifty Years of Ornithology in New Zealand

The history of ornithology in New Zealand over the past 50 years and longer has been shaped by events far back in its geological past, events that are largely interconnected. Firstly, New Zealand has been separated for around 80 million years from the rest of Gondwanaland and has persisted above sea level in some shape or form ever since. Secondly, New Zealand has been isolated from other land masses, so all terrestrial mammals have been kept at bay until about 1000 years ago, when Polynesians arrived with dogs and kiore (*Rattus exulans*). Western man with his trappings and camp followers was kept away until a mere 200 years ago. Thirdly, New Zealand's chance position on the Pacific rim close to the Antarctic convergence has brought an astonishing array of petrels and shearwaters ashore to breed in this rare sanctuary without mammalian predators.

The New Zealand region stretches across the South Pacific from the subtropical Kermadec Islands at 29.5°S to subantarctic Macquarie Island at 55°S, spanning some 2750 km from north to south. Cook Strait, separating the North and South Islands, is at the same latitude as Tasmania, or Madrid. The native flora displays strong affinities with its erstwhile neighbours in Gondwanaland, sharing the southern beeches (*Nothofagus* spp.) with Chile and Tasmania and with representatives in the Myrtaceae allied to the Australian eucalypts. There is also a strong component of plants of subtropical origin. Until the Maori arrived, New Zealand was solidly forested, the forests having evolved without mammals. There are indeed still odd corners of New Zealand where one can catch a whiff of the Mesozoic; where one can see such archaic forms as the tuatara (*Sphenodon*), remotely related to the dinosaurs, peripatus (*Peripatooides*), endemic frogs (*Leiopelma*), and the short-tailed bat (*Mystacina tuberculata*), sole surviving member of its endemic family with closest relatives in South America. And of course we still have such archaic birds as kiwi (*Apteryx* spp.) and Kakapo (*Strigops habroptilus*), though moa (Dinornithiformes) were hastened to extinction by the Maori. Thus here we can see penguins beside palms, parrots beside glaciers.

The Maori burned off much of the drier forest east of the main divide (McGlone 1989); but in something less than 150 years of settlement by Western man New Zealand lost 11.5 million ha of primeval forests, most of it rich lowland forest converted to grazing land. Introduced browsing mammals have degraded much of what remains and introduced carnivores (feral cats and mustelids) and rodents (especially *Rattus rattus*) have reduced populations of native birds ill-adapted to withstand mammalian predation. By far the most serious losses have been caused by the wholesale destruction of lowland forest in the last 100 years. Cassels (1984) suggested that some 30 species or subspecies of birds have disappeared from the New Zealand mainland in the c.1000 years since Polynesian settlement, and Williams (1962) that 5 species and 5 subspecies have gone in the last 100 years. Sadly the process continues.

During the past 50 years the Laughing Owl (*Sceloglaux albifacies*), Huia (*Heteralocha acutirostris*), Piopio (*Turnagra capensis*), probably related to the bowerbirds, and most likely the Bush Wren (*Xenicus longipes*) have been lost. Half a dozen other species are so endangered that their survival for another 50 years is doubtful. Opinions differ of course, but these might include the Chatham Island Petrel (*Pterodroma axillaris*), the Chatham Island Taiko (*Pt. magentae*), Chatham Island Oystercatcher (*Ostralegus chathamensis*), Black Stilt (*Himantopus novaeseelandiae*), Kakapo, and perhaps the Chatham Island Black Robin (*Petroica traversi*), now somewhat less likely (see below).

Then several other forest birds, though not yet 'endangered', have declined disturbingly fast in recent times: these include the Brown Kiwi (*A. australis*), the Kaka (*Nestor meridionalis*), 2 parakeets (*Cyanorhamphus* spp.), the Rock Wren (*Xenicus gilviventris*), and the Yellowhead (*Mohoua ochrocephala*), all of them endemics. Taking the gloomy view,

these may comprise the next generation of candidates for extinction if the area of native forest continues to be eroded. A previously unrecognised threat to the survival of a few vulnerable endemics (e.g. Black Stilt, island races of parakeets) is that, when reduced to low numbers, the survivors start hybridising with more abundant, non-endemic congeners; the original genetic stock is thus irretrievably submerged. No wonder that 11% of the world's 'endangered' species of birds, listed in the *Red Data Book*, live precariously in New Zealand.

But is this gloomy view really justified? The Ornithological Society and the Royal Forest and Bird Protection Society, and in a more activist role the Maruia Society, have done wonders to spread knowledge and foster concern about the future of New Zealand birds. There is a growing awareness among politicians and developers alike that we simply cannot go on 'mining' native forest faster than it can regenerate naturally. Besides, much of the aesthetic and scientific value of the forest lies in the fact that it is still largely a product of long evolution without man's intervention, and until recently without terrestrial mammals. It is this that makes the native forest of New Zealand unique on a world scale and at the same time so vulnerable.

A few select offshore and outlying islands remain more or less in their pristine state, free of mammals and possibly the last refuge of some beleaguered bird species. In the normal course of events it might be only a matter of time, and a short time at that, before these islands were in effect absorbed with the mainland and invaded by mammals. But New Zealand wildlife biologists have become skilled, not just at preventing this from happening, but also in effect at putting back the clock by ridding even quite large islands of mammals and then using them as refuges for endangered species rescued from less secure habitats. The growing pace, success, and confidence in carrying out these operations is most impressive and encouraging for the future (Atkinson 1988). Three recent examples must suffice here.

Most famous and hazardous of all was the transfer of the world population of Black Robins from Little Mangere to nearby Mangere Island, in the Chatham group. Not so long ago the population was down to 5 males and 2 females, and then just 1 female by 1980. Their transfer was made necessary because the scrap of coastal bush atop Little Mangere, a mere stack in the ocean where the birds were living, was being eroded away. A crash programme of revegetating Mangere with local trees and shrubs was begun in advance to make the island more hospitable for the birds. Then, at last, Little Mangere was scaled again (no mean feat in itself), the birds were mist-netted and boxed up (after many rehearsals) and taken to the waiting boat for the trip to Mangere, where they were released without mishap. Then, to augment the female's productivity, her first clutch was given to a pair of Chatham Island Warblers (*Gerygone albofrontata*) nesting on the same island. This induced the female robin to lay again, which she would not otherwise have done. As a result of this and a further move to South East Island, where the closely related tit *Petroica macrocephala* was used as a foster parent, there are now about 90 Black Robins alive, and other islands are being sought to accommodate the growing population.

Another notable achievement, to protect breeding petrels and other birds, was the extermination of feral cats on Little Barrier Island. This is a large island of 3053 ha, rugged, mountainous, and densely forested. It had been infested by cats for many years and they were feeding on a rich diet of breeding Cook's and Black Petrels (*Pterodroma cookii* and *Procellaria parkinsoni*). Corpses of the birds found on tracks provided useful clues to the cats' whereabouts, and so eventually the last one was trapped; but it was a long struggle. Now free of cats, Little Barrier is valuable as a safe breeding site for the petrels and for hosting endangered species brought from other places, such as Saddlebacks (*Philesturnus carunculatus*) and Kokako (*Callaeas cinerea*), 2 of New Zealand's endemic wattlebirds. The latest addition is part of the remanent population of Kakapo from Stewart Island, where numbers of this remarkable almost flightless and nocturnal parrot (Merton *et al.* 1984) have been dwindling as a result of predation by feral cats.

The extermination of Australian brush-tailed possums (*Trichosurus vulpecula*) from forested Kapiti Island (1970 ha), off the Wellington coast, was a very different kind of

operation, recently completed. Kapiti is not an unmodified island; it was once the local headquarters of whalers operating in Cook Strait, and later much of the forest was cleared for grazing; but since farming ceased most of the island has reverted to bush. Farm stock, including free-ranging pigs and goats, were exterminated, and, to his credit, the ranger got rid of the cats too. This left only Norway rats (*R. norvegicus*) and kiore, neither regarded as too harmful to birds, and some 20 000 possums, which proceeded to devour the forest. The extent of their damage was not at first realised, though varying numbers had been trapped every few years to prevent their becoming too numerous. But when trapping was discontinued as an experiment in the 1970s, the effects of their feeding became obvious. The birdlife on the island is not entirely natural either because it includes probably the last viable population of Little Spotted Kiwi (*A. owenii*), which were introduced there. However, the island has become an important refuge and showcase for such forest birds as parakeets, Kaka, and Robins (*Petroica australis*), now scarce on the mainland.

The ranger's drive and enthusiasm were responsible for starting an all-out war on the possums in 1980. Careful organisation and a dedicated team of trappers reduced numbers by about 75% in the first 2 years. The very last possum was got by December 1986, after nearly 20 000 had been killed in the course of almost 1.4 million trap-nights! Trained dogs accounted for 40% of the possums killed in the last 2 years; they worked for 4500 man+dog hours at an average catch rate of 1 possum every 117 hours. The progress of the operation was overseen by scientists in Ecology Division, DSIR. Inevitably some birds were killed in the traps too; these included mainly NZ Pigeons (*Hemiphaga novaeseelandiae*) and Morepork owls (*Ninox novaeseelandiae*), and just a few Kaka and Weka (*Gallirallus australis*). At a catch rate of around 1 bird per 10 000 trap-nights, this was a small price to pay for the rehabilitation of Kapiti as a reserve. The forest is now flourishing and the island has already been used for transplanted Saddlebacks and Stitchbirds (*Notiomystis cincta*). Possums have also now been exterminated from Codfish Island (c. 1500 ha), off Stewart Island, as part of the plan to enhance the quality of island reserves.

With man, especially Western man, so recent a newcomer to New Zealand, much emphasis is placed on reserving samples of the original vegetation on the mainland and offshore islands, as nearly as possible in their pristine state. However, most of the National Parks and larger reserves (which include nearly 10% of the land area) are still too small or otherwise deficient to ensure the survival of wide-ranging species of forest birds, some of which are already confined to the very largest tracts of forest. Many of these species are long-lived and recent research suggests that unsuccessful breeding is the major cause of their scarcity. This may be caused by predation, by ship rats or mustelids, or depletion of food supplies by possums or even by introduced wasps (*Vespula* spp.). There is also a real danger in relying too greatly on reserves alone for protecting native birds in the long term. More emphasis must be placed on providing wide buffer zones surrounding the reserves and actively managing the forests to improve their conservation value.

The tussock grasslands of the South Island and perhaps some of the wetlands of the North Island may be the only man-made landscapes of New Zealand that are regarded as worth preserving as part of the national heritage. Both were created or greatly expanded by the Maori, but are now being converted to more productive grazing land. The drastically modified landscapes that now characterise New Zealand farmland have proved attractive to only a few native birds, such as the Australasian Harrier (*Circus approximans*), which is probably now much commoner than ever it used to be. Instead, this land has been taken over by open-country birds introduced last century from Europe, and more recently by an interesting trickle of immigrants from Australia (oddly classified as 'self-introduced').

The first trans-Tasman movement to be recorded was the arrival of flocks of Silvereyes (*Zosterops lateralis*) in 1856, now one of the commonest species in any habitat with trees or shrubs, including urban areas. As in south-eastern Australia, the Silvereye appears to be a partial migrant here too. Other Australian species now well established include the Royal Spoonbill (*Platalea leucorodia*), White-faced Heron (*Ardea novaehollandiae*), Coot (*Fulica*

atra), Spur-winged Plover (*Vanellus miles*), Black-fronted Dotterel (*Charadrius melanops*), Welcome Swallow (*Hirundo tahitica*), and probably as escaped cage-birds, the Sulphur-crested Cockatoo (*Cacatua galerita*), 2 rosellas (*Platycercus* spp.) and the Kookaburra (*Dacelo gigas*). The Red-vented Bulbul (*Pyconotus cafer*) was exterminated soon after it became established in Auckland, apparently after being released from a ship in about 1952. In the last 50 years, too, about 20 extra species of waders, mainly from the Arctic, have been added to the New Zealand list, presumably as a result of more intensive watching.

Understandably, these introduced and self-introduced birds have never won the same esteem as the darling natives, though their behaviour and ecology as new settlers merit more attention. Most of the introduced species were imported with much loving care and at some cost from Europe to populate the newly created and otherwise almost birdless grazing lands. There is probably only minimal competition between native and introduced species because they occupy such different habitats (but see Diamond & Veitch 1981). The paucity of introduced species in the forest is because few strictly forest species were introduced; perhaps the main exception is the Blackbird (*Turdus merula*), which does enter the forest as well as other habitats as in Europe. Forest insectivores would have been difficult to bring by sailing ship, and in any case no one wanted them.

There are some surprising absentees from the list of introduced species, most notably the Linnet (*Carduelis cannabina*), a popular cage-bird in Europe for which there still appears to be much suitable vacant habitat. Expatriate ornithologists from Europe can amuse themselves by dreaming up other new candidates for introduction: my list would be headed by the Stonechat (*Saxicola torquata*), and then more experimentally by the Dartford Warbler (*Sylvia undata*), to enliven the rather barren gorse-clad hills that mark land mismanagement here as in Britain. There are also surprises among the species that were introduced, such as the Cirl Bunting (*Emberiza cirrus*), which is distinctly local in Britain, as in New Zealand.

New Zealand ornithologists are of course active in such pursuits as bird banding (or ringing), filling in nest record cards, and various regional inquiries. They have developed their own special 'sport' of beach patrolling, which is appropriate for an island nation with long ocean beaches and some 55 Procellariiformes to its credit. Beach patrolling has produced a special breed of ornithologist skilled at identifying putrid or desiccated corpses; and it has brought to light many rarities and revealed some of the perils of life on the ocean wave.

Other ornithologists have grappled with the problem of counting birds in dense evergreen forest, often in mountainous terrain (Dawson & Bull 1975). No real breakthrough allows us to estimate actual densities of forest birds, but adoption of a standard technique makes it possible to compare the numbers and diversity of birds in different types of forest. This has proved valuable in arguing the case for adequate reserves of representative samples of forest.

Counting birds along forest transects preoccupied many ornithologists in the 1970s; but the job is tedious and scientifically unexciting, and it tends to make for rather dull reading no matter how important it may be. It is therefore refreshing to find new research replacing the routine counts to describe the life histories of the birds, be they kiwi, petrels, waders, pigeons, parrots, NZ wrens, or wattlebirds. Endemic species not at present considered 'endangered', but which may become so in the future, are at last receiving some attention. At the same time Diamond & Veitch (1981) have taken a second look at extinctions and introductions; and exciting discoveries have been made (e.g. Millener 1988) among subfossil bones of wrens to moa littering the floor of limestone caves in North-west Nelson. Clearly we still await a definitive account of the early avifauna of New Zealand (but see Holdaway 1989).

In his *The Art of Bird-Watching*, Max Nicholson (1931) claimed that, 'Bird watching is either the most scientific of sports or the most sporting of sciences . . . as a sport it is distinguished by the fact that no one knows the rules.' Things have not changed. Certainly in a small country so thinly populated as New Zealand all bird-watchers must be catered

for by the one Ornithological Society of New Zealand and all may aspire to publish in its journal *Notornis*, named to mark that bird's rediscovery in 1948.

It is easy to forget how far ornithology in New Zealand has come since *NZ Bird Notes* (which preceded *Notornis*) was first published in 1944. In April of that year, the Editor, Brian Marples, reported on 'Trapping and ringing work on the White-eye . . . throughout the Dominion'. He had to explain that '. . . the rings are made of aluminium, usually from Selo film cases, with a number and perhaps the initial of the worker scratched on them'. Bird ringing remained 'ringing' until the American Thane Riney and Ken Miers (1956) published on 'banding' *Notornis*. Thereafter the American usage stuck.

The journal *Notornis* has served New Zealand ornithology well, steering a middle course between events of primarily local interest and more 'scientific' studies that have stood the test of time. Besides Marples' (1944) study of White-eyes in the latter category, early issues contained censuses of breeding Gannets (*Sula serrator*), (Wodzicki & Fleming 1946, Fleming & Wodzicki 1952), Fleming's (1962) 'History of the New Zealand landbird fauna', Williams' (1962) examination of the extinction rates of land and freshwater birds, and Bourne's (1964) prophetic paper suggesting that the Magenta Petrel and the Chatham Island Taiko were one and the same and might still be breeding there: it is and they are. The contents of *Notornis* also attest to the growing interest of New Zealand ornithologists in the birdlife of Antarctica and the South-west Pacific.

Recent editions of Falla *et al.*'s *Field Guide to the Birds of New Zealand* (1966) provide local ornithologists with a handy reference book in the Peterson tradition, comparable to those covering other parts of the world. This invaluable volume has been accompanied by the usual crop of books purporting to cater for the special needs of every class of birdwatcher, as well as some fine books of photographs, paintings and a few sound recordings. In a class of their own are Turbott's (1967) edition of *Buller's Birds of New Zealand*, a classic from 1888, and Fleming's *George Edward Lodge: the Unpublished New Zealand Bird Paintings* (1982), which had been gathering dust in the National Museum since about 1913. It has to be admitted, however, that New Zealand ornithology suffers from the lack of any one truly comprehensive and up-to-date work on the birds of the region, such as underpins ornithology in more favoured regions; Oliver's *New Zealand Birds* (1955) was the last attempt at full coverage.

Over the last 50 years, amateur ornithologists, the NZ Wildlife Service (now submerged in a new Department of Conservation), Ecology Division of DSIR, the museums and the universities have all made important contributions across the spectrum of New Zealand ornithology. The next 50 years should be equally productive.

J.A. Gibb

Recent Bird Research at the New Zealand Subantarctic Islands

For the purpose of this review the subantarctic islands comprise the Bounty, Antipodes, Campbell, Auckland, Snares, and Macquarie Islands and their various off-liers. Macquarie Island, although politically part of Tasmania, is by zoogeography closely related to the New Zealand islands and appropriately included here. 'Recent' in the present context covers work published in or later than 1970. For an earlier review of research from this region see Warham (1980).

Getting to and from the southern islands has been a major problem over the years and investigators have used the New Zealand Navy and other New Zealand government vessels, the United States Navy, fishing boats, and tourist ships for transport. Paradoxically, these islands are less accessible than is the Ross Dependency, which one reaches direct by air from Christchurch. Much of the bird work has been supported directly or indirectly by New Zealand government agencies, which have shown some renewed interest since the declaration of a large exclusive economic zone embracing these islands.

The bird research itself has been rather patchy, most of it done during short summer-time visits. Only at Macquarie Island have year-long spells in the field been possible for ornithologists, thanks to the presence of a permanent research station. This has allowed some long-term work such as that on the Royal Penguin (*Eudyptes schlegeli*) summarised by Carrick (1972). Campbell Island is also permanently staffed, but although members of the meteorological parties and visitors, mostly short term, have collected useful data over the years, very few ornithologists have seen a full year there. The Hornings, who stayed at the Snares Islands for nearly 15 months, were primarily entomologists but contributed much information on the birds, some of which has been published, for example Horning & Horning (1974).

The work done has mainly been surveying and cataloguing to determine the numbers and distribution of species, their seasonal use of habitats, behaviour and breeding phenology. Some selective collections have been made to augment the often poorly documented material in our museums. Little experimental work has been attempted, much less than has been done in the New Zealand Antarctic. Although many gaps in our knowledge remain, the period in question has seen great increase in that knowledge, probably more than in all the preceding years.

The Surrounding Seas

The behaviour and distribution of oceanic birds in the huge area encompassed by these southern islands have yet to be looked at as a whole. The most comprehensive accounts are those made at sea by Jenkins (1981), who included maps of sightings of the major seabirds of the region, and that of Robertson & Jenkins (1981) of sightings during extensive travels in 1981. This last paper includes information on the numbers and species accompanying the fishing fleets. Otherwise we have only data gathered by people transecting the area *en route* to other destinations — by Darby (1970), Harper (1972), Hicks (1973), Vooren (1973), and Johnstone (1974). In his study of the feeding techniques of petrels in the Southern Ocean, Harper (1987) included observations from our area. All these were summertime visits: the situation in winter seems to be unknown.

Two general accounts of the status of the seabirds of this region have been given recently. Rounsevell & Brothers (1984) covered the seabirds of Macquarie Island and their conservation, and the programmes being mounted there to control introduced rabbits and cats. A parallel review by Robertson & Bell (1984) is less detailed but covers the seabirds of the whole New Zealand region. Both accounts include estimates of population sizes.

The Bounty Islands

The Bounty Islands are perhaps the least accessible of our southern islands, but, being small, much can be seen from offshore and the general composition of the summertime avifauna was known before recent landings there. Darby (1970) confirmed the breeding of the Cape Pigeon (*Daption capense*) on these islets, and a 2-week stay in November 1978 of a 3-man party on Proclamation Island resulted in a comprehensive report on its birds. Helicopter surveys added information on some of the other islets in the group (Robertson & van Tets 1982). Their account is notable for data on the general breeding biology and behavioural patterns of the endemic shag (*Leucocarbo campbelli ranfurlyi*), previously unstudied in the field. They estimated that there were 569 breeding pairs. They obtained nest densities and early chick growth of the Salvin's Mollymawks (*Diomedea cauta salvini*) (c. 76 000 pairs) and Erect-crested Penguins (*Eudyptes sclateri*) (c. 115 000 pairs) and information on the little-known *crassirostris* prion.

The Antipodes Islands

The birds of Antipodes Island, south from the Bounties, were very much unknown until examined by 2 parties, 1 from 28 January to 12 March 1969 from the University of Canterbury, the other from 20 November to 6 December 1978 sponsored by the New Zealand Department of Lands & Survey and the Wildlife Service. The first party worked solely on the main island, the second used boats and a helicopter to explore some of the off-lying islets and stacks.

The bird work done by the first expedition has all been published, as has a detailed account of the expedition (Warham & Johns 1975). The general account of the birds included estimates of the sizes of the populations of Northern Giant Petrels (*Macronectes halli*) and the dark-plumaged Wandering Albatrosses (*Diomedea exulans* subsp.) as well as a detailed survey of the birds present (Warham & Bell 1979). Some new data on the Antipodes Island Snipe (*Coenocorypha aucklandica meinertzhageni*) were given, measurements of the smaller petrels tabulated, and the occurrence of a population of Soft-plumaged Petrels (*Pterodroma mollis*) recorded. This was a new bird for New Zealand.



Figure 13. John Warham in Wandering Albatross country, Antipodes Island, 1969. Photo: R.J. Stanley.

However, the main research findings were published separately. A major objective had been to learn something of the breeding of the Erect-crested Penguin. The work in 1969 covered behaviour and aspects of the later chick-rearing stage (Warham 1972b). Biometrical work on Rockhopper Penguins (*E. chrysocome*) was also published (Warham 1972a), as was an analysis of the aerial calls of the Soft-plumaged Petrels (Warham 1979).

Treeless Antipodes Island (2025 ha) is remarkable in supporting thriving populations of 2 congeneric parakeets, the Antipodes Island Parakeet (*Cyanoramphus unicolor*) and Reischek's Parakeet (*C. novaezelandiae hochstetteri*). These were the subjects of a comparative ecological study by R.H. Taylor, who found a marked niche segregation in feeding habits and timing of breeding (Taylor 1975). The expedition brought live examples of both parakeets back to New Zealand; others were captured later and *unicolor* was established as a breeding bird in local aviaries. Further data on the feeding ecology and breeding of that bird were given by Taylor (1985), who estimated a population of 2000–3000 birds.

Information from the 1969 visit was also incorporated in other research papers, for example on petrel body temperatures, petrel wing loadings, petrel vocalisations, and petrel stomach oils (Warham 1971a, 1977, 1988; Warham *et al.* 1976).

The main published results of the 1978 party's work on this island consist of papers by Imber (1983) on the smaller petrels and of Moors (1980) on the Southern Skua (*Stercorarius skua lomnbergi*). Imber's work filled some important gaps in the earlier account. He was able to confirm breeding of the Snares Cape Pigeon (*D. c. australe*), of the Subantarctic Fairy Prion (*P. turtur subantarctica*) and of the Grey-backed Storm-Petrel (*Garrodia nereis*). He also found Soft-plumaged Petrels in burrows, but was evidently a little early for their eggs. A major find was that the Little Shearwater (*Puffinus assimilis*), seen by earlier parties, nested abundantly on the off-lying islands, comprising the largest Australasian population of that bird and, unlike our other populations, laying in the early spring. An unexpected finding was that the small colony of Black-browed Albatrosses (*Diomedea melanophrys*) on Bollons Island was of the dark-eyed typical subspecies, not the pale-eyed form *impavida*, which breeds only at Campbell Island.

Moors' study of the skua concentrated on food habits, clutch size, and early chick growth. He found that penguin eggs and chicks were the dominant prey of coastal nesting pairs, petrels as large as Shoemakers (*Procellaria aequinoctialis*) that of the inland ones — evidently rather similar to the situation at Macquarie Island.

Campbell Island

For an ecologist the work at Campbell Island in monitoring the effects of removing the sheep is particularly interesting. The plan was stimulated by the census of sheep and Royal Albatrosses (*Diomedea epomophora*) made by Taylor and Bell during the University of Canterbury's Antipodes Island Expedition (Taylor *et al.* 1970). This led to the revival of a proposal to construct a fence across the narrow centre of the island, remove the sheep from one half and monitor the changes to albatross numbers and vegetation in the sheep-free and sheep-rich areas. The fence was erected in 1970 and the sheep in the northern half shot. The recovery of the vegetation with the removal of sheep was dramatic, unlike that of the albatrosses which, by 1976, had increased in both halves, though rather more in the sheep-free segment (Dilks & Wilson 1979). These authors suggested that the increases may have been less a consequence of the absence of sheep than the end to burning-off and human predation and perhaps to a better food supply due to reduced competition from marine mammals.

The 1969 University of Canterbury team spent 8–26 January on Campbell Island, and part of the work done related to the breeding and biometrics of the Rockhopper Penguin. The results allowed some comparisons with the Macquarie and Antipodes Island populations (Warham 1972a).

An expedition of the Lands & Survey Department at Campbell Island in the summer of 1975–76 had a boat and so could inspect the cliffs from the sea and land on some of the offshore islets (Anon. 1980). These visits revealed probable breeding sites of Cape Pigeons

and, on Dent Island, the presence of small numbers of the Campbell Island Teal *Anas aucklandica nesiotis* (Robertson 1976). This appears to be the sole remaining breeding place for this form. There are also good colonies of Subantarctic Diving Petrels (*Pelecanoides urinatrix exsul*) and many Pipits (*Anthus novaeseelandiae*) on Dent Island with indications of breeding by other petrels now rare or extinct on the rat-infested main island. The morphology of this and of other populations of the New Zealand Pipit was examined by Foggo (1984).

During this expedition the locations of the colonies of the 2 resident mollymawks, the Black-brows and Grey-heads (*D. chrysostoma*) on the main island were plotted. There were about 11 530 pairs of Grey-headed Mollymawks and 74 825 of the Campbell Island form of the Black-browed Mollymawk.

There was evidence that the Rockhopper Penguins had declined in numbers, and Moors (1986) confirmed this trend and alerted ecologists to the need to monitor other populations of this circumpolar species. The causes of the decline are not known. Although cats and rats are probably the main causes of the loss of the small petrels from the main island they do not appear to affect the penguins. Dilks (1979) found the remains of only 1 prion-sized seabird in the 20 samples of cat scats he analysed: the few birds identified were Silvereyes (*Zosterops lateralis*), Hedge Sparrows (*Prunella modularis*), and Redpolls (*Carduelis flammea*). The main prey was Norwegian rats.

The Auckland Islands

The Auckland Islands with their variety of habitats and relatively comfortable anchorages have attracted many visitors over the years. Taylor (1971) reviewed the history of expeditions there and of man's effects on the birds and other animals and gave a list of the birds still breeding on Enderby and Rose Islands. Enderby still had healthy populations of Yellow-eyed Penguins (*Megadyptes antipodes*), Royal Albatrosses, Auckland Island Shags (*Leucocarbo campbelli colensoi*), Red-fronted Parakeets, and Pipits.

A major visit of the Lands and Survey Department in 1972 resulted in a preliminary report on the birds of the islands (Yaldwyn 1975). Little new information was found, but the long-presumed nesting of the Cape Pigeon was confirmed with about 200 pairs on Beacon Rock, North Harbour. Nesting of the Grey-backed Storm Petrel and Erect-crested Penguin was also confirmed, and the Rockhopper Penguin and Northern Giant Petrel colonies were mapped. A small population of New Zealand Falcons (*Falco novaeseelandiae*) breeding around Carnley Harbour and on Adams Island was evidently feeding on Antarctic Prions (*Pachyptila desolata*). The Auckland Islands Rail (*Rallus pectoralis muelleri*) was seen. The population of Banded Dotterels (*Charadrius bicinctus exilis*) was estimated at 100–200 birds, this large subspecies having been described by Falla (1978). The feeding habits of these birds were examined by Pierce (1980) during a later Lands and Survey Department visit.

Enderby Island Royal Albatrosses had increased; there were about 18 pairs nesting and 41 non-breeders in 1972–73 and a few isolated nests on headlands at the northern end of the main island (Yaldwyn 1975). The Wandering Albatrosses were mostly on Adams Island (c. 7000 pairs), making the Auckland Islands, with a total of about 7250 pairs, the largest known colony of this species in the world. The 1972–73 party also got on to Disappointment Island, home of the typical race of the White-capped Mollymawk (*D. c. cauta*), again with the largest population of the species, c. 60 000 pairs.

A more definitive publication from this expedition is Weller's account (1975) of the Flightless Teal (*Anas a. aucklandica*), based on 5 weeks at Ewing Island and around the northern end of the group. These birds were present on most of the small low islands, but some had nested on steep-sided Disappointment Island evidently without dependence on sea foods. Weller studied the duck's food and feeding behaviour on the low shorelines where most were found. Here they worked through the kelp and shallow pools taking invertebrates and decaying algae. Their main predators were the local skuas that the ducks watched warily, whereas they paid no attention to giant petrels that flew by.

Another brief account of the Auckland Island Teal is that of Scott (1971), and earlier,

Kear & Scarlett (1970) laid the extinct Auckland Island Merganser (*Mergus australis*) to rest.

The Snares Islands

The Snares Island Field Station of the University of Canterbury was established in 1961 by Bernard Stonehouse and the research programme taken over by me in 1967. As we are both ornithologists it is understandable that bird studies featured largely in the work undertaken, and this continues to the present. Of the 51 items in the 'Collected Reprints' of these expeditions, issued in November 1984, 18 dealt with birds.

There have been 2 general accounts of the birds since 1970. The Hornings were the first (and only) scientific party to overwinter on the Snares — in 1971–73 — and they gave an account of the birds seen with some details of arrivals and departures (Horning & Horning 1974). They recorded 7 new birds for the islands, none very surprising except perhaps for the 3 Skylarks (*Alauda arvensis*) seen flying overhead in February and April. Grey Warblers (*Gerygone igata*) were also seen for the first time, as was the Fantail (*Rhipidura fuliginosa*), which has since become plentiful and bred. The Hornings banded 858 fledgling Buller's Mollymawks (*D. bulleri*), some of which have been seen again in recent years.

Sagar (1977a) gave a parallel account of the birds of the 1976–77 expedition. A feature of that summer was the presence of Black Cormorants (*Phalacrocorax carbo*), 49 being seen at one time. Some died and all seem to have been part of the exodus from eastern Australia that carried birds of this species far and wide to Norfolk Island and elsewhere.

Some of the Snares Island parties have landed on the second largest island of the group — Broughton Island — and on the rocks of the Western Chain. However, the late Sir Charles Fleming was the first ornithologist to get on to the Western Chain in recent times, giving a general account of the breeding habitats and noting that the Snares Crested Penguins (*Eudyptes robustus*) on Toru were still incubating whereas on Main Island they already had quite large chicks (Fleming & Baker 1973). These workers also discovered Fulmar Prions nesting in the rock crevices, a species hitherto unknown from The Snares.

The next party landed on Wha and Rima Islets, spending 8 hours on Rima to count penguins, Salvin's Mollymawks (*D. c. salvini*), Cape Pigeons and Fulmar Prions (Sagar 1977b). More comprehensive surveys of Western Chain birds were made in 1984 (Miskelly 1984), when all the main islets were inspected. A surprise was finding 3 Black-browed Albatrosses of the typical race, 2 of them displaying to each other. There were also a few Chatham Island Mollymawks (*D. c. eremita*) on Rima. One of these was sitting on an empty nest with a Salvin's Mollymawk alongside. On Toru, 2 *eremita* were sitting next to *salvini* on nests. So far no breeding or interbreeding has been reported.

A major component of the Snares Island avifauna is the endemic Snares Crested Penguin. An initial account of the biometrics of this bird was published by Stonehouse (1971) and a more detailed one of the breeding biology by Warham (1974). The latter paper, based on 6 summers' work, dealt with the annual cycles of breeders, non-breeders, and yearlings, mortality, and the complex display repertoire. It included the first mapping of the 112 colonies on Main and Broughton Islands. Some of the vocalisations accompanying the displays were also described (Warham 1975).

Another notable bird of these islands is the typical race of Buller's Mollymawk. Most of this subspecies breeds here, a few on the Western Chain and on the nearer offshore stacks. The distribution of the estimated 4750 nests was mapped (Warham & Bennington 1983) and vocalisations used in displays analysed (Warham & Fitzsimons 1987).

By far the most abundant bird at the Snares Islands is the New Zealand Muttonbird or Sooty Shearwater (*Puffinus griseus*). This burrows wherever the soil is deep and dry enough. It was studied over 4 summers and the annual timetables detailed with the help of additional information collected in spring and autumn by the Hornings. Chick rearing and other data were gathered for comparison with earlier work from Whero Island, Stewart Island (Richdale 1963). His were slightly smaller birds that laid slightly later than those at The Snares (Warham *et al.* 1982). Burrow densities were scored for a series of randomly

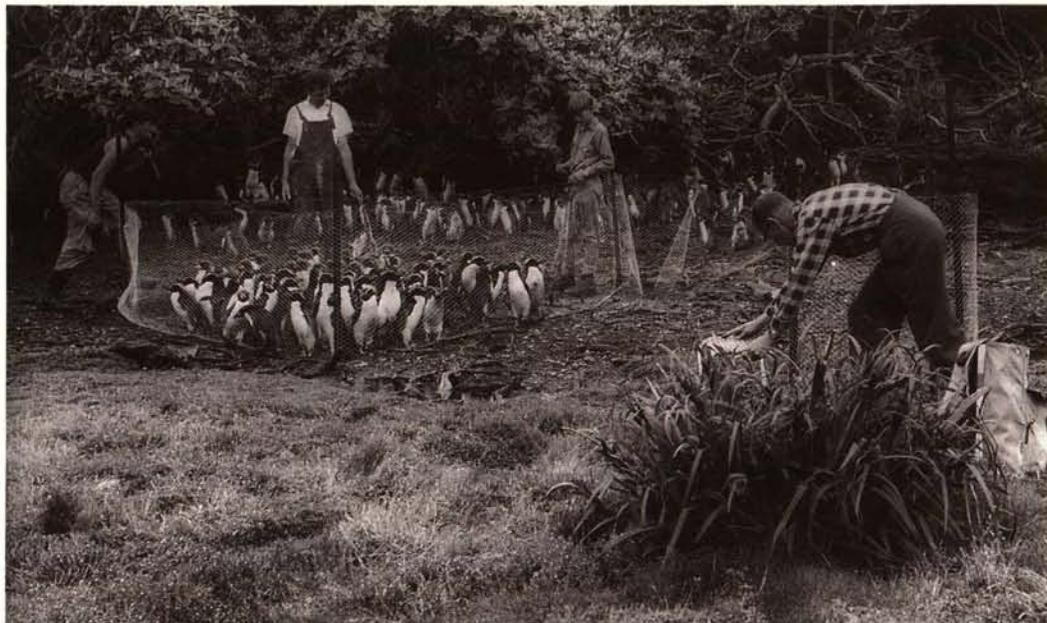


Figure 14. Preparing to band Snares Crested Penguin chicks, University of Canterbury Snares Island Expedition, 1967. (Left to right) Dick Anderson, Bernard Stonehouse, Dennis Knox, John Warham.

chosen quadrats in the various vegetation types to give an estimate of 3 287 000 burrows on Main Island (328 ha). Heaviest densities of 1.9/m² were in tussock meadows (Warham & Wilson 1982).

In the 1960s and early 1970s some Buller's Mollymawks banded as breeders by Richdale in 1948 were still nesting. Richdale & Warham (1973) generated survival curves for 2 cohorts of birds banded as breeders. One pair was still nesting after 23 years, and several birds were at their old sites with different partners, their original ones presumably being dead. The 1976–77 party found one of Richdale's Buller's Mollymawks that he had banded as a breeder in 1948 still breeding near a Richdale peg 29 years later.

Sagar (1979) studied the Cape Pigeons of the northern race *australe* that breed at various places in the cliffs. His research covered mainly late incubation to chick fledging. Breeding in many respects is similar to that of birds of the nominate race except that the timing is earlier at this northern location although, as in other populations, it is well synchronised. In another facet of his study, he examined the sexual dimorphism of the adults and provided a discriminant function for separating the sexes by head and middle toe with claw measurements (Sagar 1986).

Another little-known New Zealand endemic, the Mottled Petrel (*Pterodroma inexpectata*), nests abundantly on these islands during the southern summer. The results of 4 years' observations of its general breeding behaviour and vocalisations have been published (Warham *et al.* 1977), but close study of its whole cycle while in the Southern Hemisphere has yet to be undertaken.

The Antarctic Terns (*Sterna vittata*) that breed on the Snares Islands in small numbers were watched during a summer visit by Sagar (1978), the first detailed field examination of the species in our region. He presented basic information on incubation periods, chick growth, and nestling periods and found that, as at Macquarie Island, there is a double peak in laying (see also the note by Sadleir *et al.* (1986) on the laying of this bird at Campbell Island). Observations on how these terns cope with the strong winds of the Subantarctic have also been made (Sagar & Sagar 1989).

The 2 endemic passerine subspecies of the Snares Islands — the Snares Fernbird

(*Bowdleria punctata caudata*) and Snares Black Tit (*Petroica macrocephala dannefaerdi*) — together with the Island Snipe (*C. a. huegeli*), are plentiful and make attractive subjects for study, partly because of their tameness. The fernbird research by Best (1979) concentrated on foods and feeding techniques and on the attitudes adopted when hunting prey. It was the result of 2 summertime stays.

Incidental information on the Black Tit has been collected over the years (e.g. Best 1975), but only recently has its breeding biology been scrutinised closely. McLean & Miskelly (1988) calculated that there are about 500 pairs, if their estimated minimum breeding density of 2.7 pairs/ha holds throughout the forested and scrub-covered ground on the islands. The characteristics of 49 nest sites were analysed and these included overhead protection from the nightly downpour of Sooty Shearwaters. Data were obtained on clutch size, the timing of breeding over 3 seasons, incubation and parental care. The authors suggest that the high density of nests arises because of the lack of predation, but this leads to high intraspecific competition so that, compared with mainland populations, productivity is low at 2.5 chicks per pair per annum.

That the Snares Island Snipe lacks an aerial display has been confirmed by Miskelly (1987). The Snares Islands birds have a flexible incubation system in which some males are polygynous and others not (Miskelly 1989).

Much material on the birds of the Snares Islands has contributed to publications on other related topics, such as their ectoparasites (e.g. Smit 1979). Bennington *et al.* (1975) reported on levels of PCBs and DDT in Sooty Shearwaters, Common Diving Petrels, and Mottled Petrels from these islands, the last species having the highest levels of contamination, probably acquired during the post-nuptial stay in the North Pacific.

Macquarie Island

The research station at Macquarie Island was established in 1948 and from its inception ornithological observations were made. Later, long-term projects, mostly by the CSIRO, were initiated. During the period under review work on the Royal Penguin undertaken during a 15-months' stay was published (Warham 1971b), and the late Robert Carrick presented his analysis of the timetables of the various categories of the Royal Penguin population, of the progression of each sex towards adulthood, and of their survival and breeding success in relation to age (Carrick 1972). This work was based on observations of 884 adults (many of known age and partnerships) that were flipper banded between 1956 and 1967, as were 17 223 chicks and 994 adults of unknown status — see also Carrick & Ingham (1970). Breeding success was related to age and few birds less than 10 years old contributed regularly to the annual production of fledged young. Breeding success was also related to bodyweight, and minimum weights for both sexes at each stage of the breeding cycle were established.

In a further study of this species, Smith (1974) redescribed the display repertoire and suggested that all the main displays reduce disturbance in the colonies and conserve time and energy.

Shaughnessy (1975) scored the facial colours of these birds around the island, finding dark-faced ones commoner on the west side. Truly black-faced examples on the Macaroni Penguin pattern were probably of the order of 1 in 10^5 and if a stray bird with a jet-black throat (some of which have been found on The Snares and on Campbell Island) can be identified as male, it is much more likely to be a true Macaroni (*E. chrysolophus*) than an abnormal Royal Penguin.

The foods of Royal Penguins had long been known to consist mainly of euphausiids, but no detailed data on the diet were known until food samples from adult birds taken by the water offloading technique were made by Horne (1985). His late summer study covered both Royal and Rockhopper Penguins, finding that, at the time of sampling, both species were preying on similar species. As the Rockhoppers' stomach contents were less digested, they may have been feeding closer inshore. The diet of the Royals on the east coast was significantly different from that of those nesting on the west, the latter taking less euphausiids. These findings were confirmed by the longer studies of Hindell

(1988a,b), who also found that the diets changed during the course of the season, becoming more varied during chick feeding, at which time the Rockhoppers took more fish, although *Euphausia vallentini* still made up the bulk of the food of both species throughout.

A similar study of the food of the King Penguin (*Aptenodytes patagonicus*) at this island by Hindell (1988c) ran over a full year. Their prey were mainly 2 species of lantern fish, juveniles being eaten from December to July, adults mostly in August and September. The main colony of this bird, at Lusitania Bay, has expanded until in 1975 a small additional colony became established about 10 km to the north of the main one (Rounsevell & Copson 1982). At least 70 000 pairs nest on the island now (Rounsevell & Brothers 1984).

While the King Penguins have increased, the small population of the Wandering Albatross has decreased, and very few chicks are now reared. The remanent population was studied by Tomkins (1983, 1984, 1985). In his 1983 note he presented information on the copulation of these birds in relation to egg laying. His 1984 paper dealt with the biometrics of the birds and their eggs and the 'Gibson Code' of their plumage scores. His are the first published measurements from this population. In his 1985 paper he analysed the breeding success of the birds from 1974 to 1978, finding an annual mortality of 21% of the breeding birds, much higher than that of an earlier estimate for 1965-68 of 5.4% by Carrick & Ingham (1970). The cause of the decline in numbers and increased mortality is not known.

Banding at this island has extended over many years, many birds being colour-ringed and of known age and history. Analysis of annual records of marked Light-mantled Sooty Albatrosses (*Phoebastria palpebrata*) by Kerry & Colback (1972) established that successful breeders do so biennially. The status of the small populations of Black-browed and Grey-headed Albatrosses has also been reviewed recently (Copson 1988). The largest group of Black-brows is on Bishop Island, about 33 km south of the main island, with 44 half-grown chicks in February 1976 (Lugg *et al.* 1978).

The finding that the giant petrels, genus *Macronectes*, contained 2 sibling species (Bourne & Warham 1966) led to a flurry of investigations around the Subantarctic. Johnstone (1974) described the sightings and behaviour of the 2 birds as seen during a series of voyages between Australia, Macquarie Island, and Antarctica, finding that the northern species *M. halli* tends to follow ships and its range at sea tends to be more northerly than that of the southern form *M. giganteus*, which follows ships less regularly. Their diets proved to be very similar, but *giganteus* took more marine foods and less carrion than *halli*, although the differences were considered inadequate to explain the differences in breeding seasons (Johnstone 1977).

Behaviour of the 2 species when feeding at seal carcasses on Macquarie Island's beaches was also examined (Johnstone 1979). As might be expected of similar species that often nest within sight of each other, attempted interbreeding sometimes occurs (Johnstone 1978). Electrophoretic analysis of some serum proteins by Shaughnessy (1970a) showed that the 2 species are very similar genetically. Shaughnessy also looked at the genetics of the white and dark phases of the southern species. Using data on 208 families, he concluded that the dimorphism is controlled by 2 autosomal allelic genes with white phase dominant to dark and that the frequency of mixed marriages did not differ from that expected of random mating (Shaughnessy 1970b). The banding and recovery of giant petrels at this island has been reported (Woehler & Johnstone 1988).

Burrowing petrels were once abundant at Macquarie Island but have declined from predation by cats and Weka (*Gallirallus australis*). Their present status was reviewed by Brothers (1984). He found the Blue Petrel (*Halobaena caerulea*) still breeding on a few offshore stacks. This bird, once reputed to be plentiful, had been searched for several times without success, and so its discovery was rather surprising. The prognosis for its survival seems poor because numbers were small and no eggs were known to have hatched, although Brothers suggested that about 500-600 pairs might still be around the island on rocks safe from cats. Brothers also discovered very small groups of Fairy Prions,

again on cat-free stacks. This was a new breeding species for the island, although specimens had earlier been taken away from nests and breeding had been suspected.

Predation on burrowing petrels by feral cats and skuas was assessed by Jones (1977, 1980) from examination of cat scats and stomach contents and skua castings. The White-headed Petrel (*Pterodroma lessonii*) and the Antarctic Prion are the most plentiful burrowing species still breeding and those most often killed by these predators.

The Macquarie Island or King Shag (*Phalacrocorax albiventer purpurascens*) is a familiar species to visitors because a large accessible colony is not far from the research base at Buckles Bay, but surprisingly little research had been done on the species before that of Brothers (1985), who collected data over 5 breeding seasons. He located 23 breeding sites and estimated a total population of 760 breeding pairs. He detailed the timing of laying, pair-bond and nest-site tenacity, chick rearing activity, foods, mortality, and the first measurements of live adults. Adults were sexed by differences in voice.

The Southern Skua population has been estimated at about 550 breeding pairs (Rounsevell & Brothers 1984). Aspects of the biology of this bird were studied by Purchase (in Carrick & Ingham 1970), its relationship with the rabbit population by Jones & Skira (1979), this latter partly in conjunction with a proposed rabbit eradication programme. These workers found that during summer, skuas with territories on the low-lying coastal terraces took few rabbits but concentrated on killing and scavenging at the nearby penguin colonies and around the Elephant Seals, whereas skuas on the plateau, distant from the penguin colonies, were heavily dependent on young rabbits.

Stewart Island Weka (*G. a. scotti*) were introduced as a food for the sealers probably in 1874 and were widespread by 1890. They have been another pest with which the native birds have had to contend. The first investigation on Weka biology at this island was begun in 1976 with field counts to assess the size of the population, and in 1979, 98 birds were shot for data on measurements and for analysis of gizzard contents (Brothers & Skira 1984). The sexes were markedly dimorphic in size in all standard measurements except tail length. Brothers & Skira reckoned that there may have been 500 Weka on the island, but recognised that such figures were imprecise because of the cryptic behaviour of the birds and their penchant for hiding in heavy tussock. The diet was omnivorous, as usual, but few birds were found among the food samples: insects, spiders, and vegetable matter predominated but mice and rats were thought probably more important because of their size. The Weka themselves suffer predation from feral cats and skuas. Eradication of the cats and Weka is planned and the latter have already declined following the reduction of the rabbits through myxomatosis, presumably as a result of increased pressure by the cats (Brothers & Skira 1984).

To end on a sombre note, Taylor (1979b) traced the history of the Macquarie Island Parakeet (*C. n. erythrotis*) from its abundance up to 1880 to its extinction about 1890, during which time the sealers ate them and took them back to Sydney as pets. This coincided with the introduction of rabbits, cats, and Weka. Taylor suggested that the introduction of rabbits may have provided a year-round food for the cats, allowing both cats and Weka to increase, leading to increased pressure on the parakeets throughout the year. Similar factors may have led to the extinction of the indigenous Banded Rail (*Rallus philippensis macquariensis*).

John Warham

Evolution, Extinction and the Subfossil Record of New Zealand's Avifauna

In its evolutionary history the New Zealand avifauna, both fossil and living, shows some intriguing features. Land bird species are relatively few and most are endemic; with some notable exceptions, few groups have shown a marked degree of adaptive radiation; an unusually large number of species is flightless or has weak powers of flight; a remarkable number of species has become extinct within the last 1000 years. Of the 93 terrestrial or freshwater species found in Pleistocene to subrecent deposits and, therefore, considered to have been prehistoric colonists, some 33 species (the exact number depending on the classification adopted) are presumed to have been extirpated during Polynesian settlement and a further 10, at least, have become extinct within the last 150 years. In this brief résumé, I have not cited literature sources as these are given in a fuller version of this paper in Rich *et al.* (1990).

New Zealand's Geological Background

It has been argued that palaeogeographic and palaeoclimatic events in the Mesozoic and Cenozoic have greatly influenced present-day bird distribution and evolution, and that these events need to be considered when discussing the centres of origin and pathways of dispersal of avian groups. A succession of episodes in the geological history of New Zealand, the nature and timing of which have profoundly influenced the development of other segments of the biota, have been no less crucial to the evolution of its avian fauna.

New Zealand, at the beginning of its geological history, formed a segment of Gondwanaland, roughly equi-distant between the Pacific coast of West Antarctica and the east coast of Australia. It was thus contiguous with other southern continents and shared to some degree their fauna and flora. In the late Cretaceous, differential movement between Australia, New Zealand, and Antarctica produced first the separation of New Zealand from West Antarctica (82 million years ago) and then the opening of the Tasman Sea (82–60 million years ago).

The timing of New Zealand's separation is particularly critical to the subsequent evolution of its avian fauna, in that separation apparently pre-dated the arrival in the Australian region of both snakes and placental mammals.

Throughout the Tertiary, New Zealand, as part of a mobile Pacific margin, became a changing archipelago, tectonic folding and faulting producing frequent changes in geography. In the absence of land connections, dispersal of faunal elements to New Zealand during the Tertiary must have been dominantly trans-Tasman, undoubtedly assisted since the Oligocene by the circum-Antarctic current and its associated west wind drift.

The Pleistocene was a period of marked tectonic and climatic fluctuation. Repeated glacial and interglacial episodes produced marked geographical, climatic, and biological changes. At each interglacial, high sea-levels inundated low-lying areas with the consequent separation of islands leading to varying degrees of endemism in the biota isolated on them. Where such high sea-levels almost completely inundated island groups, much of the terrestrial biota may have been eliminated. The diverse subfossil and recent faunas of the Chathams, for example, must have resulted largely from adaptive radiation among late Pleistocene colonists. During glacial periods, retreat of the sea allowed considerable land extension, and many islands, previously separated during the Pliocene, re-joined the mainland. The last post-glacial period saw a general amelioration of climate. Areas previously deforested became revegetated and a rapid rise in sea-level inundated former straits which, once again, became barriers to the dispersal of terrestrial organisms.

Shorelines readjusted to a sea that stabilised at its present level some 6500 years ago. Except in limited alpine, arid, or wetland regions and in areas subjected to recent volcanism, forest and scrub would have dominated the landscape.

The arrival of man about 1000 years ago initiated a series of ecological changes of unprecedented size and speed. The introduction, for the first time in New Zealand's history, of carnivorous mammals — first Polynesian rats and dogs and then European cats, rats, and mustelids — as well as the extensive clearance of indigenous forest, has had a continuing profound ecological impact, especially on the more ancient birds.

Possible Centres of Origin, Dispersal Routes, and Times of Colonisation

Land connections in the Southern Hemisphere persisted until the Late Cretaceous and Tertiary, and climates that supported sizeable forests persisted until the late Tertiary in South America, Australia, New Zealand, and the Antarctic. Birds could pass freely along both continental and archipelagic routes. As the continents became more isolated and climates more zoned, however, bird faunas on the major land masses became increasingly distinctive. A Gondwanan origin and dispersal has been proposed for the ratites (though recently questioned), penguins, some galliforms such as the megapodes, suboscines, and, somewhat less certainly, pigeons, parrots and cuckoos.

Six main geographical elements have been recognised in the New Zealand avifauna (i.e. archaic, Malayo-Pacific, austral, Holarctic, Australian, and cosmopolitan). Those taxa inferred to have been in New Zealand long enough to be classed as *archaic* elements (the ratites and the 2 endemic families of passerines) *may*, like the tuatara (*Sphenodon*), have reached New Zealand directly by a southern route. Some groups, especially those of ancient dispersal, *may* have originated in southern (Gondwana) regions but reached New Zealand, in effect secondarily, through Australia. Equally, groups of northern (*Malayo-Pacific*) affinity *may* have come either directly from the north and/or through Australia. The southern or *austral* element in the avifauna consists exclusively of seabirds, especially penguins, albatrosses, petrels, and cormorants, many of which have circumpolar distributions. A few New Zealand birds (the *Holarctic* element) are related to North Temperate forms but are absent in the intervening tropics, for example the Scaup (*Aythya novaeseelandiae*), the Merganser (*Mergus australis*), the Black-billed Gull (*Larus bulleri*), and the South Island Pied Oystercatcher (*Haematopus ostralegus finschi*). The dominance of the *Australian* element in the New Zealand avifauna, especially among terrestrial and freshwater birds, has long been recognised. As a result of transoceanic 'sweepstakes' dispersal, Australia has been a prolific source of plants and animals from the early Tertiary to the present.

The morphological differences that distinguish New Zealand birds from their overseas relatives have been used as a rough indication of the time that has elapsed since they first successfully colonised New Zealand. Despite the problems arising from changes in systematic ranking of and differing evolutionary rates in particular groups, this yardstick, in default of other evidence, is used here. Thus, the New Zealand ratites, the moa (Dinornithidae and Emeidae) and kiwi (Apterygidae), *may* have been here in the Late Cretaceous. The other 2 endemic families, the wrens (Acanthisittidae) and the wattlebirds (Callaeatidae), are presumed to be early Tertiary, and 25 endemic genera later Tertiary colonists. The New Zealand thrushes (*Turnagra*), formerly thought to be an endemic family Turnagridae, have recently been placed in the Paradisaeidae. The endemic species of overseas genera are probably Pleistocene arrivals. Endemic subspecies *may* be no older than post-glacial; certainly, well-differentiated subspecies have developed on both sides of Cook and Foveaux Straits and on the Auckland Islands in less than 10 000 years. Birds inseparable from their overseas counterparts are probably all Holocene arrivals. Many, such as the Pukeko (*Porphyrio p. melanotus*), Pied Stilt (*Himantopus h. leucocephalus*), Harrier (*Circus approximans*), Banded Rail (*Rallus philippensis assimilis*), and Kingfisher (*Halcyon sancta vagans*) *may*, to judge by the lack of subfossil records, have colonised only within the last few hundred years. If the known historical colonists and the increasing variety of stragglers that *may* yet breed in New Zealand are added to this list of inferred

trans-Tasman migrants, it is clear that the composition of New Zealand's past and present avian fauna has been markedly influenced by chance, or 'sweepstakes', dispersal.

The Fossil Record

The major inadequacy of New Zealand's fossil record for birds is that only 2 widely separated time periods are represented: the Tertiary, and the late Pleistocene and Holocene. Only a few taxa, representing only 3 orders, have solely Tertiary records. Far more are known from Quaternary deposits, but most of them are found only in post-glacial to subrecent deposits.

Fossil bones of most of the extant and recently extinct bird species known in New Zealand occur in deposits of Plio-Pleistocene to subrecent age. The extinct species represent 8 orders: 1 (Dinornithiformes) includes the extinct endemic families Dinornithidae and Emeidae; another (Caprimulgiformes) has no living New Zealand representatives but is known both living and fossil in Australasia; the remainder (Pelecaniformes, Anseriformes, Falconiformes, Gruiformes, Charadriiformes, Passeriformes) are cosmopolitan, with some living New Zealand species (Table 4).

Plio-Pleistocene deposits have so far yielded only a few isolated bones (mostly of moa), none of them older than about 2.5 million years. Other terrestrial deposits, which have the major subfossil remains, are largely of post-glacial age. The 4 main types of deposit (cave sediments, dune sands, swamp alluvium, and occupation middens) are distributed throughout New Zealand and on some outlying islands. The number of subfossil sites known in New Zealand exceeds 800, of which almost 550 are in the North Island, more than 220 in the South and Stewart Islands, and some 50 in the Chathams.

Caves: Formed mostly in limestone or marble but occasionally in lava, caves are important places for subfossil faunal remains. The birds found in cave deposits are mainly flightless forest-dwellers. Those found most consistently and in greatest abundance include many species of moa (e.g. *Anomalopteryx didiformis*), kiwi (e.g. *Apteryx australis* and *A. owenii*), rails (e.g. *Gallirallus australis*), ducks (e.g. *Euryanas finschi*), parrots (e.g. *Strigops habroptilus*), and passerines (e.g. *Callaeas cinerea*). Frequently, sediments in caves also contain stream-washed accumulations of landsnails, many of them species confined to forest habitats. The age of most remains is unknown, but a few radiocarbon determinations from the Waitomo region (North Island) and North-west Nelson (South Island) have yielded dates mostly within the range 10 000–30 000 years BP.

Swamps: A prolific source of subfossil birds has been peat swamps usually in, or adjacent to, limestone country. Localities such as Lake Poukawa and Te Aute in the North Island and Herbert, Enfield, Kapua, and Pyramid Valley in the South Island have been among the most important subfossil sites so far investigated. Most avian remains recovered from such swamps have been those of moa, although at Te Aute, Pyramid Valley, and Lake Poukawa many carinates have also been found. In the northern North Island most of the extensive peat swamps are too acidic to preserve bone material. Bone material from only a very few swamps has so far been radiocarbon dated, giving ages as yet no greater than about 9500 years BP.

Dunes: Extensive late Pleistocene dunes are in many parts of New Zealand, but none so far investigated appears to have maintained conditions suitable for long-term preservation of bone material. In some places, however, dunes developed during post-glacial time have retained a remarkable array of generally well preserved avian remains, as well as those of associated reptilian and landsnail faunas. A significant feature of the faunas in these dune deposits is that they consist mostly of forest-dwelling species. The consistent occurrence of such species as Kaka (*Nestor meridionalis*), parakeets (*Cyanoramphus* spp.), Kokako (*Callaeas cinerea*), Saddleback (*Philesturnus carunculatus*), and Tui (*Prosthemadera novaeseelandiae*), of extinct taxa with inferred forest-dwelling habits such as moa (Dinornithiformes) and rails (Rallidae), and of landsnails such as *Rhytida* spp. and *Serpho kivi* (an obligate arboreal species) attests to the former existence of extensive vegetative cover at or very near their sites of deposition. Radiocarbon dating of both moa bone

(continued on page 99)

Table 4. Systematic list of birds identified from subfossil deposits in New Zealand. South Island includes Stewart Island. Nomenclature follows Kinsky (1970, 1980) and more recent revisions. Legend: E, extinct species; E*, Australian species now extinct in New Zealand; ?, identification uncertain; S, swamp/alluvium/colluvium; C, cave; D, dunes and/or loess; M, midden (interpret these data with caution as, especially in eroding dune-midden sites, unequivocal evidence associating bird remains with midden debris is often lacking). Note: Kiwis and penguins are at the end of the table.

| | NORTH ISLAND | | | | SOUTH ISLAND | | | | CHATHAM ISLANDS | | | |
|------------------------------------|--------------|---|---|---|--------------|---|---|---|-----------------|---|---|---|
| | S | C | D | M | S | C | D | M | S | C | D | M |
| DINORNITHIFORMES | | | | | | | | | | | | |
| <i>Anomalopteryx didiformis</i> | E | + | + | + | + | + | + | + | + | | | |
| <i>Megalapteryx didinus</i> | E | | | | | + | + | + | + | | | |
| <i>Pachyornis mappini</i> | E | + | + | + | + | | | | | | | |
| <i>P. australis</i> | E | | | | | + | + | + | | | | |
| <i>P. elephantopus</i> | E | | | | | + | + | + | + | | | |
| <i>Emeus crassus</i> | E | | | | | + | + | + | + | | | |
| <i>Euryapteryx curtus</i> | E | + | + | + | + | | | | | | | |
| <i>E. geranoides</i> | E | + | + | + | + | + | + | + | + | | | |
| <i>Dinornis struthoides</i> | E | + | + | + | + | + | + | + | + | | | |
| <i>D. novaezealandiae</i> | E | + | + | + | + | + | + | + | + | | | |
| <i>D. giganteus</i> | E | + | + | + | + | + | + | + | + | | | |
| PODICIPEDIFORMES | | | | | | | | | | | | |
| <i>Podiceps cristatus</i> | | + | + | | + | | | + | + | | | |
| <i>P. rufopectus</i> | | + | | | + | + | + | + | + | | | |
| PROCELLARIIFORMES | | | | | | | | | | | | |
| <i>Diomedea exulans/epomophora</i> | | | | + | | | | + | + | | | |
| <i>D. epomophora</i> | | | | | | | | | | | | + |
| ? <i>D. chrysostoma</i> | | | | | | | | | + | | | + |
| ? <i>D. chlororhynchos</i> | | | | | | | | | | | | + |
| <i>D. bulleri</i> | | | | + | + | | | + | + | | | + |
| <i>D. cauta</i> | | + | | + | + | | | + | + | | | + |
| <i>Phoebastria palpebrata</i> | | | | | | | | | | | | + |
| <i>Macronectes halli</i> | | | | + | + | | | | | | | + |
| <i>Fulmarus glacialisoides</i> | | | | | | | | | | | | + |
| <i>Daption capense</i> | | | | + | + | | | | | | | + |
| <i>Pterodroma macroptera</i> | | | | + | + | | | | | | | + |
| <i>P. lessonii</i> | | | | + | | | | + | + | | | + |
| ? <i>P. externa</i> | | | | | | | | | | | | + |
| <i>P. inexpectata</i> | | + | + | + | + | | | + | + | + | | + |
| <i>P. neglecta</i> | | | | | | | | | | | | + |
| <i>P. magentae</i> | | | | | | | | | | | + | + |
| ? <i>P. ultima</i> | | | | | | | | | | | | + |
| <i>P. leucoptera</i> | | | + | | | | | + | | | | |
| <i>P. cookii</i> | | | + | + | + | | | + | | | | |
| <i>P. nigripennis</i> | | | | | | | | | | | | + |
| <i>P. axillaris</i> | | | | | | | | | | | + | + |
| ? <i>Halobaena caerulea</i> | | | | | + | | | | | | | |
| <i>Pachyptila vittata</i> | | | | + | + | | | + | + | + | | + |
| <i>P. salvini</i> | | | | + | | | | | | | | + |
| <i>P. turtur</i> | | | + | + | + | | | + | + | + | | + |
| <i>P. crassirostris</i> | | | | | | | | | | | | + |
| ? <i>Procellaria cinerea</i> | | | | | | | | | | | | + |
| <i>P. parkinsoni</i> | | | + | + | | | | + | | | | + |
| <i>P. westlandica</i> | | | | | | | | | | | + | + |
| <i>P. aequinoctialis</i> | | | | | | | | | + | | | + |
| <i>Puffinus carneipes</i> | | | | + | + | | | | | | | + |
| <i>P. bulleri</i> | | | | + | + | | | + | | | | + |
| <i>P. griseus</i> | | + | | + | + | | | + | + | + | | + |
| <i>P. tenuirostris</i> | | | | + | + | | | + | + | | | + |
| <i>P. gavia/huttoni</i> | | | | + | + | | | + | + | + | | + |
| <i>P. assimilis</i> | | | + | + | + | | | + | + | | | + |
| <i>Oceanites oceanicus</i> | | | | | | | | + | | | | |
| <i>Garrodia nereis</i> | | | + | | | | | | | | | + |
| <i>Pelagodroma marina</i> | | | + | + | | | | + | + | + | | + |
| <i>Fregetta tropica</i> | | | | | | | | | | | | + |
| <i>Pelecanoides urinatrix</i> | | | | + | + | | | + | + | + | | + |

Evolution, extinction and the subfossil record of New Zealand's avifauna

| | NORTH ISLAND | | | | SOUTH ISLAND | | | | CHATHAM ISLANDS | | | |
|--|--------------|---|---|---|--------------|---|---|---|-----------------|---|---|---|
| | S | C | D | M | S | C | D | M | S | C | D | M |
| PELECANIFORMES | | | | | | | | | | | | |
| <u>Pelecanus novaeseelandiae</u> | E | + | + | + | + | | | | + | + | | |
| <u>Sula bassana</u> | | | | + | + | | | | | | | + |
| <u>S. dactylatra</u> | | | | | | | | | | | | + |
| <u>Phalacrocorax carbo</u> | | | | | | | | | | | | + |
| <u>P. varius</u> | | + | + | + | + | | + | + | + | | | + |
| <u>P. melanoleucos</u> | | | | + | + | | + | + | + | | | |
| <u>Leucocarbo carunculatus</u> | | | | + | | | | | | | | + |
| <u>Stictocarbo punctatus</u> | | | | | | | | | | | | + |
| | | | | + | + | | + | + | + | | | + |
| CICONIIFORMES | | | | | | | | | | | | |
| <u>Egretta alba</u> | | | | | | | | | | | | |
| <u>E. sacra</u> | | + | | + | + | | | | + | | | |
| <u>Botaurus stellaris</u> | | | | | | | | | | | | |
| <u>Ixobrychus novaeseelandiae</u> | E | + | | | | | | | | | | |
| ANSERIFORMES | | | | | | | | | | | | |
| <u>Cygnus sumnerensis</u> | E | + | | + | + | | + | + | + | | | + |
| <u>Cnemidornis calcitrans</u> | E | | | | | | + | + | + | + | | |
| <u>C. gracillis</u> | E | + | + | | | | | | | | | |
| <u>Pachyanas chathamica</u> | E | | | | | | | | | | | |
| <u>Euryanas finschi</u> | E | | | | | | | | | | | + |
| <u>Malacorhynchus scarletti</u> | E | + | + | + | + | | + | + | + | + | | |
| <u>Biziura delautouri</u> | E | | | | | | + | | | | | |
| <u>Tadorna variegata</u> | E | + | | + | | | | | + | + | | |
| <u>Anas superciliosa</u> | | + | + | + | + | | + | + | + | + | | + |
| <u>?A. gibberifrons</u> | | + | + | + | + | | + | + | + | + | | + |
| <u>A. aucklandica</u> | | + | | + | + | | + | + | + | + | | + |
| <u>A. rhynchotis</u> | | + | + | + | + | | + | + | + | + | | + |
| <u>Hymenolaimus malacorhynchos</u> | | + | | + | + | | | | + | | | + |
| <u>Aythya novaeseelandiae</u> | | + | + | | | | | | + | | | |
| <u>?Oxyura australis</u> | | + | + | + | + | | + | + | + | | | + |
| <u>Mergus australis</u> | E* | + | | | | | | | | | | |
| | E | | | + | + | | | | + | + | | + |
| FALCONIFORMES | | | | | | | | | | | | |
| <u>Circus approximans</u> | | | | | | | | | | | | |
| <u>C. eylesi</u> | E | + | + | + | + | | + | + | + | + | | + |
| <u>Harpagornis moorei</u> | E | + | | + | + | | + | + | + | | | |
| <u>Haliaeetus australis</u> | E | | | | | | | | | | | + |
| <u>Falco novaeseelandiae</u> | | + | + | + | + | | + | + | + | | + | + |
| GALLIFORMES | | | | | | | | | | | | |
| <u>Coturnix novaeseelandiae</u> | E | + | + | + | + | | + | + | + | | | |
| GRUIFORMES | | | | | | | | | | | | |
| <u>Gallirallus philippensis</u> | | | | | | | | | | | | |
| <u>G. dieffenbachii</u> | E | + | | | + | | + | + | + | | | |
| <u>G. modestus</u> | E | | | | | | | | | | + | + |
| <u>G. australis</u> | | | | | | | | | | | + | + |
| <u>Capellirallus karamu</u> | E | + | + | + | + | | + | + | + | + | | + |
| <u>Diaphorapteryx hawkinsi</u> | E | + | + | + | + | | | | | | + | + |
| <u>Porzana pusilla</u> | | | | | | | | | | | | + |
| <u>P. tabuensis</u> | | + | | + | | | | | | | | + |
| <u>Porphyrio porphyrio</u> | | + | | + | | | + | | | | | + |
| <u>P. mantelli</u> | | + | | + | + | | + | + | + | | | |
| <u>Gallinula hodgenorum</u> | | + | + | + | + | | + | + | + | | | |
| <u>Fulica prisca</u> | E | + | + | | + | | + | + | + | | | |
| <u>F. chathamensis</u> | E | | + | + | | | + | + | + | | | |
| <u>Aptornis otidiformis</u> | E | | | | | | | | | | + | + |
| | E | + | + | + | + | | + | + | + | | + | + |
| CHARADRIIFORMES | | | | | | | | | | | | |
| <u>Haematopus ostralegus</u> | | | | + | | | + | + | + | | | |
| <u>H. unicolor</u> | | | | + | | | + | + | | | | |
| <u>H. chathamensis</u> | | | | | | | | | | | | |
| <u>Charadrius obscurus</u> | | | | + | + | | | | | | | + |
| <u>Charadrius bicinctus</u> | | | | + | | | | | | | | + |
| <u>Thinornis novaeseelandiae</u> | | | | | | | | | | | | + |
| <u>Anarhynchus frontalis</u> | | | | | | | | | | | | + |
| <u>Numenius phaeopus</u> | | | | + | + | | | | + | + | | |
| <u>Limosa lapponica</u> | | | | + | | | | | + | + | | |
| <u>Arenaria interpres</u> | | | | | | | | | + | | | + |
| <u>Coenocorypha aucklandica</u> | | | | + | + | | + | + | + | | | + |
| <u>C. chathamica</u> | | | | | | | | | | | + | + |
| <u>Calidris canutus</u> | E | | | | | | | | | | + | + |
| <u>Himantopus himantopus/novaeseelandiae</u> | | | | + | | | | | | | | + |
| | | | | + | + | + | + | + | | | | |

Ornithological Reviews

| | NORTH ISLAND | | | | SOUTH ISLAND | | | | CHATHAM ISLANDS | | | | | | | | | |
|--------------------------------------|--------------|--|---|---|--------------|---|--|--|-----------------|---|---|---|--|---|---|---|---|--|
| <u>Stercorarius skua</u> | | | | + | + | | | | + | + | | | | + | + | | | |
| ? <u>S. maccormacki</u> | | | | | | | | | | | | | | + | | | | |
| ? <u>S. longicaudus</u> | | | | | | | | | | | | | | + | | | | |
| <u>Larus dominicanus</u> | | | | + | + | | | | + | + | + | | | | + | + | | |
| <u>L. scopulinus</u> | | | | + | + | | | | + | + | + | | | | + | + | | |
| ? <u>L. bulleri</u> | | | | | + | | | | + | + | + | | | | | | | |
| <u>Hydroprogne caspia</u> | | | | + | + | | | | + | + | | | | | | | | |
| <u>Sterna vittata/paradiseae</u> | | | | | | | | | | | | | | + | | | | |
| <u>S. albostrata</u> | | | | + | + | | | | | + | | | | + | + | | | |
| <u>S. nereis</u> | | | | + | | | | | | | | | | | + | | | |
| <u>S. striata</u> | | | | + | + | | | | + | + | + | | | | + | + | | |
| COLUMBIFORMES | | | | | | | | | | | | | | | | | | |
| <u>Hemiphaga novaeseelandiae</u> | | | + | + | + | + | | | + | + | + | + | | | + | + | + | |
| PSITTACIFORMES | | | | | | | | | | | | | | | | | | |
| <u>Strigops habroptilus</u> | | | + | + | + | + | | | + | + | + | + | | | | | | |
| <u>Nestor meridionalis</u> | | | + | + | + | + | | | + | + | + | + | | | | + | + | |
| <u>N. notabilis</u> | | | | | | | | | + | + | | | | | | | | |
| <u>Cyanoramphus novaeseelandiae</u> | | | + | + | + | + | | | + | + | + | + | | | | + | + | |
| <u>C. auriceps</u> | | | + | + | + | + | | | + | + | + | | | | + | + | | |
| CUCULIFORMES | | | | | | | | | | | | | | | | | | |
| <u>Chrysococcyx lucidus</u> | | | | | | | | | | | | | | | | | + | |
| <u>Eudynamis taitensis</u> | | | | + | + | | | | + | | | | | | | | | |
| STRIGIFORMES | | | | | | | | | | | | | | | | | | |
| <u>Ninox novaeseelandiae</u> | | | + | + | + | + | | | + | + | + | + | | | | | + | |
| <u>Sceloglaux albifacies</u> | E | | + | + | + | + | | | + | + | + | + | | | | | + | |
| CAPRIMULGIFORMES | | | | | | | | | | | | | | | | | | |
| <u>Megaegotheles novaeseelandiae</u> | E | | | + | + | | | | + | + | | | | | | | | |
| CORACIIFORMES | | | | | | | | | | | | | | | | | | |
| <u>Halcyon sancta</u> | | | | + | | + | | | | + | | | | | | | | |
| PASSERIFORMES | | | | | | | | | | | | | | | | | | |
| <u>Acanthisitta chloris</u> | | | | + | | | | | | + | | | | | | | | |
| <u>Xenicus longipes</u> | | | | + | + | + | | | | + | | | | | | | | |
| <u>X. gilviventris</u> | | | | + | | | | | | + | | | | | | | | |
| <u>Traversia lyalli</u> | E | | | + | | | | | | + | | | | | | | | |
| <u>Pachyplectes jagmi</u> | E | | | + | + | | | | | | | | | | | | | |
| <u>P. yaldwyni</u> | E | | | | | | | | | + | | | | | | | | |
| <u>Anthus novaeseelandiae</u> | | | + | + | + | + | | | | + | | + | | | | + | + | |
| <u>Bowdleria punctata</u> | | | + | + | | | | | | + | | + | | | | + | + | |
| <u>Finschia novaeseelandiae</u> | | | | | | | | | | + | | | | | | | | |
| <u>Mohoua albicilla</u> | | | + | + | | | | | | | | | | | | | | |
| <u>M. ochrocephala</u> | | | | | | | | | | + | + | | | | | | | |
| <u>Gerygone igata</u> | | | | | | | | | | + | | | | | | | | |
| <u>G. albofrontata</u> | | | | | | | | | | | | | | | | + | + | |
| <u>Rhipidura fuliginosa</u> | | | + | + | + | | | | | + | | + | | | | + | + | |
| <u>Petroica macrocephala</u> | | | + | + | + | | | | | + | + | | | | | | | |
| <u>P. australis</u> | | | + | + | + | | | | | + | + | + | | | | | | |
| <u>P. traversi</u> | | | | | | | | | | | | | | | | + | + | |
| <u>Notiomystis cincta</u> | | | + | + | | | | | | | | | | | | + | + | |
| <u>Anthonis melanura</u> | | | + | + | + | | | | | + | | + | | | | + | + | |
| <u>Prothemadera novaeseelandiae</u> | | | + | + | + | + | | | | + | + | + | | | | + | + | |
| <u>Philesturnus carunculatus</u> | | | + | + | + | + | | | | + | + | + | | | | | | |
| <u>Heterochoa acutirostris</u> | E | | + | + | + | | | | | | | | | | | | | |
| <u>Callaenas cinerea</u> | | | + | + | + | + | | | | + | + | + | | | | | | |
| <u>Turnagra capensis</u> | E | | + | + | + | | | | | + | + | + | | | | | | |
| <u>Palaeocorax moriorum</u> | E | | + | + | + | + | | | | + | + | + | | | | + | + | |
| APTERYGIFORMES | | | | | | | | | | | | | | | | | | |
| <u>Apteryx owenii</u> | | | + | + | + | + | | | | + | + | + | | | | | | |
| <u>A. australis</u> | | | + | + | + | + | | | | + | + | + | | | | | | |
| <u>A. haastii</u> | | | | | | | | | | + | | + | | | | | | |
| SPHENISCIFORMES | | | | | | | | | | | | | | | | | | |
| <u>Aptenodytes patagonicus</u> | | | | | | | | | | | + | + | | | | + | | |
| <u>Megadyptes antipodes</u> | | | | | | | | | | + | + | + | | | | + | + | |
| <u>Eudyptula minor</u> | | | | + | + | + | | | | + | + | + | | | | + | + | |
| <u>Eudyptes cf. pachyrhynchus</u> | | | + | + | + | | | | | + | + | | | | | + | + | |

collagen and landsnail shell carbonate from sites on the Aupouri Peninsula, North Island, has yielded ages within the range 600–6000 years BP.

Middens: Occupation middens frequently contain the discarded or worked bones of a wide variety of birds hunted by the early Polynesians. Such middens are most common on coastal dunes but are also present in inland rock shelters. Most dated sites rich in avian bones are 400–800 years old. In younger sites, bird remains are generally scarce. Of the 33 avian species known to have become extinct during the Polynesian period, the remains of at least 30 (including all 11 moa species) have been found in association with Archaic Maori occupation sites. However, it seems that for none of them can extinction be attributed solely to direct hunting. In addition to these extinct birds, the remains of a considerable array of the living species has also been found in middens. The species composition of midden faunas varies considerably from one site to another. Petrels (Procellariidae) and cormorants (Phalacrocoracidae) are usually the most common marine birds, and of the terrestrial species, Kaka, parakeets, pigeons (*Hemiphaga novaeseelandiae*), Weka (*Gallirallus australis*), and Tui are generally the most abundant.

Interpretation of Quaternary Avifaunal Remains

The great quantity and variety of remains from all these subfossil sources are, unfortunately, of little use in clarifying origins and evolutionary trends because most are geologically very recent. Nonetheless they are very useful in taxonomic studies and for indicating former distributions and probable times of colonisation and extinction. Distributional data should be interpreted with caution, however, because the location of remains is surely more indicative of the distribution of sites with conditions suitable for the preservation of bones than of the distribution of faunal populations. Similarly, due to the vagaries of chance preservation, indicated times of colonisation can only be minima, and those of extinction maxima, because we are most unlikely to find the first or last fossil specimens of a species.

The New Zealand Quaternary Avifaunal Fossil Record

New Zealand's living avian fauna contains members of 18 orders, of which all but 1 (Apodiformes: Swifts) appear in the Quaternary fossil record. Two additional orders (Dinornithiformes: moa, and Caprimulgiformes: Owllet-nightjars, etc.) are known only as fossils. In Table 4 subfossil distributions of all known taxa are given for mainland New Zealand (including Stewart Island) and the Chathams. The present status (extinct or living) and the types of deposit in which remains have been found (swamp/cave/dune/midden) are indicated.

Summary

The evolutionary development of New Zealand's avifauna has been influenced by the interplay of geological, geographical, climatic, and ecological factors. At the outset, being a segment of the temperate Gondwana supercontinent during the Mesozoic, New Zealand could take part in faunal and floral exchanges among the then contiguous southern continents. New Zealand's separation in the Late Cretaceous came at a time that allowed some of the archaic elements of its biota to establish themselves, but still early enough to prevent colonisation by snakes and predatory mammals. Since New Zealand's drift north and its isolation in the early Tertiary, colonisation had to be entirely transoceanic. 'Sweepstakes' dispersal, assisted since the Oligocene by the circum-Antarctic current and its associated westwind drift, has long been important for colonists from the west. The archipelagic nature of the New Zealand landmass throughout the Tertiary and Pleistocene doubtless fostered adaptive radiation and speciation, but also caused numerous extinctions among both original inhabitants and incoming colonists. The monotypic and relict nature of many of New Zealand's endemic genera is more likely to indicate Pleistocene extinction of their congeners, than conservatism and lack of speciation in the Tertiary. The climatic extremes of the Ice Ages, which must have decimated the warm-adapted Tertiary biota, also provided stimulus for speciation among those elements that survived. The post-glacial

fauna must have been a remarkable mélange, comprising survivors of the Pleistocene extinctions and new transoceanic colonists, expanding to fill niches left vacant by those that had succumbed. This fauna with its many aberrant, specialised, and frequently flightless forms had evolved in splendid isolation on a richly forested, predator-free landmass and would have been ill-adapted to survive what was to be for many of its members the final episode in their evolutionary history — the arrival of man.

Man, by extensive clearing of forests, by introducing mammalian predators and partly by direct predation, has wrought ecological changes so large and rapid that almost half New Zealand's complement of terrestrial birds was exterminated in less than a thousand years.

Human influence continues to have an almost universally harmful effect on the remaining bird fauna, although natural immigration by new species continues partially to offset depletion.

P.R. Millener

Physiological Research on New Zealand Birds

The New Zealand avifauna is characterised by a high proportion of endemic species: 81 of the 193 species that regularly breed in the New Zealand region do so nowhere else. New Zealand birds also have interesting physiological adaptations, for example the very large egg of the kiwi (*Apteryx*) in relation to body size; the 3–4 year breeding cycle of the Kakapo (*Strigops habroptilus*); and egg-laying at 2-day intervals during clutch formation in the Rifleman (*Acanthisitta chloris*). Physiological studies contribute to knowledge of the biology of unique New Zealand birds such as the kiwis and to our understanding of distinctive features of the New Zealand avifauna such as the long breeding seasons of many species. In 1973 a summary of ornithological research identified physiology as needing more attention (Williams 1973). This situation remained unchanged until the recent start of full-time research into avian reproductive physiology at Ecology Division, DSIR. In this review I summarise research on the physiology of New Zealand birds, together with topics for future research and the application of physiology to the management of native birds.

Previous Research on Kiwi

Parker (1891) described the anatomy of the skeleton of the Brown Kiwi (*Apteryx australis*) and of its brain during development, and Craigie (1930) described the anatomy of the brain in detail. Kiwi have small eyes but a well-developed sense of smell and are the only birds with the nostrils at the tip of the bill (Kuschel 1975). Their very large olfactory bulbs resemble in size those of mammals rather than other birds (Craigie 1930). Wenzel (1968) tested the olfactory powers of kiwi. He confirmed that kiwi have a keen sense of smell and could detect food by smell alone.

The first physiological measurements on Brown Kiwi were made by Farner *et al.* (1956), who found that the body temperature of Brown Kiwi was slightly lower than that of other birds. The standard metabolic rate of all 3 species of kiwi is also lower than that predicted on their size from data on non-ratite birds (Calder & Dawson 1978).

Beale (1985) measured pulse and respiration rates, body temperature, passage time through the digestive system, and the response to anaesthetics of Brown Kiwi adults and chicks. He also reported the concentrations of several ions and proteins in a single blood sample.

Kiwi lay very large eggs in proportion to their body size (Reid 1971a), as shown in a remarkable radiograph of a female kiwi shortly before laying (Reid 1981). The yolk of the kiwi egg forms a much larger proportion of the total egg weight (60%) than in other precocial species (Calder *et al.* 1978, Reid 1971b). Reid (1971b) commented that the kiwi egg apparently has a greater energy content per unit weight than reported for any other bird. Calder & Rowe (1977) found that the yolk contains 91% of the total energy content of the egg and estimated that yolk formation added 174–203% to the standard metabolic budget of the female. Rowe (1978) measured the incubation temperature of an artificial egg, finding the lower surface of the egg to be 10°C cooler than the top. He suggested that the egg is not turned during incubation, unlike the eggs of almost all other birds. These observations have subsequently been used to design artificial incubation routines for kiwi eggs.

Another unusual feature of kiwi anatomy is the presence of 2 functional ovaries; whereas in most birds only the left ovary develops. Kinsky (1971) found paired ovaries in all 3 kiwi species and described in detail the reproductive system of female Brown Kiwi. Ovulation alternated between both ovaries, but only the left oviduct developed and was functional. The season of egg laying reported for the Brown Kiwi (July–February) corresponded to the peak breeding period revealed by Kinsky's samples. He found females

with developing ovarian follicles in all months sampled (February–November) and considered it likely that eggs could be laid throughout the year. This has been confirmed for captive Brown Kiwi (R. Goudswaard, pers. comm.). The review of kiwi biology in Kuschel (1975) offered no explanation of how the timing of breeding is regulated in free-living kiwi.

Previous Research on Other Birds

There have been several physiological studies of penguins on the mainland and in Antarctica. Farner (1958) measured body and egg temperatures of Yellow-eyed Penguins (*Megadyptes antipodes*), and Grau (1982) used an oral dye-capsule technique to measure the timing of egg formation in the Fiordland Crested Penguin (*Eudyptes pachyrhynchus*). Stonehouse (1967) reviewed the biology and thermal balances of penguins. The composition of the egg and the energetics of the breeding cycle of the Adélie Penguin (*Pygoscelis adeliae*) have been studied in the Ross Dependency in Antarctica. The composition of the Adélie Penguin egg was described by Reid (1965), and the chicks have about half of the original yolk available to sustain them after hatching (Reid & Bailey 1966). More recently, the energetics of the breeding cycle have been studied at Cape Bird (L.S. Davis & B. Green, pers. comm.).

Thermo-regulation in the South Polar Skua (*Stercorarius maccormicki*) was studied at Cape Roys in Antarctica by Spellerberg (1969), who found that the skua had physiological adaptations no different from those of similar-sized gulls that lived in less harsh climates. Farner (1956) measured body temperatures in the Fairy Prion (*Pachyptila turtur*), and Warham (1971a) extended these observations to other species of petrel, finding that they had lower body temperatures than most other birds.

Energetics and nutrition have been considered in several species. The lipid composition of the eggs of Takahe (*Notornis mantelli*) was found to be similar to that of chickens (Body 1984). The influence of environmental factors on food intake and the energy needs of Greenfinches (*Carduelis chloris*) was studied by Gillespie (1982), the energetic needs of Kaka (*Nestor meridionalis*) by Beggs & Wilson (1987), and the relationship of body mass and composition to the survival of Starling (*Sturnus vulgaris*) chicks by Thompson & Flux (1988). Baker (1975) examined the body composition of South Island Pied Oystercatchers (*Haematopus ostralegus*) in relation to the spring migration and to breeding. The oystercatchers did not undergo a period of massive pre-migratory fat deposition as do many long-distance migrants. Sherley (1985, thesis) used the technique of Grau (1982) to estimate the time of yolk formation in Rifleman as part of a study of the courtship feeding of females by males. The male Rifleman contributed a significant amount of the extra energy required by females for egg formation.

Current Research

The first full-time physiological studies of birds in New Zealand were made in the reproductive physiology laboratory at Ecology Division, DSIR. Techniques have been developed to measure hormone levels in very small volumes of blood by radio-immunoassay. These new methods are being used to study the physiology of seasonal breeding and of biological clocks in New Zealand birds.

In a collaborative study with M. Potter (Zoology Department, Massey University), we are studying the endocrinology of reproduction in free-living Brown Kiwi. The levels of various reproductive hormones are being measured in blood samples collected monthly for 2 years from birds in Northland. The results will provide a picture of the annual cycle of hormone levels and of the relationship of hormone levels to different stages of breeding and to the pattern of parental care.

Interesting features of the endocrinology of the kiwi include the pattern of estradiol secretion in females in relation to egg formation, high estradiol levels in males and their correlation with parental care, and a rapid rise in estradiol and testosterone levels in April and May. This rise in hormone levels indicates that the brain-gonad axis is being switched on at a time when daylength is decreasing, and experimental work is now needed to find

out what activates the reproductive system of the kiwi in the late autumn. The other species of kiwi have breeding seasons and patterns of parental care that differ from those of the Brown Kiwi, and work is in progress to describe the endocrinology of the breeding cycle of the Great Spotted Kiwi (*Apteryx haastii*) in North-west Nelson.

We are studying the endocrinology of reproduction in the Yellow-eyed Penguin, in collaboration with P. Seddon (Zoology Department, Otago University). Monthly blood samples were collected from penguins nesting on the Otago Peninsula, and testosterone, estradiol, and progesterone levels have been measured. The Yellow-eyed Penguin has a short period of egg laying in the spring. The hormone data suggest that the penguin has a similarly short period of ovarian and testicular activity, the gonads being active for only about 2 months each year. The Yellow-eyed Penguin's reproductive cycle is probably driven by changes in photoperiod, the initiation of gonadal activity being a response to the increasing daylength of spring.

To apply physiological principles to reproduction in native birds, we have to understand how environmental factors influence the timing and success of breeding. The constraints of working in the field with native birds have led us to undertake work on introduced birds, and the reproductive cycle of the House Sparrow is being studied in Lower Hutt. Free-living sparrows were collected monthly for a year, and sparrows have also been held in outdoor aviaries so that we can examine the influence of factors other than daylength on the timing of breeding.

The primary environmental cue for the timing of breeding in many animals is the annual cycle of daylength. In some species the hormone melatonin mediates the effects of daylength on gonadal activity. As part of our studies of seasonality in birds, we have studied melatonin secretion in the Adélie Penguin in Antarctica to understand how the birds time their daily activities in the continuous daylight of the Antarctic summer. The results indicate that the biological clock of the penguins remains functional, and hence that they can maintain a sense of time during the summer. This sense of time is necessary to synchronise the start of the breeding season, for the timing of feeding trips away from the rookery, and for the birds to have a direction-finding ability (the sun is north at midday) on their annual migration to and from the breeding rookeries.

The Future

Research in avian physiology is developing in New Zealand. With new techniques of collecting blood samples and measuring physiological variables in free-living or captive birds, a wide range of physiological studies can be made without disrupting the normal activities of birds. Physiological studies increase our knowledge of the biology of unique New Zealand birds, such as the kiwi. They help to define and explain distinctive features of the New Zealand avifauna, such as the long breeding season of many species, and they can also be applied to enhance the breeding of rare and endangered species. The management of native birds often requires a good basic physiological knowledge of the species, and so physiological studies will increase. An example of this is the application of reproductive physiology principles to the management of the Kakapo (Cockrem 1989).

Future physiological work will often be a collaboration among ornithologists to develop a comprehensive understanding of the biology of a species through multidisciplinary studies, including physiology, behaviour, ecology, nutrition, genetics, and biochemistry. Topics for attention are the physiology of seasonal breeding, the relationships between physiology and behaviour, nutrition, energetics, and metabolic physiology, and the physiology of migration. Descriptive studies of free-living birds raise questions that can be answered only with birds in more controlled situations, and there will be increasing work with captive native birds. Physiological techniques currently being developed will become increasingly important in future studies and management of New Zealand birds.

Genetic Studies of New Zealand Birds

Moa may be dead, but their genes live on! Unfortunately, this does not mean that we can resurrect live moa, but it does mean that genetic studies can be done on moa DNA (the molecule that carries genetic information coding for inherited characteristics in all living organisms). DNA has been extracted from muscle tissue of moa remains preserved for thousands of years in dry caves (G. Chambers, pers. comm.).

It is also possible, using recent advances in molecular genetic technology, to get DNA from dried and alcohol-preserved museum specimens. These new and exciting techniques are opening up a goldmine of information about taxonomy, population structure, and the evolution of living and extinct birds. Molecular techniques for studying genetics have been in common use for only the past 2 decades overseas and for only a few years in New Zealand.

Taxonomic studies can make good use of molecular genetic methods, particularly to distinguish between morphologically similar or cryptic species and to determine evolutionary relationships among species, genera, and families. An almost complete reanalysis of the taxonomy of the birds of the world has been attempted by Charles Sibley and his colleagues (Sibley *et al.* 1988). This colossal task was (and is) tackled by the technique called DNA-DNA hybridisation, which is based on DNA similarities at a gross (whole molecule) level. Two of the more controversial findings for New Zealand taxa are the suggested 'recent' divergence time (40–50 million years ago) between Australian and New Zealand ratites (Sibley & Ahlquist 1981) and the reclassification of New Zealand wrens (Sibley *et al.* 1982).

Few other researchers have used DNA-DNA hybridisation. Until very recently, the most common method of assessing genetic relationships by molecular techniques has been protein electrophoresis. This method is based on separation of protein variants, which are derived from simple genetic differences, in an electric field. An early example in New Zealand was Harper's (1978) study of albatrosses and petrels, which provided overall support for the accepted taxonomy. Sometimes unexpected results challenge our current understanding of taxonomy. For example, Forbes' Parakeet, which is found only on Mangere Island in the Chatham Islands, is currently designated as a subspecies of the New Zealand Yellow-crowned Parakeet, whereas our studies using protein electrophoresis suggest that it is not only a distinct species but also is more closely related to Red-crowned Parakeets. Some morphological support for this reclassification comes from the fact that Forbes' Parakeets overlap in size with the sympatric Chatham Islands Red-crowned Parakeet, whereas Forbes' have a very different size and shape from mainland Yellow-crowned Parakeets (Nixon 1982, thesis). As early as the 1930s, Fleming (1939) suggested that Forbes' Parakeet was different enough from mainland Yellow-crowned Parakeets to be a separate species.

Below the species level, molecular techniques can be used to define subspecies or distinct populations and to estimate the distribution of variation among different populations. One of the first studies of this kind in New Zealand found that the described subspecies of Blue Penguin are part of a cline rather than discrete forms (Meredith & Sin 1988). Geographical distance among populations does not necessarily equate with genetic divergence. For example, our studies have shown that Red-crowned Parakeets, of which 3 extant subspecies are on outlying islands in addition to the mainland subspecies, are less genetically diverse than Yellow-crowned Parakeets, which are geographically less widespread.

Population genetics has perhaps reaped the most benefit from new technology. Until the mid-1960s, genetic variation was thought to be very limited in populations and individuals, the main differences being between species. Electrophoresis showed that, on

the contrary, genetic variation is relatively high within populations and among individuals, and indeed that this variation may be important because high levels of variation have been linked in some species to increased survival, reproductive success, and growth rate (Mitton & Grant 1984). The future ability of populations to adapt to environmental changes may also depend on adequate levels of genetic variation (Frankel & Soule 1981). This realisation of the importance of maintaining genetic variation within populations has led to a new field of biology, conservation genetics.

An understanding of the genetic structure of populations is also important for conservation management. Molecular techniques can often provide a much quicker method of assessing population structure than traditional ecological studies. For example, research is under way to estimate the degree of mixing between populations of Yellow-eyed Penguins. So far, the results define 3 major populations (Campbell Island, Enderby Island, and the South Island) with very limited interchange among them. The relative isolation of each population implies that each may have to be treated separately for management purposes.

Similar work is under way on Blue Duck to find out whether a 'population' is confined to a single river or whether dispersal within and among catchments is enough to define a much larger population. One concern for the conservation of this threatened species is that agricultural and riverine development has forced Blue Ducks into isolated remnants of what were originally much larger populations. One novel aspect of this study is the use of a powerful new technique, called DNA fingerprinting, which has been making the news headlines since 1988 for its use in conclusively identifying criminals from minute amounts of blood, hair, or semen left at the scene of a crime. Because DNA fingerprinting uses specific 'probes' for highly variable sections of DNA, genetic differences can be detected right down to the level of the individual. This is being used to confirm parentage and to examine relationships among local populations of Blue Duck.

Future generations of Takahe in the new population being established in the Stuart Mountains, Fiordland, will be monitored by the same technique. This is possible because blood samples and the DNA extracted from blood can be kept indefinitely at very low temperatures. Overseas, and now in New Zealand, museums and universities have set up frozen tissue collections to supplement the more traditional museum collections of skins and alcohol-preserved bodies. Victoria University, the National Museum, and the Department of Conservation have collaborated to establish such a collection in New Zealand.

Other examples of the use of molecular techniques in New Zealand ornithology include studies of hybridisation, for example between Black and Pied Stilts (Green 1988, thesis) and between Forbes' and Red-crowned Parakeets (our work), and studies of genetic changes in introduced species, for example Starlings (Ross 1983) and Mynas (Baker & Moeed 1987).

Of course not all genetic studies use molecular techniques. Traditionally, variation has been assessed from morphological characteristics, such as plumage coloration and body size. Subspecies of New Zealand birds have generally been defined on such characteristics, a recent example being the suggestion that Bellbirds on the Poor Knights Islands form a distinct subspecies (Bartle & Sagar 1987). Natural variation in morphological characteristics is certainly not lacking, but the precise genetic basis for such variation is usually poorly understood because a complex system of multiple interacting genes controls most morphological characteristics. However, at least 4 examples of simple, single-gene control of colour variation have been suggested for New Zealand birds. In 3 of them, the polymorphism consists of black and pied phases within a species: Fantail (Craig 1972), Variable Oystercatcher (Baker 1973), and Little Shag (Dowding & Taylor 1987). In the fourth, the Black and Pied Stilts, which are thought to be separate species (Pierce 1984), a single gene does not explain the range of hybrid plumages. Differences in frontal band coloration in Yellow-crowned and Orange-fronted Parakeets also seem to be controlled by a single genetic locus (Taylor *et al.* 1986).

A genetic technique that has not been widely used on New Zealand birds is the study

of chromosomes (karyology). To our knowledge, karyotypes are available for only 8 endemic species of bird: Pipit (Ray-Chaudhuri 1976), Brown Kiwi (De Boer 1980), Kea (De Boer & Belterman 1980), Variable Oystercatcher (Baker *et al.* 1981), Red-billed Gull and Red-crowned Parakeet (Nugent 1981, thesis), Morepork (Belterman & De Boer 1984), and Takahe (Stewart-Scott & Bell 1987). Even for these species little is known beyond chromosome number and basic morphology. Identification of the sex chromosomes has proved useful for sexing some sexually monomorphic species, such as the Takahe.

And what has genetics taught us about moa? Very little as yet because the amounts of DNA recovered from their mummified bodies are very small and fragmented, limiting its present scientific use. However, a new technique has been developed to deal with very small quantities of DNA. Soon, DNA studies will tell us about the relationships among moa and their surviving relatives, kiwi and other ratites. It may even be possible to assemble DNA fragments into relatively complete genomes of extinct species. Whether reconstructed genomes could ever lead to the recreation of an extinct species remains for now the most distant gleam in the eye of conservation geneticists.

S.J. Triggs & C.H. Daugherty

Bird Art in New Zealand

Inevitably, nga tangata Maori were this country's first bird artists, whose imagery would change with epoch and resources. Waitaki limestone (and other) petroglyphs celebrate the moa, indigenous eagle, and more: bird-form, bird-spirit, tempting analogy with Arctic or Kalahari visions. Northern, cultivating tribes would later bring both stylised and specific bird forms into their carvings — hence the ubiquitous Manaia with its prototypical bird-profile/full-face duality. Maori arts, in common with notable others — Oceanic, Meso-American — were to derive much colour, tone, and texture directly from then-abundant feathers, worked into a fibre base: skills, now modified by availability of source-species, being currently revitalised. The first-known European images of New Zealand birds, by naturalist-illustrators (Georg Forster most noteworthy) aboard Cook's ships, anticipate a dichotomy frequent in bird art and referred to below: between creative aesthetic and field-scientific imperatives. By this comparison, bird elements in traditional Maori arts are socially holistic.

During most of the nineteenth century, New Zealand bird art was attendant to European discovery — initially maritime, then increasingly interior. Usually biased towards the documentary rather than the expressive, it engaged various British, French, and German artists of calibre (Andrews 1986). Besides these, Richard Laishley, Onehunga's Congregationalist minister in the 1860s — trained as an artist, as well as for the pulpit — brings heart-warming relief. His studies of the local avifauna combined learned accuracy with humane bewilderment over recently encountered species of a new but already challenged land. Then, in 1873 and 1888, appeared the successive editions of Walter Lawry Buller's *A History of the Birds of New Zealand*, with chromolitho plates by J.G. Keulemans, a Dutch-born illustrator after the style of Edward Lear and John Gould. His suites of images for the 2 editions differ markedly: the first being, arguably, the more direct and uncontrived; the later series running to enhanced pronouncement and perhaps more rigidity of definition. But these have become by far the better-known; a century later some have turned, by repetition or mutation, into national icons. In modified reverse, the Fantail and the Kea on current banknotes are but two of the commoner examples of this absorption-per-facsimile. Much earlier, a decorative bird-tableau print, based upon the second edition images in composite, was circulated — to become, itself, a collector's item. From a person who never physically perceived this country, Keulemans' imagery is certainly pervasive: trinkets, tea-towels, textbooks, even tattoo-parlours, have all been vehicle to his legacy. One detail in his Kea plate — 2 distant birds harassing a sheep — no doubt pandered to runholders' lethal prejudice against the species.

From such stereotyping, to conservation: into the present century the Royal Forest and Bird Protection Society became an increasing force, via quarterly journals and album-folios, for public information. Unsophisticated but wide-reaching, the albums could be found in many a home, school, club, or library, their colour plates of native birds (often with specific flora) from watercolours by Lillian A. Daff. Her command of medium and subject was not even — to whit a non-likeness of the Brown Creeper, or banal cross-placing of two Kakariki — yet at best she did suggest physical scale and enveloping locale. Daff's Stitchbird on a Supplejack is evocative whilst Keulemans' second edition *Notiomystis* is but a Victorian sweetstall bird of liquorice-and-caramel. Her Black-backed Gull is caught in calling-posture; her Sooty Shearwater skims over foulweather swell. Of unpredictable aesthetic; a not wholly reliable recorder — still, Daff brought awareness of native species to many, by visual vernacular.

By then, other bird images had found currency. Along up-country torrents or the Petane swamp of Hawke's Bay and over Stewart and Little Barrier Islands, H. Guthrie-Smith and his plate-camera had caught, and through publication formed, new perceptions

of native birds in elegant tone-photographs. As a companion essay to this shows, photography became an entire province of ornithology itself. But latitudes, initiated by the camera, obliged bird art to review not just an old dichotomy, but a plurality: of intent, idiom, and aesthetic; the illustrative, the idealised, or the mythopoeic. The field-scientific, or the abstractive, might better be seen as parameters to this range of references than as mutually exclusive opposites. Another polarisation concerns bird art done by its own specialists, *vis-à-vis* bird images by artists of a wider subject-scope. But there is much middle ground — of shared perception and concern with respective methods. To concede differences, and degrees of thematic emphasis, is not to arbitrate, nor to affix priorities.

From 1930 until the mid-1950s, visual art expectations were checked by Depression, War, and peacetime shortages. Stinted of materials, artists diversified and in such hard times, black-and-white graphics held fast. The woodcuts of E. Mervyn Taylor are good examples of the period: many feature New Zealand birds, including species of allegorical significance, such as Te Kotuku. Also suggestive of that period is Hilda Wiseman's block-print 'Huias' (Rotorua Art Gallery collection). Under the aegis of Canterbury Museum's Roger Duff, Theo Schoon produced adaptations upon the Archaic/Waitaki petroglyphs, with (as noted already) their avian forms. Some of these were reiterated in A.R.D. Fairburn's fabric-blocks and one other, later, in postage-stamp design: so Schoon's elegant derivations moved towards a general acceptance. After about 1956 Art Museums assumed more cosmopolitan focus; dealer-galleries appeared; professional scale and output defined the committed artist. Molly Macalister exhibited her stylised, carved 'Gannets' and Russell Clarke a large oil of a Harrier in a cabbage tree. By 1960 Keith Patterson, a colourful artist then living in Devonport, produced harbour studies on paper, dominated by Black-backed Gulls.

Under quite another star, Princess Margaret's wedding gift from this country was a pair of silver Kiwi, silversmithed by John Simpson of Christchurch. Internationally, C.F. Tunnicliffe and Roger Tory Peterson had set new standards of publishable bird illustration — fresh norms, emphasising living posture and characteristics, eschewed stuffed-owl rigidities of earlier guidebooks. In New Zealand's scope of similar publication Avis Acres, Chloe Talbot-Kelly, later Elaine Power, would, among others, make successive contributions. Bird art on coins is almost as old as the very use of money. Whose designs should provide the reverse of the nation's coppers and silver, following decimal change-over, provoked some tense debate. Postage stamps, too, are 'monetary' in function and indeed scale, but changes in their aesthetic — issued in by technical innovation — conform with those in publishing. As the most casual philatelist can attest, New Zealand issues over recent decades have done justice to many indigenous, often rare, birds; so engaging artists of specialised skills, Janet Marshall being but one.

After leaving Art School, and, with it, predictable experiments in topical painting modernisms, I needed to re-engage personal interests as imagery. Hence boyhood bird-watching through the tutelage of R.B. Sibson, insights to the natural environment of the Bethell property at Te Henga as relaid by H.B. Lusk, and other bird themes were combined into a style blending Mexican, Folk, Primitive, and (then) British Pop. It was challenging to see how any Tui, Pīpiwharauoa, or Hawk might be large-writ upon a surface, without its essence becoming subsumed by paint properties. Overseas experience, then sustained practice, widened the reference-base and redefined intent: 'Last Flight of the Kokako' (1979) and 'Kaiarara Kaka, Variant' (1983) became statements about species/cum/environmental peril. Bird forms, which had served well early in my career, became emblems to the cause of their survival, and were reproduced as fund-raising cards by the Native Forest Action Council.

New reproduction and publication developments have had a pervasive effect upon much bird art. In earlier times, Bewick (say) or Audubon knew thoroughly how their work connected with printing devices and paper sizes, their method having to defer to known processes. Sophisticated techniques, however, predispose some artists towards super-fidelity, with the potential for minimising differences between original and facsimile. Many a work of nature observation may be produced, and viewed, in terms of its print-run as

much as itself. Within this transactive coda, works by Raymond Harris Ching have for over 20 years assumed prominence; bench-marks to super-fidelity, they have seen less successful imitators. Indeed, the mid-70s saw a hightide of various and competing forms of nature realism. A decade later, contributory talent holds fast. Noel Cusa (British/NZ) is one watercolourist whose handling of birds and habitat is accuracy through gentle understatement. Geoff Arnold, younger (and an ex-Sibson pupil), has completed a Fine Arts degree in bird painting with emphasis on taxonomy. An approximate contemporary, Russell Jackson exhibits with dealer-galleries and is at home with both ornithological realism and a more decorative, allusive, style — both based on solid field-work. Piers Hayman was a professionally qualified artist in Britain before coming to Auckland, where his contributions have been energetic: illustrating his own bird column in *The NZ Herald*, working on the Muka Studio litho-stone, and presently being Director of the Auckland Society of Arts. At the time of writing, Ching's 'The Guilded Triptych' has seen display — an image relating (by however archaic or eclectic means) relatively more to painted surfaces and their interaction.

Canterbury-trained Bing Dawe has been an active sculptor since the mid-70s. Technically accomplished, he uses a variety of materials: fine-finished woods, polished metal, conjoining elements. Many of his pieces relate to structural, skeletal, or dynamic properties of bird anatomy, particularly wing articulation. This conjunction — of 'live' movement with 'dead' skeletal features — alludes to issues of threatened species-life; to perceived environmental deaths. By way of comparison, Christine Hellyar, in one of her sculptural presentations, has alluded to reciprocal food-seeking roles of both the Huia sexes; while Colin McCahon's 'The Care of Small Birds' (1975) saw a parallel between flocking terns at Muriwai and the sequences of the rosary. Jaqueline Fahey uses gulls and owls, Sylvia Siddell cormorants, as vehicles for social allegory. Other bird forms have occurred in the work of artists as diverse as Michael Shepherd, Dick Frizzell, John Hovell, and Richard Killeen. But there is no New Zealand 'epoch' of symbolic proclamation like that of 20th century Australian painting — beginning with Sydney Long and sustained in the works of Sidney Nolan, Clifton Pugh, Arthur Boyd, and Albert Tucker: where broilgas strut, lorrikeets clamour, galahs and cockatoos flock in profusion, over newly perceived spaces. Our own findings are more sober and 'discrete' — like our wildlife. To concede this is not to culture-cringe; we would concede that a Fernbird, although unique, does not carry the colour value of a Gouldian Finch.

Gary Baigent would expect no accreditations as a specialised bird photographer, fine camera artist as he nevertheless is. Yet on a trek around East Cape he captured — aptly in black and white — a single North Island Tomtit atop some rough scrub. So the bird is presented, a little lonely; an isolated, incidental few seconds of a day's journey; and utterly authentic.

The imagery and idiom of nga tangata Maori would change with epoch, and resources. Fred Graham lives near Waiuku. His sculpture, called 'Foster Parent — Kereana', was acquired by the Waikato Museum of Art and History in 1988. A massive Kereru chiselled out of greenish steatite stone from the Nelson area, its surface ranges from rough-cut through to smooth-polished, approximating the scope of plumage-texture typical of that bird. Between the feet are 2 smaller juvenile Ruru, in foster-protection. Graham created this work during a Maori sculptors' workshop in Lower Hutt; the hostess/co-ordinator there was called Kereana and was, herself, a parent figure to young people with deep needs and problems. More recently the artist has produced a work for the Ford Motor Company: a kauri Kotuku, the Bird of a Single Flight, between steel-surfaced Eleventh and Twelfth Heavens. A bird of ancient oral legend, referred to by Mervyn Taylor half a century earlier; today the focus of an indigenous creation in modern form and context — and an appropriate conclusion.

Bird Photography in New Zealand

In reviewing the history of bird photography in New Zealand, one should distinguish between the scientists and naturalists who photograph selected bird species that they are researching, and those naturalists, usually amateur, who deliberately plan to photograph a variety of birds, often having to make elaborate preparations by using hides.

Prominent among the scientist photographers, whose photographs supported their studies of birds in the southern offshore and outlying islands, are J. Darby, R.A. Falla, C.A. Fleming, P.C. Harper, F.C. Kinsky, L.E. Richdale, E.G. Turbott, J. Warham, and K. Westerskov.

The pioneer of dedicated bird photography in New Zealand was undoubtedly W.H. Guthrie-Smith. He wrote and illustrated several books, including *Tutira, the Story of a New Zealand Sheep Station* (1st ed., 1921), *Birds of the Water, Wood and Waste* (1st ed., 1910), and *Birdlife on Island and Shore* (1925). All were profusely illustrated with some remarkable bird studies, many of which would stand scrutiny today. Guthrie-Smith was fortunate in having employees who always carried his heavy gear and, in most cases, built his hides!

W.R.B. Oliver's first edition of *New Zealand Birds* (1930) contained photographs by various people, notably the Wilkinsons of Kapiti Island. This was soon followed by *The Life Histories of New Zealand Birds* (1932), a large-format volume written and illustrated by E.F. Stead. It contained black and white photographs of birds, taken mainly in the South Island.

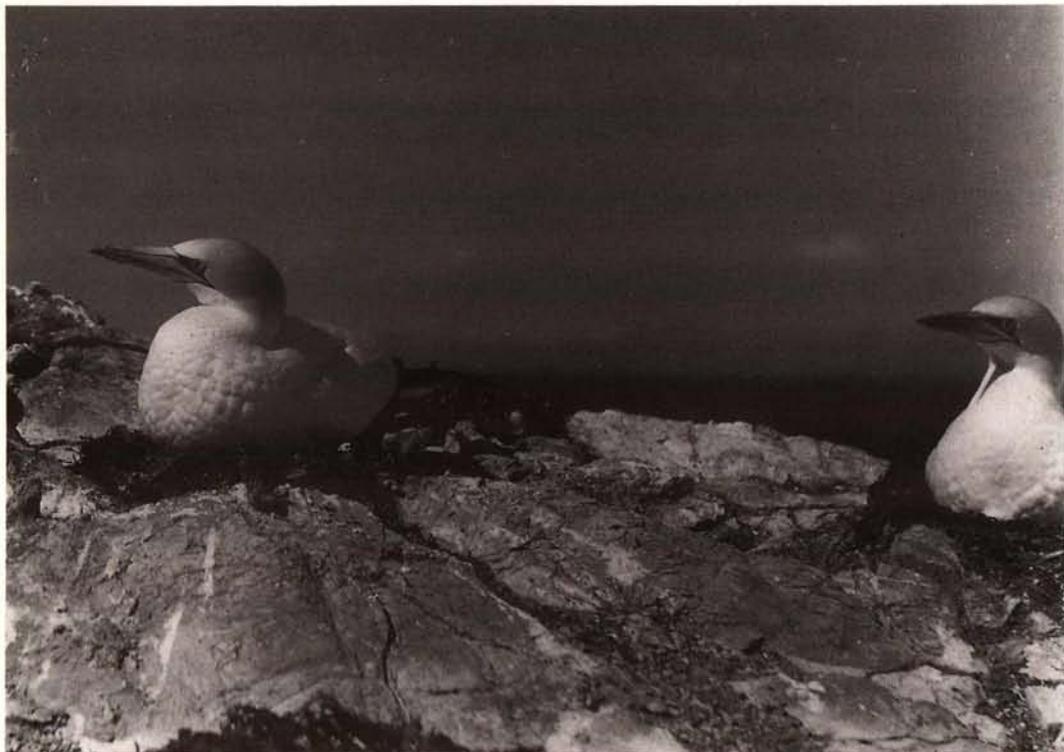


Figure 15. Gannets nesting on Waiheke Island, 2 October 1946. Photo: G.A. Buddle, Auck. Mus. collection.

Only after the war did the publishing of bird photographs become commonplace. G.A. Buddle's *Bird Secrets* (1951) contained black and white bird photographs of very high quality, considering the equipment available at that time.

In his book *Kapiti Bird Sanctuary* (1952), A.S. Wilkinson and his wife Amy had several interesting photographs of bush birds. Many of these photographs were quite remarkable, considering the low light in the bush and the slow speed of the films and lenses used. One interesting shot shows a Whitehead feeding a Long-tailed Cuckoo chick. Another, taken in 1927, depicts a Kakapo, presumably a survivor of the 3 birds liberated on the island in 1912.

The expanded second edition of W.R.B. Oliver's *New Zealand Birds* (1955) contained the first published colour photographs of New Zealand birds; 12, taken by K.V. Bigwood, R.V. Francis-Smith, and R.R. Forster. The book also contained several black and white photographs, including one, by W.P. Mead, of a North Island Kokako on its nest. Mead took this shot by climbing a ladder propped just below the nest and photographing the sitting bird from a distance of less than a metre.

I wrote and illustrated *Focus on New Zealand Birds* (1957), producing 3 years later an enlarged edition containing some colour plates. These publications contained some of the first published shots of the Morepork in flight and feeding young. They also contained a series on the Kingfisher and Reef Heron feeding chicks. All these photographs were taken on quarter plate glass plates using a vintage Sanderson stand camera. The 1957 edition of this book was published locally in Warkworth, and was financed by prepaid subscriptions by OSNZ members.

M.F. Soper's *New Zealand Bird Portraits* (1963) was followed 2 years later by *More New Zealand Bird Portraits*, which contained 20 colour plates and black and white illustrations of very high quality. The series on the nesting Southern Crested Grebes were some of the first published of this species. The first full-colour book, *Birds of New Zealand*, appeared in 1963. Edited by G.R. Williams, it contained 50 colour plates by K.V. Bigwood, F.C. Kinsky, P. Morrison, M.F. Soper, and myself.

From the early 1970s, with the advantage of more sophisticated camera and flash equipment, many high-quality colour photographs of New Zealand birds were produced for books, periodicals, calendars, and brochures. Several officers of the former Wildlife Service were photographing a wide range of birds including many endangered species. Prominent among the photographers of this period were J.L. Kendrick, D.V. Merton, R. Morris, P. Morrison, C.J.R. Robertson, and C.R. Veitch. Among the amateur photographers producing high-quality photographs during this period were C.E. Barwell, G.R. Chance, D.W. Hadden, P.C. Harper, I. McVinnie, M.F. Soper, J. Warham, and myself.

During the last decade the popularity of bird photography increased rapidly, so that in 1986 when a publishing firm advertised for photographs of New Zealand birds they received over 4000 colour transparencies from more than 80 photographers. A large proportion of these submissions came from B. Chudleigh, J. Fennell, D.W. Hadden, C. Miskelly, C. Monteith, M. Quinn, P.H. McKenzie, J.L. Sagar, and D. Stonex.

The number of photographers taking serious movie film of New Zealand birds has been more restricted. K.V. Bigwood produced some of the finest films when working with the National Publicity Studios, and P. Morrison and J.L. Kendrick of the Wildlife Service followed with some high-quality films, many showing footage of birdlife on the outlying islands. In the amateur field G.C. Ell and I produced several films for screening to conservation societies and schools.

Until 1980, G.C. Foster photographed and produced several notable films while working with the National Film Unit and many of these bird films appeared on television. With the phasing out of the NFU Natural History Unit, the TVNZ Natural History Unit, based in Dunedin, has produced very high-quality films of New Zealand birdlife, which have gained a high international reputation, especially the 'Wild South' programmes.

Ornithology in New Zealand Universities

Until the 1960s, ornithology received little attention in New Zealand's universities except at Otago. Comparative morphology was still the paramount concern of zoology courses up to the end of the 1940s. It was the great expansion in biological thought in the 1950s, with greater emphasis on biological processes and ecological aspects of zoology, that provided the right climate for the emergence of serious study of ornithology in universities. Moreover, with the establishment of the Wildlife Service (Department of Internal Affairs) and Animal Ecology Division of DSIR, there arose a demand for graduates with ornithological expertise.

This trend and demand encouraged the appointment of university staff with ornithological research interests. They attracted students for post-graduate study and funds from DSIR and Wildlife Service for research in topics of concern to these departments. The rapid expansion in ecological studies and the emergence of ethology as a coherent discipline gave impetus to the choice of ornithological topics for post-graduate study, especially in New Zealand, where birds are the predominant land vertebrates. Not the least important influence in all this ornithological ferment was the success of the Ornithological Society and the interest and body of information that it created.

University of Otago (Dunedin)

Of significance in this train of events was the appointment of B.J. Marples to the Chair of Zoology at Otago University in 1937. His parents, noted amateur ornithologists, stimulated his interest in birds from childhood. Then at Oxford he came under the influence of Charles Elton and the work of the Edward Grey Institute and also the British Trust for Ornithology.

When I joined the Zoology Department at Otago in 1939 as laboratory technician, Marples was completing a study of the food of the Little Owl and investigating the food of the Mallard for the Otago Acclimatisation Society. In 1939, through the enthusiasm of Marples, the Ornithological Society of New Zealand was founded. At this time, L.E. Richdale, an instructor in agriculture in primary schools and an MA in education from Otago, began to take an interest in the Royal Albatrosses at Taiaroa Head on the Otago Peninsula. When he sought the advice of Marples, he began a long and friendly association. Marples spent many hours discussing with Richdale the possibilities for ornithological projects and encouraged him to undertake systematic investigation of seabirds. There is no doubt that these discussions helped to mould Richdale's thoughts in the early days of his monumental studies of seabirds. Although Richdale was appointed honorary lecturer in zoology at Otago University in 1940 and retained that status until 1952, he took no part in teaching. In October 1952, he was awarded the DSc degree by the University of New Zealand for his studies of seabird life-histories.

In 1938-1939 Marples, using thin aluminium bands with numbers pricked on them, made a pilot study of flocking White-eyes. During 1940, various-sized aluminium bands were produced bearing the legend 'Return to Otago Univ.' and the Otago University banding scheme was launched. This predated the Ornithological Society's Ringing Scheme by 7 years, during which Marples and I banded several hundred land and seabirds, as well as contributing to the first OSNZ special co-operative study, the White-eye trapping and ringing scheme. Marples was also experimenting with automatic recording of the nesting behaviour of birds, and we developed and successfully used 2 simple kinds of sensor. This novel method of behavioural study predated the now commonplace use of biometry by 2 decades.

All this surge of ornithological thought and endeavour at Otago University, however, did not alter the teaching course in zoology. In the vertebrate course at this period the

origin, structure, and diversity of each of the classes were exhaustively treated, the Aves being no exception. There was no room for a treatment of the life of the animal. However, in 1942, the Otago University Biological Society was founded, and its first project was mapping Starling roosts in Dunedin. Field ornithology crept in at the extracurricular level!

When in 1944 I began a Masterate thesis, I was given as a topic the description and life cycle of 3 unnamed trematodes whose larval stages live in the freshwater snail *Potamopyrgus antipodum*. At this time all degrees were granted by the University of New Zealand and were examined by the professors of zoology of all 4 colleges. This dictated the nature of the candidate's submission. The topic chosen was suitable and acceptable to the examiners but not to *my* liking. After much pleading and against Marples's better judgement, I was permitted to change my topic to a study of the Blackbird with the proviso that it should have a reasonable morphological and histological content to satisfy the northern examiners. In the end, only external morphology, plumage, and soft part coloration were dealt with and gross anatomy of the gonads noted to determine the reproductive cycle. General behaviour, song, territory, courtship display and mating, roosting and nesting behaviour constituted the bulk of the thesis. The automatic records of nesting behaviour made over the previous 3 years were also included. The entirely new ground broken in this thesis was very well received; apparently it was timely.

In 1947, by then assistant lecturer in the department, I was given a block of 4 lectures in the Aves section of the vertebrate course to deal with courtship, display, and territory in birds — the live animal was emerging in zoology courses. In 1948, liaison with the Otago Acclimatisation Society was established and a pheasant banding programme organised for them — a connection which was continued over the years and finally resulted in the establishment of the first wildlife diploma courses in the 60s. This remains the only such course offered in New Zealand universities. Another project undertaken for the acclimatisation society was a survey of Chukar distribution, the results of which were published by Marples and Gurr (1953).

Soon after the formation of the Animal Ecology Section of the DSIR, Otago University obtained a grant from that section for an investigation on the Harrier. This was the forerunner to research grants for ornithological studies that is now an established part of university research funding.

In the early 50s, Jiro Kikkawa came to Otago as a post-doctoral fellow working on the White-eye. Colin Beer, a Rhodes Scholar from Otago, returned to the Department of Zoology after D. Phil. studies at Oxford with Tinbergen and a post-doctoral year with Lehrman at Rutgers. In the 2 years that he stayed at Otago he continued his studies of gull behaviour and contributed behavioural lectures to the general course work. With the appointment in 1960 of Kaj Westerskov, the Diploma in Wildlife Management course, a 1-year postgraduate course with thesis, was set up. Ornithology then became an increasing part of the honours and Dip Sci, MSc, and PhD courses. Westerskov's wide-ranging ornithological publications and his supervision of 67 students for diplomas and degrees during his 20 years in the department ensured Otago's ornithological tradition. Lloyd S. Davis, appointed lecturer in the department in 1985, has kept the tradition going with continuing involvement in Antarctic and local bird studies.

University of Canterbury (Christchurch)

At Canterbury University, the appointment of Bernard Stonehouse in 1960 resulted in the start of Canterbury's Antarctic and Subantarctic studies and the establishment of a station at The Snares. Stonehouse also made use of the facilities of the department's excellent field station at Kaikoura. In 1966, John Warham took over from Stonehouse and the programme was continued and expanded. His work on crested penguins and petrels (in association with many students) is well known. In Antarctica various studies on penguins and skuas were continued by Euan Young and students. The Snares programme (studies of most of the birds there) continues. The department also ran an expedition to Antipodes Island in early 1969 on which ornithological observations were made. Open Bay Island off the Westland coast has been the base for past and continuing penguin studies. John

Warham also established a connection with Kowhai Bush at Kaikoura. Here the emphasis has been on the biology of forest birds, generally with a behavioural/ecological bias. Ian McLean continues work on the relationships between birds and predators and brood parasites. At the undergraduate level, the class Aves has its proper place in the standard vertebrate zoology course and ornithology is offered as a seminar course at fourth year level in the Honours course. Occasional courses in New Zealand birds or their conservation are offered by the Department of Continuing Education.

Massey University (Palmerston North)

In 1961, now senior lecturer in zoology at Massey Agricultural College, I introduced bird behaviour under the guise of ecology to the fourth-year Bachelor of Agriculture course. The practical project for this course was the mapping and study of territory of Blackbirds on campus. A member of this class, Michael Imber, on completing his degree, joined the staff of the NZ Wildlife Service and in 1988 was awarded Massey's first DSc in Zoology for his work on petrels. After a year with Tinbergen at Oxford, I set up the first full behaviour course in New Zealand universities, in which the main emphasis of practical work was bird behaviour.

When Massey Agricultural College became a multi-faculty university in 1964, the way was clear to develop ornithology in the zoology department. Several Adult Education courses, notably that on seabirds, have been offered by the department and have been very well received by the public. My gull studies, which started in the 40s, and my continuing connections with Tinbergen's group provided the basis for developing ornithology in the department and appointing staff with like interests.

Robin Fordham, a graduate of Victoria University, came to Massey University in 1968 after post-doctoral population studies on Rooks at Aberdeen University. His long involvement with Dominican Gulls shifted to rails and led to work on Pukeko and the Moorhen (in Scotland), centring mainly on dispersion and activity.

Brian Springett joined the Department in 1977, having worked on Arctic Terns in Durham, United Kingdom, and on Silveryeyes in Western Australia. Behaviour and population studies of introduced birds were started immediately (Black Swan, Australian Magpie, Spur-winged Plover). In the early 1980s his interests changed to community studies of forest birds in relation to forest structure and to the dynamics of endangered species, such as North Island Brown Kiwi.

Edward Minot came to Massey University in 1981 after studying interspecific competition in titmice at the Edward Grey Institute of Field Ornithology, Oxford. He has continued an interest in field studies of competition and breeding ecology, with work on Starlings that breed on the farms at Massey University and data from a population of kiwi in Northland.

Clare Veltman began lecturing in the department in 1984 at the completion of her doctoral study of Magpie social behaviour at Massey University. She did further work on Magpie singing and song sharing patterns in collaboration with resident research visitors. Fieldwork on Blue Duck behaviour began in 1985, at the invitation of the Wildlife Service.

Past Massey students well established in New Zealand ornithology include John Craig (University of Auckland); Hugh Robertson, John Cockrem (DSIR); Ralph Powlesland, Christine Reed, Mike Imber (DOC); Brian Gill (Auckland Museum); and John Innes (Forest Research Institute). Other graduate students have proceeded with scholarships to Oxford, Monash, and Toronto to complete doctorates.

Victoria University of Wellington

Victoria University's first ornithological thesis was Balham's ecological studies on waterfowl in 1949. It was based on observations on life histories, weights and measurement, and feeding habits of waterfowl, and incorporated the results of banding. This was work carried out for the game bird section of Department of Internal Affairs and reflected the awakening awareness of the use of scientific investigation in management of waterfowl resources. Sorensen in 1956 wrote up his studies on albatrosses made while on

Campbell Island as a coast-watcher during World War II and on 2 subsequent spells in the late 40s as meteorologist at the weather station there. Balham joined the staff in the late 1950s and began teaching ecology and ornithology and this has been a small but constant component of the research output of VUW since the late 1960s. Significant work from these early days are studies on behaviour of ducks by Murray Williams and the Kea by Kerry Potts, the ecology of the Black-backed Gull by Robin Fordham and the detailed research on prions, petrels and albatrosses by Peter Harper.

With the appointment of Ben Bell in 1976, the range of topics was increased and a regular flow of ecologically based projects on birds has resulted as students have progressed to graduate research from revamped undergraduate courses in ecology, in which New Zealand ornithological material is prominent.

Charles Daugherty was appointed in 1982 and began analysis of the genetics of native and introduced fauna by electrophoretic techniques. Much of this research has concentrated on endangered species to aid conservation and management. One notable ornithological work is the study of Black Stilts by Brenda Green.

University of Auckland

Auckland University's contribution to ornithology before 1970 was minimal, with the notable exception of Charles Fleming's MSc thesis. As part of a general course on vertebrates, ornithology is taught at advanced levels, but no specialist course on this topic has ever been offered. Fleming's thesis considered the taxonomy of prions and the possible isolating mechanisms that resulted in their speciation. He was an exceptional student and had already done much independent field ornithology. His thesis was the result of some of this personal research, which he brought together and presented for MSc in 1940.

Peter Jenkins was appointed from the Department of Education in 1968 and ornithological theses began appearing soon after. Jenkins began a study of the vocal behaviour of Saddlebacks on Cuvier Island for his PhD. His interest in vocal behaviour of birds has continued, considerable effort being given to studies of the dynamics of Chaffinch song in many parts of New Zealand.

Euan Young joined the department in 1972. His ornithological research began in the 1959-60 summer in Antarctica with a study of the feeding and breeding biology of Antarctic Skuas. Interest shifted to relationships between skuas and Adélie Penguins and involved 5 summers' work at the Cape Bird Manilu Rookery, Ross Island. Since then research has been on chick survival, feeding behaviour, life-time productivity and co-operative breeding of Southern Skuas. Current programmes also include research on skua inter- and intra-population genetics.

John Craig joined the department in 1973 fresh from finishing his PhD studies on Pukekos at Massey University. The major theme of his studies has been behavioural ecology, especially the foraging and social organisation of honeyeaters and a continuation of the Pukeko studies. Study of honeyeater foraging has led to pollination studies, especially of New Zealand flax, while a long concern with conservation prompted work with rodents and how these may influence endangered fauna including birds.

The involvement of students and past students in ornithological studies has a long history through the activities of the university's Field Club and its latter-day offshoot, the Offshore Islands Research Group. Past Auckland students well established in New Zealand ornithology include Mick Clout, Rod Hay, Henrik Moller (DSIR); Susan Triggs, Murray Douglas (DOC).

Lincoln University (Canterbury)

At Lincoln College of Agriculture, David Stenhouse, who was on the staff for a brief period in the late 50s, did an investigation in 1959 into an outbreak of damage by Redpolls to fruit blossom, mainly of apricots and peaches in Central Otago. He reported the nature and extent of the damage and commented on the taxonomic status of Redpolls in New Zealand. In 1960, Gordon Williams succeeded Stenhouse and completed a PhD on the ecology of Californian Quail in 1966. Between 1968 and 1973 3 studies were

carried out on the predation on agricultural pest insects, primarily grass grub, by Starlings, Magpies, and gulls. When Williams rejoined the staff as Head of the Entomology Department in 1980, he revitalised Lincoln's ornithological endeavours. His main contributions during this period were the publication of *The Red Data Book of New Zealand* in 1981 (co-authored by D.R. Given) and his papers on avian island-biogeography. Two graduate students began ornithological theses at this time. Their studies were the ecology of riverbed breeding birds and the comparative biology of 2 species of petrels.

Graham Wilson joined the staff after Williams' death in 1983. Wilson continued his studies already underway on Adélie Penguin populations and has recently begun research on social organisation and ecology of Kea, primarily at Mount Cook National Park. Currently 3 graduate students in ornithology are studying habitat requirements of South Island Robins, management of Kea, and the impact of Canada Geese on pastures. In addition another MAppSc student, jointly supervised by Ian McLean at Canterbury University, is studying brood reduction in Fiordland Crested Penguins.

Lincoln University now sees its contribution to ornithology as being primarily 'applied' and directed mainly within national parks and reserves. Ornithology is an important component in undergraduate courses in ecology and natural history, taught primarily to Parks and Recreation students. In recent years Wildlife Management has been taught at third-year degree and master levels and from 1989 is an important component of the Applied Ecology course. The emphasis is on the New Zealand fauna and management of threatened and endangered species.

Waikato University (Hamilton)

The University of Waikato has only recently turned its attention towards ornithology and currently has two masterate studies in progress, one on Bittern ecology and the other on nest-dumping or egg parasitism in Grey Teal.

Ornithological Theses

Until 1962 all New Zealand degrees were granted by the federal University of New Zealand. The degree structure was Bachelor degree, then Masterate (with honours, awarded on merit, available to candidates who completed within 6 years of commencing study), then PhD (not available 1931-48). All these degrees involved course work and were supervised. DSc, the highest science degree, was awarded for unsupervised published work of international repute.

After devolution of the University of New Zealand in 1962, the constituent colleges became separate universities and developed their own course regulations and degree structure. All except the University of Auckland introduced BSc with honours, which became the shortest route to a PhD and brought New Zealand degree structures more in line with those of the universities in most other English-speaking countries. Masterate degrees are still available. Specialist post-graduate diplomas are now also offered.

The list of theses (Appendix) shows how ornithology has developed in New Zealand universities. Before the 60s only 4 ornithological theses had been presented for masterate degrees in science in New Zealand universities (Fleming 1940, Gurr 1946, Balham 1949, Sorensen 1956). The progress from only 4 theses in 20 years before 1960 to 121 theses and diplomas in the decade 1978-88 eloquently attests to the increased awareness of the importance of ornithological studies in New Zealand — as befits a country whose endemic land vertebrate fauna is avian dominated. It is also an appropriate response to the increasing demand for the conservation and management of our unique avifauna. The scope and diversity of ornithology are now firmly established in the universities of New Zealand and its future is assured.

L. Gurr

University Studies of Bird Vocalisations in New Zealand

Research during the 60s on song-learning, dialects, and duet singing in birds in Britain and the United States was made possible by the invention of good portable tape-recorders and of the Kay Sonagraph (voice print machine). The studies that resulted were motivated by a much wider theoretical interest than just the cataloguing of birds' sounds. At long last there seemed to have arrived an opportunity to settle the age-old unresolved nature-versus-nurture controversy. The point at issue? In the development of an animal's behaviour, which is more important, learning from others or instinctive behaviour inherited genetically from the parents?

Auckland University

In 1969 I visited Cuvier Island to help a wildlife ranger check the Saddlebacks released there the previous year. Saddlebacks were ideal candidates for song study, particularly as the original colonisers had been individually colour-banded. With the help of the Wildlife Service, especially Dick Veitch, we started colour-banding the island-bred birds and recording the songs of every Saddleback on the island.

The first discovery was that there were clearly defined dialects in which a small number of neighbouring male birds sang the same song. But much more exciting was that within each dialect was one of the original founding male birds from Hen Island. The question immediately arose, 'Were the birds clustered around each coloniser his sons?' That is, had they inherited his song genetically, or otherwise? By colour-banding nestlings of fathers whose songs were known, we showed that the descendants did not sing their father's song, but always that of their neighbours in the territories surrounding where the new bird claimed his territory (Jenkins 1976, thesis). Furthermore, each of these sons moved out of his father's dialect area before setting up a territory, even though there seemed plenty of room, and this gave rise to the idea that young male birds were using the dialect system to avoid consanguineous matings and the dangers of in-breeding. This suggestion was later put to the test on Tiritiri Matangi Island.

The first 2 student contributions to song study (Counsilman 1971, McLean 1975) were in theses in which song formed a small section of a more general study. Jim Counsilman studied the Indian Myna and Ian McLean the Fantail on Cuvier Island. Rod Hay (1975, thesis), however, took song behaviour of the South Island Robin as his central topic. His work with colour-banded robins in Kowhai Bush near Kaikoura included a comparison with the song of the Black Robin on Little Mangere Island.

The introduced birds of New Zealand provide a rich resource for the study of the evolution of song behaviour because, in general, the introductions occurred over a short span of years in the last century followed by complete genetic isolation to the present day. Thus, comparisons with parental stocks may lead to an understanding of the speed with which songs change, and in what ways they become modified.

This was the motivation for the first studies of Chaffinch song in New Zealand by Melvyn Galbraith (1977, thesis). In particular we wanted to test claims for the existence of song dialects in British Chaffinches. Our results were not conclusive; the problem was too big for one year's work, but it did show how crucial the pattern of sampling is in any attempt to study song dialects. Next came a study of song and social behaviour in the North Island Tomtit in the Hunua Range by Jo Bissett (1978, thesis) and a thesis on Kokako song by Tony Hughes (1981).

Studies by Tim Lovegrove (1980, thesis) and Tony O'Callaghan (1980, thesis) on Cuvier Island on Saddleback territorial and pair-bond behaviour included much material

on song. Steve Dawson (1982, thesis) studied the singing behaviour of Chaffinches to test the Beau Geste hypothesis, which proposed that birds have a repertoire of songs and so can move about their territory constantly changing the songs and deterring other male Chaffinches from settling in an area that seems overcrowded. Steve's results did not support the hypothesis (Dawson & Jenkins 1983).

Kay Clapperton (1982, thesis) studied the vocal behaviour of the Pukeko. She was interested in the roles of their vocalisations in their communal breeding system. An interesting innovation was to attach a radio telemetry microphone to a bird's leg to find out which bird the calls were coming from — some calls were made without opening the beak. A second study that year of a non-passerine was that of the Southern Brown Skua by Diane Brunton (1982, thesis) from recordings made on South East Island.

Terri Sheils (1986, thesis) monitored the breathing movements of a Starling by telemetry while simultaneously recording its song to correlate breathing with the Starling's almost continuous warble song.

Geof Plunkett (1987, thesis) continued the investigation into the geographical patterns in Chaffinch song and concluded that dialects based on the whole song had not developed in New Zealand. He also discovered that the change in song from that of the ancestral British stock was much less than predicted for songs that have passed by learning from one generation to the next for about 120 years. David Allen's thesis (1988) on Little Barrier Island Whiteheads included descriptions of the vocalisations of these communally breeding territorial birds.

Sonja Murphy (1989, thesis) studied the effects of social relationships on the song production of Saddlebacks on Tiritiri Matangi Island. She compared the song production of single pairs in isolated bush patches with that of groups of pairs in other patches. Sonja also tested the effects of song playback on Saddlebacks and measured the fluctuations of singing during the course of a day and during a year. Alan Tennyson (1988, thesis) investigated the vocal behaviour of Fairy Prions and Black-winged Petrels in relation to aerial courtship and sexual dimorphism.

Other publications by staff of the university are: a short note on the song of the New Zealand Fernbird (Jenkins 1978), a theoretical paper (Craig & Jenkins 1982) in which a model for the evolution of complexity in bird song was proposed together with a set of predictions arising from the model, and a short review on aspects of song learning, competition, and dialects (Jenkins 1985).

In collaboration with Allan Baker (Royal Ontario Museum, Toronto) I have continued work on Chaffinch song from 2 angles. The first (Jenkins & Baker 1984) recorded the evolutionary changes detected in Chaffinch songs in New Zealand, and the second (Baker & Jenkins 1986) compared Chaffinch song in New Zealand and in its colonising outlier, the Chatham Islands. The results are discussed in the context of population concepts such as founder effect and drift. Some of the results of Kay Clapperton's work on Pukeko calls were published (Clapperton & Jenkins 1984).

In 1986, interest in Starling song was reactivated by the visit to the University of Dr Martine Adret-Hausberger. This resulted in a paper (Adret-Hausberger & Jenkins 1988) on the very complex warble songs of Starlings. At the same time Jenny Keene has been intensively sampling Starling song at Papakura to investigate song behaviour in relation to the breeding season, mimicry, and sexual selection.

I have mentioned the hypothesis that young male Saddlebacks may avoid in-breeding by dispersing to areas with different dialects from those of their fathers. This was tested on Tiritiri Matangi Island by transferring pairs with particular dialects from Cuvier Island and establishing them in separate bush patches on Tiritiri in such a way that each of 6 bush patches had its own distinct song dialect. By colour-banding nestlings and observing where both male and female yearlings eventually bred, we tested the anti-incest idea. The hypothesis is not supported by the evidence: females dispersed further than males and several males mated incestuously.

Other Universities

John Warham at Canterbury University derived from his long-standing interest in petrels several publications on aspects of their vocal behaviour: in 1979 on the vocalisations of the Soft-plumaged Petrel, on the calls of the *Procellaria* petrels in 1988, and jointly with C. H. Fitzsimons, in 1987, on the vocalisations of Buller's Mollymawk.

At Canterbury also, Jim Cunningham (1985) included in his PhD thesis a section on the communicatory behaviour of the Brown Creeper, and Joe Waas in his thesis (1989) included aspects of vocal behaviour in aggressive interactions of Little Blue Penguins. F.M. Proffitt (1988) studied parent-chick recognition of calls in the Snares Crested Penguin for her BSc (Hons) project.

McLean & Waas (1987) showed that the begging calls of nestling Long-tailed and Shining Cuckoos are remarkably similar to the begging calls of their respective hosts' nestlings. They suggest several explanations for this resemblance, including the hypothesis that the parasitic nestlings are mimicking the hosts' chicks to deceive the hosts.

Susan Farabaugh (1982) and Ellie Brown, visiting American researchers at Massey University, have been pursuing a major project on the vocal behaviour of the introduced Australian Magpie. At Otago University Beth Spiers (1988) took for her degree topic the recognition calls within families of Adélie Penguins in Antarctica.

P.F. Jenkins

Birds and the Maori

Perhaps 1000 years ago, the discoverers and first settlers of Aotearoa, the Polynesian ancestors of the Maori people, came to a land of birds. They brought with them the dog and the kiore (Polynesian rat, possibly a stowaway). The pig and the chicken, which accompanied Polynesian settlement elsewhere in the Pacific, did not make the long sea journey to New Zealand. Instead, meat was now available in the form of wild birds, notably large flightless moa and other species.

In many parts of New Zealand, especially along the east coast of the South Island, on the south-west of the North Island and on Coromandel Peninsula, the earliest settlement sites are marked by the bones of moa and other now extinct birds. At the South Taranaki sites of Kaupokonui and Waingongoro have been found the bones of 4 genera of moa (*Pachyornis*, *Euryapteryx*, *Anomalopteryx*, and *Dinornis*), and another 11 extinct species, including a swan and duck, 2 raptors, several rails, and a crow, along with the recently extinct Huia and New Zealand Quail. Little Spotted Kiwi, Takahe and Kakapo, no longer present in the North Island, are also found in the oven debris and middens at these sites (Prickett 1983).

Such is the concentration of bones of extinct birds at many sites that it is tempting to invoke the Pleistocene overkill ideas of Paul Martin to explain the rapid demise of so many species. These ideas were developed in relation to North America, where the sudden extinction of many genera of grassland mammals was linked to the arrival of man in that continent (Martin 1984). In New Zealand the short time-span of human settlement and a handful of radiocarbon dates enable us to see that bird extinctions before the arrival of Europeans did not take place simultaneously throughout the country (e.g. Anderson 1984). Clearly, however, the arrival of Polynesians proved catastrophic for many of the older inhabitants.

Traditional ethnological descriptions have the Maori living in harmony and balance with the natural world, including its birds (e.g. Best 1942). Maori cosmogony and religious ideas related all living and non-living things to man so that exploitation of birds for food or other purposes demanded careful ritual and strict practical observances. Local control over resources, seasonal hunting, and rahui (a local ban over resource exploitation) are just some aspects of practical conservation practised by the Maori.

It is easy to romanticise this ideal. We must remember that the first settlers arrived from tropical Pacific atolls and small high islands, perhaps in the region of the Cook and Society Islands, to an unfamiliar temperate world. Careful exploitation of the new environment doubtless took time to develop and just as certainly was marked by many irreversible mistakes. Maori exploitation of the environment was undoubtedly more responsible for, and responsive to, environmental change than the romantic view would represent.

Archaeology has traced changes in local bird populations by changes in the composition of middens. In many areas there is major shift from deposits dominated by the bones of moas and other now extinct birds to middens containing smaller forest birds and illustrating a greater reliance on fish and shellfish. Atholl Anderson has traced this for the southern South Island in his book *When All the Moa Ovens Grew Cold* (1983).

At another level, archaeological research has demonstrated changing patterns of exploitation for what must have been much more local reasons. An example is provided by the Washpool midden site in Palliser Bay, where Leach (1979) suggested a decline in bird hunting or changes in the local bird population to account for a marked reduction in bird species and numbers between the 12th and 13th centuries and the later 14th century occupation levels. Tui and 2 species of parakeet make up almost two-thirds of the

numbers in the early level. Some 35 species are identified. Tui, parakeets, and Kereru (pigeon) make up more than 60% of the numbers of 12 species in the 14th century occupation level.

Historical accounts of Maori exploitation show well the practical and prestige importance of birds as food and the method and ritual used for success. Forest birds that were most important were the Kereru, Kaka, Tui, parakeets, Bellbird, Weka, Kakapo, and kiwi. Birding might take place close to a major settlement or some distance away where men would establish a short-term camp in the hunting season. Favoured areas were jealously preserved by local groups and productive trees might be named and honoured in speech and song. Kereru were hunted at their best in early winter when they gathered to feed on ripe miro berries. Waka kereru (water troughs) lined with noose snares were set up in the trees, or snares might line a natural pool near an important feeding area. Hundreds of birds could be caught in one day.

Other methods of catching bush birds included snare perches for single birds and wooden spears as much as 10 m long. The latter were commonly made of tawa with a bone barb or stingray spine lashed to the end. Such spears were raised slowly into position beneath a perching bird and then thrust home. Snare perches were sometimes decoratively carved, and so they were clearly more than simply utilitarian. Sometimes a captured Kaka tethered by a leg ring was used to call down its fellows. Kakapo and kiwi were hunted with dogs or with snares set near nests or on runs. Weka too might be caught by set snares but also by working a snare and a lure (in the form of something fluttered or shaken) on the ends of 2 sticks. The inquisitiveness of the Weka would prove its undoing.

In wetlands the Grey Duck, Pukeko, and other waterbirds were taken, especially in late summer while they were moulting. Paradise Shelduck were important in the South Island. On the coast, penguins and shags were hunted with a wide variety of other birds that turn up in middens, perhaps taken by chance as much as deliberately. Albatrosses were captured by special hooks like fishhooks, which were trolled behind canoes offshore.

The only major traditional bird exploitation to have survived is the annual April–May capture of Sooty Shearwater ('muttonbird') fledglings on the islands of Foveaux Strait. Only descendants of the original Maori owners of the islands can take muttonbirds. The birds are taken at night, plucked and preserved in containers, which were traditionally of bullkelp protected by totara bark and flax basket. Many are given away as part of a surviving web of social obligation, but others are sold for general consumption. North Island 'muttonbirds' included the Fluttering Shearwater, Flesh-footed Shearwater, and chicken Petrel, and Grey-faced Petrel. Only the last species is taken today, from various offshore islands between Cape Karikari and the Bay of Plenty.

It must be emphasised that birds were an important prestige food, not just to be eaten when abundant but also to be available for special occasions of group hospitality. Much work went into preserving birds in their own fat in gourds or totara bark baskets, as well as to preserve southern Muttonbirds in bull kelp containers. Decorated gourd containers filled with preserved birds were stored in raised pataka (storehouses) ready for an occasion when the laws of hospitality demanded the very best.

Birds were taken for their feathers and long bones as well as for food. Kiwi, Kereru, Kaka, Tui, and other birds were greatly valued for their feathers, used in the decoration of feather cloaks, which became the most prized of all garments during the 19th century. Kiwi feathers are still available for cloak making from accidentally killed birds, but only by special permission of the Department of Conservation. Pheasant, Guinea fowl, and chicken feathers have also been used in recent years. Huia tail feathers, Kotuku (White Heron) plumes, and the tail streamers of the Amokura (Red-tailed Tropicbird), which occasionally was wrecked on northern beaches, were highly prized in decorating the hair of chiefs. Albatross long bones were fashioned into simple flutes and toggles for clothing.

The Significance of Captain Cook's Voyages for New Zealand Ornithology

No people ever went to sea better fitted out for the purpose of Natural History . . .
(Ellis to Linnaeus, 1768).

When the *Endeavour* left England in 1768 at the start of Cook's first voyage, she had on board the young Joseph Banks and Daniel Solander, a naturalist of outstanding ability who had studied under the great Swedish botanist Carolus Linnaeus. On board also was Sydney Parkinson who, although employed by Banks primarily as a botanical draughtsman, drew many zoological specimens, including birds, collected on the voyage.

Banks himself was interested mainly in botany, but many bird specimens were also collected during the voyage. On one day alone, Banks recorded having killed 69 oceanic birds of 7 species (Beaglehole 1963). Many land birds must also have been collected, but it seems that full attention was given to zoological matters only when the *Endeavour* was at sea and studies in botany were not possible.

As a result the great majority of the bird species recorded by Banks and described in fine detail by Solander (but unfortunately never published by him) were oceanic species. These Solander descriptions are particularly important because they include previously unknown members of the Diomedidae as well as the first of many southern petrels, most of which occur in New Zealand waters. Identifications of most of the birds described by Solander are given in Lysaght (1959). From a New Zealand point of view the Solander descriptions are the most valuable ornithological contributions of the voyage.

The ornithological records from New Zealand proper are very disappointing, considering that nearly 6 months were spent in New Zealand waters with several landfalls between early October 1769 and the end of March 1770. Although 'some most beautiful birds' were shot at Anaura Bay and other birds are recorded as having been shot elsewhere, no New Zealand land or shore birds are known to have been described by Solander or drawn by Parkinson. Banks said 'of Birds there are not many species' and indeed referred to very few in the general account he wrote of New Zealand on the eve of his departure. In view of the second and third voyage comments about bird life in Queen Charlotte Sound, where the *Endeavour* spent 3 weeks, one concludes that during their New Zealand landfalls Banks and Solander were mainly occupied otherwise than with ornithology. A few New Zealand birds can be identified from Parkinson's *Journal* (1773), but the information is meagre and the given localities sometimes erroneous, a problem which probably stems from the way his records were posthumously published.

Although there were on the *Endeavour* 'many bottles with ground stoppers, of several sizes, to preserve animals in spirits', it is doubtful that many of the birds collected actually went into those bottles. It seems clear that most of them were eaten, including those that were described by Solander and drawn by Parkinson. Nevertheless, some bird specimens did reach England, including specimens of the South Island Kokako and Tui (Medway 1976).

Unfortunately, Banks and Solander did not publish the scientific results of their voyage. Had they done so the first Cook voyage might have achieved greater significance in the history of New Zealand ornithology.

When Sir Joseph Banks withdrew from participation in Cook's second voyage, the Admiralty appointed Johann Reinhold Forster at the last moment as official naturalist for the voyage. Forster was well qualified for this position (Hoare 1976, 1982). He took with him his eldest son, George, then aged only 17, as assistant and natural history draughtsman. They sailed on a voyage that lasted 3 years and that became important,

among other things, for its contributions to science, especially to zoological and botanical knowledge of the southern oceans, New Zealand, and other Pacific localities visited.

When the *Resolution* arrived at the Cape of Good Hope in October 1772, the Forsters met a young Swede, Anders Sparrman, who like Solander had studied under Linnaeus. Sparrman had arrived at the Cape only 6 months before to carry out a botanical survey for the Swedish government. The elder Forster persuaded Sparrman to join them, which he did as an assistant to the elder Forster, who bore his expenses on board and paid him a yearly salary. In addition, Sparrman was to receive part of such natural curiosities as the Forsters might chance to collect. When Sparrman returned to Sweden in 1776, after completing his interrupted African studies, he took with him several bird specimens that had been collected on the voyage. Latin descriptions and illustrations of these appeared in his *Museum Carlsonianum* (1786–89). Nine of the species described are New Zealand birds: Spotted Shag, Western Weka, Red-crowned Parakeet, Long-tailed Cuckoo (collected in Tahiti), South Island Rifleman, South Island Fantail, South Island Robin, Bellbird, and South Island Thrush (Piopio). The specimens on which Sparrman based these descriptions are the types of the species. Three of them, specimens of the Spotted Shag, Red-crowned Parakeet, and South Island Thrush, are still in the Naturhistoriska Riksmuseet in Stockholm (Medway 1976).

The two Forsters and Sparrman had the makings of a first-class scientific team (Begg & Begg 1966). Their methods are best described in the Forsters' own words as they appear in the preface to their *Characteres Generum Plantarum* (1776):

... wherever we landed we all set about collecting with all our might birds, plants, fish and shell-fish; when we went back to the ship each one was allotted his own duties. Sparrman was to describe the plants, my son was to draw them; I assigned to myself the zoological descriptions. However, while Sparrman was examining the plants in detail my son and I often were consulted and we had common discussions. Then my son arranged the plants he had described in another volume; I revised them all before the descriptions were again transcribed into yet another volume in accordance with the Linnaean System; and while Sparrman and my son were occupied with this, I kept collecting more new plants and other riches of nature and keeping watch lest we should leave any place with empty hands.

Among the zoological descriptions thus compiled by the elder Forster were descriptions, in minute and accurate detail, with Latin names, of new bird species met with as the voyage proceeded. About 150 species of birds were described. The great pity for J.R. Forster's reputation as an ornithologist and the ornithological literature of the time is that this exceptionally important manuscript lay unpublished and largely unknown until many years after the voyage and after Forster's death. Although it was apparently ready for publication shortly after the return of the *Resolution*, it was not until 1844 that it was edited by Heinrich Lichtenstein of Berlin and published under the title *Descriptiones Animalium*. Only then did the full nature and extent of the new ornithological knowledge that the Forsters had gained on the voyage become generally available to the scientific world. Many of the bird species described were new to science when Forster first collected and described them. However, with the delay in publication, other workers, quite unfamiliar with the species in their natural habitats, and after much less labour and privation than the Forsters, were able to describe and validly name most of the birds described in *Descriptiones Animalium*. Very few now bear the scientific names originally given to them by Forster. Among New Zealand species which do are the Fluttering Shearwater, Mottled Petrel, Red-billed Gull, and Variable Oystercatcher.

Lichtenstein, in publishing Forster's manuscript, clearly considered it contained much valuable scientific information, for he wrote in his preface that

as for scientists they too will be delighted even now by the wealth of information on very many animals that live in the Antarctic and its islands, and more accurately

presented than in zoological works. I should scarcely dare to predict where and how far this book will spread its light.

The noted German ornithologist Erwin Stresemann described it in his *Entwicklung der Ornithologie* (1951) as a 'hidden treasure'.

Of the works published by the Forsters after the voyage, George Forster's *Voyage Round the World* (1777) gave the scientific world little indication of the wealth of new ornithological discoveries they had made. The remarks on birds written by George and included in his father's *Observations made during a Voyage round the World* (1778) did not do their ornithological discoveries full justice, and in his *Enchiridion* (1788), the elder Forster listed 81 genera of birds without referring to any species except under the genus *Callaeas*, the New Zealand Kokako. Only 2 monographs published by Johann Forster gave any real indication of the depth of new ornithological knowledge gained, but unfortunately these were restricted to 2 genera. They were *Historia Aptenodytae* (1781) and *Mémoire sur les Albatros* (1785), which, Stresemann said, 'can rank even today as models of brilliant, thorough and comprehensive presentation'.

The value of the Forsters' second voyage ornithological work was greatly enhanced because almost every description by the father was accompanied by an able drawing of that species by the son. Of these bird drawings, 140 were purchased by Sir Joseph Banks in 1776 and are now in the British Museum (Natural History), London (Lysaght 1959). They form a very important part of the ornithological legacy from the second voyage. Particularly important scientifically are those drawings that are the types of the species illustrated. For New Zealand, these species are the Paradise Shelduck, Grey Duck, New Zealand Scaup, Blue Duck, New Zealand Dotterel, Shore Plover, New Zealand Pigeon, Pipit, Yellowhead, South Island Bush Wren, Brown Creeper, and Shining Cuckoo. Most of the Forster bird drawings are unpublished, but several depicting New Zealand birds have been reproduced, particularly by Begg & Begg (1966).

The younger Forster at least began a journal on the second voyage, but unfortunately the known portion is complete only to 1 January 1773. It has been published (Kahn *et al.* 1972) and contains some interesting ornithological observations for the period of the voyage that it covers. However, the complete journal kept by the elder Forster on the voyage has at last been published (Hoare 1982). This journal contains many important ornithological observations, showing that Forster was very interested in birds. The Forsters' second voyage ornithological work was original, of a high standard, important scientifically, and constitutes a fundamental contribution to the ornithology of most of the areas visited during that voyage (Medway 1979a).

William Anderson sailed on the second voyage as surgeon's chief mate on the *Resolution*. He was competent in several fields, including ornithology. He kept a journal on the voyage, but it has not been located. However, we have manuscript descriptions of bird species he recorded during the voyage, including some from New Zealand and the southern oceans (Anderson, W., no dates; 2 MSS in British Museum (Natural History)).

Clearly, the most significant contributions to New Zealand ornithology from Cook's voyages resulted from the 1773 and 1774 visits to Dusky and Queen Charlotte Sounds.

... tomorrow we shall either go in *dusky Bay*, or try to find a Harbour in this broken Land, which probably will be sheltered by Islands; & consequently be a good place for fishing & promises likewise some Grass for our Sheep & Goats, & perhaps some plants for botanical Examination, & birds for our meals & Examination.

So wrote Forster in his journal on 26 March 1773 as the *Resolution* approached Dusky Sound after the first long sojourn in southern waters, during which several new oceanic birds were collected and described.

Birds for meals and examination were indeed found in Dusky Sound. 'Parrots, Perroquets, large Green & brown Pigeons, large & small Wattlebirds, Pohebirds, Fantails, Thrushes, Mocking birds, Yellowheads & various other birds inhabit these impenetrable

Forests'. By the time the *Resolution* left the locality in May 1773, the Forsters had recorded the following 36 species, those marked with an asterisk being described in detail by the elder Forster in his zoological manuscript later published as *Descriptiones Animalium*:

Southern Blue Penguin*; Wandering Albatross*; Broad-billed Prion; Gannet; Black Shag; Pied Shag*; Little Shag; White Heron; Paradise Duck*; Grey Duck*; Brown Teal; Blue Duck*; New Zealand Scaup*; Falcon*; Western Weka*; Variable Oystercatcher*; New Zealand Dotterel*; Shore Plover*; Red-billed Gull*; New Zealand Pigeon*; South Island Kaka*; Red-crowned Parakeet*; Kingfisher*; South Island Rifleman*; South Island Bush Wren*; New Zealand Pipit*; Brown Creeper*; Yellowhead*; South Island Fantail*; Yellow-breasted Tit*; South Island Robin*; Bellbird*; Tui*; South Island Saddleback*; South Island Kokako*; and South Island Thrush*.

Perhaps the most significant among these records are those of the now extinct or endangered Shore Plover, South Island Bush Wren, South Island Saddleback, South Island Kokako (which Forster recognised as a new genus and called *Callaeas*), and South Island Thrush. Also of interest was the discovery of a large nesting colony of Broad-billed Prions on Anchor Island, about which Forster wrote:

Here we heard at about 5 o'clock a croaking & sometimes a shrill noise, caused by innumerable young & old birds, which we found to be the blue or black-banded Petrels, which live in the above mentioned holes & are fed there by their parents, who go every day in the morning out to Sea, & return in the evening, & disgorge the collected food in the mouths of their young ones. We saw in the dawn vast flights of them go out to Sea.

The next landfall was in Queen Charlotte Sound, which the *Resolution* reached on 18 May 1773, meeting up again with the *Adventure*, from which it had earlier become separated in the Indian Ocean. Forster recorded at least 28 species during a stay of 3 weeks. Most had been seen in Dusky Sound, but the following were new for the voyage and again those marked with an asterisk were described in detail by the elder Forster in his zoological manuscript:

Fluttering Shearwater*; King Shag*; Spotted Shag*; Bittern; Reef Heron*; South Island Pied Oystercatcher; Black-fronted Tern*; and Morepork*.

Forster summarised the birds of this visit to Queen Charlotte Sound in his journal:

The feathered tribe is here pretty numerous. We found three kinds of new Shags, of which we shot a good many, gannets, two kinds of Gulls viz. the Herring & the black & white Gull, a new *Petrell*, a new Tern, one kind of Duck, namely the large *painted Duck*. The woods abound in Parrots, Perroquets, Pigeons, Wattlebirds & especially *Pohebirds*, which live by sucking the juices out of the finest flowers, and are as delicate eating as the best Ortolans. There are besides small wattlebirds, Mockingbirds, a great many of the black & yellow breasted Thrush, the Fantails, Yellowheads, & others. A new kind of Hawk & Owl was likewise here. We saw on the shores *Oyster-catchers*, *Sandpipers*, *Sand Larks*, & a red legged *Brown Heron*. These are chiefly the birds peculiar to this country.

William Bayly, astronomer on the *Adventure*, confirmed the abundance of several species in the following passage from his journal (McNab 1914):

There are great numbers of large grey Parrots that have very beautiful plumage and

small Parroquets flying in great plenty so that I frequently killed two or three at one shot. I saw two kinds of small Hawkes, both being small, & a small grey owl. There are plenty of large Wood Pigeons much the same as Wood Pigeons in England. There are great plenty of a kind of birds much resembling our black birds, except they have a few white feathers in the wings and tail and some fine loose downy feathers round the neck which grow out among the black ones & has the appearance of fine white hairs inter-mixed with the feathers & under the throat are 4 fine curling white feathers growing in a tuft. These are called Poey-Birds. They are thought to be the finest eating for delicacy & richness & far to exceed the Otterlin so much esteemed by the Epicurans. There are likewise great variety of Beautiful singing Birds which made the Woods ecco with their different Notes which made the greatest harmony. When we came first into Charlotte Sound we found great plenty of Shel-drakes, Curlues, Ducks, & Divers all which we found to be very good eating.

After some months in the Society and Friendly Islands, the *Resolution* returned to Queen Charlotte Sound on 2 November 1773, remaining for 3 weeks. During this stay 2 new species were added to the New Zealand bird list, the Diving Petrel and the Shining Cuckoo. Of the former Forster wrote that 'in the night the small diving Petrels retire to the hills, where they have some holes under ground like Rabbits, & there they all together make a great noise, like to the croaking of Frogs at a Distance, & sometimes to the cackling of Hens'.

While the *Resolution* was at Queen Charlotte Sound the *Adventure* was at Tolaga Bay in the North Island. There, William Bayly recorded that he saw 'Wood Pigeons, Parroquets, Grey Parrots, Poey Birds, & Quails & vast variety of singing Birds' (McNab 1914).

The final second voyage visit to Queen Charlotte Sound was by the *Resolution* for 3 weeks in October–November 1774. No new birds are known to have been collected although many birds were shot. Forster recorded on one occasion that, 'we shot about 10 large Wattelbirds, a Curlew, Perrokeet, small Wattlebirds etc' and on another 'we shot 12 Pigeons, 3 Shags, 4 Wattle birds, 3 Pohebirds, 2 Perrokeets & 4 small Wattlebirds, with one Hawk, & a yellowhead, 30 birds in all'. It is clear that many of the birds collected in New Zealand and elsewhere during the voyages were eaten by the crews of the ships. Many Tui were undoubtedly shot just for food (Medway 1976).

No naturalist was officially appointed to Cook's third voyage. However, William Anderson again sailed on this voyage as surgeon on the *Resolution*. Before his early death he made significant contributions to the ornithology of the voyage, but unfortunately such contributions have largely gone unnoticed and need still to be fully assessed. He kept a journal, the surviving portion of which has been reproduced by Beaglehole (1967). We also have his manuscript descriptions of new zoological items met with as the third voyage proceeded (Anderson, already cited). Great use was made of Anderson's third voyage journal by the editor of the official account of the voyage, and John Latham made extensive use of his zoological manuscripts when compiling his *General Synopsis of Birds* (1781–1801).

The third voyage ships visited New Zealand once only, staying at Queen Charlotte Sound 12–23 February 1777. Anderson noted in his journal that 'the woods are tolerably stock'd with birds' and briefly described about 23 species, all of which, except the Long-tailed Cuckoo, had been recorded in New Zealand on the second voyage. Of particular interest today are his records of the South Island Saddleback, South Island Kokako, and South Island Thrush, the last being described as 'frequent'. The Kingfisher was the only species met with at Queen Charlotte Sound that Anderson described in his zoological manuscript from this voyage. A few bird specimens were taken back to England and passed into the possession of Sir Joseph Banks.

The White-fronted Tern is not known to have been collected and described until this voyage. Shortly after the ships left Queen Charlotte Sound a specimen was taken off the south-east coast of the North Island. It was described by Anderson in both his journal and his zoological manuscript and drawn by William Ellis, whose painting is the type of the

species (Medway 1976). Ellis also drew 5 of the species of birds met with at Queen Charlotte Sound. His third voyage bird drawings, and those by John Webber (apart from 1 of the South Island Kokako), have been described by Lysaght (1959).

Sir Joseph Banks was the main recipient of the ornithological specimens collected on all 3 of Cook's voyages (Medway 1976, 1979b, 1981), many of which became the types of the species. Unfortunately he dispersed the specimens widely and few are known to survive. Sir Ashton Lever's collection contained many bird specimens from Cook's voyages that also became types. Lever's collection was sold by public auction in 1806. The specimens were widely dispersed, and most of the types have been lost, the few known remaining ones being in the Naturhistorisches Museum at Vienna and the Merseyside County Museums at Liverpool. Apart from the Sparrman New Zealand bird types in Stockholm, type specimens from Cook's voyages of the New Zealand Falcon, South Island Kaka, Red-crowned Parakeet, and South Island Thrush are in Vienna and of the Tui and South Island Kokako are in Liverpool (Medway 1976, Wagstaffe 1978, Largen 1987).

When the third voyage ships returned, John Latham was preparing his monumental *General Synopsis of Birds*, in which he described all the known species of birds. He described many new species collected on Cook's voyages, primarily on the basis of specimens that he examined in the collections of Banks and Lever, including many from New Zealand. Unfortunately Latham gave only English names to the species he described. Gmelin shortly afterwards, in his edition of *Systema Naturae* (1788-93), converted Latham's descriptions into short Latin diagnoses with Latin names and thus has credit as the first describer of many new species. Altogether about 60 species of birds found in the New Zealand region were first validly described from specimens collected or paintings executed on Cook's visits to New Zealand between 1769 and 1777.

The complete story of the ornithology of those visits has yet to be written, but undoubtedly the observations, collections, and descriptions that resulted from them are fundamental to the history of New Zealand ornithology. No further significant contribution to that history was to be made for another 50 years.

D. G. Medway

The 19th-Century Bird Collectors

Ornithology in the nineteenth century was based primarily on the accumulation and study of specimens — in the same way as much scientific study of lower classes of animals (insects, for instance) continues to be in the twentieth century. Museums and also individual ornithologists built up collections of mounted birds and study skins. Indeed private collections continued to be made in New Zealand into the twentieth century, until the Wildlife Act 1953 made the possession of most species of native birds illegal.

During the 1880s and 1890s in particular, scientific specimens made up only a part of the total trade in native birds. 'Game' species (including Kaka and especially New Zealand Pigeon) were a familiar part of the colonial diet. A much wider range of species was sold by taxidermists and dealers catering for the demand for bird-skins, which were used both in ornamental cases of mounted birds as drawing room decorations, and also in feather fashions: feather boas, muffs, collars, and hats. Many New Zealand towns had their dealers in this trade: Edward Spencer and Sigvard Dannefaerd in Auckland; St Clair and Hector Liardet, and Alexander Yuill in Wellington; William Jewell in Christchurch; William Smyth in Dunedin. Smaller centres even had their local 'bird-stuffer': A. John Jacobs in Masterton, Alfred Avery in Marton.

These dealers obtained many of their own specimens, but were also supplied by a host of collectors: men who supplemented their income or even made a living by shooting and skinning birds. At one end of the scale were the collectors supplying an international market, who visited New Zealand in pursuit of specimens. Andreas Reischek, who worked in New Zealand for 12 years up to 1889, could be classed in this group. Or Henry C. Palmer, who collected on the Chatham Islands for Walter Rothschild in 1890 before going on to Hawaii and the Laysan Islands. Among the New Zealand collectors, Henry H. Travers, son of the Wellington lawyer and scientist W.T.L. Travers, was almost in this category; from 1863 to the 1890s he went on organised expeditions in New Zealand and to many offshore islands to obtain specimens to order. Further down the scale were men like Charles Robinson, who in the 1890s went on a number of expeditions to the Heaphy area to obtain Great Spotted Kiwi for Sir Walter Buller. But most collectors in New Zealand were men like William Hawkins on the Chatham Islands, or William Docherty, W.J. Wheeler and S. Percy Seymour in Fiordland and South Westland — fossickers, prospectors, and recluses who made some money by selling the skins of locally available birds.

Then there were the opportunist collectors: men whose occupations took them to remote localities where rare or unusual (and therefore valuable) species could be obtained. Lighthouse keepers such as Charles Robson at Cape Campbell and David Lyall at Stephens Island forwarded bird skins to Henry Travers or directly to scientists such as Buller or Walter Rothschild, who were known to pay well for specimens. Similarly, the Nelson surveyor Jonathan Brough supplied bush birds (notably the Bush Wren *Xenicus longipes*) and William W. Smith, gardener at Albury Estate near Timaru, specialised in supplying Laughing Owls. The rewards for the opportunist collector could sometimes be very great: Donald Ross, whose dog brought in the fourth known specimen of the Takahe in 1898, patriotically accepted £250 from the New Zealand government so that the bird might remain in a New Zealand museum; rumour had it that European buyers were offering £100 more — and this at a time when the average male wage in New Zealand was about £85 a year.

The impact of the collectors on bird populations was probably not great for most species; loss of habitat in the progress of colonisation must have been a more significant factor than loss of birds taken by collectors. However, the collectors were not like other predators; they concentrated on the rare and unusual species — those with the highest

market value. Species nearing extinction were most valuable of all and hence the most rigorously hunted. Where a species was known to survive only in a restricted area such as an island, the collector's task became easier and his destructive effect all the greater.

R. Galbreath

Reischek's New Zealand Bird Collection

During his 12 years in New Zealand, 1877–89, Andreas Reischek assembled a large and valuable collection of birds, nests, and eggs. Some of the birds he collected and prepared are still in museums and in private ownership in New Zealand; part of the collection was sold to the Rothschild Museum at Tring, England, but was later sold to the American Museum of Natural History, New York; and a small collection of 33 skins and mounts, 6 skeletons, and 1 egg is in the Landesmuseum Linz (Aubrecht 1988: 234). The main collection, about 1000 specimens, has been kept intact in the Naturhistorisches Museum Wien, most specimens being from the original purchase in 1891, but some purchased or donated in 1917 and 1941–42.

As Reischek's stay in New Zealand was towards the end of the period when many species now rare or extinct were still relatively common, he could study them and make representative collections. The Vienna Museum collection of New Zealand birds is one of the biggest, best labelled, and best prepared collections outside New Zealand. For some groups it rivals and exceeds the contents of our own museums. Its near-completeness and series of rare or extinct endemics make it a valuable repository and a key source in taxonomic and distributional work.

Three species that we would expect to be represented among the study skins or mounts, but are not, are Great Spotted Kiwi, Black-fronted Tern, and Rock Wren. There is no evidence from Reischek's writing that he ever saw or collected the Great Spotted Kiwi. He apparently did not know or collect Black-fronted Tern, but what is, unbeknown to him, undoubtedly a reference to seeing them, is the following (Reischek 1885: 99): '*Sterna antarctica* (Common Tern) I found as far as forty miles inland, following the plow, picking up the vermin, or sitting on the fences watching for them.' Being a mountain man, he was certainly familiar with the Rock Wren (Reischek 1884: 191). The lack of specimens could have been an oversight, or they may have been lost in the field (taken by rats, as he frequently complained) or in transit.

The Vienna Museum has over 90 000 bird skins and egg clutches, and New Zealand specimens are distributed according to taxonomic classification, not held as a separate unit. There is no general index or entry catalogue, and so locating wanted specimens is slow and cumbersome, and you need the help of the museum staff. (I wish to thank the Curator of Birds, Dr. H. Schifter, and his assistant, for their helpfulness during my visit.). This account will give an impression of what is available and thus save time for ornithologists interested in using the collection.

In addition to study skins, the museum has mounted birds in natural positions on display in the large bird halls, open to the general public. Of special interest to New Zealanders are 6 Kakapo in a large glass display case, 8 Brown and Little Spotted Kiwi in another display case, and a large wall display of the tubenoses, Procellariiformes, most of them mounted by Reischek and from New Zealand, as a wall plaque explains.

Varying figures have been given for the number of bird specimens in the Reischek collection. Priday (1952) in a translation of Reischek's 1924 book, gives neither a true nor full translation of the 1924 text. Reischek's book, (1924: 319) quotes the 1890 *Annals of the Vienna Museum* (in my correct and full translation): 'The ornithological objects total 3016 specimens, 738 being of exotic birds and 2278 specimens mainly [vorwiegend] of the ornith of New Zealand; there also appears to be several [einige] new forms in the collection.'

I have checked the original 'Museum Report' for 1890 (Hauer 1891: 7-8), and here too are discrepancies between Reischek and the report. Dr Franz Ritter von Hauer, then Director of the Museum, having succeeded von Hochstetter in 1885, presented a factual, concise account of the Reischek collection. In part (in my translation) this reads:

the most important part of these collections consists of the ornithological objects. They include 3016 specimens, and of these 738 are exotic birds from various parts of the world and 2278 specimens, mainly from the New Zealand bird fauna with some specimens from Australia and the Solomon Islands. Almost all of the species occurring in New Zealand are represented in a total of 957 skins, often in very complete series which show the variation in plumage according to age, sex and season of year; among these are 40 species already very rare, appreciably decimated in numbers as a result of colonization . . . There also appear to be several new forms in the collection. There are further 157 birds preserved in alcohol, usable for anatomical examination; 566 unprepared skeletons . . . and finally 534 eggs and 64 nests.

During my examinations of the collection in 1978 and 1980, I believe I examined and recorded all Reischek's New Zealand study skins (Table 5), but not the inaccessible mounted specimens in the display halls.

Table 5 – Study skins of New Zealand birds in the Vienna Museum of Natural History collected and prepared by Reischek.

| | |
|---|------------|
| Kiwi, Apterygiformes (2 species) | 34 |
| Penguins, Sphenisciformes (5 species) | 37 |
| Grebes, Podicipediformes (2 species) | 7 |
| Albatrosses and petrels, Procellariiformes (27 species) | 99 |
| Shags and gannets, Pelecaniformes (6 species) | 65 |
| Hérons and bitterns, Ciconiiformes (4 species) | 12 |
| Waterfowl, Anseriformes (6 species) | 62 |
| Birds of prey, Falconiformes (2 species) | 11 |
| Gamebirds, Galliformes (1 species) | 2 |
| Cranes and rails, Gruiformes (6 species) | 74 |
| Waders, gulls and terns, Charadriiformes (15 species) | 115 |
| Pigeons and doves, Columbiformes (1 species) | 9 |
| Parrots and parakeets, Psittaciformes (6 species) | 82 |
| Cuckoos, Cuculiformes (2 species) | 10 |
| Owls, Strigiformes (2 species) | 10 |
| Kingfishers, Coraciiformes (1 species) | 10 |
| Songbirds, Passeriformes (19 species) | 249 |
| Total 107 species | 888 |

According to the original accession list, the egg catalogue, the museum received 372 eggs and 36 nests from New Zealand with the purchase from Reischek in 1891; some of these eggs and nests I have examined, for example, 2 Kakapo eggs (Westerskov 1981: 267). Eggs of rare and less common species in this collection are: 3 eggs of Brown Kiwi, 1 of Little Spotted Kiwi, 12 of Wandering Albatross, 1 of Laughing Owl, 1 of Bush Wren, 1 of Rock Wren, 2 of Wrybill, 3 of Kakapo, 4 of New Zealand Falcon; there is also a nest with 1 egg of Piopio, and a nest of Kokako. The total of New Zealand birds collected by Reischek and in the Vienna Museum thus consists of about 1000 stuffed specimens (888 study skins, the rest mounted on display), 372 eggs, and 36 nests, as well as birds in alcohol and skeletons, less readily available.

In addition to its comparative completeness, the collection's main strength is the several extinct species and series of less common, rare and extinct species: 17 specimens of Brown Kiwi, 17 Little Spotted Kiwi; 11 New Zealand Falcon; 2 New Zealand Quail; 42 Weka; 8 Variable Oystercatcher, 19 New Zealand Dotterel, 8 Wrybill; 15 Kakapo, 24



Figure 16. Type specimens of Antipodes Pipit (*Anthus novaeseelandiae steindachneri* Reischek, 1889) collected by Reischek on Antipodes Island, February 1888, and now in the Vienna Museum of Natural History. Photo: K.E. Westerskov.

Kaka, 10 Kea, 12 Red-crowned Parakeet, 19 Yellow-crowned Parakeet; 2 Laughing Owl; 10 Riflemen, 8 Bush Wren, 8 Fernbird, 8 Brown Creeper, 8 Whitehead, 8 Yellowhead, 20 New Zealand Robin, 13 Stitchbird, 23 Saddleback, 8 Huia, 14 Kokako, and 20 Piopio.

Dr. Ludwig von Lorenz-Liburnau, who had become Curator of Birds and Mammals of the Vienna Museum of Natural History in 1888 and was in charge when Reischek's bird collection was obtained in 1891, published a first instalment (never continued) of a systematic review of the Reischek material (Lorenz-Liburnau 1902).

In this study he treated briefly, but some in more detail, the following species: Kokako, Huia, Saddleback, Piopio, New Zealand Robin, Pied Tit, Grey Warbler, Brown Creeper, Whitehead, Fernbird, New Zealand Pipit, Fantail, Silvereye, Bellbird, Tui, Stitchbird, Rifleman, Bush Wren, New Zealand Kingfisher, Long-tailed Cuckoo, Shining Cuckoo, Red-crowned Parakeet, Yellow-crowned Parakeet, Antipodes Island Parakeet, Kaka, Kea, Kakapo, Morepork, Australasian Harrier, New Zealand Falcon, New Zealand Pigeon.

Lorenz-Liburnau proposed (pp. 308-9) 2 new subspecies: *Anthus novaeseelandiae reischeki* from the North Island and *Anthus novaeseelandiae chathamensis*, about both of which Kinsky (1970: 65) commented that their status 'needs critical examination'.

Included is also a brief discussion of the Antipodes Pipit *Anthus novaeseelandiae steindachneri*, discovered and described by Reischek, and of which the type specimens (NMW 12416 and 12417), February 1888, Antipodes Island, are in the Vienna collection (Fig. 16). Reischek named this bird in honour of Dr Franz Steindachner, Curator of Birds at the Museum during most of the time Reischek was in New Zealand, and with whom he had been in contact. There is a detailed discussion of colour variation in the Kaka (pp. 316-19).

King's College Bird Club

Any educational institution worth its salt runs some sort of field club to make at least some of its nurslings aware of the more obvious fauna and flora of the district.

King's College, an Anglican boarding school, was founded in 1896. When it moved from Remuera to a site beside the main railway line south of Otahuhu in 1922, it moved virtually into the country. When I joined the staff in spring 1939 most of the staff and boys had bicycles. In the 1940s the Bird Club was largely a bicycle brigade exploring every track that led to the shores of Manukau Harbour. Before the airport runways pushed far out over the tidal flats, many boys were happy to feel the clean mud and sand between their toes at sites where tens of thousands of gulls, godwits, and stilts fed eagerly on broad expanses of soft ooze. More than 60 species of birds have been listed in the immediate vicinity of the school's spacious, well-planted grounds. To the east of the school, Banded Rails scuttled among the mangroves in the upper creeklets of the Tamaki.

KCBC became a corporate member of the OSNZ as soon as the latter was formed. King's boarders came from remote areas of the North Island and were encouraged to be observant during their holidays and report their findings. After winter gales in 1946, Peter Williams recovered remains of wrecked seabirds from Mitimiti Beach north of Hokianga. Among them was a South Polar Skua, confirmed by Dr R.A. Falla as the third New Zealand record. In 1948 Barrie Heather recorded Taranaki's first White-faced Heron. Hugh Davidson in 1952 reported 5 Royal Spoonbills near Foxton. In 1947, when John Cunningham launched his Myna survey, these rowdy aliens were avidly logged and counted by many schoolboys.

The end of the war was the lifting of a cloud and once again youth could travel in hope. By 1946 it was possible to plan something more ambitious than day excursions to inner islands of the Hauraki Gulf. The Club's first application to visit Little Barrier Island was turned down, but there was a bureaucratic change of heart and at crack of dawn on 16 December 1946, 5 boys, 1 master, and Ross McKenzie as botanical adviser, sailed from Leigh on Norman Warren's sturdy *Gunner* to be welcomed warmly 2 hours later by Charlie and May Parkin, the diligent guardians of the island.

After such an auspicious beginning, an annual island-trip came to be expected. Next came Little Barrier (1947, 1952, 1963, 1966, 1967), Hen (1949, 1954, 1961), the Cavallis (1951), Big Chicken (1953, 1957, 1962), the Poor Knights (1958), and the Mercuries (1961, 1962, 1965). On some expeditions the Club was glad to be strengthened by the presence of Old Boys, or guests such as Fred Kinsky, Don Merton, Dick Veitch, and John Jenkins.

In the holiday of August–September 1959, the Club broke new ground when Brian Bell, senior field officer of the Wildlife Division, invited 3 boys to share in a preliminary survey of the Alderman Islands, linking learning with adventure. What an enchanting experience to sit quietly at nightfall in a whirling snowstorm of White-faced Stormies. When Douglas Robinson of the King's staff organised a trip to Fiji in 1965 so that upper school biologists could study tropical reefs, the Bird Club was invited and 3 young ornithologists had an eye-opening experience.

There were more than 20 island-camping trips between 1946 and 1972, but there was plenty to keep young naturalists busy on the Auckland isthmus. Sketching birds in the field or drawing them from prepared skins was encouraged. Arthur Hipwell, art master from 1936 to 1951, contributed greatly to OSNZ finances by painting birds for the Society's first Christmas cards. Old Boys Bruce Chambers, and later Russell Thomas, provided the business acumen that ensured the success of the card scheme.

Other Old Boys who have served OSNZ well are Peter Skegg, David Fenwick, Chris Barlow, and Tim Lovegrove, who in succession have compiled the annual index to

Notornis, an exacting duty for which a little knowledge of Latin is a necessary aid. John Davenport helped to start seasonal censuses of waders on the Manukau Harbour. For 12 years Barrie Heather has edited *Notornis* with judgement and meticulous care, always fighting the battle for contributions to be written not in jargon but in well-phrased English.

The Club's purpose was summarised in the school magazine of 1959: 'The important things are to get out in the field; observe with a critical eye; make notes; draw if you can; and above all, get some fun out of your bird-watching.' Hundreds of boys took part in local field-trips and learnt, we hope, to distinguish a knot from a dotterel and a pipit from a skylark. Few former members of the Club have not been cheered — or puzzled — at the sight of a bird that was either an old friend or, up till that moment, outside their experience. *Floreat semper aves atque spectatores* (long live the birds and those who watch them).

R.B. Sibson

Royal Forest and Bird Protection Society

It is heartening to know that some things improve. That is certainly the case with Kapiti Island, which is today regarded as one of New Zealand's most important offshore islands, home to our largest population of Little Spotted Kiwi, as well as a haven for many other species now rare on the mainland. But at the turn of the century Kapiti was in trouble, and it was largely as a result of concern over the island — then a bird sanctuary — that the Royal Forest and Bird Protection Society came into being.

Cats and goats were prolific on the island in the early 1900s; a half-hearted control programme attempted to deal with them, but to little avail. In 1922 Forest and Bird founder Val Sanderson visited the island with an *Evening Post* editorial writer. They discovered 5000 goats and sheep wandering free, the forest bare and few birds. In 3 days they spotted 1 Kereru, 3 Tui and several unidentified smaller birds.

On his return to the mainland, Sanderson took up the fight for Kapiti's wildlife in earnest. With the backing of Wellington newspapers a campaign was begun to rid Kapiti of stock, widening into a campaign to protect wildlife everywhere. On 28 March 1923, a meeting set up a new organisation, the Native Bird Protection Society, 'with the object of advocating and obtaining unity of control in all matters affecting wildlife'.

The Society was no radical organisation; in fact its roots were establishment, with the first president the former Prime Minister Sir Thomas Mackenzie, one of the vice-presidents H. Guthrie-Smith, and other well-known notables figuring among the early proponents. However, Val Sanderson was the driving force behind the Society. Appointed secretary in 1923, in addition he took on the position of president 10 years later and remained president until his death in 1945.

A lively quarterly newsletter, the precursor to the modern-day *Forest and Bird* magazine, revealed the Society's early preoccupations: the early establishment of island sanctuaries,



NEW ZEALAND SLEEPS

Figure 17. Cartoon from *Forest and Bird*, November 1939.

fighters against further exotic animal introductions by acclimatisation societies, efforts to halt destructive bird collecting and to protect native birds legally. Although the Society's name implied a limited focus, the link between animals and their habitat was made at an early stage, as evidenced in two headlines in successive articles: 'No Native Birds Means No Native Forests' ran one, followed by the warning, 'No Native Forests Means No Native Birds'.

A leading member of the Society in the 1920s, Dr J.G. Myers, presented its view in a paper to the 1928 conference of the International Committee for Bird Preservation, of which the Society was a member. Myers identified destruction of habitat as the foremost reason for the decline of native birds. Introduced animals and fire came next on the list, followed by a lack of active protection by the government. His remedies were: adequate enforcement of protection laws; unified control of sanctuaries and reserves; a campaign against exotic plants and animals; research into native species; education about native birds.

As it does today, the Society then recognised its proper role as an educator and lobbyist, and through the efforts of people like Sanderson and Perrine Moncrieff it achieved a great deal. Posters were produced on the evils of shooting or collecting birds, and thousands were sent to schools or posted up in railway stations.

Sanderson was a man before his time in his uncompromising advocacy on behalf of native plants and animals. In 1937 he recommended that production forests and protection forests be divided up between a Forest Service and a Department of Conservation — in the end the process was to occur 50 years later.

As well as encouraging protection for native birds, the Society's chief concerns during the 30s, 40s, and 50s were erosion, the deer 'menace', and the threats of continued animal introductions. Even the question of oiled seabirds — not to become a serious threat until much later — was raised as early as 1929. In 1936 the Society presented a petition to Parliament seeking a ban on the caging of wild birds and the use of bird lime. A year later the government regulated to stop the use of bird lime but wild birds could still be caged.

Scientists and bird fanciers were the targets of the Society's ire for the way in which they captured and killed birds. The permit system for collecting was so liberal that it was said to be easier to get a permit than to catch a bird. As a result of Forest and Bird's lobbying, permits became harder to get.

The Society took a special interest in certain birds. During the 1930s it held a special appeal to protect the Royal Albatross colony at Taiaroa Head, culminating in the erection of a fence and a lookout. At times it opposed duck shooting, not only to protect ducks but also because many shooters killed species other than ducks. The Pukeko was a good example, even though it was not considered good eating.

Shags were regarded as a menace by trout fishermen; the Society pointed out that shags were in New Zealand first, their native fish prey had been replaced by trout and now shags were blamed for taking trout. Three shag species still have only limited protection despite their negligible effect on sport fisheries.

As its numbers increased, especially from 1960 on, Forest and Bird became involved in a number of campaigns to protect birds:

It supplied funds to help buy and revegetate Mangere Island to place the Chatham Island Black Robin there.

It financed the erection of electric fences around the Black Stilt's breeding area in the Mackenzie Country to stop predation.

It funded a 3-year Kokako research programme that was instrumental in stopping logging in the West Taupo forests of the North Island.

It demanded the full protection of the Kea, which was still legally being shot by high country farmers as late as 1986.

For the last 5 years it has campaigned to protect the Yellow-eyed Penguin nesting areas.

It has fought to return water to the Wanganui River headwaters, a river system vital for a large part of the threatened Blue Duck population in the North Island.

In recent years the Society's focus has switched from the very endangered birds to the problems faced by the 'threatened' and 'vulnerable' categories of birds; the Kaka, kiwis, Blue Duck, Yellow-eyed Penguin, New Zealand Dotterel, Kea and Yellowhead are good examples.

Despite the knowledge more than half a century ago that saving habitats was the key to protecting birds, only in the last decade have the greatest steps been taken to set aside large areas of forest, especially lowland forest. Although huge areas like Fiordland had been national parks since the turn of the century, it took until 1981 for the great lowland forests of the West Coast (Okarito and Waikukupa) to be protected, and until 1989 for the last 2% of our kahikatea forest to be saved in South Westland.

Today, with a membership of more than 50 000, Forest and Bird is a powerful force for bird conservation. Its areas of concern now go well beyond those implied by its title, with campaigns to save tussocklands, wetlands, coastal areas, and even the ozone layer. However, the special place of birds in the New Zealand landscape is such that their welfare will remain a primary focus for the Society as we move towards the year 2000.

G. Hutching

New Zealand Wildlife Service

Hatched in obscurity, nurtured spasmodically, fledged through commitment, destroyed in full flight! New Zealand's conservation history will record the comparatively brief reign of its Wildlife Service with honour and gratitude. In the space of 40 years and despite considerable financial and political odds, the New Zealand Wildlife Service established for itself an enviable world-wide reputation for commitment and expertise in many fields.

Its many conservation achievements, both pioneering and spectacular, were made possible by dogged application to the tasks it set itself. The heroes were the small band of men and women who were totally committed to the protection, enhancement, and care of the nation's wildlife and who gave themselves unstintingly in pursuit of that goal.

How did the Wildlife Service begin? In 1931, because of dramatic increases in feral populations of introduced animals (deer species, chamois, goats, and tahr) the government of the day was forced to instigate culling to reduce animal numbers. Culling was under the supervision of the Department of Internal Affairs, the government agency responsible for the administration of the Animals Protection and Game Act 1922. It also had the oversight of acclimatisation societies, the protection of native species, and the setting of game bird hunting seasons.

World War II heavily curtailed the deer control programme. However, in August 1945, under considerable pressure from the then NZ Forest and Bird Protection Society, the government approved the formation of a Wildlife Branch within the Department of Internal Affairs to grapple with animal control and assume responsibility for administering the Animals Protection and Game Act 1922. Its brief included responsibility for the management of the Rotorua and Southern Lakes Acclimatisation Districts, because of the valuable tourist trout fisheries associated with those regions.

By 1946 the nucleus of a wildlife organisation was well established. Although the emphasis in those formative years was on controlling wild animals, its general responsibilities for wildlife were not ignored. This situation was not to last long, however! The discovery in 1948 of Takahe (*Notornis mantelli*) in Fiordland by Dr Geoffrey Orbell shook the ornithological world of that time. Government reacted quickly by appointing a rare birds advisory committee under the umbrella of the Wildlife Branch and, shortly after, appointed a scientist, Dr G.R. Williams, to study the Takahe. Gradually, through promptings by the 'rare birds advisory committee' and the acclimatisation movement, more scientists were appointed to study animal control, threatened species, and the harvesting of game birds. This led also to the introduction of a training scheme for wildlife officers. The Wildlife Service, though not yet known by that name, was on its way.

Of course, problems arose from time to time. Differences of opinion over courses of action to be followed, questions of how to allocate slim financial resources and set priorities, even personality difficulties among the staff. However, none of these matters detracted in the end from the commitment and comradeship that made being an employee of the Wildlife Service rather special.

By the early 1960s, the Wildlife Branch, as it was named from 1945 to 1974 (except for a brief period 1952-56 when called the Wildlife Division), had established itself as the protector of all native fauna on land and shore. It was the first organisation to take up the challenge and seek protection of wetlands in New Zealand and it strongly influenced government in its enactment of legislation to protect those values. Along with the acclimatisation societies it was concerned about game bird numbers and worked hard to study and promote sound methods of harvesting game species. In 1956, after 25 years of intensive effort throughout New Zealand, the then Wildlife Division transferred responsibility for deer and large mammal control to the Forest Service.

Subsequently, however, the new Wildlife Branch removed all the goats, cats, possums,

rats, and weka from over 40 offshore islands in the pursuit of fauna conservation values. While the most spectacular of these were probably the efforts on Macaulay in the Kermadecs, Mangere in the Chathams, Cuvier, and Little Barrier Islands, some of the smaller islands, such as Whale, Maud, Jackie Lee, and Herekopare, have produced long-lasting conservation advantages for rare and threatened species on or later introduced to those habitats.

As early as 1948, the Wildlife Service began widespread wetland surveys, and these early pilot efforts steadily developed into sophisticated surveys, inventories, and reservation procedures, covering the whole country. By April 1987, in co-operation with the then Department of Lands and Survey, almost every Crown-owned wetland was in some form of reservation. Many private wetlands were purchased and added to the list of wetland reserves.

The organisation also fought many battles before catchment and drainage boards, commissions and tribunals: Lakes Hatuma, Tuakitoto, and Wairarapa; the Piako, Whangamarino, and Wairarapa wetlands; and the Motu, Ahuriri, and Mangonui-o-Te-Ao Rivers in their day being areas of major conflict or delicate negotiation.

During its brief career the Wildlife Service lodged over 500 objections to specific water right applications, rarely being unsuccessful in gaining full or partial protection for many valuable wildlife habitats.

Together with the Nature Conservation Council, the Wildlife Service was to the fore in promoting the International Union for the Conservation of Nature's Wetlands Convention and played a significant role in the formation of the criteria set.

The Fauna Protection Advisory Council, which followed on from the initial 'rare birds advisory committee', saw the development of a very special partnership between lay and professional ornithologists involved in the important pursuit of a properly considered research and management approach to 'survival plans' for many of New Zealand's rare endemic species.

The once-threatened species that have benefited from this approach are now legendary — North and South Island Saddleback, Stitchbird, Takahe, Blue Duck, Black Stilt, Black Robin, Brown Teal, and Little Spotted Kiwi. Kakapo have been given a last desperate chance to avoid extinction through the transfer of breeding birds from Stewart Island to both Little Barrier and Codfish Islands, which had been freed of all predatory animals (apart from kiore) in readiness for the transfers. Volunteers have been prominent in supporting these work programmes, and Ducks Unlimited (NZ) Ltd has played a valuable role through its members breeding Brown Teal and Blue Duck to assist their rehabilitation.

Over the years the Wildlife Service developed a permit scheme for the keeping of wildlife in captivity, giving the public an important opportunity for taking part in this aspect of conservation work. This scheme allowed for the development of strong captive-breeding populations of species such as the Red- and Yellow-crowned Parakeets.

Along with the Ornithological Society of New Zealand, the Service instigated a series of bird counts of both migratory and resident species over many of New Zealand's estuaries and major riverbeds. This data, in addition to its purely scientific value, has proved invaluable whenever such habitats have become threatened by some form of development.

Under its national bird banding scheme, inherited from the Dominion Museum in 1967 and run in close association with ornithological interests, some 25 000 to 30 000 birds of over 200 species are banded annually. Valuable data from this scheme on the dispersal and longevity of various species has contributed greatly to many professional and private studies.

As early as 1968 the Wildlife Service recognised the threat to wader species posed by the introduction of spartina grass in many estuaries. At first, it single-handedly carried out successful eradication measures throughout the country, later assisted in Southland by officers of the local acclimatisation society. Subsequently, central and local government interests became involved and in most localities where spartina is still a problem eradication has now become a function of the local authority.

By the mid-1960s the Wildlife Service had successfully completed a series of game bird research projects on Pheasant, California Quail, Canada Goose, Chukor, Grey and Mallard Duck, Paradise Shelduck, Black Swan and Pukeko. As a result, sound hunting practices could be introduced to perpetuate harvestable stocks of these species. Although now dated, these studies have provided a firm basis for current game management practices and will yield invaluable basic data for any future studies.

The Service also operated a national advisory and liaison service to acclimatisation societies from 1961 through to its cessation, by stationing staff in strategic places throughout the country. These officers had manifold duties and, though concerned mainly with game species, they also became involved in many local issues dealing with the protection of species and their habitats, as well as performing a vital role in public relations and support services.

In the late 1950s and early 1960s, in conjunction with the acclimatisation societies, the Wildlife Service was heavily committed to the introduction of a further upland gamebird, the European Partridge. Although this was unsuccessful, the commitment was significant with total liberations of over 35 000 birds, many of them from the Service's game farm at Bulls. More recently it supported and played a minor role in the attempt to establish Red-legged Partridge, the success of which is yet to be seen.

The Wildlife Service strongly believed in the enforcement of the provisions of the Acts and regulations for which it was responsible. It supported and was active in the appointment and training of over 1000 honorary wildlife rangers throughout the country on behalf of the acclimatisation societies. It employed its own core of specialist staff and, in recognition of both international and local concerns about the developing trade in endangered species, it appointed a special unit to work in this area. This came about through the support of the sportsmen in the central North Island who, because of their concern over the increased trout poaching and illegal trafficking of illicit fish, voluntarily raised their licence fees to fund this operation. Special law enforcement sorties were made throughout New Zealand and there can be little doubt about the success of these efforts in curbing such serious activities.

In 1972, with the backing of the New Zealand Forest Service, a Forest Fauna Survey Unit was formed to evaluate wildlife habitats within large tracts of native forest earmarked for logging. The Unit's painstaking efforts, using a 1 minute audible bird count technique to determine the presence of species, provided a valuable database on which government agencies and private pressure groups depended in reaching many of the decisions of the late 1970s and early 1980s for the protection of major tracts of native forest.

The Forest Fauna Survey Unit's brief was broadened in the late 1970s to surveying all wildlife habitats of note throughout New Zealand, a task it successfully accomplished in 7 years. In doing so it provided a valuable habitat inventory, of value to local authorities and town and country planning schemes throughout the country. It also identified many vulnerable habitats and in many areas enabled the Wildlife Service to pursue their immediate protection.

The Service had its own information and publicity section, which maintained a large slide, sound tape, and film library, provided display material for use by interest groups, produced popular wildlife publications, and built up a large information base servicing both schools and the general public. It provided speakers and other educational support services and kept the public of New Zealand fully informed on the activities of the Wildlife Service through the various media. The National Wildlife Centre at Mt Bruce, the Wildlife Park at Te Anau, and the Tongariro Hatchery Information Centre at Turangi are monuments to the Wildlife Service's public education programmes.

Scientifically, many of the Wildlife Service's research projects gained important international recognition, embodying as they did a strong management-orientated approach to the study of rare and threatened wildlife. However, all scientific staff were encouraged to pursue limited, more fundamental research programmes, such as studies of Red-billed Gulls, kiwi behaviour, Royal Albatrosses, Gannets, reptiles, native invertebrates, and predators.

On the international front the Wildlife Service had strong affiliations with the International Union for the Conservation of Nature and the International Commission for Bird Preservation, several of its officers from time to time holding important positions in both organisations. Despite a comparatively small staff and many pressing responsibilities of its own, the Wildlife Service made a considerable contribution to international conservation efforts; on the Galapagos, Kiribati, Mauritius, Norfolk Island, Christmas Island in the Indian Ocean, and on mainland Australia.

After 40 years the Wildlife Service employed only 150 staff and operated on a budget of less than \$10 million. It had a considerable input from volunteers, many of whom gave freely of their time, sometimes for a year or more, their only income being payment of a weekly camp allowance.

During the Service's brief span of 40 years, its staff were subjected to 18 reorganisation inquiries, which looked variously at mergers of functions and take-over initiatives by other departments. Most of these occurred during the last 20 years and it is of lasting credit to the staff that, despite the time-consuming and morale-sapping consequences of such actions, they were able to put those irritations aside and get on with their job effectively.

It is fair comment that no government agency of recent times has mustered the unprecedented support of the general public that the Wildlife Service had. Donations towards its activities arrived weekly from the public, and the use of bird calls to herald news reports, and wildlife featured on New Zealand stamps, banknotes and coins highlighted its activities.

The New Zealand public, and particularly the people that comprised the Wildlife Service over its 40 years of existence, can be justly proud of what it achieved!

The Service was disestablished on 31 March 1987, but it can only be hoped that the excellent foundation it laid is built on soundly by the new organisation entrusted with the care of this nation's natural resources. We wish the Department of Conservation well in its endeavours to emulate and improve on the Wildlife Service's wonderful effort.

R. Adams

Ecology Division, DSIR

Ecology Division had its beginnings in 1946 when Kazio Wodzicki was appointed to the staff of DSIR to conduct a survey of introduced mammals of economic importance. Although the early emphasis of ecological work in DSIR was on mammals, the department encouraged research by its officers in fields marginal to their prime responsibilities. Kazio Wodzicki was able to conduct a national census of Gannets (e.g. Wodzicki & Fleming 1946, Fleming & Wodzicki 1952), and Peter Bull, recruited in 1948, made observations on birds during the 1949 New Zealand–American Fiordland Expedition (Bull & Falla 1951) and in the western Taupo area (Bull 1952).

In the 1950s and early 1960s, although most work in Ecology Division was directed at studying 'the rabbit problem', several important ornithological projects were carried out. Wodzicki studied the life history and population dynamics of Gannets at Cape Kidnappers (Wodzicki 1967a, 1967b, Wodzicki & Robertson 1953, Wodzicki & Stein 1958), and Peter Bull started his studies of banded birds in urban Lower Hutt (Bull 1953) and, after an earlier questionnaire survey by Kazio Wodzicki, assessed the distribution and abundance of Rooks in New Zealand (Bull 1957). Sharon Watson, recruited from Britain in 1949, published an important paper on the extensive movement of juvenile Harriers in New Zealand, based on recaptures of 206 birds initially caught at Ecology Division's study site for rabbit research at Gwavas, Hawke's Bay (Watson 1954), and Rowley Taylor, who started working for the division on a school holiday job in 1950, began his studies of Adélie Penguins in Antarctica (Taylor 1962). Byproducts of a study of the effect of deer, chamois, and hares on alpine vegetation in Nelson Lakes National Park were papers comparing the breeding of Song Thrushes and Blackbirds living mainly in native vegetation and at high altitude with the breeding of other New Zealand populations (Flux 1966), and the seasonal and altitudinal distribution of Kingfishers seen between Nelson and the Travers River valley, at the head of Lake Rotoiti (Taylor 1966).

In the 1960s Ecology Division expanded rapidly and broadened the scope of its research so that ornithological studies became an important part of its research. John Gibb, fresh from pioneering work on the ecology of tits in Britain and on the ecology of forest birds at Kaingaroa (Gibb 1961), took over the Directorship of Ecology Division when Kazio Wodzicki 'retired' in 1965. Two other important ornithological events happened that year: Ecology Division took over the former NZ Forest Service research area in the Orongorongo Valley, near Wellington, and opened a substation at the DSIR Research Orchard in Havelock North to study bird damage to crops (Bull 1968, Dawson 1970, Dawson & Bull 1970).

An important study of the forest bird community in the Orongorongo Valley was started by Tony Whitaker and continued by Mike Fitzgerald and Peter Gaze. In 7 years, 3035 birds were banded after being caught in mist-net rigs that extended 12 m from near the forest floor into the canopy (Whitaker 1972). The diets of these forest birds were determined from analysis of faeces and pellets collected from the birds during handling, or from nest sites (Moeed & Fitzgerald 1982, Fitzgerald *et al.* 1986). The morphometric data have been analysed (Robertson *et al.* 1983).

Bird studies in Hawke's Bay, guided mainly by Peter Bull, have concentrated on the ecology of Rooks, Mynas, Starlings, House Sparrows, Greenfinches, and Feral Pigeons. Dick Porter, Peter Purchas, and recently Nigel Langham have studied the distribution, breeding, feeding, and social structure of Rooks in Hawke's Bay (Bull & Porter 1975, Porter 1979, Purchas 1979, 1980). These studies led to an effective method of controlling Rooks in the intensively farmed areas of Hawke's Bay. Abdul Moeed assessed the diet of nestling and adult Mynas and Starlings (Moeed 1975, 1976, 1980) and Peter Wilson studied the ecology of Mynas in Hawke's Bay for his PhD thesis (Wilson 1973); this

included the finding that organochlorine sprays (DDT) in orchards reduced the breeding productivity of Mynas (Wilson 1980). The banning of DDT on farmland in 1968 led to a study in Hawke's Bay to see whether Starlings could be an effective biological control agent of insect pests of pasture, such as grass grub (*Costelytra zealandica*). At Belmont, Lower Hutt, a study by John and Meg Flux led to important papers on the breeding biology, age structure, and genetics of a population of Starlings (Flux & Flux 1981, 1982, Flux 1987, Thompson & Flux 1988). In Hawke's Bay, Moeed's research showed that nearly 40% of the invertebrates eaten by adult Starlings were insect pest species. Many nest boxes were erected on 3 Hawke's Bay farms, and breeding productivity was measured, but it was not possible to build up Starling numbers enough to reduce insect pest problems significantly over a large area. The breeding and feeding ecology of House Sparrows and Greenfinches were studied by Dave Dawson and Bruce MacMillan (Dawson 1970, MacMillan 1981, 1985). Peter Dilks studied the breeding and diet of Feral Pigeons that were free to forage in the wild from a loft in the DSIR Research Orchard (Dilks 1975a, 1975b), and tests showed that naive Feral Pigeons in the loft gained information on the whereabouts of good feeding sites by following experienced birds (McLennan & MacMillan 1986).

In 1968, Peter Bull suggested to the OSNZ Council that the Society should compile species lists from as many as possible of the 10 000 yard squares of the National Grid. A limited trial took place in September and October 1969, and the OSNZ Bird Distribution Mapping Scheme developed from this (Bull 1970), with Peter Bull and Peter Gaze as organisers, paid by DSIR. This led to the joint publication by OSNZ, Ecology Division, and the Wildlife Service of the *Atlas of Bird Distribution in New Zealand* (Bull *et al.* 1985).

In the 1970s and 1980s the work of Ecology Division turned increasingly towards forest ecosystems. For indexing bird numbers, the 5-minute count technique was developed by Ecology Division to assess differences in forest bird populations (Dawson & Bull 1975). More recent work has shown that this technique is also useful in agricultural, horticultural, and scrubland habitats. Ecology Division has used it to compare bird populations in 4 different forest types near Reefton (Dawson *et al.* 1978), in pine plantations and nearby native forests near Nelson (Clout & Gaze 1984), and in the Ohikanui Valley (Wilson *et al.* 1988).

All the population studies showed marked seasonal changes in the numbers of birds recorded. This led to studies of seasonal movements and reasons for them in several forest birds, as well as other single-species studies of birds not immediately endangered, so as to suggest measures to prevent their becoming endangered in the future. These studies have been greatly enhanced by the use of lightweight, powerful, and reliable radio-transmitters developed by Ecology Division's 'Sirtrack' radio-laboratory and DSIR's Physics and Engineering Laboratory.

John McLennan has studied the social organisation of Brown Kiwis in scrubland and forest of northern Hawke's Bay (McLennan *et al.* 1987, McLennan 1988) and, with Tony McCann, is comparing the ecology of subalpine and coastal Great Spotted Kiwis in North-west Nelson. In the same area, Rod Hay is investigating the breeding and dispersal of small, isolated populations of Rock Wrens.

At Nelson Lakes National Park, Peter Wilson, Jacqueline Beggs, Brian Karl and Richard Toft have followed the daily and seasonal movements of Kaka in relation to the changing distribution of food supplies (Beggs & Wilson 1987). Similar studies have been done by Mick Clout, Peter Gaze, and Brian Karl on New Zealand Pigeons at Pelorus Bridge, Nelson, and by Hugh Robertson on Tui that breed at Mohi Bush, Hawke's Bay, and move 20 km or more to feed on winter-flowering gums in towns. These studies, and a recent assessment of Kokako in the Hunua Ranges by Bruce MacMillan, Auckland Regional Authority staff, and OSNZ members, have all highlighted the need to maintain a secure reserve network that provides a range of food resources through the year, and the urgent need to keep introduced animal populations (especially wasps, possums, and rats) under control. Rod Hay is currently assessing the effects of predators (mainly stoats) on Robin populations in beech forest at Mt Misery.

Peter Gaze and Mick Clout stressed the importance of honeydew in the diet of honeyeaters in Nelson beech forests (Gaze & Clout 1983), and Henrik Moller and Jocelyn Tilley have recently investigated the ecological impact that common and German wasps may have on honeyeater populations through competition for honeydew and nectar sources.

The Tui and New Zealand Pigeon studies are both assessing the ecological role of these birds in New Zealand forests as pollinators (Tui) and seed dispersers (both). The apparently close link between the timing of breeding of the New Zealand Pigeon and the availability of native fruits has led to moves by Mick Clout, Brian Karl, Bruce MacMillan, and Hugh Robertson to compare the breeding of New Zealand Pigeons at Pelorus, Mohi Bush, and Wenderholm (North Auckland) in relation to fruit availability.

The physiological factors affecting the timing of breeding cycles of New Zealand birds are being studied by John Cockrem; he is measuring levels of reproductive hormones in captive House Sparrows and wild Brown Kiwis, Yellow-eyed Penguins and Adélie Penguins.

Although most of Ecology Division's ornithological work has been done on the New Zealand mainland, regular aerial photographic censuses since 1981 of Adélie Penguin colonies in the New Zealand sector of Antarctica, by Rowley Taylor, Kerry Barton, Bruce Thomas, and Peter Wilson, have found marked population increases (e.g. Taylor & Wilson 1982, 1985; Wilson & Taylor 1984). In the Subantarctic, the relationship between sheep, cattle, and Royal Albatross numbers has been investigated and an experiment now in progress suggests that grazing may enhance the habitat for albatross breeding (Taylor *et al.* 1970, Dilks & Wilson 1979). On the Chatham Islands, Rowley Taylor suggested that the 2 parakeet species on Mangere Island had hybridised because the usual reproductive isolating mechanisms had broken down in this modified environment (Taylor 1976). Hugh Robertson investigated the sexual dimorphism and breeding biology of the Chatham Island Warbler (Dennison *et al.* 1984, Robertson & Dennison 1984), which led to the use of the warbler as a nest host in the Black Robin conservation programme. Raoul Island was visited by Dave Dawson, as part of the OSNZ 25th Anniversary expedition in 1964, which was aborted when the island erupted, and Rowley Taylor raised concern about the heavy predation on Sooty Terns (by rats and cats) that he witnessed there during a visit in 1978 (Taylor 1979a).

Overseas, 3 members of the Ecology Division staff have carried out ornithological studies while on postgraduate scholarships in Britain. Mick Clout undertook a study of Glossy Black Cockatoos while on a scientific exchange in Australia, and Rod Hay and Hugh Robertson are doing a collaborative study with the Cook Islands Conservation Service on the ecology and conservation management of the endangered Rarotongan Flycatcher, which was down to 34 birds in 1988 as a result of intense rat predation at nests.

Ornithological expertise in Ecology Division has been used widely on land and conservation management committees such as Parks Boards and FaunaPAC. Ornithological research by Ecology Division has been important in helping the Division, and other agencies, to make recommendations for the creation of a reserve network that includes an adequate representation of virgin lowland forest (Hackwell & Dawson 1980), as well as suggesting appropriate forest and wetland management techniques. The Division plays an important role in auditing environmental impact reports and commenting on management plans, draft policies, and legislation that could have significant environmental effects.

Ecology Division staff have been actively involved with the OSNZ: Peter Bull served as the President from 1957 to 1960 and spent 24 years on the Council; he ran the Banding Scheme during 1952-56 and later helped to run the Beach Patrol Scheme (Bull & Boeson 1961a, 1961b, 1963) and the Distribution Mapping Scheme. Peter Gaze helped to organise the Distribution Mapping Scheme, served as the Secretary from 1974 to 1977, compiled the 'South Island Classified Summarised Notes' from 1983 to 1988, and co-ordinated the Society's survey of Yellowheads (Gaze 1985). Hugh Robertson has been the

Nest Record Scheme Co-ordinator (Robertson 1986), Field Investigation Officer, and Council member since 1986. The close, and mutually beneficial, association between Ecology Division (or its restructured successor) and the OSNZ will no doubt continue for another 50 years.

H.A. Robertson

An Australian Perspective on New Zealand Ornithology

The advance of ornithology in New Zealand since the foundation of the OSNZ in 1939 has been impressive. Nowadays, if an Australian interested in birds is asked what is special about ornithology in New Zealand the reply is often, 'They have a lot of seabirds, they are good at looking after endangered species, and they must be furious about how many European birds were introduced.' But we Australians must admit to some neglect of New Zealand and its birds while we were trying to find out what we had at home. The first 50 years of the Royal Australasian Ornithologists' Union's history shows no Congress held in New Zealand, despite the all-inclusiveness of our name, and the election of only 2 New Zealand Presidents. Both were distinguished, but one, Mrs Perrine Moncrieff, was especially notable as the first woman to be President of the RAOU. Fortunately, some amends have been made in recent years. Congresses are now held in New Zealand, in turn with the Australian states and Papua New Guinea. Two New Zealanders have been RAOU Fellows (R.A. Falla and C.A. Fleming), and Dr Falla served a term as President in 1952. These events show that Australians have been conscious of New Zealand ornithology for many years, but have only recently started to make serious attempts to tackle projects jointly. The rise of interest in seabirds, waders, and raptors has led to the establishment of trans-Tasman groups and now the proposed *Handbook of Australian, New Zealand and Antarctic Birds* has drawn ornithologists of both countries into frequent contact.

From an Australian viewpoint, New Zealand birds are interesting as aberrant relatives of groups much more diverse in Australia. Some of them are extremely interesting in this regard because their lengthy isolation has allowed great divergence from the ancestral stock. For example, kiwi differ greatly from emus and cassowaries; Kakapo, Kea, and Kaka seem remote from Night Parrot, Ground Parrot and Budgerigah; Tui from honeyeaters — whereas others are easily recognisable — the fantails, robins, and stilts. New Zealand birds therefore have a curiosity value for Australian bird-watchers, not matched by the thrills of quite new families such as the hummingbirds, hornbills, flamingoes, woodpeckers, and toucans that can be seen in Asia, Africa, and America. Perhaps for this reason Australian bird-watchers do not seem to give New Zealand a high rating on their planned list of tours abroad.

For the serious amateur or professional, the view of New Zealand ornithology is different. With the publication of Richdale's work, Australians — the most notable Dom Serventy — have been inspired by the information that can be derived from long-term studies of individually marked birds. Nor was that the only aspect of Richdale's work that was inspiring. The fact that he did it while pursuing an active teaching career was remarkable, and reinforced our recognition of the important part amateur ornithology plays in our science.

The introduction of so many exotics and the decline of many native species has challenged New Zealand ornithology with the task of maintaining populations of rare birds against tremendous odds, and led to first-class achievements in the preservation of endangered species and the improvement in their conservation status. The example of the recovery of the Chatham Island Black Robin is one of several such projects. Some projects seem to have been successful; others still hang in the balance; but in all we admire the skill, devotion, and single-minded effort that we see given generously by the participants.

New Zealand may not have many land birds, but its numerous colonies of seabirds provide an exacting conservation problem as well as spectacular views for the observer. The well-being of these colonies has led researchers to work closely with oceanographers, fisheries biologists, fishermen, and local farmers to elucidate the factors determining the

survival of the colonies. As well as the pioneering studies of Buller, Oliver, Falla, and Fleming, we admire the work now being undertaken both on the mainland and in the Subantarctic islands.

Our recent involvement in extensive wader studies in Australia has led to the development of close links with those involved in wader activities in New Zealand. An excellent example is the tightly co-ordinated study of the movements and breeding of the Double-banded Plover. Banding and colour dyeing have shown that, of the birds breeding in the South Island, those from the lowlands migrate for the winter to the North Island and those from the highlands to southern Australia. By co-operation on this scale, ornithologists in both countries can benefit from each other's developments, leading to similar co-operation in other ornithological matters.

Australians have followed the gymnastics of 'official ornithology' in New Zealand with some amusement. Whereas the cake seems admirably carved up by the societies — RFBPS serving the conservation lobby and bird-watchers, OSNZ looking after the serious amateurs and professionals — the government services seem a mess. Why should there be a difference between a bird studied in a national park and one studied outside it? In what way can the biology of introduced species differ so radically from that of native species that different departments need to study them? Perhaps the Australians should not be cocky; with each state 'owning' the fauna in its boundaries, the birds find themselves with 7 masters! The issue is more serious than I have made it sound, and with such mobile creatures as birds, the OSNZ has a very important unifying role to play in New Zealand, just as the RAOU is beginning to play in Australia. Let us hope the 2 organisations will continue to work together with the enthusiasm that has characterised their current major project, the *Handbook of Australian, New Zealand and Antarctic Birds*.

S.J.J.F. Davies

Search for the Taiko

The word 'Taiko' conveys mystery in the Chatham Islands, where the name was well known but not the bird to which it was attached. When I started my investigations in the Chathams in 1969, several almost mythical accounts were shared with me, and it soon became evident that a mystery bird existed in the Chathams which had not been seen in the recent past. The name 'Taiko hunters' soon became attached to people taking part in expeditions or showing interest in this bird.

Before 1978, when the first 2 Taiko were rediscovered, expedition members were often looked upon as slightly eccentric as they spent hours looking for a nocturnal 'ghost bird'. As Taiko Camp developed from a temporary fly camp to a fully equipped and self-sustaining base camp, many visitors came to inspect the facility to see what was going on in this remote part of Chatham Island. Many of the stories born of conjecture disappeared as simple items of equipment and basic plans were discussed with our neighbours.

As the programme developed, teams were organised for various aspects of work. After the first sightings on 6 January 1973, we needed access to the interior to reach the legendary 'Taiko Hill' described by H.G. Blyth in a letter to me on 24 June 1952. He had farmed the area from 1908 to 1948. Alastair Gordon of Whangarei planned and plotted the direction of the first access track to the hill, as suggested by Manuel Tuanui, who had worked for Blyth and later had bought his farm. Enthusiastic teams marked and cut a track to Taiko Hill. I can well remember reaching the hill and clambering over its slopes only to find the soft peat soil rooted and turned over by the wild pigs that roam this region. No burrows remained.

In May 1976 the track was pushed through to the Upper Tuku and a campsite established at Hatwell's Hole. The search for burrows was concentrated mainly along the Tuku River, especially on the steep banks. It was supposed that in this area burrows might be found that were out of reach of pigs and cattle and that were in positions unattractive to cats, possums, and weka. Searching throughout the Tuku River catchment, when the maps were sketchy and aerial photos showed terrain like a textured carpet, made search areas difficult to plot accurately. When the search area was extended to include inland ridges and bluffs, several beacons were erected on prominent points to help with accurate pin-pointing of possible burrow sites.

The positions of the beacons were accurately plotted by surveyor David Lawrie, assisted by Russell Thomas. Each beacon was given a local name (Murphy's Hill, Dotterel Hill, Point Gap, Lookout Hill, Soretooth Knob, Timihonga, and 281) supplied by farm owners Manuel Tuanui, Ron Seymour, and David Holmes. To reach these points tracks were cut, requiring much work by many people. Care was taken to protect the vegetation by using red 'cruising' tape instead of making slashes or blazes.

Most of our work on the south-west coast has been centred on Taiko Camp, set in the bush edge on the southern side of the Tuku Gully. For the first 10 years we were under canvas and all equipment was stored in Tuanui's woolshed. Three days were required to move equipment, food, and people across the gully to Taiko Camp and to do the reverse at the closing of the camp. Negotiating the steep tracks and soft peat bogs immobilised the Landrovers for long periods.

Despite the problems of access, good camps were established to support the work in the south-west. Water for the camps was carried in 20-litre plastic containers from a spring on the north side of the Tuku Gully. In 1978 a small, steel garden shed and a corrugated iron toilet building were erected on the site. Much equipment was stored over winter at the camp, reducing what had to be moved across the gully for storage.

During 1979 it was decided a semi-permanent camp was necessary to maintain the planned programme. Through the hard work of Ken Rowe of Rangiora, and Sir William

Gilbert, Director of World Wildlife Fund New Zealand, who arranged sponsorship of materials and equipment to build the facility, the expedition had a base camp.

In January 1980, a work party constructed a large iron roof beneath which a large kitchen-living room, pantry, laundry, shower, workshop, woodshed, and equipment storage area have been developed. The roof also catches rainwater that is stored in a 3000 gallon swimming pool, thus dispensing with the time-consuming chore of carrying spring water. The provision of a deep freeze and generators by WWF NZ allowed perishable foods to be stored in bulk. Having plentiful water, food, and firewood stored on site we can remain in the field for longer periods.

Forty Taiko have now been banded after capture at our observation site, where the first Taiko were attracted on 6 January 1973. A generator in a small shelter powers a photo-flood light that attracts Taiko, before they are 'landed' with a quartz halogen spotlight. Ten of the 40 Taiko have been recaptured. Besides Taiko, a variety of other Procellariiformes has been banded at this site, mostly Grey-backed and White-faced Storm Petrels.

Access to Taiko Camp, the centre of our research, has always been difficult. In 1969 there was no road beyond the Tuanui homestead. Access was by Landrover. While the peat country was dry very few problems were experienced, but in wet weather the peat was like a giant sponge, making travel across the gully almost impossible.

Over the past 20 years the Chatham Island County Council, supported by the New Zealand Army, has improved the gradient and developed an all-weather road to the Tuku Gully. Access to the camp for servicing is good, except in spells of prolonged bad weather.

After several seasons of unsuccessful searching for burrows of this nocturnal seabird, radio telemetry was considered, to localise an area for intensive searching. Radio transmitters were tried out in 1982 by Mike Imber on the Grey-faced Petrel (*Pterodroma macroptera*) of Whale Island. During the next 5 years members of the Taiko Expedition designed, manufactured, and field-tested a comprehensive radio-telemetric system, using materials sponsored by many companies.

During October and November 1987, 10 Taiko were captured and a transmitter was attached to the 2 central tail-feathers of each bird. The transmitters would be lost at the next moult. With radio telemetry, the first burrow was found in November 1987, during a combined effort by Taiko Expedition members and a Department of Conservation team. The pin-pointing of the burrow was the culmination of a 10-year effort by a series of teams, totalling 180 volunteers, under my supervision.

These dedicated enthusiasts gave their time and expertise to give the endangered, enigmatic, Chatham Island Taiko a chance of survival in an environment greatly modified from the time when the early Polynesian inhabitants of the Chathams, the Moriori, harvested this muttonbird as a major food. Now part of the breeding ground has been identified, conservation and management plans can be implemented in the Tuku Nature Reserve, generously given to the nation by Manuel and Evelyn Tuanui.

D.E. Crockett

The Royal Albatrosses of Taiaroa Head

In the history of human occupation of the Otago area, Taiaroa Head has been important as a fighting pa, signal, light, and pilot station for shipping, and a military fort and base in various periods of military uncertainty in more modern times. However, it is best known today as the only place in the world where 1 of the species of albatross, the Northern Royal Albatross (*Diomedea epomophora sanfordi*), has chosen to breed on a mainland.

These great albatrosses were first seen landing at the Heads in about 1914, when the area was extensively occupied as a coastal defence fort. The first recorded egg was laid there in 1920. Each year until 1934 an egg was laid, but removed or broken. A chick hatched in 1935, but was later killed. In November 1936 Lance Richdale paid his first visit to Taiaroa Head and recorded:

There on a grassy path, before my astonished gaze sat a male Albatross incubating a large white egg. That egg too was removed. In 1937 the birds again laid, so I made up my mind to do all possible to prevent a repetition of previous losses.

The efforts of Lance Richdale, citizens and organisations of Dunedin, and government agencies have ensured, since the first chick flew in 1938, that the colony has continued to grow under intensive protection through reservation and special management of the breeding area. The original research and monitoring started by Richdale continues today as probably one of the longest-running research projects on a species of bird anywhere in the world.

Research, however, is secondary to the protection, conservation, and management of these birds. Every day the protective fences and predator traps in the area are checked. All birds are banded so that information about those present and their behaviour can be recorded accurately. Weekly, the eggs or chicks are weighed. As a result, the rangers are able to monitor breeding and productivity closely. If possible, deserted eggs or young chicks are fostered to parents who have lost eggs; young parents breaking their eggs are trained on dummy eggs; chicks losing parents are fed supplementary food.

The first permanent ranger at the Heads, Stan Sharpe, was appointed in 1951. Alan Wright took over in 1967 and since 1980 local part-time staff led by Shirley Webb have maintained the daily programme of management and research. Over the past 30 years, as a result of devoted and careful management by these staff, more than 30 extra chicks (16% of the chicks that fledged), which would not have otherwise survived, flew from the colony. This management is made possible by the long and continuing research programme: Data have been collected about families, the colonial structure, and behaviour of the birds at Taiaroa Head for over 6 generations, including over 50 years of the life of 'Grandma' (banded in 1937), the oldest known bird in the world alive today. Today, some 24 breeding pairs regard Taiaroa Head as home and 60-70 birds visit the colony each year. A steady trickle of immigrants still arrives, from the main Northern Royal colonies in the Chatham Islands. Banded birds have helped record their 2-way visiting.

This, then, is conservation at work. Many of the techniques of management used are those used for endangered species, and useful lessons are learnt that will be available for endangered seabird management in the future. The knowledge of the birds from both management and research provides a perfect basis for the day to day educational commentary that is part of a public visit to Taiaroa Head.

In the early years of protection, getting permission to visit the birds at the Heads was not easy. It took several years from the early 1970s to develop a unique public visiting system for Taiaroa Head, operated by the Otago Peninsula Trust under licence, firstly from the New Zealand Wildlife Service and since 1987 from the Department of

Conservation. The present and future visiting system must always be subject to the primary concern of protecting the birds and the contents of the reserve. In this context people are rightly treated as visitors only.

All tour-groups have to be small, prebooked, and guided so that everyone in the party can participate in the experience. This experience is designed to be relaxed and unhurried, including an experienced local guide and, at the reception centre, which was opened by the Princess Royal in March 1989, a short lecture or audiovisual introduction to the history, life cycle, and conservation of the albatross. The party is then taken to a viewing observatory within the Nature Reserve to see live birds and chicks in their natural environment against a magnificent scenic panorama.

The visitor is expected to pay for the services and guides so, apart from major capital costs, the facilities and services provided are self-supporting. Any profits are used to support the facilities or other natural history sites on the Otago Peninsula.

Since the first public viewing in 1972, more than 100 000 people have visited the albatrosses and more than 20 000 now come each year, at least 60% from overseas. Taiaroa Head is a unique facility, which has begun, and will continue if carefully operated, to demonstrate the close links required to provide an experience of conservation at work. This experience must be provided by people who have a feeling for and knowledge of the site. The resulting experience is an educational one, enhanced by the mixing of peoples of all nationalities. Taiaroa Head is an important example of how a careful relationship can, with sensitive operation, exist between tourism and a natural zoological phenomenon. This was emphasised when the activities of the albatrosses and other birds in the colony were transmitted live, in the 1986 BBC TV programme *World Safari*, to a world audience of 350 million viewers.

C.J.R. Robertson

The Gannets of Cape Kidnappers

Gannets in their thousands nesting on the mainland present a scene unique in nature. The Gannet, usually an island breeder, has been notably different at Cape Kidnappers, on the east coast of the North Island of New Zealand, since at least the 1870s. Here, on a lofty promontory, a colony of the Australasian Gannet (*Sula bassana serrator*) has made its home at the southern tip of Hawke's Bay. During the 1960s a small colony of the Gannet (*S. b. bassana*) was established on Bampton Cliffs in northern England. During the 1970s and 80s 3 more mainland colonies became established in New Zealand at Muriwai Beach, Farewell Spit, and the Marlborough Sounds.

For nearly 100 years, Cape Kidnappers, one of New Zealand's most famous natural exhibits, has been the easiest place to view thousands of nests of one of the world's most spectacular seabirds. It has been a drawcard for hundreds of visitors, many of whom have come regularly throughout their lives, as children and with friends, partners, and their own children and grandchildren. Even today, when people seem to need motor vehicles to get to any remote place, some (about 20% of the 10 000–15 000 visitors a year) still manage to make the 3–4 hour beach trek on foot. The rest now use various forms of beach buggy and more formal overland transport.

Well protected today, the colony has not always been so. Early this century a baker from Hastings is reputed each year to have collected eggs, which eventually graced his shelves as magnificent sponges. Increased visitor pressure since the 1950s prompted first a volunteer corps of junior rangers, and since the late 1960s, notices, a low guidance fence, and a ranger present during the times of peak visiting.

Because of the relative ease of access, regular research was started at the Cape in 1945. Almost every year since then a monitoring programme has charted the annual population and its breeding success. The early work of Dr Kazio Wodzicki and Rev. Fred Robertson at Cape Kidnappers and of Peter Stein at Horuhoru Island in the Hauraki Gulf did much to unravel the intricacies of the Gannet's lifestyle and habits. C.A. Fleming and K. Wodzicki organised, with members of the Ornithological Society of New Zealand, a national census of the species in 1947 and I repeated this in 1969 and 1980, providing a population profile that, when combined with the annual data from Cape Kidnappers, is almost unique among international seabird studies.

The visitor can have a pleasant beach walk of 1.5–2.0 hours at low tide from Clifton Domain, south of Napier, alongside towering cliffs of rock and shingle conglomerate. The first mainland and small island gannetries are encountered at Black Reef. A kilometre further on, a rest hut and conveniences for the traveller nestle among trees before the final climb to the main Gannet colonies. The original 'Saddle' colony is now closed because of the dangerous access. The 'Lighthouse Plateau' colony, which started in about 1937, is the most accessible. Those overland travellers patronising the official 'Gannet Safari' are driven to within feet of the nesting birds.

The serried rows of Gannets, continuous noise, pungent aroma, and aerial activity are a continuing source of fascination to both visitors and researchers. Between 1950 and 1970 over 4300 chicks from this colony were banded at the nest. More than 1400 returned to their home colony, living up to 33 years. The recoveries of many others, from Kidnappers and other banding localities, dead at sea or on beaches, have been used to plot their dispersal towards Australia as young fledglings and their subsequent return home after their 'overseas experience'. Researchers have provided data to scotch the persistent story that Gannets migrate to Siberia, even though a Gannet has never been seen there.

Truly in its element at sea, the Gannet's steep plunging dive at more than 150 km/h is a spectacular way of getting food. Rarely seen from the shore, the diving is closely equalled by the spectacular aerobic flying of landing birds over the nesting colony. A

bird has to make a pinpoint landing on the nest site if it is to avoid severe confrontations and fights with closely packed neighbours. In the usual windy conditions the birds' remarkable control in the air and ability to choose the right spot are a source of amazement and a photographer's delight.

As Gannet populations around New Zealand continue steadily to increase (over 40 000 breeding pairs by 1980), they may well make further forays to the mainland for breeding sites. It will be some time, however, before the scenic spectacle of the Gannets at Cape Kidnappers will be exceeded. It is but an indicator of the riches of New Zealand's vast range of seabirds, confined to outlying islands away from the sight and influence of man.

C.J.R. Robertson

The Waders of the Miranda Coast

Since the early 1940s, when R.B. Sibson and H.R. McKenzie started Ornithological Society visits there, the Firth of Thames, including much-visited Miranda, has been one of the 3 or 4 most spectacular birding places in New Zealand.

Taking the coast road from the north, in quick succession one passes through varied habitats, each with its own particular birds. After a foretaste of godwits, South Island and Variable Oystercatchers, and New Zealand Dotterels along the sandy curves of Kawakawa Bay, the twisting road leads over steep hills and drops dramatically to a rocky coast. Across the waters of the Firth, Coromandel's hills stand tall.

Many hundreds of Spotted Shags may be seen near high water beyond Matingarahi, on Shag Rock, or, in lesser numbers, on the aged timbers of the 'Guy C. Goss', once used as a wharf at the shingle works. Man-made ponds around the works are the resort of other species of shag and waterfowl; rarely Dabchicks, hundreds of Welcome Swallows, and for a time, a White-winged Black Tern. This circus performer was seen to cling tenaciously to a power wire in a high wind! Offshore, many thousands of Fluttering Shearwaters have been known to find refuge in vast rafts away from the ravages of a tropical cyclone.

On both sides of the Firth, forested heights still contain Kokako; Bellbirds, scarce in the north, are present. As a contrast, it is possible to see White Cockatoos and Eastern Rosellas on the western side in scrubby bush fringes. Parallel to the shore, running inland, shell ridges form an ancient landform known as a chenier plain. Creek mouths are muddy and mangrove-edged. At the southern end are 2 fine rivers, the Piako and the Waihou, where Captain Cook sailed.

In several places great banks of shell have formed over the years. These have in turn been famous roosts for waders — White Bridge, Taramaire, Access Bay, Miranda Limeworks, Kairito, and Waitakaruru Rivermouth. Owing to wave action, infilling of ponds, and mangrove emergence, the favoured place changes over the years, attracting great numbers of both internal and external migrants to wherever conditions have been best for them.

A few New Zealand Dotterels breed in favoured places. Black-billed Gulls and White-fronted Terns breed in large colonies on Access Bay Spit, while Black-backed Gulls and Pied Stilts favour wetter inland fields.

The great glory of the Miranda coast is that it supports hordes of waders, which may be seen at the roosts near high water, in flight, or feeding on vast mud flats. A tight flock of up to 5000 Wrybills shows light and dark as it twists and turns during a fast pre-migration flight; endless lines of Bar-tailed Godwits and Knots come to roost, moving low over the Firth as the tide swells; hundreds of Pied Stilts yap shoreward from inland feeding places. Herons, shags, and various sandpipers come to the banks to rest. South Island Pied Oystercatchers, in flocks of up to 17 000, blacken the bank as they sleep, and alongside, other species form packed flocks. Among the regulars are Turnstones, Red-necked Stints, Curlews, Sharp-tailed, and most years, Pectoral Sandpipers, Far-eastern Curlews, and Whimbrels. The lovely Terek Sandpiper is eagerly sought and luck may bring a Grey Plover. Large size and bright red bills signal a flock of perhaps 80 Caspian Terns. As the tide falls all these and more may be watched as they bathe, preen, and scatter to feed.

A few years ago, in the third week of September at the time of arrival of trans-equatorial migrants, a group of OSNZ members watched 3 distinct flocks roosting separately. First, birds that had overwintered at Access Bay fed and rested normally. On the 21st, a second flock slept soundly while the first fed as usual, and then on the 22nd, a further exhausted flock was deeply asleep while the other 2 groups fed separately. One flock contained 47 Whimbrels just in on migration and the most I have seen together.

About 10 years ago when with 2 others I took part in the making of a Natural History Unit film, we witnessed the start of a northward migration. We spoiled the 'take' by suddenly standing stock still instead of walking on steadily as instructed. There before us, hundreds of godwits in brilliant rufous breeding plumage were climbing steeply upward, something only one of us had ever seen before. Such was the angle that a few birds dropped back, tried desperately to lift higher, and again dropped. Only 2 or 3 of these birds gained the flock. It rose steadily to a great height, levelled out, and headed north. I have experienced a similar thing at Farewell Spit previously. On both occasions the flight began late in the day.

One cannot think of Miranda without mentioning some of its rarer visitors. Among the patchwork of bronze and green salicornia and tinkling white shells may occur Great Knot; Marsh, Broad-billed, Baird's, and Western Sandpipers; Grey-tailed Tattler; Little Whimbrel; Dunlin; Asiatic Dowitcher; and in two memorable seasons Ringed Plover.

In picturesque contrast are the waddling, cawing Rooks that forage on the damp flats and breed on a hill in Australian wattles. Introduced Red-legged Partridges are also breeding now in suitable places. Spur-winged Plovers have increased with flocks of up to 60 counted. White-faced Herons are in high numbers, but the White Heron is much less common and the Little Egret is rare.

Black Shags breed in hundreds in macrocarpa trees and have been seen strung out like fence posts along a calm shore. They appeared to be having a nature-appreciation session but may well have been sated with food! Dense mangroves at Pukorokoro Creek make a much favoured roost for Welcome Swallows and House Sparrows. Very large flocks pour in. The whole coast attracts finches and buntings, especially Yellowhammers and Goldfinches. Greenfinches are in lesser numbers and Redpolls scarce.

Oddities of behaviour such as 2 or 3 Curlew Sandpipers having long turnabout chases with Welcome Swallows are not infrequent. Then, too, I have seen Knots provide a living umbrella for others of their kind in a sharp hailstorm. Were young birds being cared for by elders or the weak by the strong?

A fisherman came to me one day. He had been well out in the approaches to the Firth when 6 or 7 loud-voiced white birds with tail streamers had attended his catch. He readily identified them as tropicbirds in my Field Guide. I also saw, with others, 2 frigatebirds soaring high at Matingarahi. It was only much later in Fiji that I felt sure of their identity. And what did the 2 Giant Petrels, heavy bombers, scudding over wild water in a severe storm, do when they ran out of sea at the south end of the Firth? And was that really a Spotted Sandpiper seen at Taramaire one day? To my mind there is no more beckoning place of birds in this country than Miranda. There is still so much to learn.

B. Brown

The Birds of Farewell Spit

Farewell Spit is a wetland of international importance for migratory waders and has a bird list of 118 species. It was too isolated for most early ornithologists, being distant over the formidable Takaka Hill. It is still not easy to reach, and once you get there travel on the Spit may be a further problem. It was not until the 1960s that the Ornithological Society, in association with the NZ Wildlife Service, began to assess the full value of the Spit for waders and other birds.

H. Guthrie-Smith was one of the first to make the effort to visit the Spit. His first trip was in December 1924, when he travelled by boat from Puponga to the Lighthouse. The boat was stranded on the bay flats over a night low-tide. His visit was to see breeding species: gulls, terns, and 'red bills' (Variable Oystercatchers) and he made little reference to waders. He referred to godwits feeding about the 'high and dry' boat and that migrant sandpipers (?knots) were noted similar to those seen at Okarito. He did mention several hundred godwits and a flock of 300–400 oystercatchers (SIPO), but these were at Bird Island near Collingwood, which he visited afterwards. (This shellbank has since been eroded away.) His second visit was in September–October 1925, down the Spit by horse and buggy, the latter being lost in quicksand. Again, he did not mention waders.

Although she published little about its birds, Perrine Moncrieff sought to reserve the area for posterity. The Spit and tidal flats were reserved in 1938. I had the pleasure of visiting the Spit with Perrine and members of the Abel Tasman National Park Board in 1963. We were sitting out the high tide at the lighthouse when Perrine, tired of rather circular discussions, said, 'Brian, let's have a look at some birds.' We moved across the Spit to just south of the lightstation where knots and godwits gathered as the tide rose. The Board members followed reluctantly. We were watching a sizeable flock of waders when I heard the distinctive call of Greenshank and alerted Perrine. Two birds flew in from the west and landed in front of us in a small runnel. It was a climax to an otherwise rather unproductive day.

Our first member to write about this habitat and its birds was Bob Stidolph after a visit in 1946. He was able to sit out a high tide at the lighthouse and took the opportunity to visit the 'Shell Banks' at the extreme end. His report was limited, but it was a stimulus that drew the attention of others to the Spit. During his inquiry into the status of Bar-tailed Godwits in New Zealand in 1953, Bob and I visited the Wairau Lagoon. The discussions we had about the Spit, and his paper, whetted my imagination and inspired me to organise OSNZ courses there some years later.

During 1958–60 I visited the Spit several times in connection with my work with the Wildlife Service. Although the area was a Reserve for the Preservation of Flora and Fauna, it was given little attention and poaching was reputed to occur. A few tantalising glimpses of birds — which I later found to be stints and whimbrels — encouraged me, and fuelled my enthusiasm to learn the Spit's secrets. However, it was evident that the small resources of the Wildlife Service were inadequate for a full survey, which would need time, a lot of experienced people, and special equipment such as a 4-wheel-drive vehicle. A combination of the resources and expertise of the OSNZ and Wildlife Service seemed the answer.

In January 1961 the Society in collaboration with the Wildlife Service held its first study course and census at Farewell Spit. The party of 19 camped on Triangle Farm (now Puponga Farm Park) in an old woolshed (now removed) among some large macrocarpas and in tents near the limestone outcrops up the valley. This party and subsequent visitors were most grateful for the Freeman family's generous hospitality and assistance till their departure in 1974. This survey was perhaps the most memorable because we were breaking new ground.

We soon realised that the area was hard to work and that there would be large numbers

of birds. Nothing has changed and the Spit continues to prove hard birding. Over the years our knowledge of bird roosts and tidal patterns has increased, but the difficulties remain — the distances are great, the wind blows and the sand still flies.

The first study course set the pattern for many to come — groups of people having a mixture of skills, some very experienced and others there to learn. All visitors have felt the special excitement and atmosphere of the Spit; partly it is the high dunes and drifting sands, scrublands, wetlands, and saltings drifting out into the heat haze, but, above all, it is the huge flocks of waders, being forced back by the incoming tide until they have to rise and fly over the inner bay dunes to roost on the central sand flats. The sight and sound of these birds flying in overhead are unforgettable.

The census on the first course set baselines for the commoner species — Bar-tailed Godwit, Knot, SIPO, Banded Dotterel, and Turnstone. Who could have guessed we would count 25 000+ Knots and 18 000 Godwits and just on 1000 Turnstones? It also established the Spit as a place where one could guarantee to see rarities; for example in 1961 Little Whimbrel, Mongolian Dotterel (a first for New Zealand), and White-capped Noddy (a South Island first). It continues to produce those enticing rewards such as Western Sandpiper and Fairy Martin (both firsts for New Zealand) as well as many other more regular stragglers.

I have many memories from the first census. George Lord, Forest Service ranger at Cobb Lake, provided a leg of venison, which was beautifully cooked and served by Hetty McKenzie. George's daughter has since become an active member of the Society. Hetty brought a plum pudding all the way from Clevedon as a special treat. The 'boys' of the party managed to prise Hetty's special little bottle of medicinal brandy from her purse to pour over the pudding so they could march it ceremoniously into the woolshed 'à la flame'. And who hung the mistletoe over the doorway to the woolshed? All the junior members were blamed until we found out that it was the oldest schoolboy, Dick Sibson, a senior master at King's College.

In 1962 the OSNZ and Wildlife Service combined again to look at the Spit in winter, and see what Arctic migrants remained behind and what use local migrants were making of the area. SIPO and Banded Dotterel were the 2 main species.

The Society's grandest course was in 1967, held over 3 1-week periods in January. Over 60 members and friends took part. Again it was a collaborative effort with the Wildlife Service. During this exercise we became so familiar with the Spit that we could predict within a few hundred metres where a particular species could be found. Each subsequent visit has refined this, but the changes on the Spit due to wind and tide continue to surprise. This survey was extended to the whole of Golden Bay and Westhaven Inlet to find out the significance of the smaller harbours in relation to the Spit.

Members continued to visit the Spit, but the next census party was in March 1974. In 1977 a new approach began when a junior members' training course was held. Twelve young people nominated from 11 regions took part. Some of the cost was subsidised through the Projects Assistance Fund. They were trained in identification, how to describe a bird, counting, and keeping notes. While there they undertook a census. It proved very successful and some of those who took part as juniors hold prominent positions in the Society today. Other junior members' courses were held in 1983 and 1988. The most recent was also extended to Regional Representatives, or Recorders if the representative could not attend.

When the Freeman family left, we were concerned that arranging visits could be more difficult, but we need not have worried. Bruce and Glenis Robertson (farm park manager and his wife) have been helpful and valuable observers, making many new records, such as Glossy Ibis and Hoary-headed Grebe. Members have also been very appreciative of the help given by various Departments — Internal Affairs (Wildlife Service), Lands and Survey, Transport (Lighthouse Division), DSIR (Ecology Division), and more recently the Department of Conservation. The transport-tourist concessionaire, Collingwood Motors (more recently Safari Motors), has always taken an interest in the Society's work and, although rarely contracted for transport, has helped in other ways, from carrying

messages to providing facilities to clean down vehicles after exposure to sand and salt.

After the first junior course, 3 of the juniors organised their own trip back to the Spit in 1978. Rather than continue counts they looked at the feeding and roosting of certain species. Counts have continued at the Spit as part of the biennial national wader counts and, through Jenny Hawkins's enthusiasm, are more often than those counts require.

While waders tend to be the main focus, visits to the Spit give many other opportunities for bird study. Notable contributions have been made by Jenny Hawkins and others in following the establishment and development of the Gannet colony and the fortune of other nesting seabirds. Derek Onley has concentrated on the passerines, particularly their migration. Apart from counts of swans made by the Wildlife Service and the inclusion of waterbirds in the general counts, little attention has been given to waterbirds. Some beach patrolling has been done but returns are generally low. Often the inner beach is more rewarding than the ocean one. Seabirds are prominent offshore, but, again, only casual attempts have been made to identify them and very little done on numbers and movement relative to season and weather.

Each trip produces its own anecdotes to add to the 'official history'. Perhaps the most notable was the loss of the Wildlife Service Landcruiser in October 1979. A young officer managed to bog it at Lagoon Creek after an early morning inspection of the nesting terns on the shell banks. The youngest member went to alert the lighthouse keeper to bring tractor and tow rope while the older hands tried to edge the vehicle up the beach with the 'help' of the incoming tide. It must have been quite something to see Betty Seddon and myself being washed off the top of the vehicle while they tried to keep it upright.

Despite all efforts, the vehicle had to be abandoned. A very tired, wet, and cold group retreated to the warmth of the keeper's house but it did not stop them recording a Sanderling on the way. When they returned after the tide had fallen they were surprised to find the Landcruiser almost totally immersed in Lagoon Creek with only 1 corner of the roof still above water. Further efforts to salvage it with tractors failed and a special recovery had to be made about 3 tides later.

More recently I recall a Wildlife Service trainee reporting an unusual wader at the far end of the Spit crossing. The sages were not convinced, but after 2 days' persistence finally agreed to go and look at the bird. Sure enough there was an unusual 'sandpiper'. Neither Barrie Heather nor I could decide which one it was. It met some of the diagnostic features of a Great Knot but it was too fine and slim. However, 2 days later after about a week's worth of vigorous feeding it met the proportions as well — yes, a very thin, hungry Great Knot. Remember, the books are only a guide.

Despite all the OSNZ and other visits and studies on the Spit, there is so much to be learnt. Wouldn't it be nice to spend 12 months studying the annual cycle? From the very first study course, Farewell Spit has been suggested as an obvious place for an observatory.

Since the automation of the lighthouse, 2 houses have remained unoccupied except when the Department of Conservation (and formerly Department of Lands and Survey) has had temporary staff employed to cater for the summer tourist inflow. The Department of Conservation now cannot provide even temporary staff. The Council of the Society has put forward a proposal to the Department for the Society to take over the permanent manning of the Lighthouse Station with a view to its becoming a full-time observatory. If this happens, members will have an unrivalled opportunity to spend time at one of the country's most exciting bird-watching sites and to take part in the various study programmes or training schools in progress at the time.

Brian D. Bell

Section 4

Biographical Notes

The following are short biographies of a selection of people, all now dead, who have made significant contributions to ornithology in New Zealand. The list is by no means exhaustive; we simply celebrate 50 years of the OSNZ by bringing together a greater assemblage of biographical notes on New Zealand ornithologists than has been gathered in one place before.

Gilbert Edward Archey

1890–1974

Sir Gilbert Archey, best known as the third Director of the Auckland Institute and Museum (1924–64), was also a scientist of broad interests, ranging from New Zealand zoology to Maori art. His first scientific appointment was as Assistant Curator of Canterbury Museum (1914–24): he had graduated MA with Honours in Zoology, and his early papers were all zoological (on *Hydra*, *Daphnia*, New Zealand crayfish, etc.). Two papers on birds were included, 1 on Subantarctic birds (Archey 1923) and 1 on birds of the Chatham Islands (Archey & Lindsay 1924). The former contains an important classification of the incubating Wandering Albatrosses observed on Antipodes Island into 4 plumage coloration groups, but one group (group 3) was omitted, destroying much of the value of this early set of observations.

On coming to Auckland, he turned his attention to the subfossil moa and other bird bones being reported from coastal dunes, and from limestone caves in the Waikaremoana and South Auckland districts. In addition to several papers, his 'The moa: a study of the *Dinornithiformes*', *Bulletin Auckland Institute and Museum No. 1* (1941), is a major contribution to the study of moa and to New Zealand palaeornithology.

E.G. Turbott

Charles Archie D'Arcy Blackburn 1899-1984

The Society has good reason to remember Archie Blackburn, who was President from 1960 to 1968 and Regional Representative for Gisborne for many years. From 1958, when Te Rau Press undertook the printing of *Notornis*, to his death in 1984, he was assistant editor, steering most issues through the final stages of publication. In conjunction with Ross McKenzie, he monitored the finances over a critical period.

Although born in Hamilton, Archie was essentially a Gisborne man. At the Boys' High School he was dux. Then 3 years at Duntroon Military College gave him the training of a professional soldier; and incidentally opened his eyes to the much greater variety of birds in Australia than in New Zealand. After his return to civilian life in New Zealand he qualified as an accountant and keenly supported the embryonic Forest and Bird Protection Society. The outbreak of World War II saw him commanding the 19th (Wellington) Infantry Battalion. Having survived the 'backs-to-the-wall' campaigns of Greece and Crete, in which he served with distinction, he returned to New Zealand to take command of the First Army Tank Battalion. Forty years later, by then an octogenarian, he was proud to be selected as one of those who represented New Zealand on a tour of historic battle sites in the eastern Mediterranean.

Military duties done and his business firmly established, Archie was able to go fishing along the streams of Mt Hikurangi, sometimes in the company of Blue Duck; and to indulge his hobby of watching birds, especially on the smaller and less well-known offshore islands. In 1955 he confirmed the existence of a gannetry, which he had for some time suspected, on an islet that lay off a very difficult part of the north-east coast.

His efficiency in the field made him an ideal amateur to form close ties with the growing Wildlife Service when it was surveying our many offshore islands. This partnership took him from Cuvier and the Mercuries to Codfish and the outliers of Stewart Island. He was present when the first experimental batch of Hen Island Saddlebacks was released on Red Mercury; and he liked to describe how, far from being perplexed by their new surroundings, they quickly spotted and fell upon a generous crop of taupata berries, such as they were unlikely to have seen on Hen Island for many a year. Archie's reports on insular avifaunas show the breadth of his vision and the depth of his understanding. 'Muttonbird Islands Diary' (Blackburn 1965b) is a very important document. It is not surprising that he was asked to serve on the Fauna Protection Advisory Council. From his Duntroon days he had come to love the birds of Australia. From time to time he joined his Australian friends on expeditions into some corner of that great island-continent that ornithologically was badly known. When in 1970 OSNZ members organised a complicated expedition to some of the major islands of Fiji, Archie was the official recorder, and his report (Blackburn 1971) was so thorough that it inspired further OSNZ trips to Fiji and is still a standard reference.

At home in his own garden he made a long-term study of the nesting of Fantails (Blackburn 1965a, 1966). Such were his local contacts that, if an unusual bird appeared near Gisborne, he was likely to be informed. He realised the value of Gisborne's Waikanae Beach as a resting place for transient waders. To Archie goes the credit for adding 2 Australian land-birds to the New Zealand list, Satin Flycatcher (1963) and Black Falcon (1983). In any society that appreciates high standards of service and loyalty, men of the calibre of Archie Blackburn are indeed the 'salt of the earth'. He was most meritoriously the recipient of the Falla Memorial Award for 1981.

R.B. Sibson

Geoffrey Armstrong Buddle 1887–1951

Geoff Buddle entered Auckland Grammar School at the age of 10. He was a natural marksman and practised taxidermy on the feathered victims of his catapult. He confessed he was a collector and hoarder. His well-documented collection of birds' eggs is now in the Auckland Museum. When understanding parents gave him a camera he changed his methods of hunting. He read and appreciated the books of Richard Kearton, a pioneer of bird photography in Britain. Geoff's practical turn of mind solved most difficulties; and living on the shores of the Hauraki Gulf, he had plenty of opportunities to test his skill. In 1904 he made the first of several trips to Little Barrier, and later in that same year he was on board G.V. *Hinemoa* off to the Kermadecs where he took pictures of boobies, noddies, and tropicbirds. One of his photographs is labelled 'Amokura annoyed at having its tail-feathers pulled out by sailors.'

Two years later at Little Barrier he found the rare Parkinson's Petrel nesting and the photograph that he took reappeared in *NZ Bird Notes* (2: opposite p.144) 40 years later. In the summer of 1907–8 he was again on board the *Hinemoa* when she went on a tour of inspection in subantarctic waters. He returned with a well-chosen collection of photographs and of eggs of penguins and albatrosses.

To advance his studies in engineering he then went abroad to Berkeley, California. The outbreak of World War I found him practising his profession in England, where he joined the Royal Engineers and in due course was sent to Gallipoli. Fortunately he was one of the lucky ones. The REs were urgently needed on all fronts. In France he was severely gassed and for a long time was reckoned a doomed man. In 1926 he left England. Fijian sunshine and dedicated nursing in New Zealand miraculously cured him and he began to resume his former hobbies. By 1937 he was so fit that he was selected to take part in the New Zealand Total Solar Eclipse Expedition to the Phoenix Islands. His camera was put to



Figure 18. HMNZS *Arbutus* off northwest landing, Great Island, Three Kings group, 6 December 1945. Photo: G.A. Buddle, Auck. Mus. collection.

good use. Many specimens of birds and eggs were collected and presented to the Auckland Museum.

The characteristic birds of the Volcanic Plateau next caught his interest; and while he was studying the nesting of Dabchicks and Scaup he was joined by Bob Wilson. The 2 Majors made a good team and planned expeditions to Hen Island and Poor Knights taking with them promising young ornithologists.

Another Major then entered the scene. Magnus Johnson was an intrepid yachtsman and owner of the gaff-rigged ketch *Rosemary*. Together they tackled the difficult Three Kings group of islands, where a rugged islet is now officially named Rosemary. In 1983 it gained distinction when an Auckland botanist found that a small colony of Northern Buller's Mollymawks had become established there — a far cry from their nearest relatives.

In Buddle's book *Bird Secrets* (1951) there are words of wisdom for all bird photographers. 'The secret of success lies not so much in the type of equipment, as in its correct manipulation coupled with unlimited patience and a thorough study of the habits and idiosyncracies of the species of birds being dealt with.'

R.B. Sibson

Walter Lawry Buller

1838–1906

The dominant figure in New Zealand ornithology in the latter part of the nineteenth century was unquestionably Walter Buller. The successive editions of his *A History of the Birds of New Zealand* (1873, 1888, and a *Supplement* in 1905) were bird books in the grand manner, after the pattern set especially by the London ornithological entrepreneur John Gould. In an era when colonial scientists generally deferred to London authorities such as Gould and sent new species to them to describe, Buller was an exception. And unlike other colonial ornithologists such as T.H. Potts or F.W. Hutton who had emigrated from Britain, Walter Buller was a native-born New Zealander. He was born in 1838 at Pakanae on the Hokianga, the son of the Wesleyan missionary James Buller. He was educated in his father's study and at the Wesleyan College in Auckland. By a combination of ability, ambition, and sheer effrontery, he succeeded in turning his boyhood interest in the birds of his native country into a scientific career that made him the pre-eminent authority in his field, recognised in London as well as in New Zealand.

Walter Buller dominated New Zealand ornithology from 1873, when he published the first edition of his *A History of the Birds of New Zealand*, to his death in 1906. His influence has continued long after that time; although many of the species he described and the nomenclature he used have been rejected or revised, his accounts of birds now rare or extinct continue to be consulted and the illustrations from his books — 'Buller's Birds' — still provide the stereotyped images familiar to every New Zealander. Ironically, these illustrations were created not by Buller but by J.G. Keulemans, a London-based artist specialising in such work, who had never been to New Zealand and, apart from those few species he was able to see at the Zoo, worked entirely from stuffed birds and museum skins.

Buller's era was one of rapid change in New Zealand as British colonists cleared the bush to make way for farms and towns, while also bringing in a whole new fauna: some (ship rats, for instance) introduced inadvertently, but most — Skylarks and Starlings, deer and hedgehogs, possums and stoats — were deliberately 'acclimatised'. Buller's special contribution to New Zealand ornithology was his accumulation of specimens and observations on the many native species that were then declining toward an apparently inevitable extinction. The displacement and extinction of all native things before the progress of European colonisation was almost an article of faith for the colonists in New Zealand — and for several generations of native-born settlers after them — but although many native species turned out to be much more resilient than had been imagined, some did disappear. Buller's observations on species such as New Zealand Quail, Piopio, and Huia, his remarks on their habits and what he termed their place in the economy of nature (the term 'ecology' did not come into general use until the twentieth century) are thus of enduring value.

R. Galbreath

Alexander Thomson Edgar 1900–1983

Born and educated in Scotland, Sandy Edgar, when 19 years old, left for Malaya to become a rubber planter in Perak. Sandy was never one to do things by halves. He mastered his trade and after years of experience and observation put his ideas into a *Manual of Rubber Planting* (1938), which became a standard textbook. Revised and enlarged editions appeared in 1960 and 1982 and are still quoted. For his services to the industry the Malayan government awarded Sandy the high honour JNM.

The study of birds in the field was for him a life-long hobby, and Malaya was an ornithologist's goldmine. He would happily recall how once he watched 19 species in the same tree. He made numerous original discoveries, especially of nests and eggs, and he worked in conjunction with the British Museum (Natural History) and the Raffles Museum, Singapore. He was a joint founder of the Malayan Nature Society and its first secretary.

World War II engulfed Sandy from 1940 to 1945, first in the local forces and later in the Indian Army. Taken prisoner by the Japanese, he survived more than 3 years of captivity. The consolations of ornithology suffered a setback when his captors took away his fieldglasses. When he rejoined his wife Aileen and 3 children in New Zealand in 1945, malnutrition had impaired his sight and physical balance. A year in New Zealand fortified him. His feeling of pleasure was obvious when he was handed a Long-tailed Cuckoo freshly wire-killed and realised how well he could see the details of a bird that he did not know. In 1946 he returned to Malaya as planning adviser to several rubber companies.

When he returned to New Zealand in 1959 he lived in Titirangi. Here, compared with the teeming birdlife of Malaysia, he found the bush of the Waitakeres rather dull. In 1961 a sojourn on Hen Island was bliss indeed, because he could sit quietly and come to grips with a variety of indigenous species all around him. On Auckland's west coast, the Ledgard boys, whom he called his tireless spaniels, schooled him in the art of beachcombing. He was quick to appreciate the large mixed flocks of waders in Manukau and the Firth of Thames.

Sandy was essentially a countryman, whose motto was 'early to bed and early to rise' and to whom the hours of daylight should be spent in creative work. Suburban Titirangi offered few challenges. In 1960 he went north and took up a gorse-infested property along the southern coast of the Kerikeri Inlet, where in due course on a shell bank, which he watched daily, he recorded such rare visitors as Common Sandpiper and Asiatic Black-tailed Godwit. Brown Teal frequented a dammed creek and Welcome Swallows were already a familiar sight. Sandy was back in his element, close to the land with a task to do and birds to watch.

As his farm began to measure up to his high standards, he threw himself unreservedly into the activities of OSNZ, serving as Secretary, and as Regional Representative for Northland. When planned surveys were held in distant places such as the Kermadecs or Mercury Islands, Farewell Spit, Southland lagoons, or Bay of Plenty, Sandy revelled in acting as recorder, gently grilling the participants on what they had found that day in their allotted area. With Sandy at the helm the birds of Northland came to be assessed, square by square, as accurately as any in the country. From Kerikeri, when tides and season seemed suitable, he would make the long drive north to Paua to study the flocks of migratory waders and often to find the odd one out. He also found time to compile national reports on Welcome Swallows (1966), NZ Dotterels (1969), the irruption of Nankeen Kestrels (1969), and Reef Herons (1978). All these and many other self-imposed tasks he carried out with his habitual thoroughness and good humour.

Rudyard Kipling once wrote of the men who
went out who would rather not
And fought with the Tiger the Pig and the Ape
To hammer the world into decent shape.

Sandy was one of them; and in his time he took a hammering. To such men a Society such as ours owes a very great debt. His services were recognised when he received the Robert Falla Memorial Award for 1982.

R.B. Sibson

Robert Alexander Falla 1901–1979

My first memories of Bob Falla, perhaps the best-known ornithologist New Zealand has produced, are of him giving a talk to a Science Club at Mt Albert Grammar School (where I was a pupil) in the early 1930s. Already, at this time, his name was synonymous with 'birds' in the Auckland area. I remember the obvious enthusiasm he brought to this occasion and his uninhibited ability to mimic bird call and song. Through my interest in shell collecting I became associated with Auckland Museum, and particularly with Baden (A.W.B.) Powell, the museum conchologist. I also came under the influence of that remarkable group of museum people, Gilbert Archey, Lucy Cranwell, Vic Fisher, Graham Turbott, and Dick Scobie, and saw a little and learnt a lot of Bob Falla. The war and overseas service intervened, but I heard of the hush-hush coast-watching activity on Auckland and Campbell Islands (code-named the Cape Expedition) in which Falla took a leading role.

After the war, early in 1947, I was appointed to the staff of the Dominion Museum in Wellington. W.R.B. Oliver retired as Director later in that year, and the small staff eagerly, and somewhat apprehensively, awaited news of his successor. It proved to be Falla, and we scientists were delighted at the appointment of a scientist of his calibre, a man who had published the magnificent report on seabirds for the BANZAR Expedition, a worker in the field with experience both in the Auckland Museum and as Director at Canterbury Museum. He arrived at the museum early in 1948, more or less straight from leading an expedition to the Snares Islands with Robert Cushman Murphy and Charles Fleming. I was to serve under him and work with him until his retirement in 1966. His appointment brought hope to an institution that was still suffering from the wartime commandeering of most of the building for defence purposes, the staff having to occupy the display floor (which was still closed to visitors) with makeshift work spaces squeezed between the display cases. Falla was faced with battling bureaucracy to regain the whole building, have it renovated, redevelop the displays and have them opened to the public, and with reorganising working and storage space. That all this was achieved by September 1949 is a tribute to Falla's leadership.

Over the years I grew to know him well in formal and informal situations inside the building and in the field. One of his first actions was to set his rubbish basket alight with dottle from his pipe, a human action which endeared him to his staff, working at that time in a rather staid atmosphere. I rapidly learnt to appreciate his immense fund of knowledge on a wide range of topics besides birds — Antarctica, the subantarctic islands and their history, the maritime history of New Zealand, conservation, whaling, seals, and general natural history — and his great ability as a public speaker. He shared his knowledge freely and his interests were contagious, and so I found myself becoming an ornithologist of sorts.

On my first field trip with him and Alex Black on the *Alert* (a 72-foot ex-harbour defence launch) investigating marine life and the plants and animals of the islands along the southern shores of Cook Strait, I found that in rough weather gear, pitching through rough seas in a small boat, seeing petrels and other sea birds through his binoculars, a different (and perhaps the true) Bob Falla emerged. Over the years I was to spend weeks with him at sea in small boats, ashore on offshore islands around Stewart Island, or on the Bounty or Antipodes Islands, but I never ceased to be surprised at the same transformation.

Charles Fleming, in his obituary of Falla in *The Emu*, recounted some of Falla's memorable puns. When Fleming and Falla were together in a relaxed situation they



Figure 19. Canterbury Museum Bird Club, Christchurch, 1946. The adult on the left is R.A. Falla. Second child from the left is D.E. Crockett.

competed in this practice. In a small boat, after a long, hard, rough night, *and before breakfast*, they did not form an endearing pair but in retrospect one could have wished for a tape recorder. Falla had a magnificent capacity for lucid exposition. I remember him enlivening a wearisome train journey from Christchurch to Dunedin with a long, clear account of the relationship, field characters, and comparative biology of the southern shags, an account full of interest for any biologist. The honours that came to him late in life sat lightly on his shoulders. His friends and colleagues may have found the adjustment from 'Bob' Falla to 'Doc' Falla to 'Sir Robert' difficult. To the man it was the birds that mattered, birds that perhaps became more and more inextricably mixed up with conservation.

R.K. Dell

Otto Finsch 1839–1917

At an early age Finsch, who was born in Germany on 8 August 1839, became devoted to collecting and observing birds. His first ornithological paper, which dealt with the birds of Bulgaria, was published in 1859, at which time he apparently decided to become an ornithologist.

From 1861 to 1864, Finsch was in Leiden as an assistant to Hermann Schlegel at the Rijksmuseum. During this period he developed a special enthusiasm for parrots. This interest culminated in his great monograph *Die Papageien* (Leiden, 2 vol., 1867–68), with which Finsch immediately took his place among outstanding ornithologists. From 1864 to 1879, he was in Bremen initially as curator of the natural history collections belonging to the Museum Society and as a colleague to Gustav Hartlaub. Hartlaub persuaded Finsch not to complete *Die Papageien* without having studied the parrots in the most important European collections. Therefore Finsch, who had already visited several European museums, went to London in 1864, where he studied parrots in the British Museum and other collections and made personal contacts that he carefully cultivated later.

At this time Finsch, who since a boy had been interested in Cook's Pacific voyages, began to work seriously on the ornithology of the Polynesian Pacific. When he moved to Bremen in 1864, Dr Eduard Gräffe's first consignment of birds from the larger islands in the Samoa and Fiji groups had just arrived at the Godeffroy Museum, which had been established in Hamburg in 1861. Finsch and Hartlaub worked together on this consignment and in 1867 published their *Beitrag zur Fauna Centralpolynesiens. Ornithologie der Viti-, Samoa- und Tonga-Inseln* (Halle). Finsch continued until 1879 to produce many important articles that dealt with further bird shipments to the Godeffroy Museum.

In 1867, Walter Buller's essay *On the Ornithology of New Zealand* (reprinted in *Trans. NZ Inst.* 1(1869): the fifth essay in Part III) became available. Finsch, who obtained a copy from Alfred Newton, translated it into German and reprinted it with his own comments in *Journal für Ornithologie* 15(1867): 305–347. His comments were in turn translated into English (at the request of Julius von Haast, to whom Finsch sent a copy) and published in *Trans. NZ Inst.* 1(1869): 112–125. Among other things Finsch considered that of the 7 specimens described as new by Buller, 3 were more or less doubtful or at least demanded closer investigation. Buller's rejoinder to Finsch's critique appeared in *Trans. NZ Inst.* 1(1869): 105–112. Shortly afterwards Buller and Finsch again crossed swords after the publication of a paper by Buller describing several purportedly new bird species.

From about 1869, Julius von Haast exchanged many bird specimens with Finsch, who also received specimens from other leading New Zealand scientists including James Hector, F.W. Hutton, and Buller himself. Finsch's own researches and papers by Buller, Hutton, T.H. Potts, and W.T.L. Travers led to the publication of his 'Revision der Vogel Neuseelands' and later corrections and additions thereto (*Journal für Ornithologie* 20(1872): 81–112, 161–188, 241–274; 22(1874): 167–224; abstracts of which appeared in *Trans. NZ Inst.* 5(1873): 206–212; 7(1875): 226–236).

Finsch had long yearned to see the southern islands, and in particular New Zealand, the study of whose birds had occupied so much of his imagination and labour. His opportunity came in 1879 when, leaving his position in Bremen and with assistance from the Academy of Sciences in Berlin, he headed south, eventually arriving in New Zealand in October 1881. He returned to Germany in November 1882 and presented his large and important collections to the Berlin Museums.

For various reasons little of the rest of Finsch's life was devoted to ornithology. In 1899 he was offered the post of curator in the bird department of the Rijksmuseum at Leiden, which he had left in 1864. He returned to Germany in 1904, where he died on 31 January 1917.

In New Zealand, Finsch's name lives on in the genus *Finschia* Hutton, 1903; in the extinct New Zealand duck *Euryanas finschi* (Van Beneden, 1875); and in the South Island Pied Oystercatcher *Haematopus ostralegus finschi* Martens, 1897. *Eudypitula minor albosignata* Finsch, 1874 and *Eudypites chrysolophus schlegeli* Finsch, 1876 are still valid.

D.G. Medway

Charles Alexander Fleming 1916–1987

Born in Auckland and educated at King's College and Auckland University College, Sir Charles Fleming was one of New Zealand's most distinguished scientists. Apart from war service as a coast watcher at the Auckland Islands (1942–43), his whole working life was spent in the New Zealand Geological Survey, where he became Chief Palaeontologist. His outstanding research contributions in geology alone would guarantee him a place of distinction in New Zealand science, but these contributions were matched by others in ornithology, entomology, and the history of New Zealand science. He had an extraordinary ability to cross the conventional boundaries between scientific disciplines; this attempt to summarise his work as an ornithologist inevitably highlights but a small part of a very large picture.

Charles Fleming made his ornithological debut in 1939 when he published in *The Emu* his classic paper on the birds of the Chatham Islands, where he and Graham Turbott had spent 2 months during the summer of 1937–38. Highlights of the trip included the first detailed study of the endemic New Zealand Shore Plover (on South East Island) and the climbing of precipitous Little Mangere Island, where the survival of the elsewhere extinct Black Robin and Forbes' Parakeet was confirmed. The paper contains such a wealth of information (both personal observations and historical gleanings from local residents) that, 50 years on, it remains essential reading for anyone interested in the birds of the Chathams.

Fleming's next 2 important papers, both published in 1941, were concerned with the taxonomy and distribution of gadfly petrels and prions. The paper on prions arose from a

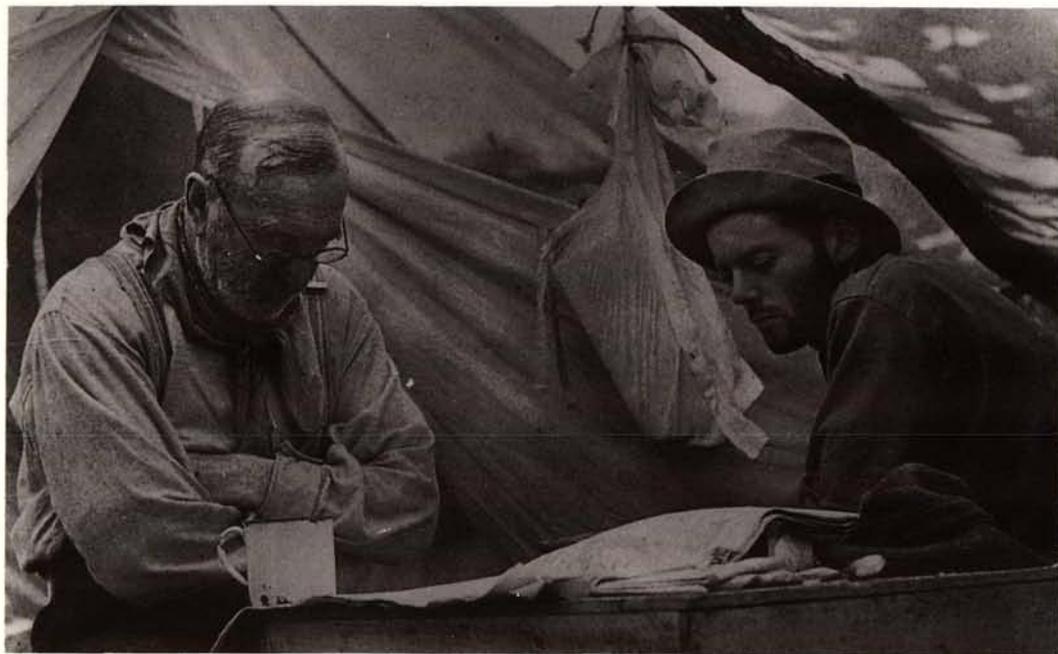


Figure 20. R.A. Wilson (left) and C.A. Fleming, Hen and Chickens expedition, 8 December 1939. Photo: G.A. Buddle, Auck. Mus. collection.

thesis undertaken at Auckland University College and for which he was later awarded the degree of Master of Science with Equivalent First Class Honours. His detailed anatomical studies confirmed that the 6 species of prion could be grouped into 3 subgenera, and he then speculated how speciation may have been conditioned by changes over geological time in the positions of the boundaries between different zones of surface water.

Even in these early days, Fleming's ornithological interests were not confined to seabirds on remote islands. During 1939–40, while working on his thesis, he found time to study the Silvereyes living in the garden of his Remuera home. This work (Fleming 1943), based on colour banding, a new technique in those days, still provides the most comprehensive information on the territories and breeding habits of Silvereyes in New Zealand.

Fleming's next major ornithological work was to revise the classification of the New Zealand tomtits and robins. He separated the robins into a subgenus of their own, representing an earlier invasion of tit-like stock, and showed that the Black Robin of the Chathams was indeed a 'robin' rather than a very close relative of the superficially similar Snares Island Black Tit, as some had previously claimed. By combining his geological and zoological knowledge he was able to deduce that much of the subspeciation in the tits must have occurred in post-glacial times.

While preparing the robin paper, Fleming was also working, jointly with K.A. Wodzicki and other members of the Ornithological Society, on a census of the Gannet population of New Zealand. After preliminary ground counts at some of the more accessible gannetries, Fleming and Wodzicki spent many eye-straining evenings counting the occupied nests shown on aerial photographs of all the New Zealand gannetries. The final result (Fleming & Wodzicki 1952), the first full census of any New Zealand seabird (a total of some 21 000 pairs), was to prove a valuable baseline that, some 30 years later, allowed Wodzicki and his co-workers to demonstrate that the Gannet population had doubled in size during the intervening years.

The Gannet census marks the end of Fleming's period of sustained ornithological field work. His professional work as a palaeontologist at the New Zealand Geological Survey, and his increasing involvement in the affairs of the Royal Society of New Zealand (of which he served 2 terms as president, 1962–66), were making ever-increasing demands on his time, and ornithology had to be relegated to such spare time as he could find. Nevertheless, he was still to produce some 90 more papers that were entirely or mainly ornithological in character. Several of these later papers were substantial and of wide interest. Some sought to establish when various species reached New Zealand and from where they had come; others discussed the extinction of moa and the part played by the early Polynesians in contributing to this.

Two of Fleming's other major ornithological works deserve special mention: the *Checklist of New Zealand Birds* (1953) and *George Edward Lodge — The Unpublished New Zealand Bird Paintings* (1982). Fleming was the convener of the committee that prepared the Ornithological Society's first detailed checklist of New Zealand birds and he played a major part in its compilation.

With his long-standing interest in historical aspects of New Zealand ornithology, Fleming was invited in 1980 to write a text to accompany the publication of 89 Lodge paintings of New Zealand birds, paintings that had languished in strongrooms of government agencies for some 70 years. He provided a lengthy introduction which, apart from describing the history of the paintings, updated many of his own ornithological contributions. This introduction, together with his detailed accounts of each of the species illustrated, was a fitting end to Fleming's major ornithological writings.

But Fleming's ornithological contributions are not to be judged by his writings alone. In 1940 he was very active in the formation of the Ornithological Society of New Zealand and, when not overseas on war service himself, he did much to see that the embryo society survived through the difficult years of war. He was the Society's first organiser for the Auckland region, and later served as 'recorder', co-ordinating the efforts of amateur members and ensuring their observations were preserved. He was the Society's president

in 1948–49. Although he did not again hold office on the Council, he continued his interest in the Society's affairs and was a regular contributor at meetings of the Wellington Branch for some 40 years.

Fleming served on many national and international committees dealing with the administration, organisation, and promotion of science, and several of these were concerned *inter alia* with ornithological matters. He was a member of the Fauna Protection Advisory Council almost continuously from 1955 until his death, at which time he was acting chairman. This council, advisory to the Minister of Internal Affairs, was largely concerned with the conservation of endangered birds. He was able to make many important contributions to the Council's deliberations because of his personal knowledge of the places where the birds lived, his wide reading of overseas literature, and his personal prestige in the community. He made equally important contributions as a member of the National Parks Authority. Particularly in his later years, he became a passionate advocate for conservation and, although he found the associated politics stressful and injurious to his health, he was always ready to fight vigorously for the protection of New Zealand's natural environment and its threatened plants and animals.

Fleming's impressive service to ornithology in the public arena was matched by his influence at the personal level. His enthusiasm for natural history was infectious and his encouragement and advice, given freely and unobtrusively to amateurs, students, and professional ornithologists alike, did much to promote ornithology and conservation in New Zealand.

Fleming's outstanding contributions to science were recognised by his colleagues, at home and abroad. His election as a Fellow of the Royal Society of New Zealand in 1952 was followed by 2 prestigious overseas honours: Fellow of the Royal Society of London (1967) and Foreign Member of the American Philosophical Society (1973). His ornithological distinctions included Corresponding Fellow of the American Ornithologists' Union (1962) and Fellow of the Royal Australasian Ornithologists' Union (1974). Public recognition of his services to New Zealand science came with the award of OBE in 1964 and KBE in 1977.

P.C. Bull

George Robert Gray

1808–1872

Gray entered the British Museum in 1831 as an assistant in charge of the bird collection. He was appointed Assistant Keeper of the zoological collections of the Museum in 1869.

R. Bowdler Sharpe wrote of G.R. Gray, his 'lamented predecessor', as being a person 'with whom the ornithology of New Zealand seems always to have been a favourite study' (*The Zoology of the voyage of HMS Erebus & Terror, 1844-1875*, Volume 1: Birds: 21). His 'favourite study' seems to have begun when, in September 1842, the Directors of the New Zealand Company presented to the British Museum 37 specimens of birds that Ernst Dieffenbach had collected in New Zealand and the Chatham Islands during his visit between 1839 and 1841 as naturalist on the Company's ship the *Tory*. Using these specimens, and others collected by Rebecca Stone and Andrew Sinclair, together with published and unpublished sources (including the Parkinson and Forster drawings from Cook's first and second voyages), Gray drew up the first published list of New Zealand birds, including those of the Chatham and Auckland Islands ('List of the Birds hitherto recorded in New Zealand, Chatham and Auckland Islands, with their Synonyma,' pages 186-201 in Dieffenbach, E. (1843) *Travels in New Zealand* 2). Of the 84 species admitted, Gray considered 8 to be new. Five of his names for those new species still apply: *Anthornis melanura melanocephala* Gray, 1843; *Rallus philippensis dieffenbachii* Gray, 1843; *Rallus philippensis assimilis* Gray, 1843; *Podiceps rufopectus* Gray, 1843; and *Pterodroma cookii cookii* (Gray, 1843).

The return of the British Antarctic expedition in the *Erebus* and *Terror* and the presentation of its bird collections to the Museum gave Gray the opportunity, in 1844–45, to publish the first descriptive account of all the birds of New Zealand known at that time (*The Zoology of the Voyage of HMS Erebus & Terror, op. cit.* 1: Birds: 1-20). Gray was able also to refer to J.R. Forster's descriptions of New Zealand birds from Cook's second voyage, which had recently been published in Berlin (*Descriptiones Animalium*, 1844) and to include a collection of New Zealand birds, recently acquired from Percy Earl, which included several new species. In this work Gray described some 99 species belonging to the ornithological fauna of New Zealand and the Chatham and Auckland Islands. Nine birds Gray described are still valid taxa: *Sceloglaux albifacies albifacies* (Gray, 1844); *Gerygone albofrontata* Gray, 1844; *Eudypetes pachyrhynchus pachyrhynchus* Gray, 1845; *Leucocarbo carunculatus chalconotus* (Gray, 1845); *Sula bassana serrator* Gray, 1845; *Anas aucklandica chlorotis* Gray, 1845; *Porzana pusilla affinis* (Gray, 1845); *Chlidonias hybrida albostriatus* (Gray, 1845); and *Coenocorypha aucklandica aucklandica* (Gray, 1845).

In 1844–5 the first 2 volumes of Gray's celebrated *Genera of Birds* (London, 1844–49) also appeared. In these, he founded, *inter alia*, the endemic New Zealand genus *Strigops* and its only species *habroptilus* Gray, 1845. Ten years later, he published his *Catalogue of the Genera and Sub-genera of Birds* (London, 1855), which included the endemic New Zealand genera *Xenicus* and *Coenocorypha*, the type species of the latter, *aucklandica*, having already been founded by Gray in 1845.

Gray had not finished adding new taxa to the New Zealand avifauna. In 'A list of the birds of New Zealand and the adjacent islands' (*Ibis* (1862): 214-252) he listed 173 species. The new birds described included *Xenicus longipes stokesii* Gray, 1862; *Anthus novaeseelandiae aucklandicus* Gray, 1862; and *Procellaria parkinsoni* Gray, 1862.

After the publication of his 1862 list, Gray appears to have published nothing further specifically on the ornithology of New Zealand and its adjacent islands. The resident New Zealand naturalists Buller, Hutton, Travers, Potts, and others, and the German ornithologist Finsch, gradually gained interim supremacy in the study of the birds of New

Biographical Notes

Zealand. But there can be no doubt that Gray, although he lived in London and saw alive none of the many New Zealand birds he described, made by far the most significant contribution of his time to the taxonomy of the New Zealand avifauna.

D.G. Medway

William Herbert Guthrie-Smith 1861–1940

Born in Scotland, he was brought up with gamekeepers and ghillies and educated at Rugby School, where he was fortified by the prevailing classical curriculum and preferred going bird nesting to playing games. WHG-S came to New Zealand in 1880. After 2 years at Peel Forest Station, where he learnt the elements of sheep farming, he went north to Hawke's Bay and with another 'new chum', took up a huge block of untamed land at Tutira. The young men looked upon their rough domain about as intelligently as an infant looks from its perambulator on the world.

WHG-S never shirked hard work. There were lean years because the wool market was so unstable; but he battled on, aided by his faithful shepherd, Charles Stuart. After a hard day's work out of doors, WHG-S liked to relax with literature — you can't keep a well-educated classicist down — and he even wrote a historical play in verse. After it was published, he came to be known locally as 'The Poet' and was even compared to Shakespeare! All along he retained the seeing eye of a real country man and his sympathy with the world of nature prompted a paper 'Bird Life on a Run' in the *Transactions of the NZ Institute* (1895). It gave a foretaste of books to come.

When *Birds of the Water, Wood and Waste* was published in 1910, the author was acclaimed as the Gilbert White of New Zealand. A second edition appeared in 1927. Assured of a steady income, he turned his attention to the birds of the coast and offshore islands. Exploration and writing were dear to his heart. Some notable books followed: *Mutton Birds and Other Birds* (1914), *Tutira* (1921 with later editions in 1926, 1953, 1969), *Bird Life on Island and Shore* (1925) and *Sorrows and Joys of a New Zealand Naturalist* (1936). *Tutira*, the story of a New Zealand sheepstation, is a masterpiece of observed detail. It is still one of the books about New Zealand that deserves to be called 'great'.

As a conservationist he was ahead of his time. He was deeply concerned over the fate that overhung many endemic species under the impact of modern land-use and he foresaw the menace that rats could be on the many offshore islands. As a young man C.A. Fleming visited WHG-S in Hawke's Bay, and the memory that he had talked with such a giant among naturalists gave him great satisfaction.

R.B. Sibson

Johann Franz Julius Haast 1822–1887

Julius Haast arrived in Auckland just before Christmas 1858 as a shipping agent. He had studied geology at university in his birthplace, Bonn, and travelled widely. By one of those chance happenings, next day the Austrian frigate *Novara*, on a scientific voyage around the world, entered harbour. On board was Dr Ferdinand Hochstetter, who at 29, 7 years younger than Haast, was already a leading geologist and lecturer at Vienna University. Their meeting was the start of a life-long friendship so close that later each was godparent to the other's first child. Hochstetter had been asked to do work for the New Zealand government and during the 9 months that he was in the country Haast accompanied him most of the time, learning much and contributing his own knowledge, boundless energy, and cheerful company.

On their last expedition, in Nelson Province, they were shown some caves near the Aorere River where an almost complete moa skeleton had recently been found. There Haast and a companion were excited to disinter the remains of a further 10 birds of at least 6 species. These were brought to Nelson Museum and some of the bones were later sent to Hochstetter in Germany.

In 1860 Haast was engaged to evaluate the coal seams in the Buller area and found a particularly good deposit north of the river at an altitude of 450 m which he named Coalbrookdale. He saw the tracks of a large kiwi in the snow on the summits of the range, which convinced him that the Maori stories of a big kiwi like a turkey must be true. Later the Large Spotted Kiwi, or Roa, was named *Apteryx haastii*; for him. This was a rigorous expedition. The party nearly starved when stores ordered before leaving Nelson arrived late and in poor condition. The vessel carrying them had struck a reef and been beached for repairs. They were in the field 9 months.

Haast was appointed Canterbury's Provincial Geologist in 1861. Right from the beginning he pressed for a provincial museum. He offered his collections, his services free as custodian, and the proceeds from 3 public lectures each winter to boost funds.

After his marriage to Mary, daughter of Edward Dobson, the Provincial Engineer and one of the original Canterbury settlers, Christchurch became Haast's home. He took a full part in the city's cultural and intellectual life. A talented singer, he took part in public performances, and his wife was an accomplished pianist. He is reputed to have kept up his vocal exercises in the field, and certainly he kept up his party's morale when they were benighted. He founded the Philosophical Institute of Canterbury and chaired it for many years. He was a foundation committee member of the local acclimatisation society.

Although many people now associate Haast with the pass that bears his name, he was probably not the first European to stand on the summit of this old Maori route. But he was the first to complete the tedious traverse down what is now known as the Haast River to the sea. With his lively interest in all the new country that he saw, he not only recorded his geological findings, but also collected plants and kept notes on mammals — Norway rats were already widespread — insects and birds. Skins were prepared, some after their owners had provided a tasty meal. Haast described the mischievous behaviour of the Kea, one of which 'began to study botany' and dragged a packet of precious plant specimens over a precipice. They had no more paper for pressing plants so had to use their scarves and handkerchiefs as a substitute.

Haast kept up a correspondence with a very wide circle of scientists around the world. Botanical specimens were sent to Dr J.D. Hooker at Kew, bird skins and bones to Sir Richard Owen at the British Museum. When, in 1866, a huge deposit of moa bones was found in a swamp on Glenmark Station, 80 km north of Christchurch, the network that

was to bring so much material to the Canterbury Museum through exchanges was already partly set up.

Finding the remains of perhaps a thousand moa was tremendously exciting. G.H. Moore, the New Zealand partner in the company that owned the station, generously offered several men to help with the excavation. As work progressed other bones came to light. As well as those of bush birds and waterfowl still living there were those of the giant rail (*Aptornis*), the giant goose (*Cnemiornis*) and odd wing and leg bones that proved to be those of a large extinct eagle. Haast named this *Harpagornis moorei*. Later three complete skeletons were procured.

With the arrival in Christchurch of 4 wagonloads of moa bones, some storage place was sorely needed. With the help of a taxidermist, F.R. Fuller, 7 moa skeletons were articulated, and in 1867 the nucleus of a museum was opened to the public in 2 rooms of the Government Buildings. At last, in 1868, the building of a separate museum was approved by the council and in the following year Haast was appointed director. When he realised that shortage of money was going to deprive the building of the space and dignity that he felt it deserved, Haast promptly set up a public appeal for funds and raised enough to modify the design. The opening, in 1870, must have been a proud moment for him. From this time the museum and higher education based on it were his chief concern. With Bishop Harper, the warden of Christ's College, he founded the Canterbury Collegiate Union, out of which the University of Canterbury grew.

Haast was generous to his friends and to those in need. Much of the information on birds that he gathered during his survey work was put at the disposal of Sir Walter Buller. Haast also found many subscribers for Buller's book when Buller was having financial difficulties with his publisher.

Haast became 'von Haast' in 1875 on receiving an Austrian knighthood. A British knighthood (KCMG) was conferred in 1886. Sir Julius von Haast was undoubtedly one of the great explorer-scientists of New Zealand. For nearly 30 years he gave unstintingly to his adopted country his abounding enthusiasm, energy, and talents. Canterbury Museum, which he campaigned for and directed until his death in 1887, is his monument, along with that area of south Westland that bears his name, part of the high country he loved so much.

A.J. Goodwin

Frederick Wollaston Hutton

1836–1905

Hutton was the leading figure in the development of biology in New Zealand in the late 19th century. His earliest scientific work was in geology, his contributions including economic reports on the goldfields and palaeontology. However, he was in 1877 appointed Professor of Natural Science at Otago University, and in 1880 Professor of Biology at Canterbury University College, and his later career was mainly in biology. He was Curator of Canterbury Museum from 1893 to 1905.

In addition to numerous papers, his *Index Faunae Novae-Zelandiae* (1904) was a major contribution to New Zealand zoology and the first comprehensive 'check-list' providing a survey of the known fauna. Hutton had a strong interest in birds: his ornithological papers, published mainly in the *Transactions of the New Zealand Institute*, included one of much interest on the flight of albatrosses (Hutton 1869). His *Catalogue of the Birds of New Zealand, with diagnoses of the Species* (1871) provided an early survey of the avifauna, before Buller's *History of the Birds of New Zealand* (1st edition), and included the first records of several stragglers, for example Grass Whistling Duck.

Perhaps the most influential of Hutton's publications was his joint work with James Drummond, *The Animals of New Zealand: an Account of the Colony's Air-breathing Vertebrates* (1904 and subsequent editions). Until the appearance of Oliver's *New Zealand Birds* in 1930, this was the standard popular reference work on New Zealand birds, bats, seals, whales, reptiles, and amphibians. The introduction provided a useful survey of the origin and relationships of the fauna, and of the history and impact of acclimatisation. 'Hutton and Drummond', as the book was widely called, although scrappy by today's standards, was concise and interesting, and included field observations by contemporary observers. The illustrations are still of much interest, a number being reproductions of plates otherwise not readily available from such works as Rowley's *Ornithological Miscellany* and Gray's *Zoology of the Voyage of H.M.S. Erebus and Terror*.

E.G. Turbott

Hector Ross McKenzie 1897–1981

A stalwart of the Society for 40 years, H.R. McKenzie served as President (1954–56) and Treasurer (1957–66). Perhaps more importantly, Ross was Regional Organiser (later called Regional Representative) for South Auckland from when it became a separate region in 1954 until 1973. During these years he became one of the Society's most loved and well-known members.

Born at Clevedon in 1897, the product of a farming family, he trained in New Zealand's Territorial Army. By 1916, with the Great War 2 years old, he was on his way to the Middle East and thence to France where, just before the battle of the Somme, he lost a leg and suffered other severe injuries. These affected him for the rest of his long life. He learned to live with almost daily bouts of pain. In this sense, though he was back in New Zealand by the age of 21, his war never ceased.

Ross married Hetty Goertz in 1921 and the couple moved into a house in the Ness Valley, whose encircling hills and bush were home to North Island Kokako. In time Ross was to study these and describe their nesting. Three daughters and 2 sons were born and the family moved to nearby Clevedon, where Ross was in charge of accounts for a local firm.



Figure 21.
Dick Sibson (left) and
Ross McKenzie,
Miranda, Firth of
Thames, 1970s.
Photo: R. Thomas.

He became interested in botany and built up a fine herbarium, but it was not until years later, in 1941, that he discovered the year-old Ornithological Society. Charles Fleming, then Regional Organiser for Auckland, was about to leave the area and handed on Ross's enquiry to R.B. Sibson. An outing to the little-known Miranda coast of the Firth of Thames followed and, as has happened to many others, a great and abiding interest was fired — a momentous day! The same could be said for the fellowship that developed between these 2 dedicated men. Ross was 'into' birds. During the rest of his life he returned to the richness of birdlife here. Though interested in all birds, like many others he found a special fascination in the waders, their migrations, changing plumages, and of course the occasional thrill of finding rarities. He discovered the first Terek Sandpiper in this country and, to those who knew him well, it became very much 'his' bird.

He advanced rapidly within the Society, becoming known as a character as well as a shrewd and knowledgeable expert. As RO for South Auckland, Ross planned, led, and recorded bird study over a large area covering Awhitu Peninsula, the Manukau Harbour, and across to Clevedon, south and east to Lake Waikare, the Firth of Thames and Thames itself. With 2 great wader areas, long shorelines, bushed hills, swamps, rivers, and farmlands, there was plenty to see and do. Ross's friendliness and specialised knowledge of botany, as well as of birds, drew people to him wherever he went. As a couple, Ross and Hetty shone with warmth and sincerity. They loved people and people loved them.

Over the years Ross's roomy cars carried many people eager to share trips of exploration with this natural teacher and his hospitable wife. Wader census days became occasions of great enjoyment. Directed by Ross, held at mid-winter and mid-summer, they covered Manukau Harbour and the Firth. People gathered at Kirk's Bush in Papakura or at the old limeworks at Miranda 2 hours before high water, received instructions and sketch-maps, and set off each to cover a particular high tide roost. Count time was at high water, and any flock movements were carefully recorded. Muddied but happy groups would later converge on the meeting place to hand in results, compare notes, and carefully check the identification of difficult species. Often lunch had to wait while Ross scrutinised the last for confirmation. Many years of valuable data have accumulated and the regular censuses continue today. Other activities within the region were surveys of particular species or areas, banding (especially of New Zealand Dotterels — one first banded by Ross in 1950 was still alive at Seagrove in 1988), bush counts, beach patrols, and many exploratory trips.

Over the years, 'Old Hawkeye', as he was affectionately known, with walking stick and lancewood staff, woolly hat firmly on his head and wise blue eye to the lens of his brass telescope, found many birds. With increasing age and infirmity he deemed it best to stay in one place on field trips. In this way he regularly found birds that would otherwise have been missed and thus demonstrated the wisdom of this course to the occasional over-eager newcomer.

Ross became very well known to visiting birders, many of whom were Americans who sought birding itineraries and advice. The McKenzies' exploratory trips throughout this country had taken them to even the most remote places. Out of his detailed knowledge and his visitors' need came Ross's book *In Search of Birds in New Zealand. How and Where to Find Them* (1972). A very practical guide, it contained maps and exact directions and, though out of print, remains a valued aid to travelling birders today. An unexpected bonus from his ever-willing help to overseas visitors came when Ross and Hetty were sponsored to Principia College, Illinois, in 1969 for him to lecture and lead field trips. This was greatly enjoyed.

Before the publication of his book, Ross spent 4 productive years in the position of Associate Ornithologist at Auckland Museum under Graham Turbott. It was a pleasure to take in a bird to find Ross happily at work with, often as not, Hetty in attendance also. One was shown recent interesting finds and a 'Cook's tour' would soon develop if time permitted.

Ross published regularly. From his first contribution to *NZ Bird Notes* in 1945 ('A Blackbird Nesting Story') to the last in *Notornis* in 1980 ('Some Red-capped Dotterel

Records') papers and notes of notable interest appeared. He taught all who came to learn from him the importance of exact detail and of publishing. One memorable project involved the experiences of the late Robert St Paul, one of 3 brothers who studied birds as they went about their work as bushmen. Bob, then in his eighties, was shaky and able to write only with great difficulty, and so with my tape recorder and Ross's detailed list of questions we travelled to Waikino, in the Karangahake Gorge. In Bob's cottage on the steep side of the hill we spent many fascinating hours. Edited painstakingly by Ross, 'A Bushman's 17 years of Noting Birds' was published in 6 parts during 1975-77. It covered the years from 1944 to 1961 as recorded in Bob's journal. Needless to say it had been Ross who persuaded him to write it originally.

In May 1981 the Society established the Falla Memorial Award. The Council unanimously agreed that Ross McKenzie should receive the first award (for 1980). He died in Hamilton less than a month later, just before his 84th birthday.

B. Brown

John Chambers McLean 1871–1918

J.C. McLean was born in Hastings, the son of a prosperous Hawke's Bay run-holder. After completing his education at Nelson College he managed the large family-owned Waikohu sheep station in the foothills of the Raukumara range north-west of Gisborne. There he kept detailed records of the birds he saw both during his farming operations and on special bird-watching expeditions, particularly with H. Guthrie-Smith of Tutira — another run-holder with ornithological interests. McLean was one of New Zealand's earliest field observers and his records throw much light on the habits and ecology of several forest species. Sadly, McLean was responsible for supervising the bush clearing of large areas of his hill country run (specifically the slopes of Mt Maungahaumia, at the southern end of the Raukumara Range to the north of the present Motu Gorge road).

In 1897 McLean was admitted as a member of the British Ornithologists' Union and subsequently, when the Australasian Ornithologists' Union was established, he joined it as well. He published several papers on the bird life of Poverty Bay and surrounding districts in *Ibis* and *Emu*. His most substantial contribution (McLean 1911) resulted from 2 lengthy stays in the Raukumaras in the winters of 1906 and 1907. His observations on various species, especially perhaps those on Kokako, Whitehead, and Falcon, are of much interest, and his photographs both of nests and of the country described are outstanding for his time. Important details are included of the methods used in transforming bush into farmland, and on the immediate effect on the birdlife.

In September–December 1911 McLean accompanied H. Guthrie-Smith on the Stewart Island expedition that gave rise to the latter author's book *Mutton Birds and Other Birds* (1914). He was, says Guthrie-Smith: '... a friend of older standing ... gifted with the most imperturbable of tempers. ... even waist deep in water chilled with melted hail, with the knowledge of a rotten bridge in front and a rising river to swim, (he) was still able to note the discovery of a pair of Orange-wattled Crows in the flooded scrub. ... I acknowledge he beat me there. If I had seen a Moa I should have let it pass. ...'

McLean drowned in 1918 attempting to cross the flooded Waipaoa River near his home. His ornithological notebooks for the period 1906–12, including detailed field notes of the 1911 Stewart Island expedition, are held by the Alexander Turnbull Library, Wellington.

E.G. Turbott & R. Galbreath

Perrine Millais Moncrieff

1893–1979

Perrine Moncrieff was an outstanding woman, who made a tremendous contribution to both ornithology and conservation in New Zealand for some 50 years. Her early years were spent in London, Brussels, and Scotland. She married Captain Malcolm Moncrieff in 1914 and settled in New Zealand shortly after the First World War.

From the time of her arrival in Nelson she was interested in all facets of ornithology and conservation, being very concerned at the continual loss of native forests to logging and farming and the consequent decline of native birds.

Mrs Moncrieff joined the RAOU in 1923. She was the first woman president in 1932–33 and the first New Zealander to hold this office. She wrote several papers for *Emu*, one of which was on the behaviour of the South Island Robin. Her presidential address, titled 'Birds and Women', discussed women's position in ornithology. She was a founding member of the OSNZ but did not remain a member for long as she objected to the lack of a conservation policy in the Society's constitution.

Perhaps Mrs Moncrieff's most important contribution to New Zealand ornithology was the publication in 1925 of her book *New Zealand Birds and How to Identify Them*, which ran into 5 editions. There are still many of our members who grew up with her book as their first field guide.

It is largely due to Mrs Moncrieff's concerted efforts that the Abel Tasman National Park was created and that Farewell Spit was designated a wetland of international importance. In recognition of her part in establishing Abel Tasman National Park, the Dutch Government awarded her the Order of Orange-Nassau in 1974 and a year later she received the CBE for her work for conservation.

Mrs Moncrieff was an avid letter writer and had a world-wide correspondence with many noted naturalists, including the English ornithologist and author of *Birds of the Ocean*, W.B. Alexander.

Along with ornithology and conservation, Mrs Moncrieff played a considerable part in the public life of Nelson, especially the Nelson Institute and Library. She was a founding member of the Nelson Bush and Bird Preservation Society, which after the Second World War was replaced by the Nelson Branch of the Royal Forest and Bird Protection Society. She was also a founder member and for many years a vice-president of the Royal Forest and Bird Protection Society.

She kept her interest in birds and was always great fun to take bird-watching. Her companions not only shared in her knowledge but were treated to a wealth of information and entertaining anecdotes from an intelligent woman who had definite ideas on many subjects. There are still many of us who were enriched by the warmth of her generous friendship.

J.M. Hawkins

Walter Reginald Brook Oliver 1883–1957

Dr Oliver is best known ornithologically for his book *New Zealand Birds* (1st edition 1930, 2nd edition 1955), still a standard reference work. He was a naturalist and scientist of wide-ranging interests, perhaps most prominent as a botanist. (He edited the 2nd edition of Cheeseman's *Manual of the New Zealand Flora*, and his DSc was awarded for his paper 'Revision of the Genus *Coprosma*.') The full list of his publications includes contributions on geology, molluscs, seals and whales, archaeology, plants, and birds.

In 1908, while still employed as a Customs Officer, he took part in his first full



Figure 22. Members of the Auckland Museum expedition to the Three Kings Islands preparing to depart from Auckland on the ketch *Will Watch*, February 1934. Those with ornithological connections are: R.A. Falla (second from left, standing), Capt. G.M. Turner (third from left, standing, obscured), E.G. Turbott (fourth from left of front row, standing), C.A. Fleming (left, seated) and W.R.B. Oliver (right, seated). Photo: NZ Herald, Auck. Mus. collection.

scientific expedition, a 10-month stay (with T. Iredale and others) on Sunday Island of the Kermadec group. He published on the geology, molluscs, and botany of the Kermadecs, as well as on birds. Other expeditions were made during his subsequent career to the subantarctic islands, the Chathams, and Lord Howe, and he was a member of the Auckland Museum expedition to the Three Kings and other northern offshore islands in 1934. He joined the staff of the Dominion (now National) Museum in 1920, and was Director from 1928 to his retirement in 1947.

His *New Zealand Birds* immediately had a major impact on New Zealand bird study. Students and field workers up to that time had been limited essentially to Hutton & Drummond's *Animals of New Zealand*, which provided little field information and gave only a very uneven summary of the earlier work of Buller and others, and the first attempt at a field guide, Perrine Moncrieff's *New Zealand Birds and How to Identify Them* (1925). *New Zealand Birds*, in addition to its comprehensive treatment and useful summary of field observations such as those by Mr and Mrs A.S. Wilkinson on Kapiti, included the first modern synopsis of moa and information on other subfossil bird discoveries. Oliver later wrote a full survey of work on moa to date, including his own views on classification (Oliver 1949).

The 2nd edition of *New Zealand Birds* is still widely used: it was a major effort by the author to bring taxonomy and field information up to date, but was notable also for his treatment of some more difficult groups, for example the Stewart Island Shag and the oystercatchers, based on his own somewhat unorthodox taxonomic views.

E.G. Turbott

Thomas Henry Potts 1824–1888

Among 19th century New Zealand ornithologists, 2 men stand out: Sir Walter Buller and T.H. Potts. They make an interesting contrast. Buller was the more successful in his own time; from humble beginnings as the New Zealand-born son of a penurious missionary, he relentlessly pushed himself forward, exploiting his knowledge and his collections of New Zealand native birds (along with his opportunities in the Native Land Court), to achieve fame, fortune, and, finally, a place of honour at 'home' in England. T.H. Potts, on the other hand, when he emigrated to New Zealand in 1854 was already a man of means. He was described by a contemporary as 'an alert, vivacious, peppery, little man'. He was also known for his generosity — by the time he died in 1888, between bank mortgages and loans to friends in need, most of his fortune had gone. Potts was a man of many interests: his library at Onetahi (in Governor's Bay on Lyttelton harbour) included a collection of 17th century prayerbooks; his collection of British birds' eggs included several of the extinct Great Auk; he was a keen gardener and an enthusiastic sportsman — a shooter of waterfowl and game birds. But it is for his writings on the native bush and bird-life of his adopted country that he is best remembered. His articles on life 'Out in the Open' were published first in the *New Zealand Country Journal* and in 1882 collected along with other papers in a book under the same title. Potts was not as facile a writer as Buller, nor as familiar with the scientific conventions of nomenclature, but where Buller's papers now seem macabre in their recital of specimens procured, Potts's humbler manner, his engaging accounts of living birds in their bush or shoreline haunts, and his passionate advocacy of their protection, give his writings a lasting appeal.

Potts was well acquainted with Buller, and remained on good terms with him — at least until the publication of Buller's *A History of the Birds of New Zealand* in 1873. Privately, however, Potts was amused by Buller's cheek and competitive determination to get what he wanted; while Buller was rather disparaging about Potts ('our field ornithologist'), his new species that did not pass scientific scrutiny and his literary style that lacked the proper scientific gravity. Buller, nonetheless, was not above using extensive quotations from Potts's observations in his own book. This caused a rift between the 2 men. Although Buller had acknowledged Potts's material Potts considered that he had been misused; Buller, in his subsequent writings, downplayed Potts's contributions.

While Buller, though born in New Zealand, followed conventional colonial wisdom and wrote of the impending doom of almost all native species, Potts was one of the first among the colonists to call for the conservation of native forests and the protection of native birds — even from scientific collectors, 'for we believe there are those who would shoot the Cherubim for specimens without the slightest remorse'. In 1872 and again in 1878 he put forward the idea that islands should be set aside as sanctuaries for the indigenous fauna and flora, and suggested Resolution Island in Fiordland and 'some of the small islets off the N.E. coast of the North Island'. Potts's ideas gained little attention at the time but 20 years later, by which time some local patriotic attachment to native bush, scenery and birds had developed among the colonists, his proposals were acted upon: Resolution Island was gazetted a sanctuary in 1891 and Little Barrier Island in 1894.

Potts's writings, like Buller's, are of interest and importance for the observations they include of habitats now greatly modified and species now rare or extinct; but Potts, more than Buller, also inspired following generations of New Zealanders to observe and to value their birds not just in museum collections but 'Out in the Open'.

Arthur Thomas Pycroft 1875–1971

Educated at the Church of England Grammar School, Parnell, where his father was headmaster, Arthur Pycroft entered the service of New Zealand Railways and at the age of 17 was appointed stationmaster at Opuā, a little port kept busy by the kauri trade in the Bay of Islands. As an alert naturalist he found himself rather a solitary pioneer in Northland, where his observations helped to bridge a yawning gap. Some of his surprising discoveries prompted him to write to Sir Walter Buller, who was happy to acknowledge his original contributions in his 2-volume supplement of 1905.

Thus in the Waitangi River, Pycroft found many Little Black Shags and noted their characteristic behaviour as they fished in flocks. This essentially Australian species had been discovered in New Zealand in 1840 by an American exploring expedition, after which it had been 'lost' for half a century. Pycroft refound it and, in the accepted Victorian manner, obtained specimens, including 7 at one shot! This was evidence of a kind that convinced and delighted Buller. Pycroft's gunnery does not seem seriously to have slowed the spread of what is now a thriving Australian colonist.

Among the numerous Arctic Skuas that in summer habitually victimise the colonies of White-fronted Terns in the Bay of Islands, Pycroft suspected that a few Pomarines also occurred; but it was 30 years before his friend A.B. Deeming procured the first specimen for New Zealand.

Another significant find was that non-breeding Wrybills frequented the Helensville arm of the Kaipara Harbour and sometimes flew over the high dunes of the peninsula to feed on Muriwai Beach. These South Island breeders had not been recorded so far north. The winter habits and distribution of Wrybills in Northland are now well understood. Pycroft led the way.

In 1896 he became a member of the Auckland Institute and Museum. He served on its council for 41 years and was President in 1935. One of his hobbies was collecting early New Zealand books, on which he became an authority. He also found it hard to resist the temptation to collect other items of old New Zealand. Late in life he bought a glass case containing a well-preserved pair of Huia, which had adorned the saloon of a country pub. Happily, he would greet his friends 'I've just got a couple of Huia and I've eaten one'; and then as they looked puzzled, he would explain how in his youth he practised taxidermy on the side; and having received a Huia for mounting, handed over the skinned body to his landlady with the request that it be cooked for his supper. How many Pakeha could boast of having sampled casserole Huia?

After 36 years with the Railways he was able to retire at the age of 51 and give full rein to his hobbies. Like many Aucklanders he had fallen under the spell of the outer offshore islands and his garden at St Heliers Bay sported superb specimens of the rare Poor Knights lily (*Xeronema*), which he had found on one of his expeditions to Hen Island (Taranga). At this time (1927–36) he was writing for the *Auckland Star* 'Ways of the Wild — a naturalist's notebook'. The young Bob Falla would visit him to talk about birds and learn how to make a skin; and later when an unknown species of petrel was discovered on Hen Island, Falla expressed his gratitude by naming it in his honour *Pterodroma pycrofti*. In 1929 he accompanied Guthrie-Smith to the Kermadec Islands.

As Pycroft was a close friend of Gilbert Archey, it was natural that he should be one of a team that was seeking to ascertain just how many species of moa there had been and why they had become extinct. In the quest that led to many remote swamps and caves, the team also found near Waikaremoana the first evidence that a large species of pelican had once inhabited New Zealand.

Biographical Notes

Arthur Pycroft was a lively naturalist and collector of the old school, to whom the advancement of ornithology owes much. Those who knew him recall his witty anecdotes and sense of fun.

R.B. Sibson

Andreas Reischek 1845–1902

Andreas Reischek was born on 15 September 1845 in Linz, the capital of Upper Austria. He grew up with a passion for natural history, especially birds, became a keen hunter, and consolidated his interests in nature by becoming an accomplished taxidermist. He left Vienna on 7 February 1877 and reached Lyttelton on 22 April 1877.

In Christchurch Reischek immediately tackled the job at Canterbury Museum for which he had been engaged on a 2-year contract at £220: taxidermy and other museum work. He also immediately began his extensive study and collection of New Zealand birds.

As early as 20 July — less than 3 months after his arrival — he had sent to Austria his first short note; this and many subsequent articles were published in a Viennese ornithological journal.

While at Christchurch, he made 2 expeditions and collecting trips. The first was a solo trip on horseback to Arthur's Pass, Taramakau Valley, Lake Brunner, Haihuna Plain, and Mount Alexander. The second was with Dr Julius von Haast to Rakaia Forks, Mount



Figure 23. Brown Kiwi; an example of Andreas Reischek's skill as a taxidermist. Photo: K.E. Westerskov.

Algidus, Whitcombe Pass (where von Haast named a glacier *Reischek Glacier*) and Whitcombe River. On these and other hunting and collecting trips in Canterbury, Reischek collected and skinned birds, as shown by labelled museum specimens in Vienna and as mentioned in his book (Reischek 1924) published posthumously by his son, also named Andreas. This book was based on, and consisted largely of, quotations from Reischek's diaries.

Reischek showed by his travels around New Zealand between 1879 and 1889, and by his choice of species studied (and collected), that he was well aware of where to find birds and which ones were rare, unusual, or for other reasons worth learning more about. He visited Little Barrier Island in search of the rare Stitchbird (*Notiomystis cincta*) and the many bird islands off the east coast of Northland, where he found the Little Shearwater (*Puffinus assimilis*) nesting on the Hen and Chickens, new for New Zealand. Particularly fruitful were his expeditions to Fiordland and towards the end of his stay to the subantarctic islands, where on Antipodes Island he collected and subsequently described Reischek's Parakeet (*Cyanoramphus novaezelandiae hochstetteri*).

Reischek was particularly familiar with the Kakapo, about which he wrote a valuable paper (for translation see Westerskov 1981). He also published important papers on the Kokako (*Callaeas cinerea*) (for translation see Westerskov 1979) and on the Piopio (*Turnagra capensis*) (Reischek 1892).

Like others of his day (e.g. Buller, Potts) Reischek collected, traded, and swapped specimens of birds, rare and common. In that respect he appears no better and no worse than anyone else: collection was in that period the way to learn of species, maybe find new ones. But it must be said to his credit that Reischek, at a meeting of the Auckland Institute in November 1886, inspired by Chief Judge F.D. Fenton's proposal at a previous meeting to make Little Barrier Island a bird sanctuary, supported the proposal and offered his assistance in procuring kiwi and Kakapo for release on the island.

After his return to Austria Reischek on 7 January 1891, inside 2 years of his return, while his memory of New Zealand was still fresh, read a paper to the Imperial and Royal Zoological-Botanical Society of Vienna on the effects of civilisation on the New Zealand fauna and its rapid disappearance; the paper was published in April 1891. This assessment by a competent observer, who had spent as much time in the field as any New Zealand contemporaries, is valuable today because it serves as a yardstick against which to measure later developments. His gloomy predictions have not all come true.

Reischek was not a scholar or academically trained professional ornithologist. His writings contain many inaccuracies, mistakes, incorrect naming, misspellings; against that we must consider the lack of bird and plant books available to him and lack of adequate maps. At least he put down his observations, which cannot be said of any other collector/taxidermist of his day. Reischek added materially to the understanding of the distribution of New Zealand birds and to biological facts on the life histories of various species; on nests and eggs, on food and feeding, and on behaviour.

The specimens he collected were well preserved and many are in as good a condition today as when they were made (Fig. 23). All specimens collected by Reischek were well labelled. Anyone who has worked with old bird skins in New Zealand museums will know the very limited value of the large numbers of specimens with little or no information.

Buller called Reischek 'a very careful observer' and 'indefatigable'. In 1888 Dr T.M. Hocken of Dunedin met Reischek at the Wanganui Museum, where Reischek was 'stuffing and arranging' birds. Hocken gave this first-hand description: 'He is an Austrian of probably 38 years, silent when out of, but most garrulous when in conversation; an enthusiast in his special function of observer of animal life in natural surroundings. I should judge him to be deficient in scientific knowledge, but a good observer of the habits of animals' (from the T.M. Hocken travel diaries in the Hocken Library, University of Otago, brought to my attention by Dr A.G. Hocken).

Reischek's major achievement was undoubtedly his large and almost complete collection of New Zealand birds, one of the best in existence and now well preserved in the Vienna Museum of Natural History.

In 1885 Buller, Hector, and Travers nominated Reischek for a fellowship of the Linnean Society of London; this allowed him to use the letters FLS after his name, as he then did on all his specimen labels. In Vienna he was elected an Honorary Member (Ehrenmitglied) of the Vienna Ornithological Society (Aubrecht 1988: 133). These were the only forms of official recognition Reischek received, either in the land he adopted for 12 years or in his homeland later.

Reischek added 3 birds to the New Zealand list. He collected a Black-footed Albatross (*Diomedea nigripes*) in Dusky Sound, July 1884, the only record for New Zealand; the specimen is in the Vienna Museum (NMW 4470). He collected and described Reischek's Parakeet — *Cyanoramphus novaezelandiae hochstetteri* (Reischek, 1889) — and the Antipodes Pipit — *Anthus novaeseelandiae steindachneri* Reischek, 1889 — both from Antipodes Island. Also, on Snares Island in February 1888, he saw a 'black tomtit', which he captured by running it down ('Unfortunately I had brought no gun on shore'; Reischek 1888: 380). It was a bird he had not seen before, 'probably entirely new', and he sent it to Dr Otto Finsch 'for examination'. However, Dannefaerd collected a series of Black Tits 6 years later and sent them to Rothschild, who named them *Miro dannefaerdi*, thus depriving Reischek of association with a species he had been first to collect.

The highlight of Reischek's life was his time in New Zealand. His return to Austria was fraught with disappointment, with no appointment to the new Museum of Natural History in Vienna, as he had undoubtedly (and reasonably) expected.

He left New Zealand on 20 February 1889, being farewelled 2 days earlier by the Auckland Institute, which presented him with an address recording the appreciation of the council and members of 'the valuable services rendered to the cause of Science in New Zealand by Mr. A. Reischek, who has spent 12 years of unwearying and enthusiastic devotion in studying the Natural History and particularly the Ornithology of the Colony', and wishing him 'the success and recognition in Europe which his arduous and valuable researches in New Zealand so well deserve'.

He arrived home in Vienna on 15 April 1889. He had difficulties getting his many crates of bird specimens and other collections through customs; 2 years passed before his large bird collection was bought for a comparatively modest sum by a group of high-ranking and influential friends and presented to the Museum. Reischek took the disappointments calmly; in 1894 he moved to Klosterneuburg near Linz, and he was in 1896 appointed curator at the newly completed Landesmuseum in Linz. In 1898 he bought an idyllic house in Linz on slopes bordering the Danube. Here he lived his few remaining years. He died on 3 April 1902 at the age of 56 years.

K.E. Westerskov

Lancelot Eric Richdale 1900–1983

The New Zealand region is the breeding ground for the greatest variety of penguin species. The world's rarest is probably the Yellow-eyed Penguin, first discovered at the Auckland Islands in 1840 and in 1888 found breeding at the Otago Peninsula near Dunedin on mainland New Zealand.

In 1951, a Dunedin schoolteacher, Lancelot (Lance) Richdale, surprised the international scientific community by his publication of a book entitled *Sexual Behavior in Penguins*, based mainly on his studies of the Yellow-eyed Penguin. Published in America it rated enthusiastic reviews overseas, *Time* magazine describing the author as the 'Dr Kinsey of the penguin world'. Even more remarkable was the fact that 16 years earlier, like most other people of the time, Lance Richdale thought that penguins lived at the South Pole. He was not impressed when some schoolchildren showed him one for the first time. Yet Robert Cushman Murphy, then a leading international curator and ornithologist at the American Museum of Natural History, was to state, 'There is probably no paper in the history of science that has involved such continuous, intimate and long-term recording of the behaviour of wild animals'.

How then did a full-time agriculture adviser (today's science adviser) from 1928 to 1960, for schools of the Otago Education Board, with a masters degree in history, come to be a specialist on the ecology and habits of penguins? Richdale once said, 'I got on to penguins by accident', and added that, 'My main interest all along had been botany, especially the study of alpine flora. One day I went up to the top of a mountain with a number of other naturalists, and it started to rain. In the process of going down, someone left a gate open and a lot of sheep got mixed. The owner of the mountain then would not let any of us up there, and I had to give up my work. I remembered an invitation I had from some schoolchildren to go and look at penguins.'

Richdale's looking at Yellow-eyed Penguins covered a total of 18 years from 1936, including over 1300 personal visits to breeding areas and more than 80 000 km of travel, at all times of day and night and in all seasons. Early in the study (1942) he sent to Britain a major book (4 volumes of manuscript and photos), but the war prevented publication. Later he found he had so much material that 2 books were necessary. The second classic, *A Population Study of Penguins* (1957) was written while on a Nuffield Research Fellowship at Oxford University, working under the eminent ecologist Dr David Lack.

If Richdale had looked only at penguins, his contribution to New Zealand science and knowledge would have been considerable, but in the 30 years from 1936 he did field research that resulted in over 105 scientific books, monographs, papers, and popular articles on a wide range of birds, but mostly seabirds. In November 1936 he saw a Royal Albatross for the first time when it was sitting on an egg at Taiaroa Head. That egg was stolen. Later, when introducing his first monograph on the albatrosses, he wrote 'In 1937, the birds again laid, so I made up my mind to do all possible to prevent a repetition of previous losses. I literally lived alongside the nest and made a special point of being present all day every Saturday and Sunday'. For 120 days he recorded information about the birds, and his protection was so successful that the first chick of the now thriving Taiaroa Head albatross colony flew in 1938. His pioneering efforts, locally and nationally, fostered the protection of this unique mainland colony at a time when public awareness and support for the principles of conservation were limited.

However, the greatest variety of seabirds live on islands isolated from human habitation. Late in 1938, Richdale made his first visit to Whero Island, a tiny speck of rock off the

northern coast of Stewart Island. From 1940 to 1950, he spent over 50 weeks in self-imposed isolation, studying the varieties of small burrowing petrels, including the muttonbird, in their natural habitat. His usual day (on every day of the visit) started at 8 a.m. and finished at 3 a.m. the next morning.

Accommodation in the early years at Whero was a tent. He had no wireless, no books, and fresh food arrived subject to a break in the weather and a reliable boatman. Christmas dinner 1942 'consisted of bread 25 days old, butter of the same advanced age, jam, cocoa, tinned milk and sardines'. In an area renowned for its fresh fish, he had not been able to catch any throughout 25 days of storms. Later, local people were to raise money for a small hut to make his intensive life of study a little more comfortable.

From all this achievement, we can see that Lance Richdale was capable of intense concentration and drive. This single-minded application to the matter in hand produced the field data and papers that earned him a deserved international reputation. His many honours culminated in 1982 in the award of an OBE for services to ornithology. A seemingly shy and retiring individualist to his scientific colleagues, he had little sympathy for theory unsupported by fact, especially when he was in the process of providing the facts. When scientific journals were unable to cope with the size of his massive studies, he published and sold them himself at no small cost.

Probably Richdale's greatest contribution was as an educator. It does not show as books on shelves, but is reflected in the attitudes and curiosity of the teachers and thousands of young children who listened and learned from him, throughout a working life as an instructor in science and agriculture.

Without fail, letters from past pupils yield a common and composite theme from memories now often 50 years old.

Mr L.E. Richdale, whom most of us called Mr 'Rich', visited the school on a regular basis. He was known as the 'Nature Study' man. We looked forward to his visits as he always took us outside for a lesson, very much a novelty in those days of sitting in rows from 9 a.m. to 3 p.m., except for playtime and lunchtime. He didn't seem to bring anything to school. He would just take us outside and talk about the things that were there... the silver birch trees with a transparent skin on the bark... beautiful weeds... stick insects in the hedges... how dead leaves had skeletons. He brought a wonder of nature to the school children, lifting their lives from the dryness of the classroom, teaching them the values of nature. A quiet, friendly listener, no dramatics, no films, no posters, no books, just using nature itself, a good experience. No hint of the famous scientist. Just a man who loved nature and wanted to share it and his bird work with the children. He never paraded his knowledge, and his greatest charm lay in the fact that everyone felt comfortable in his presence.

Thus, as local teacher or international scientist, he had that element of genius that manifested itself in a compulsive curiosity. At all times, Dr Lancelot Eric Richdale OBE, MA, DSc, FRSNZ, FLS was a severe questioner of the hypothetical, always searching for and recording in detail that firm foundation necessary to support his fierce assertion that *proof is the authority, not authority the proof.*

C.J.R. Robertson

Gordon Roy Williams

1920–1983

Born in South Africa and educated in Australia, Gordon Williams came to New Zealand in 1949 to join the Wildlife Branch of the Department of Internal Affairs, which later became the New Zealand Wildlife Service. In this organisation, and subsequently at Lincoln College, he made important contributions to wildlife management and to conservation, partly as a research scientist and partly as an administrator and educator.

Although his ornithological research was wide ranging, it centred on 3 species: California Quail, Takahe, and Kakapo. His work on California Quail began in 1949 and continued for 15 years. He did much of the early field work himself, but later this was progressively delegated to others while Williams, by then already involved in research on Takahe, concentrated on analysing and publishing the accumulating data. He provided the first major account of the population dynamics, food, and habitat requirements of California Quail in New Zealand. His finding that the quality of the habitat was more important in regulating quail numbers than was predation, hunting, or disease is perhaps commonplace today but, at the time, it was a relatively new concept, at least to many sportsmen. The work was also of interest in another respect. Although several species of introduced birds had been in New Zealand for about 100 years, Williams' work on quail (and contemporaneous studies on pheasants and waterfowl by his colleagues) provided the first detailed information on how some of the introduced birds were interacting with a new and changing environment.

Williams was often instrumental in introducing overseas concepts and techniques to New Zealand. His early work reflected an interest in population dynamics and in cycles, acquired during a stay at the Oxford Bureau of Animal Population. Later, after a visit to the University of Aberdeen, he brought back new statistical techniques for deriving population estimates, life tables, and mortality rates and used these on his quail data. He was among the first in New Zealand to appreciate the value of tape recorders for studying and teaching natural history, and he made what are now historic recordings of the calls of wild Takahe at Lake Orbell (1954) and of Pitcairn Island birds (1956). His association with the paper on the relationships of the New Zealand wrens as indicated by DNA-DNA hybridization (Sibley *et al.* 1982) is a further example of his interest in bringing overseas techniques to bear on New Zealand problems. In the later years of his life he became particularly interested in overseas work on island biogeography and its implications for nature conservation in New Zealand.

Several scientists took part in the early research on Takahe and it is often difficult to identify the precise contributions made by each. Williams, however, stands out in providing the essential service of collating and publishing well-researched information gleaned from widely scattered historical and contemporary sources. His predilection for historical research in museums and libraries is further evident in his papers on Kakapo (1956 and 1960), Laughing Owl (Williams & Harrison 1972), and wattlebirds (1976). These historical compilations provided a very useful information base, and contributed to the success of the substantial field studies undertaken later by some of his younger colleagues. Other historically valuable reports are his accounts of the spread of introduced birds to New Zealand's outlying islands (1953) and of the birdlife of the Pitcairn Islands (1960), the Kermadecs (Edgar *et al.* 1965), the Gouland Downs (1960), and the Cleddau River area near Milford (1960).

As an administrator, Williams made important contributions during the period 1965–79, first as head of research and later as director of the Wildlife Service. Under his leadership the Research Section was greatly enlarged and earned an enviable reputation for

the quality and relevance to management of its research. Management groups also prospered and the Service became a world leader in developing techniques for the successful management of threatened species. With Williams's approval, members of the Ornithological Society were encouraged to help the Service by taking part in field surveys and, jointly with the Ecology Division of DSIR, to produce New Zealand's first ornithological atlas of bird distribution. Williams also served ornithology well in various voluntary activities. He was an officer of the Ornithological Society from 1957 to 1971 (successively serving as secretary, vice-president, and president) and he presided over the successful amalgamation of the Society's national bird banding scheme with that of the Wildlife Service on game birds.

Williams's contributions to zoological education and to the training of future wildlife officers were made mainly during his 2 periods at Lincoln College, first as a lecturer in Agricultural Zoology (1960-65) and later as Professor of Entomology (1979 until his death). His books, tape recordings, and radio talks contributed much towards fostering public interest in wildlife and its conservation.

P.C. Bull

Robert Adams Wilson 1876–1964

'Major Bob' was one of those energetic and observant naturalists to whom OSNZ is deeply indebted and for whom its foundation meant a great deal. Born at Bulls and brought up in the lowlands of the Manawatu, he was educated at Wanganui Collegiate School. He delighted in all the outdoor pursuits of a lively and alert country boy. In 1891, when he was only 15, he had the good fortune to go south with G.V. *Hinemoa*. That was still very much the age of shooting and collecting. When the vessel put in at Milford Sound, he bagged a real trophy, a Piopio *Turnagra capensis*. Then as *Hinemoa* cruised near the Western Reef of the Snares, his sharp eyes noted colonies of mollymawks, which later proved to be Salvin's Mollymawk, not recognised by scientists till 1893. The Western Reef is now known to be the most northerly nursery of this mollymawk, which breeds only in subantarctic New Zealand. After *Hinemoa* reached the Aucklands Islands, a pair of New Zealand Mergansers fell to his gun. He was not to know how scarce *Mergus australis* had become. He was one of the last to see it alive.

Back in the Manawatu, his dashing horsemanship put him into the Rangitikei team that won the Savile Cup. By now his prime interests were farming, especially the development of sand-country, and forestry. But the call of the wild was strong in his blood. He became an expert deer-stalker; and eventually wrote a book *My Stalking Memories*, which quickly sold out. In 1924, because he was such an authority, he was asked to make a selection of New Zealand deer heads for the British Empire Exhibition at Wembley.

RAW was a conscientious diarist. *A Two Years Interlude 1916–1918* described his experiences on the battlefields of France. To see or hear 'new' birds amid the desolation gave him joy. Kestrel, Cuckoo, Nightingale, Corncrake were duly logged.

Bird Islands of New Zealand (1959) is dedicated to Edgar Stead and Geoff Buddle, who, like him, delighted in exploring offshore islands and remote places. Although the author says he was merely their henchman, they were glad to benefit from his good company, his field craft, and his mastery of camping. At the chosen site he was never happy till everything was ship-shape, an example to all young naturalists who were lucky enough to be invited to join one of his field trips. The rain and mud of the memorable Snares expedition in 1947 were a formidable challenge that saw him at his best.

Spurred and alarmed by Guthrie-Smith's gloomy reports on the insidious threats that, like the sword of Damocles, hung over the fauna and flora of many offshore islets, Stead and Wilson investigated the outliers of Stewart Island on a series of trips over many years. Stead had already noted the distinctness of the southern Spotted Shags, now known as Blue Shags, and in 1930 Oliver named them *steadii*. Then came Wilson's turn to have a bird named in his honour. During a stay on Codfish Island, the explorers found that the local fernbirds were markedly distinct. When Stead described them in 1936, he named them *wilsoni*. Meanwhile the thickly forested northern islets, which had a wealth of breeding tubenoses and remnant populations of some passerines once abundant in the North Island, were beckoning irresistibly. In 1937 Geoff Buddle, who had known the Hauraki Gulf since boyhood, joined the team.

For many years before the birth of the OSNZ, this gifted trio had studied and photographed the birds of New Zealand's diverse archipelago for the fun of the game, the adventure of exploration, and as a challenge to their skills. At the same time they were striving to ascertain the true status of little-known species, to evaluate losses and form a basis of knowledge to try to safeguard the future. Robert Wilson's *Bird Islands of New Zealand* has a vivacity and charm all its own. It is also packed with important information.

R.B. Sibson

Kazimierz Antoni Z Granowa Wodzicki

1900–1987

Born and educated in Poland, Count Kazimierz Wodzicki came to New Zealand in 1941 to serve as Consul-General for the exiled Polish Government in London. He and his family had miraculously escaped to Britain when the Germans invaded Poland, where he had been Professor of Anatomy and Histology at the University College of Agriculture in Warsaw. Before leaving Poland he had published 39 research papers on topics ranging from the anatomy and reproductive physiology of poultry to the neolithic and medieval goats of Poland, but his main interest was in birds, particularly the ecology and migration of storks.

Despite his busy and stressful life as a wartime diplomat, Count Wodzicki found time to pursue his ornithological interests in New Zealand. He soon joined the newly established Ornithological Society of New Zealand and was a frequent contributor to *NZ Bird Notes* (later *Notornis*) from 1942.

At the end of the war, when Poland fell into the Russian sphere of influence, Count Wodzicki could no longer represent his country as a diplomat, and he did not wish to return there. The New Zealand government found work for him in DSIR investigating the problems caused by the various introduced mammals that inhabited New Zealand's farmlands and forests. This work, published in 1950 as DSIR Bulletin No. 98 *Introduced Mammals of New Zealand: an Ecological and Economic Survey*, led to the establishment of the Animal Ecology Section (later Ecology Division) of DSIR and Dr Wodzicki became its first Director. (Although he held the hereditary title of Count, he preferred to use his academic title of Doctor when working as a scientist in New Zealand).

The Animal Ecology Section was primarily concerned with research on mammals, but Dr Wodzicki catered for his ornithological interests by working extra hours and he encouraged his staff to do likewise; thus work on Gannets, Rooks, and ornithological surveys continued along with research on mammals. His retirement from DSIR in 1965 made little difference to his life of research. He soon turned his attention to rodent problems in the Tokelau Islands and on Niue, and again managed also to publish some papers on the birds of the islands.

Among his many ornithological contributions (often published jointly with colleagues), the studies of birdlife at Waikanae Estuary and of the Gannets at Cape Kidnappers were especially significant because they were continued over many years, thus allowing the detection of long-term changes. The Waikanae Estuary surveys (Wodzicki 1946), were repeated (Wodzicki *et al.* 1978); they recorded in detail the changes that had occurred in the birdlife as new houses encroached on the nearby sandhills and as the estuary and its adjacent beaches were subjected to greatly increased human use. The work on Gannets was no less productive. In 1946–47, Wodzicki and Fleming censused the Gannet population of New Zealand by counting occupied nests shown on aerial photographs and checking the results by ground visits to some of the gannetries. This was the first full census of any New Zealand seabird (Fleming & Wodzicki 1952). Another first in Gannet research came from Dr Wodzicki's banding operations, which revealed the previously quite unsuspected fact that young New Zealand Gannets disperse to Australian seas within a few days of leaving their natal colonies. Yet another surprise came when, in 1969–70 and again in 1980–81, Dr Wodzicki and his co-workers repeated the Gannet census and found that the population had been increasing at the rate of 2.3% per year since 1946–47.

Apart from his own personal research, Dr Wodzicki had an important influence on New Zealand ornithology by encouraging and supporting the work of other people, particularly the members of his staff in Ecology Division and, later, the graduate students

Biographical Notes

he helped supervise at Victoria University, where he became an Honorary Lecturer in the Zoology Department. His contributions to New Zealand ornithology (some 35 papers during his 46 years in New Zealand) were matched by work in other fields of zoology (particularly mammalogy) and by his services to the Polish community in New Zealand. He was indeed a remarkable character; cheerful and friendly and with impeccable manners, but very determined and always ready to battle or cleverly circumvent any obstruction to his research plans. He was no less determined to see that every piece of research with which he became involved resulted in a published paper. For his scientific work he was elected a Fellow of the Royal Society of New Zealand in 1962, and his scientific and cultural contributions were further recognised publicly in 1976 when he was awarded the OBE.

P.C. Bull

Appendix — Ornithological Theses from New Zealand Universities, 1939–89

Universities are listed from south to north. For each university, degrees are listed from doctorate to BSc(Hons) or diploma. For each degree or diploma, theses are listed by year and then by author. This list was compiled in mid-1989, so not all theses for 1989 could be included.

University of Otago

PhD

1982

Pierce, R.J. A comparative ecological study of Pied and Black Stilts in South Canterbury.

1983

Lalas, C. Comparative feeding ecology of New Zealand marine shags (Phalacrocoracidae).

1986

Harris, W.F. The breeding ecology of the South Island Fernbird in Otago wetlands.

1988

Seddon, P.J. Patterns of behaviour and nest site selection in the Yellow-eyed Penguin (*Megadyptes antipodes*).

van Heezik, Y. The growth and diet of the Yellow-eyed Penguin, *Megadyptes antipodes*.

MSc

1946

Gurr, L. The Blackbird (*Turdus merula* Linn.) bionomics and bodily characters.

1968

Redhead, R.E. Food habits of the Harrier Hawk (*Circus approximans gouldi*).

1977

Lalas, C. Food and feeding behaviour of the Black-fronted Tern, *Chlidonias hybrida albostratus*.

1978

Bomford, M. The behaviour of the Banded Dotterel *Charadrius bicinctus*.

Dunn, P.L. The feeding ecology of the New Zealand Pigeon (*Hemiphaga novaeseelandiae*).

1983

Gillespie, G.D. The morphology and feeding ecology of Mallard (*Anas platyrhynchos*) and Grey Duck (*Anas superciliosa*) in relation to agriculture in Otago, New Zealand.

1984

Gales, R. Comparative breeding biology of seabirds on the Otago Coast.

1988

Johnstone, R.M. Incubation routines, foraging trip regulation and identification of sex in the Grey-faced Petrel *Pterodroma macroptera gouldi*.

Speirs, E.A.H. Vocal discrimination among individuals by Adelie Penguins (*Pygoscelis adeliae*).

DipSci (a postgraduate diploma in science)

1974

Gray, R.S. The territoriality of the South Island Rifleman near Dunedin.

Henderson, N.M. Autumn and winter flocking behaviour of the Brown Creeper (*Finschia novaeseelandiae* Gmelin 1789).

1976

Bomford, M. Factors affecting Greenfinch damage to a sunflower crop.

Pierce, R.J. The feeding ecology of Wrybills in Canterbury.

1977

Buchan, G.S. Mallard, Grey and hybrid ducks in Otago and Southland.

1979

Howes, B. The recognition of methiocarb residue and combining scare techniques may repel birds from cherries and grapes.

Kingsford, S.J. Maintenance behaviour of the Pied Stilt, *Himantopus himantopus leucocephalus*.

BSc(Hons)

1966

Sim, R.E. The winter flocking organisation of the Redpoll (*Carduelis flammea*) in captivity.

1968

Johnston, B.R. Some aspects of egg and chick mortality, breeding success and population dynamics in a colony of South Polar Skuas, *Catharacta maccormicki* (Saunders), at Cape Hallett Antarctica.

Appendix

- Smales, M. Diurnal rhythms of the Redpoll *Carduelis flammea* in relation to light.
1969
- Craig, J.L. Polymorphism in the New Zealand Fantail *Rhipidura fuliginosa* (Sparrman).
1973
- Alspach, P.A. Some interrelationships of aggression and territory size and boundary in the South Island Robin (*Petroica australis australis*).
1975
- Dunn, P.L. Feeding and roosting patterns and foraging behaviour of four wader species at Aramoana, Dunedin.
1976
- Mulder, A.M. Aspects of bird damage to oilseed rape crops in Gore.
1983
- Johnston, S.E. The feeding ecology of Spur-winged Plovers (*Vanelus miles novaehollandiae*) in Otago.
1984
- Read, A.F. The abundance and habitat use of Yellowheads (*Mohoua ochrocephala*) (Gmelin, 1789).
Sneddon, P. Communication in the Greenfinch *Carduelis chloris*.

DipWildMgmt

- 1966
- Harrison, W. A survey of bird species and bird hazard at and in proximity to Momona airport.
Otway, P.A. A winter survey of duck ponds in Otago.
Vance, P. Observations on the Eastern Rosella (*Platycercus eximius*).
1967
- McKenna, P.B. Some aspects of the distribution of the Kea.
Zander, R.C.W. The Paradise Duck (*Tadorna variegata*) in the Southland and Otago Acclimatisation Districts.
1968
- Wakelin, D.J. A comparative study of the feeding behaviour of the White Heron (*Egretta alba modesta* Gray 1831) and the White-faced Heron (*Notophox novaehollandiae* Latham 1790).
1970
- Child, P. Seasonal migrations of some Central Otago riverbed birds.
1974
- Taylor, M.K. Habitat and distribution of the California Quail, *Lophortyx californica*, in the Otago Acclimatisation Society district.
1975
- Belford, C.J. Lead poisoning in Mallard and Grey ducks in Otago.
Miles, K.A. The development of wildlife management and conservation in New Zealand.
1976
- Campbell, B.A. Feeding habits of the Kea in the Routeburn Basin.
Johnson, W.B. Distribution and habitat utilization of the Chukar Partridge (*Alectoris chukar*) in the Otago Acclimatisation District.
Willoughby, H.G.B. Bird recolonisation of regenerated beech (*Nothofagus*) forest.
1977
- O'Kech, S.D. A survey of the history and distribution of the Yellow-eyed Penguin (*Megadyptes antipodes*) on Otago Peninsula.
Poczwa, Z. Habitat utilization of the Greenfinch *Carduelis chloris* in relation to the growing of oilseed rape *Brassica napus*.
1980
- Gillespie, G.D. Damage caused by Greenfinches to a rapeseed crop.
McKenzie, C.M.A. The influence of human settlement on New Zealand's avifauna.
1981
- Macdonald, J.J. A study of the history, environment and wildlife of Hawkesbury Wildlife Management Reserve.
Sadler, B. Social feeding in the Greenfinch.
Tan, B. Pukeko at Waihola: fluctuation in numbers, and some aspects of habitat use.
Thompson, J. Aspects of the ecology and damage by Black Swans (*Cygnus atratus*) in Central Otago.
1982
- Anderson, M.N. Habitat selection by the New Zealand Shoveler.
Michelsen (Heath), S. Rock Wrens, Mount Cook National Park: Habitat requirements and feeding behaviour.
Soulsby, R.C. Duck harvest and the 1982 duck hunting season in Otago.
1984
- O'Brien, N.E. The history of the attempt by the Otago Acclimatisation Society to establish the Chukar Partridge (*Alectoris chukar*) on the Taieri Ridge.

Lincoln University

PhD

- 1966
- Williams, G.R. A study of California Quail in New Zealand, with particular reference to population ecology.

1972

East, R. Starling (*Sturnus vulgaris* L.) predation on grass grub (*Costelytra zealandica* (White), Melolonthinae) populations in Canterbury.

1985

Hughey, K.F.D. Hydrological factors influencing the ecology of riverbed breeding birds in the plains reaches of Canterbury's braided rivers.

MAgrSci

1968

McIlroy, J.C. The biology of magpies, *Gymnorhina* spp., in New Zealand.

MApplSci

1985

Wragg, G.M. The comparative biology of Fluttering Shearwater and Hutton's Shearwater and their relationship to other shearwater species.

University of Canterbury**PhD**

1969

Adams, H. The mechanics of bird flight.

1970

Mills, J.A. The population ecology of Red-billed Gulls (*Larus novaehollandiae scopulinus*) of known age.

Moeed, A. Ecological aspects of the bird hazard problem at Christchurch International Airport.

1972

Baker, A.J. Systematics and affinities of New Zealand oystercatchers.

Coleman, J.D. The feeding ecology, productivity and management of Starlings in Canterbury, New Zealand.

Warham, J. The breeding biology and behaviour of *Eudyptes* penguins. Part I.

1973

Warham, J. The breeding biology and behaviour of *Eudyptes* penguins. Part II.

1977

Fox, N.C. The biology of the New Zealand Falcon (*Falco novaeseelandiae* Gmelin 1788).

1980

Gill, B.J. Breeding of the Grey Warbler with special reference to brood-parasitism by the Shining Cuckoo.

Powlesland, R.G. A time-budget study of the South Island Robin *Petroica australis australis* at Kowhai Bush, Kaikoura.

1985

Cunningham, J.B. Breeding ecology, social organisation and communicatory behaviour of the Brown Creeper (*Finschia novaeseelandiae*).

Sherley, G. The breeding system of the South Island Rifleman (*Acanthisitta chloris*) at Kowhai Bush, Kaikoura, New Zealand.

1989

Waas, J.R. Agonistic and sexual behaviour in the Little Blue Penguin.

MSc

1965

Mills, J.A. The breeding biology and population dynamics of the Red-billed Gull (*Larus novaehollandiae scopulinus*, Forster 1884).

Tunncliffe, G.A. The Pukeko.

1966

Spellerberg, I.F. Ecology of the McCormick Skua, *Catharacta maccormicki* (Saunders) in southern McMurdo Sound, Antarctica.

1968

Coleman, J.D. Aspects of the ecology of the Rook *Corvus frugilegus frugilegus* in Canterbury.

1969

Baker, A.J. The comparative biology of New Zealand oystercatchers.

Williams, J.M. Territorial ecology and ethology of McCormick's Skua *Catharacta maccormicki* (Saunders) at Cape Bird, Ross Island, Antarctica.

1970

Tasker, C.R. Reproductive behaviour of the Red-billed Gull (*Larus novaehollandiae scopulinus*, Forster).

1973

Best, H.A. The biology of the Snares Fernbird *Bowdleria punctata caudata* (Buller, 1894).

1977

Ude Shankar, Maxine J. Aspects of the behaviour of the South Island Fantail *Rhipidura fuliginosa fuliginosa*.

1979

Kearton, P. The breeding biology and behaviour of the Yellow-breasted Tit.

Appendix

1980

Davis, L.S. Egg and chick survival of the Adelle Penguin (*Pygoscelis adeliae*) at Cape Bird, Antarctica.

1984

Meredith, A.M. The taxonomy of four populations of the Little Blue Penguin (*Eudyptula minor*).

1985

Taylor, G.A. The effects of logging on forest bird communities on the Mamaku Plateau, New Zealand.

1988

Meis, Teresa J. Waterfowl management in North Canterbury, New Zealand.

BSc (Hons)

1966

Baker, A.J. Observations on the winter feeding of the South Island Pied Oystercatchers (*Haematopus ostralegus finschi*) at the Heathcote-Avon Estuary.

Coleman, J. The distribution and abundance of the Rook *Corvus frugilegus* in Canterbury.

Dawson, D.G. Breeding in the House Sparrow (*Passer domesticus* L.).

Procter, D.L.C. The diurnal activity of the Rook *Corvus frugilegus* L.

1967

East, R. Studies on the distribution and abundance of birds in the Christchurch Botanic Gardens.

Smith, Janet M. A study of the effect of May-season shooting upon numbers of Grey Duck/Mallard hybrids in a protected Christchurch city area.

Spurr, E.B. Observations on the winter activities of the White-faced Heron (*Notophoxyx novaehollandiae*) at Kaikoura.

Tasker, C.R. A preliminary study on territory in the Blackbird *Turdus merula*.

Tasker, R. Aggression in the Blackbird.

1968

Nield, Janet A. Thermal conductance through skin and feathers of three species of penguins.

1969

Grant, T.R. Autumn and winter movements of the Spotted Shag *Phalacrocorax punctatus punctatus* (Sparrrman, 1786) from the Scarborough colony, Banks Peninsula, New Zealand.

Harper, G.M. A preliminary study of feeding in the Goldfinch and of the relationships of introduced finches in the South Christchurch region.

1970

Best, H.A. A comparative feeding study of three wading birds at the Heathcote-Avon Estuary.

Hick, B.R. A behavioural study of wintering Wax-eyes in the Christchurch area.

Louisson, Victoria M. Feeding in the White-faced Heron (*Ardea novaehollandiae*) at Robinson Bay, Akaroa Harbour.

Rankin, N.A. Social and feeding behaviour in the White-backed Magpie, *Gymnorhina hypoleuca*.

1971

Bisset, S.A. Gull helminths of the Paradise Shelduck *Tadorna variegata* (Gmelin) in Canterbury.

Bisset, S.A. The winter diet of the Paradise Shelduck in Canterbury.

Scally, Elizabeth A. A comparison of feeding in the Blackbird (*Turdus merula*) and Song Thrush (*Turdus philomelos*) in the Pinetum, South Hagley Park.

Wilson, G.J. Aspects of the behaviour of the Sooty Shearwater at Snares Islands.

Wilson, G.J. Aspects of the biology of the Sooty Shearwater and Mottled Petrel at Snares Islands.

1972

Biss, Rosemary H. Aspects of the biology of *Ornithodoros capensis* a tick of sea birds.

Browne, W.M.M. The breeding biology of the Spotted Shag *Phalacrocorax (Stictocarbo) punctatus punctatus* (Sparrrman 1786) at Whitewash Head, Sumner, New Zealand.

Field-Dodgson, M.S. Habitat utilization of some water-fowl at an artificially created pond.

1973

Granville, I. The behaviour of the Australian Coot, *Fulica atra australis* (Gould, 1845) during the 1972/73 breeding season at Virginia Lake, Wanganui.

Sagar, P.M. A review of bird census methods.

1974

Fordyce, R.E. Aspects of the biology of the Blue Duck, *Hymenolaimus malacorhynchos* (Gmelin, 1789).

Hendry, Marcia G. Growth, mortality and parental care in Red-billed Gull chicks.

Paulin, C.D. Bird activity in continuous daylight.

1975

McMillan, Jennifer M. Structural differences in moa eggshell types.

1976

Dodgshun, P.S. Response of bush-bird diversity to habitat structure in northwest Fiordland.

Dodgshun, P.S. Some aspects of hole-nesting and burrow-nesting birds.

Kearnton, P.M. The incidence of melanism in birds breeding in the New Zealand region.

Rutherford, D.M. Migratory birds and exotic animal diseases.

1977

Budgeon, Lynda A. Aspects of the biology of the Black Stilt (*Himantopus novaeseelandiae* Gould) in the Upper Waitaki Riverbasin.

- Merton, Jennifer M. Feeding habitats of the Black Stilt, *Himantopus novaezealandiae*, in the Upper Waitaki Basin.
1978
- Elliott, G.P. The territorial behaviour and breeding biology of the South Island Fernbird, *Bowdleria punctata punctata* (Quoy and Gaimard, 1830).
1980
- O'Donnell, C.F.J. The habitat preferences, breeding, feeding, behaviour and populations of the Southern Crested Grebe (*Podiceps cristatus australis*) on the Ashburton Lakes, 1979-1980.
1981
- Barth, M.A.M. A preliminary study of the taxonomy of the *Eudyptula* species in Australasia: protein polymorphism and phenotypic variation of populations of *Eudyptula minor* on Banks Peninsula.
Eggleston, J.E. Bird populations in Banks Peninsula forest remnants.
- Moore, Kevin. Foraging behaviour and competition in ducks.
- Taylor, Graeme A. The observed distribution, habitat preferences and calling behaviour of the North Island Brown Kiwi (*Apteryx australis mantelli*) in the Rotorua district, New Zealand (1980/81).
1983
- Pettigrew, Catherine H. Pre-chick behaviour of Buller's Mollymawk, *Diomedea bulleri*.
1984
- Miskelly, Colin. Aspects of the ecology and behaviour of Snares Island Snipe.
- Tollan, Andrew M. Maintenance energy requirements and energy assimilation efficiency of the Australasian Harrier.
1987
- Hayes, Lynley M. The foraging behaviour of the New Zealand Kingfisher (*Halcyon sancta vagans*).
1988
- Proffitt, Fiona M. Parent-offspring recognition in Snares Crested Penguins (*Eudyptes robustus*).

Victoria University of Wellington

PhD

- 1966
Fordham, R.A. Population studies on the Southern Black-backed Gull.
1973
- Purchas, T.P.G. The feeding ecology of the Rook (*Corvus frugilegus frugilegus* L.) in the Heretaunga Plains, Hawke's Bay.
- Wilson, P.R. The ecology of the Common Myna (*Acridotheres tristis* L.) in Hawke's Bay.
1978
- Harper, P.C. A comparative study of plasma proteins from 29 species of albatrosses and petrels.
1983
- Potts, K.J. Aspects of the feeding ecology of Mallard and Black Swan in a small freshwater lake.
- Waghorn, E.J. Studies on the Australian Gannet *Sula bassana serrator* Gray.
1987
- Beauchamp, A.J. A population study of the Weka *Gallirallus australis* on Kapiti Island.

MSc

- 1949
Balham, R.W. Ecological studies on the waterfowl.
1956
- Sorensen, J.H. Studies on albatrosses and seals on Campbell Island.
1963
- Fordham, R.A. The biology of the Southern Black-backed Gull (*Larus dominicanus* Lichtenstein) in Wellington, New Zealand.
1972
- Neill, M.M. Geographic variation in the House Sparrow.
- Singh, G. The morphology and systematics of mallophaga infesting New Zealand Anatidae.
1982
- Nixon, A.J. Aspects of the ecology and morphology of *Cyanoramphus* parakeets and hybrids from Mangere Island, Chatham Islands.
1983
- Elliott, G.P. The distribution and habitat requirements of the Banded Rail (*Rallus philippensis*) in Nelson and Marlborough.
- Farley, J. Studies on the alimentary tract helminths of the Black Swan *Cygnus atratus* (Latham).
1988
- Green, B.S. Genetic variation and management of Black Stilts, *Himantopus novaezealandiae*, Pied Stilts, *H. h. leucocephalus* (O. Charadriiformes).

BSc(Hons)

- 1967
Williams, M. Observations on the behaviour of New Zealand Anatinae in captivity. Part I and II.

Appendix

1969

Lavers, R.B. Behaviour of the Paradise Shelduck.

Potts, K.J. Ethological studies of the Kea.

1974

Buchanan, I.M. An analysis of plumage characteristics of Mallard and Grey Ducks and their hybrid derivatives.

Harper, P.C. Observations on the Fairy Prion (*Pachyptila turtur*) at the Poor Knights Islands, N.Z.

1976

Garrick, A.S. Food habits of Pipits (*Anthus novaeseelandiae*) and Skylarks (*Alauda arvensis*) at Huiarua Station, Tokomaru Bay.

1979

Sherley, G.H. Aspects of the feeding ecology of introduced finches and sparrows at Pukepuke Lagoon, coastal Manawatu.

1982

Dumbell, G.S. Regression modelling of the avifaunas present in Golden Downs native forest remnants during December 1981.

1985

Drummond, M.B. Spatial and seasonal aspects of foraging in four species of forest bird.

1986

Duckworth, K.A.H. A comparison between the population dynamics of colonising and established Paradise Shelduck (*Tadorna variegata*) populations.

1988

Harper, G. Sonographic analysis of the vocalisation of the Yellowhead (*Mohoua ochrocephala*).

Massey University

DSc

1987

Imber, M.J. Origins, phylogeny and taxonomy of gadfly petrels

PhD

1974

Craig, J.L. The social organization of the Pukeko *Porphyrio porphyrio melanotus* Temminck, 1820.

1983

Bimler, A.M. The behavioural ecology of the population of Black Swan *Cygnus atratus* Latham on a Manawatu dune lake.

1984

Veltman, C.J. The social system and reproduction in a New Zealand Magpie population and a test of the cooperative breeding hypothesis.

1987

Tarburton, M.K. The breeding biology of two populations of the White-rumped Swiftlet *Aerodramus spodiopygius assimilis* in Fiji and *Aerodramus spodiopygius chillagoensis* in Queensland, with special reference to factors that regulate clutch size in birds.

1988

Moffat, M. Abundance and foraging niches of forest birds in part of the Ruamahanga ecological area, Tararua State Forest Park.

MSc

1968

Laing, D.J. Some quantitative changes in the behaviour of the domestic chicken in the first seven weeks after hatching.

McConkey, B.F. Bionomics of the Pied Stilt (*Himantopus leucocephalus*) in New Zealand with special reference to breeding behaviour.

1972

Campbell, P.O. The feeding ecology and breeding biology of the Goldfinch (*Carduelis carduelis* Linnaeus, 1758) at Havelock North, New Zealand.

1976

Powlesland, R.G. A study of the relationship between the Starling *Sturnus vulgaris* and the haematophagous mite *Ornithonyssus bursa*.

1977

Baker-Gabb, D.J. Aspects of the biology of the Australasian Harrier (*Circus aeruginosus approximans* Peale, 1948).

Gray, R.S. The Kakapo (*Strigops habroptilus*, Gray, 1847), its food, feeding and habitat in Fiordland and Maud Island.

Wright, J.D. The time budget and feeding ecology of the Pukeko *Porphyrio porphyrio melanotus* Temminck, 1820.

1981

Moffat, M. Aspects of the biology of the Spur-winged Plover (*Vanellus miles novaehollandiae* Stephens 1819).

1982

Lo, P.L. Ecological studies on the White-faced Heron (*Ardea novaehollandiae novaehollandiae* Latham 1790) in the Manawatu.

1984

Matthews, C.W. Aspects of the biology of the Little Shag (*Phalacrocorax melanoleucos brevirostris* Vieillot 1817).

1986

Reed, C.E.M. The maintenance and reproductive behaviour of Black Stilts (*Himantopus novaezealandiae*) in captivity, and implications for the management of this rare species.

BSc(Hons)

1970

Wetherill, C. Aspects of the activities and dynamics of Starling, *Sturnus vulgaris*, flocks in autumn and winter.

1976

Petersen, G.W. A study of *Ornithonyssus bursa* infestations on starlings and sparrows, and in starling nest boxes, over the non-breeding season.

1977

Bimler, A.M. A consideration of the social displays of the Mallard *Anas platyrhynchos* in crowded and non-crowded situations.

1978

Robertson, H.A. Aspects of the carrion-feeding behaviour of the Marsh Harrier (*Circus aeruginosus approximans* Peale 1848).

1984

Hickson, R.E. Flocking and territorial behaviour of the Australian Magpie in relation to food.

University of Auckland**PhD**

1976

Jenkins, P.F. The social organisation and vocal behaviour of the Saddleback *Philesturnus carunculatus rufusater*.

1984

Hay, J.R. The behavioural ecology of the Wrybill Plover *Anarhynchus frontalis*.

Silyn-Roberts, H. Crystal growth in eggshells.

1986

Jamieson, I.G. An epigenetic study of the social behaviour of the communally breeding Pukeko (*Porphyrio porphyrio melanotus* T.).

1988

Dumbell, G.S. The ecology, behaviour and management of the New Zealand Brown Teal or Pateke (*Anas aucklandica*).

MA

1971

Councilman, J.J. Some aspects of the behaviour of the Indian Myna (*Acridotheres tristis tristis*).

MSc

1940

Fleming, C.A. The systematics, distribution, bionomics and some aspects of the anatomy of the genus *Pachyptila* Illiger.

1969

Gravatt, D.J. The feeding ecology of honey-eaters (Aves: Meliphagidae) on Little Barrier Island.

1972

Millener, P.R. The biology of the New Zealand Pied Cormorant *Phalacrocorax varius varius* (Gmelin 1789).

1973

Oliver, R.B. Studies of the breeding biology of the Southern Black-backed Gull (*Larus dominicanus*) on Rangitoto Island.

1975

Hay, J.R. The vocal behaviour of the New Zealand Robin (*Petroica australis*) and its local congeners.

McLean, I.G. Aspects of the social and feeding ecology of the Fantail (*Rhipidura fuliginosa*).

1977

Cox, G.J. Utilization of New Zealand mangrove swamps by birds.

Galbraith, M.P. Variation in the song of the Chaffinch (*Fringilla coelebs*) with particular reference to dialectical patterns.

Willams, P.C. Aspects of the biology of Blackbirds and Thrushes.

1978

Bisset, J.E. Aspects of the song and social behaviour of the Tomtit (*Petroica macrocephala*)

Jones, G. The Little Blue Penguin (*Eudyptula minor*) on Tiritiri Matangi Island.

Appendix

1979

Dawe, M.R. Behaviour and ecology of the Red-crowned Parakeet (*Cyanoramphus novaeseelandiae*) in relation to management.

1980

Lovegrove, T.G. The Saddleback pair bond.

O'Callaghan, A.P. Use of space by the North Island Saddleback (*Philesturnus carunculatus rufusater*).

Stewart, A.M. The social organisation and foraging ecology of the Tui (*Prothemadera novaeseelandiae*).

1981

Hughes, A.J. The vocal dynamics of the North Island Kokako.

Nugent, G. Chromosomal sexing and sexual dimorphism in a monogamous bird.

1982

Becker, A.M. Analysis of the spatial pattern of a communal gallinule, the Pukeko (*Porphyrio porphyrio melanotus* Temminck).

Brunton, D.H. The vocal behaviour of the Brown Skua (*Catharacta skua lonnbergi*) and the Southern Black-backed Gull (*Larus dominicanus*).

Clapperton, B.K. The role of vocalisations in the social organisation of the Pukeko (*Porphyrio porphyrio melanotus* Temminck).

Dawson, S.M. Chaffinch song repertoires and the Beau Geste hypothesis.

White, C.S. Helping behaviour of the Pukeko.

1985

Moorhouse, R. Ecology of Kakapo (*Strigops habroptilus* Gray 1845) liberated on Little Barrier Island.

Rasch, G. The behavioural ecology and management of the Stitchbird.

1986

Sheils, D.M.T. The Starling (*Sturnus vulgaris*) and the synchronism of breathing with vocalizations.

1987

Boyd, S. Patterns of use of beach honeydew by birds and insects.

Davis, A.M. The behavioural ecology and management of New Zealand Shore Plover.

Flint, E.L. Non-breeding aggregations of skuas on South East Island; a behavioural analysis.

Green, T.C. Comparative ecology of Red-crowned Parakeets on Little Barrier Island.

Plunkett, G.M. Cultural evolution in Chaffinch song; processes from micro and macro geographical pattern analysis.

1988

Allen, D.G. Whitehead (*Mohoua albicilla*) behavioural ecology on Little Barrier Island.

Beggs, J. Energetics of Kaka in a South Island beech forest.

Murphy, S.M. The interaction of social organisation and parentage with vocalisation in the North Island Saddleback.

Tennyson, A.J.D. Sexual dimorphism of calls and aerial calling in the Procellariiformes.

University of New Zealand

DSc

1939

Falla, R.A. Antarctic birds.

1941

Archey, G.E. The moa - a study of Dinornithiformes.

1952

Richdale, L.E. Studies of seabird life histories.

Compiled by L. Gurr

References

Note: Ornithological theses produced at New Zealand universities, 1939-89, are listed in the Appendix.

- ADRET-HAUSBERGER, M.; JENKINS, P.F. 1988. Complex organization of the warbling song in the European Starling *Sturnus vulgaris*. Behaviour 107: 138-156.
- ANDERSON, A. 1984. The extinction of moa in southern New Zealand. Pp. 728-740 in Martin, P.S. & Klein, R.G. (eds.) Quaternary Extinctions. Tucson: Univ. of Arizona Press.
- ANDREWS, J.R.H. 1986. The Southern Ark. Zoological Discovery in New Zealand 1769-1900. Auckland: Century Hutchinson.
- ANONYMOUS 1980. Preliminary Report of the Campbell Island Expedition 1975-76. Wellington: Dept. Lands & Survey.
- ARCHEY, G. 1923. Notes on birds of the subantarctic islands. Rec. Cant. Mus. 2: 117-201.
- ARCHEY, G.; LINDSAY, C. 1924. Notes on the birds of the Chatham Islands. Rec. Cant. Mus. 2: 187-201.
- ATKINSON, I.A.E. 1988. Presidential address. Opportunities for ecological restoration. NZ J. Ecol. 11:1-12.
- AUBRECHT, G. 1988. Andreas Reischek. Der berühmte Neuseelandforscher aus Weinberg. Das Maehlviertel. Natur-Kultur-Leben. Oberoesterreichische Landesausstellung 1988. Beitrage: 231-238. Linz.
- BAKER, A.J. 1973. Distribution and numbers of New Zealand oystercatchers. Notornis 20: 128-144.
- BAKER, A.J. 1973. Genetics of plumage variability in the Variable Oystercatcher (*Haematopus unicolor*). Notornis 20: 330-345.
- BAKER, A.J. 1975. Lipid levels in the South Island Pied Oystercatcher (*Haematopus ostralegus finschi*). NZ J. Zool. 2: 425-434.
- BAKER, A.J.; JENKINS, P.F. 1986. Founder effect and cultural evolution of songs in an isolated population of Chaffinches (*Fringilla coelebs*) in the Chatham Islands. Animal Behaviour 34.
- BAKER, A.J.; MOEED, A. 1987. Rapid genetic differentiation and founder effect in colonizing populations of Common Mynas (*Acridotheres tristis*). Evolution 41: 525-538.
- BAKER, A.J.; PARSLAW, M.; CHAMBERS, D. 1981. Karyological studies of a female Variable Oystercatcher (*Haematopus unicolor*). Can. J. Genet. Cytol. 23: 611-619.
- BARLOW, M. 1983. Thrushes and Blackbirds in city park. Notornis 30: 232.
- BARTLE, J.A.; SAGAR, P.M. 1987. Intraspecific variation in the New Zealand Bellbird *Anthornis melanura*. Notornis 34: 253-306.
- BEAGLEHOLE, J.C. (ed.) 1963. The Endeavour Journal of Sir Joseph Banks. 2 vols. Sydney: Public Library of NSW.
- BEAGLEHOLE, J.C. (ed.) 1967. The Journals of Captain James Cook and his Voyages of Discovery. III. The Voyage of the Resolution and Discovery 1776-1780. 2 parts. Hakluyt Soc.
- BEALE, G. 1985. A radiological study of the Kiwi (*Apteryx australis mantelli*). J. Roy. Soc. NZ 15: 187-200.
- BEGG, A.C.; BEGG, N.C. 1966. Dusky Bay. Christchurch: Whitcombe & Tombs.
- BEGGS, J.R.; WILSON, P.R. 1987. Energetics of South Island Kaka (*Nestor meridionalis meridionalis*) feeding on the larvae of kanuka longhorn beetles (*Ochrocydus huttoni*). NZ J. Ecol. 10: 143-147.
- BELTERMAN, R.H.R.; DE BOER, L.E.M. 1984. A karyological study of 55 species of birds, including karyotypes of 39 species new to cytology. Genetica 65: 39-82.
- BENNINGTON, S.L.; CONNORS, P.G.; CONNORS, C.W.; RISEBROUGH, R.W. 1975. Patterns of chlorinated hydrocarbon contamination in New Zealand subantarctic and coastal marine birds. Environ. Pollut. 8: 135-147.
- BEST, E. 1942. Forest lore of the Maori. Dom. Mus. Bull. 14.
- BEST, H.A. 1975. The Black Tomtit. Wildlife — a Review 6: 32-37.
- BEST, H.A. 1979. Food and foraging behaviour of the Snares Fernbird. NZ J. Zool. 6: 481-488.
- BLACKBURN, A. 1965a. Breeding of the North Island Fantail. Notornis 12: 127-137.
- BLACKBURN, A. 1965b. Muttonbird Islands Diary. Notornis 12: 191-207.
- BLACKBURN, A. 1966. Some further observations on the nesting of the North Island Fantail. Notornis 13: 189-196.
- BLACKBURN, A. 1971. Some notes on Fijian birds. Notornis 18: 147-174.
- BODY, D.R. 1984. Lipid composition of eggs of the Takahe (*Notornis mantelli*) (Aves: Rallidae). NZ J. Zool. 11: 461-464.
- BOURNE, W.R.P. 1964. The relationship between Magenta Petrel and Chatham Island Taiko. Notornis 11: 139-144.
- BOURNE, W.R.P.; WARHAM, J. 1966. Geographical variation in the giant petrels of the genus *Macronectes*. Ardea 54: 45-67.

References

- BROTHERS, N.P. 1984. Breeding, distribution and status of burrow-nesting petrels at Macquarie Island. *Aust. Wildl. Res.* 12: 113-131.
- BROTHERS, N.P. 1985. Breeding biology, diet and morphometrics of the King Shag *Phalacrocorax albiventer purpurascens* at Macquarie Island. *Aust. Wildl. Res.* 12: 81-94.
- BROTHERS, N.P.; SKIRA, I.J. 1984. The Weka on Macquarie Island. *Notornis* 31: 145-154.
- BULL, P.C. 1952. Birds and mammals of western Taupo. *NZ Sci. Rev.* 10: 91.
- BULL, P.C. 1953. Observations on a marked population of Blackbirds at Lower Hutt. *Notornis* 5: 149-156.
- BULL, P.C. 1957. Distribution and abundance of the Rook (*Corvus frugilegus* L.) in New Zealand. *Notornis* 7: 137-161.
- BULL, P.C. 1968. Work of Animal Ecology Division DSIR in Hawke's Bay. In Wellwood, J.M. (ed.) *Hawke's Bay Acclimatisation Society Centenary, 1868-1968*. Hastings: Hawke's Bay Acclimatisation Society.
- BULL, P.C. 1970. Bird distribution — a new mapping scheme. *Notornis* 17: 231-235.
- BULL, P.C.; BOESON, B.W. 1961a. Preliminary analysis of records of "storm-killed" sea birds from New Zealand 1939-59. *Notornis* 9: 185-199.
- BULL, P.C.; BOESON, B.W. 1961b. Seabirds found dead in New Zealand in 1960. *Notornis* 9: 225-230.
- BULL, P.C.; BOESON, B.W. 1963. Seabirds found dead in New Zealand in 1961. *Notornis* 10: 256-277.
- BULL, P.C.; FALLA, R.A. 1951. Observations on birds. *NZ DSIR Bull.* 103: 76-92.
- BULL, P.C.; GAZE, P.D.; ROBERTSON, C.J.R. 1978. *Bird Distribution in New Zealand. A Provisional Atlas 1969-1976*. Wellington: OSNZ.
- BULL, P.C.; GAZE, P.D.; ROBERTSON, C.J.R. 1985. *The Atlas of Bird Distribution in New Zealand*. Wellington: OSNZ.
- BULL, P.C.; PORTER, R.E.R. 1975. Distribution and numbers of the Rook (*Corvus frugilegus* L.) in the North Island of New Zealand. *NZ J. Zool.* 2: 63-92.
- CALDER, W.A.; DAWSON, T.J. 1978. Resting metabolic rates of ratite birds: the kiwis and the Emu. *Comp. Biochem. Physiol.* 60A: 479-481.
- CALDER, W.A.; PARR, C.R.; KARL, D.P. 1978. Energy content of eggs of the Brown Kiwi *Apteryx australis*: an extreme in avian evolution. *Comp. Biochem. Physiol.* 60A: 177-179.
- CALDER, W.A.; ROWE, B. 1977. Body mass changes and energetics of the kiwi's egg cycle. *Notornis* 24: 129-135.
- CARRICK, R.C. 1972. Population ecology of the Australian Black-backed Magpie, Royal Penguin, and Silver Gull. *US Bureau Sport Fish. Wildl., Wildl. Res. Rep.* 2: 41-99.
- CARRICK, R.C.; INGHAM, S.E. 1970. Ecology and population dynamics of Antarctic sea birds. In Holdgate, M.W. (ed.) *Antarctic Ecology*. Vol. 1. New York: Academic Press.
- CASSELLS, R. 1984. The role of prehistoric man in the faunal extinctions of New Zealand and other Pacific islands. In Martin, P.S.; Klein, R.G. (eds.). *Quaternary Extinctions*. Tucson: Univ. of Arizona.
- CLAPPERTON, B.K.; JENKINS, P.F. 1984. Vocal repertoire of the Pukeko (*Aves: Rallidae*). *NZ J. Zool.* 11: 71-84.
- CLOUT, M.N.; GAZE, P.D. 1984. Effects of plantation forestry on birds in New Zealand. *J. Appl. Ecol.* 21: 795-815.
- COCKREM, J.F. 1989. Reproductive physiology and the management of the Kakapo. Ecology Division (DSIR) Report 18.
- COPSON, G.R. 1988. The status of the Black-browed and Grey-headed Albatrosses on Macquarie Island. *Pap. Proc. Roy. Soc. Tasmania* 122: 137-141.
- CRAIG, J.L. 1972. Investigation of the mechanism maintaining polymorphism in the New Zealand Fantail, *Rhipidura fuliginosa* (Sparman). *Notornis* 19: 45-55.
- CRAIG, J.L.; JENKINS, P.F. 1982. The evolution of complexity in broadcast songs of passerines. *J. Theoret. Biol.* 95: 415-422.
- CRAIGIE, E.H. 1930. Studies on the brain of the Kiwi (*Apteryx australis*). *J. Comp. Neurol.* 49: 223-357.
- CUNNINGHAM, J.M. 1943. Report for period ending June, 1942, on population, song, and habits of birds in Masterton gardens. *NZ Bird Notes* 1: 3-6.
- CUNNINGHAM, J.M. 1951. The position of the Myna in 1950. *Notornis* 4: 66-67.
- CUNNINGHAM, J.M. 1955. Diagrammatic expression of the seasonal intensity of bird song. *Proc. 11th Int. Ornith. Congress*: 555-560.
- DARBY, M.M. 1970. Summer seabirds between New Zealand and McMurdo Sound. *Notornis* 17: 28-55.
- DAWSON, D.G. 1970. Estimation of grain loss due to Sparrows (*Passer domesticus*) in New Zealand. *NZ J. Ag. Res.* 13: 681-688.
- DAWSON, D.G.; BULL, P.C. 1970. A questionnaire of bird damage to fruit. *NZ J. Ag. Sci.* 13: 362-371.
- DAWSON, D.G.; BULL, P.C. 1975. Counting birds in New Zealand forests. *Notornis* 22: 101-109.
- DAWSON, D.G.; DILKS, P.J.; GAZE, P.D.; McBURNEY, J.G.R.; WILSON, P.R. 1978. Seasonal differences in bird counts in forest near Reefton, South Island, New Zealand. *Notornis* 25: 257-278.
- DAWSON, S.M.; JENKINS, P.F. 1983. Chaffinch song repertoires and the Beau Geste hypothesis. *Behaviour* 87: 256-269.
- DE BOER, L.E.M. 1980. Do the chromosomes of the kiwi provide evidence for a monophyletic origin of the ratites? *Nature* 287: 84-85.
- DE BOER, L.E.M.; BELTERMAN, R.H.R. 1980. The chromosomes of three parrots: the Kea (*Nestor notabilis*), the Yellow-headed Parrot (*Amazona ochrocephala*) and the Grey Parrot (*Psittacus erithacus*). *Acta*

- Zool. Pathol. Antverpiensia 75: 9-18.
- DENNISON, M.D.; ROBERTSON, H.A.; CROUCHLEY, D. 1984. Breeding of the Chatham Island Warbler (*Gerygone albofrontata*). Notornis 31: 97-105.
- DIAMOND, J.M.; VEITCH, C.R. 1981. Extinctions and introductions in the New Zealand avifauna: cause and effect? Science 211: 499-501.
- DILKS, P.J. 1975a. The breeding of the Feral Pigeon (*Columba livia*) in Hawke's Bay, New Zealand. Notornis 22: 295-301.
- DILKS, P.J. 1975b. Diet of Feral Pigeons (*Columba livia*) in Hawke's Bay, New Zealand. NZ J. Ag. Res. 18: 87-90.
- DILKS, P.J. 1979. Observations on the food of feral cats on Campbell Island. NZ J. Ecol. 2: 64-66.
- DILKS, P.J.; WILSON, P.R. 1979. Feral sheep and cattle and Royal Albatrosses on Campbell Island; population trends and habitat changes. NZ J. Zool. 6: 127-139.
- DOWDING, J.E.; TAYLOR, M.J. 1987. Genetics of polymorphism in the Little Shag. Notornis 34: 51-57.
- EDGAR, A.T. 1969. Estimated population of the Red-breasted Dotterel. Notornis 16: 85-100.
- EDGAR, A.T.; KINSKY, F.C.; WILLIAMS, G.R. 1965. The Kermadec Expedition 17-25 November, 1964. Notornis 12: 3-43.
- FALLA, R.A. 1924. Discovery of a breeding place of Buller's Shearwater, Poor Knights Island, New Zealand. Emu 24: 37-43.
- FALLA, R.A. 1965. Distribution of Hutton's Shearwater in New Zealand. Notornis 12: 66-70.
- FALLA, R.A. 1978. Banded Dotterel at the Auckland Islands: description of a new sub-species. Notornis 25: 101-108.
- FALLA, R.A.; SIBSON, R.B.; TURBOTT, E.G. 1966. A Field Guide to the Birds of New Zealand and Outlying Islands. London: Collins.
- FARABAUGH, S.M. 1982. The ecological and social significance of duetting. In Kroodsma, D.E.; Miller, E.H.; Ouellet, H. (eds.) Acoustic Communication in Birds. Vol. 2. New York: Academic Press.
- FARNER, D.S. 1956. Body temperature of the Fairy Prion (*Pachyptila turtur*) in flight and at rest. J. Appl. Physiol. 8: 546-548.
- FARNER, D.S. 1958. Incubation and body temperatures in the Yellow-eyed Penguin (*Megadyptes antipodes*). Auk 75: 249-262.
- FARNER, D.S.; CHIVERS, N.; RINEY, T. 1956. The body temperatures of the North Island Kiwis. Emu 56: 199-206.
- FITZGERALD, B.M.; MEADS, M.J.; WHITAKER, A.H. 1986. Food of the Kingfisher (*Halcyon sancta*) during nesting. Notornis 33: 23-32.
- FLEMING, C.A. (Convener) 1953. Checklist of New Zealand Birds. Wellington: Reed.
- FLEMING, C.A. 1939. Birds of the Chatham Islands. Emu 38: 380-413, 492-509.
- FLEMING, C.A. 1943. Notes on the life history of the Silver-eye based on colour-banding. Emu 42: 193-217.
- FLEMING, C.A. 1948. The Snares Islands expedition, 1947. NZ Bird Notes 2: 181-184.
- FLEMING, C.A. 1962. History of the New Zealand land bird fauna. Notornis 9: 270-274.
- FLEMING, C.A. 1982. George Edward Lodge. The Unpublished New Zealand Bird Paintings. Wellington: Nova Pacifica.
- FLEMING, C.A.; BAKER, A.N. 1973. The Snares Western Chain. Notornis 20: 37-45.
- FLEMING, C.A.; WODZICKI, K.A. 1952. A census of the Gannet (*Sula serrator*) in New Zealand. Notornis 5: 39-78.
- FLUX, J.E.C. 1966. Breeding of Song Thrushes and Blackbirds at St Arnaud, Nelson. Notornis 13: 142-149.
- FLUX, J.E.C. 1987. Drift in laying dates of Starlings *Sturnus vulgaris*. Ornis Scandinavica 18: 146-148.
- FLUX, J.E.C.; FLUX, M.M. 1981. Population dynamics and age structure of Starlings (*Sturnus vulgaris*) in New Zealand. NZ J. Ecol. 4: 65-72.
- FLUX, J.E.C.; FLUX, M.M. 1982. Artificial selection and gene flow in wild Starlings, *Sturnus vulgaris*. Naturwissenschaften 69: 96-97.
- FOGGO, M. N. 1984. Some observations on the southern subspecies of the New Zealand Pipit. Notornis 31: 1-5.
- FORSTER, J.G.A. 1777. A Voyage Round the World in His Britannic Majesty's Sloop Resolution. 2 vols. London.
- FORSTER, J.R. 1778. Observations Made During A Voyage Round the World on Physical Geography, Natural History and Ethic Philosophy. London.
- FORSTER, J.R. 1781. Historia Aptenodytae ... Commentationes Societatis Regiae Scientiarum Gottingensis 3: 121-148.
- FORSTER, J.R. 1785. Memoire sur les Albatros ... Memoires de Mathematique et de Physique ... 10: 563-572.
- FORSTER, J.R. 1788. Enchiridion Historiae Naturali Inserviens ... Halle.
- FRANKEL, O.H.; SOULE, M.E. 1981. Conservation and Evolution. Cambridge Univ. Press.
- GAZE, P.D. 1985. Distribution of Yellowheads (*Mohoua ochrocephala*) in New Zealand. Notornis 32: 261-269.
- GAZE, P.D.; CLOUT, M.N. 1983. Honeydew and its importance to birds in beech forests of South Island, New Zealand. NZ J. Ecol. 6: 33-37.
- GIBB, J.A. 1961. Ecology of the birds of Kaingaroa forest. Proc. NZ Ecol. Soc. 8: 29-38.

References

- GILL, B.J. 1977. Counts of birds from a car in the Manawatu. *Notornis* 24: 75-81.
- GILLESPIE, G.D. 1982. Factors affecting daily seed intake of the Greenfinch, *Carduelis chloris*. *NZ J. Zool.* 9: 295-300.
- GRAU, C.R. 1982. Egg formation in Fiordland Crested Penguins (*Eudyptes pachyrhynchus*). *Condor* 84: 172-177.
- GURR, L. 1954. A study of the Blackbird *Turdus merula* in New Zealand. *Ibis* 96: 225-261.
- HACKWELL, K.R.; DAWSON, D.G. 1980. Designing forest reserves. *Forest and Bird* 218: 8-15.
- HAMEL, J. 1972. Pipits, Skylarks and rainfall. *Notornis* 19: 20-25.
- HARPER, P.C. 1972. The field identification and distribution of the Thin-billed Prion (*Pachyptila belcheri*) and the Antarctic Prion (*Pachyptila desolata*). *Notornis* 19: 140-175.
- HARPER, P.C. 1978. The plasma proteins of some albatrosses and petrels as an index of relationship in the Procellariiformes. *NZ J. Zool.* 5: 509-548.
- HARPER, P.C. 1987. Feeding behaviour and other notes on 20 species of Procellariiformes at sea. *Notornis* 34: 169-192.
- HARPER, P.C.; FOWLER, J.A. 1987. Plastic pellets in New Zealand storm-killed prions (*Pachyptila* spp.). *Notornis* 34: 65-70.
- HARROW, G. 1965. Preliminary report on discovery of nesting site of Hutton's Shearwater. *Notornis* 12: 59-65.
- HAUER, F. VON 1891. Jahresbericht fuer 1890. *Annalen des k.k. Naturhistorischen Hofmuseums* 6: 1-15.
- HICKS, G.R.F. 1973. Latitudinal distribution of seabirds between New Zealand and the Ross Sea, December 1970. *Notornis* 20: 231-250.
- HINDELL, M.A. 1988a. The diet of the Royal Penguin *Eudyptes schlegeli* at Macquarie Island. *Emu* 88: 219-226.
- HINDELL, M.A. 1988b. The diet of the Rockhopper Penguin *Eudyptes chrysocome* at Macquarie Island. *Emu* 88: 227-233.
- HINDELL, M.A. 1988c. The diet of the King Penguin *Aptenodytes patagonicus* at Macquarie Island. *Ibis* 130: 193-203.
- HOARE, M.E. (ed.) 1982. The Resolution Journal of Johann Reinhold Forster 1772-1775. 4 vols. Hakluyt Soc.
- HOARE, M.E. 1976. The Tactless Philosopher. Johann Reinhold Forster (1729-98). Melbourne: Hawthorn Press.
- HOLDAWAY, R.N. 1989. New Zealand's pre-human avifauna and its vulnerability. *NZ J. Ecol.* 12 (Suppl.): 11-25.
- HORNE, R.S.C. 1985. Diet of Royal and Rockhopper Penguins at Macquarie Island. *Emu* 85: 150-156.
- HORNING, D.S.; HORNING, C.J. 1974. Bird records of the 1971-1973 Snares Islands, New Zealand, Expedition. *Notornis* 21: 13-24.
- HUTTON, F.W. 1869. On the mechanical principles involved in the flight of the albatross. *Trans. NZ Inst.* 2: 227.
- IMBER, M.J. 1983. The lesser petrels of Antipodes Islands, with notes from Prince Edward and Gough Islands. *Notornis* 30: 283-298.
- IMBER, M.J. 1984. The age of Kerguelen Petrels found in New Zealand. *Notornis* 31: 89-91.
- JACKSON, W.R.; OLSEN, M. 1988. A study of Cattle Egret numbers in the Horowhenua. *Notornis* 35: 83-85.
- JENKINS, J. 1981. Birds seen at sea during the 1978 BAAS Expedition. *Australas. Seabird Grp. Newsl.* 16: 13-16.
- JENKINS, P.F. 1978. Song and social organisation of the Fernbird [abstract]. *Notornis* 25: 245.
- JENKINS, P.F. 1985. Song learning, competition and dialects. *The Behavioural & Brain Sciences* 8: 85-133.
- JENKINS, P.F.; BAKER, A.J. 1984. Mechanisms of song differentiation in introduced populations of Chaffinches (*Fringilla coelebs*) in New Zealand. *Ibis* 126: 510-524.
- JOHNSTONE, G.W. 1974. Field characters and behaviour of Giant Petrels in relation to their oceanic distribution. *Emu* 74: 209-218.
- JOHNSTONE, G.W. 1977. Comparative feeding ecology of the giant petrels *Macronectes giganteus* (Gmelin) and *M. halli* (Mathews). In Llano, G.A. (ed.) *Adaptations within Antarctic Ecosystems*. Houston: Gulf Publ.
- JOHNSTONE, G.W. 1978. Interbreeding by *Macronectes halli* and *M. giganteus* at Macquarie Island. *Emu* 78: 235.
- JOHNSTONE, G.W. 1979. Agonistic behaviour of giant petrels *Macronectes giganteus* and *M. halli* feeding at seal carcasses. *Emu* 79: 129-132.
- JONES, E. 1977. Ecology of the Feral Cat, *Felis catus* (L.) (Carnivora: Felidae) on Macquarie Island. *Aust. Wildl. Res.* 4: 249-262.
- JONES, E. 1980. A survey of burrow-nesting petrels at Macquarie Island based upon remains left by predators. *Notornis* 27: 11-20.
- JONES, E.; SKIRA, I.J. 1979. Breeding distribution of the Great Skua at Macquarie Island in relation to numbers of rabbits. *Emu* 72: 19-23.
- KAHN, R.L. et al. (eds.) 1972. *Georg Forsters Werke ... Vol. 4*. Berlin.
- KEAR, J.; SCARLETT, R. 1970. The Auckland Islands Merganser. *Wildfowl* 21: 78-86.
- KERRY, K.R.; COLBACK, G.C. 1972. Light-mantled Sooty Albatrosses at Macquarie Island. *Aust. Bird Bander* 10: 61-62.

- KINSKY, F.C. 1968. An unusual seabird mortality in the southern North Island (New Zealand) April, 1968. *Notornis* 15: 143-155.
- KINSKY, F.C. (Convener) 1970. Annotated Checklist of the Birds of New Zealand Including the Birds of the Ross Dependency. Wellington: Reed.
- KINSKY, F.C. 1971. The consistent presence of paired ovaries in the kiwi (*Apteryx*) with some discussion of this condition in other birds. *J. Orn.* 112: 334-357.
- KINSKY, F.C. (Convener) 1980. Amendments and additions to the 1970 Annotated Checklist of the Birds of New Zealand. *Notornis* 27 (Suppl.): 1-23.
- KIRK, A.A.; WODZICKI, K.A. 1943. One year of bird observations at Waikanae River Estuary. *NZ Bird Notes* 1: 11-16.
- KIRK, T.W. 1891. Note on the breeding habits of the European Sparrow (*Passer domesticus*) in New Zealand. *Trans. Proc. NZ Inst.* 23: 108-110.
- KUSCHEL, G. (ed.) 1975. Biogeography and Ecology in New Zealand. The Hague: Junk.
- LEACH, F. 1979. Excavations in the Washpool Valley. *Nat. Mus. NZ Bull.* 21: 67-136.
- LORENZ-LIBURNAU, L. VON 1902. Zur Ornithologie Neuseelands. *Annalen des k.k. Naturhistorischen Hofmuseums Wien* 17: 301-322.
- LUGG, D.J.; JOHNSTONE, G.W.; GRIFFIN, B.J. 1978. The outlying islands of Macquarie Island. *Geogr. J.* 144: 277-287.
- LYSAGHT, A. 1959. Some eighteenth century bird paintings in the library of Sir Joseph Banks (1743-1820). *Bull. BM (NH) (Hist. Ser.)* 1: 253-371.
- MCGLONE, M.S. 1989. The Polynesian settlement of New Zealand in relation to environmental and biotic changes. *NZ J. Ecol.* 12 (Suppl.): 115-129.
- MCLEAN, I.G.; MISKELLY, C.M. 1988. Breeding biology of the Black Tit (*Petroica macrocephala dannefaerdi*) on the Snares Islands, New Zealand. *NZ Nat. Sci.* 15: 51-59.
- MCLEAN, I.G.; WAAS, J.R. 1987. Do cuckoo chicks mimic the begging calls of their hosts? *Animal Behaviour* 35: 1896-1897.
- MCLEAN, J.C. 1911. Bush-birds of New Zealand. *Emu* 11: 1-17, 65-77, 171-187, 223-236.
- MCLENNAN, J.A. 1988. Breeding of North Island Brown Kiwi, *Apteryx australis mantelli*, in Hawke's Bay, New Zealand. *NZ J. Ecol.* 11: 89-97.
- MCLENNAN, J.A.; MacMILLAN, B.W.H. 1986. Information transfer in pigeon colonies. *NZ J. Ecol.* 9: 143-151.
- MCLENNAN, J.A.; RUDGE, M.R.; POTTER, M.A. 1987. Range size and denning behaviour of Brown Kiwi, *Apteryx australis mantelli*, in Hawke's Bay, New Zealand. *NZ J. Ecol.* 10: 97-107.
- MacMILLAN, B.W.H. 1981. Food of House Sparrows and Greenfinches in a mixed farming district, Hawke's Bay, New Zealand. *NZ J. Zool.* 8: 93-104.
- MacMILLAN, B.W.H. 1985. Breeding of Greenfinches in Hawke's Bay, New Zealand. *Notornis* 32: 85-93.
- McNAB, R. 1914. Historical Records of New Zealand. 2 vols. Wellington: Govt. Printer.
- MARPLES, B.J. 1944. Report on trapping and ringing work on the White-eye *Zosterops lateralis* throughout the Dominion. *NZ Bird Notes* 1: 41-48.
- MARPLES, B.J.; GURR, L. 1953. The Chukor in New Zealand. *Emu* 53: 283-291.
- MARTIN, P. 1984. Prehistoric overkill: the global model. Pp. 354-403 in Martin, P.S. & Klein, R.G. (eds.) *Quaternary Extinctions*. Tucson: Univ. of Arizona Press.
- MEDWAY, D.G. 1976. Extant types of New Zealand birds from Cook's Voyages. *Notornis* 23: 44-60, 120-137.
- MEDWAY, D.G. 1979a. J.R. & G. Forster and the ornithology of Cook's second voyage. In Hoare, M.E. (ed.) 1979. *Enlightenment and New Zealand 1773-1774*. Wellington: National Art Gallery.
- MEDWAY, D.G. 1979b. Some ornithological results of Cook's third voyage. *J. Soc. Bibliography Nat. Hist.* 9: 315-351.
- MEDWAY, D.G. 1981. The contribution of Cook's third voyage to the ornithology of the Hawaiian Islands. *Pacific Science* 35: 105-175.
- MEREDITH, M.A.M.; SIN, F.Y.T. 1988. Genetic variation of four populations of the Little Blue Penguin, *Eudyptula minor*. *Heredity* 60: 69-76.
- MERTON, D.V.; MORRIS, R.B.; ATKINSON, I.A.E. 1984. Lek behaviour in a parrot: the Kakapo *Strigops habroptilus* of New Zealand. *Ibis* 126: 277-283.
- MILLENER, P.R. 1988. Contributions to New Zealand's Late Quaternary avifauna. 1: *Pachyplichas*, a new genus of wren (Aves: Acanthisittidae), with two new species. *J. Roy. Soc. NZ* 18: 383-406.
- MISKELLY, C.M. 1984. Birds of the Western Chain, Snares Islands 1983-84. *Notornis* 31: 209-223.
- MISKELLY, C.M. 1987. The identity of the Hakawai. *Notornis* 34: 95-116.
- MISKELLY, C.M. 1989. Flexible incubation system and prolonged incubation in New Zealand Snipe. *Wilson Bull.* 101: 127-132.
- MITTON, J.B.; GRANT, M.C. 1984. Associations among protein heterozygosity, growth rate, and developmental homeostasis. *Ann. Rev. Ecol. Syst.* 15: 479-499.
- MOEED, A. 1975. Diets of nestling Starlings and Mynas at Havelock North, Hawke's Bay. *Notornis* 22: 291-294.
- MOEED, A. 1976. Foods of the Common Myna (*Acridotheres tristis*) in central India and in Hawke's Bay, New Zealand. *Notornis* 23: 246-249.

References

- MOEED, A. 1980. Diets of adult and nestling Starlings (*Sturnus vulgaris*) in Hawke's Bay, New Zealand. NZ J. Zool. 7: 247-256.
- MOEED, A.; FITZGERALD, B.M. 1982. Foods of insectivorous birds in forest of the Orongorongo Valley, Wellington, New Zealand. NZ J. Zool. 9: 391-403.
- MOORS, P.J. 1980. Southern Great Skuas on Antipodes Island, New Zealand: observations on foods, breeding, and growth of chicks. Notornis 27: 133-146.
- MOORS, P.J. 1986. Decline in numbers of Rockhopper Penguins at Campbell Island. Polar Rec. 23: 69-73.
- NICHOLSON, E.M. 1931. The Art of Bird-watching. London: Witherby.
- O'CONNOR, R.J.; SHRUBB, M. 1986. Farming and Birds. Cambridge: Cambridge University Press.
- OLIVER, W.R.B. 1930. New Zealand Birds. 1st ed. Wellington: Fine Arts.
- OLIVER, W.R.B. 1949. The moas of New Zealand and Australia. Dom. Mus. Bull. 15: 1-206.
- OLIVER, W.R.B. 1955. New Zealand Birds. 2nd ed. Wellington: Reed.
- PARKER, T.J. 1891. Observations on the anatomy and development of *Apteryx*. Phil. Trans. Roy. Soc. Lond. B 182: 25-134.
- PARKINSON, S. 1773. A Journal of a Voyage to the South Seas in His Majesty's Ship, The Endeavour. London.
- PERRING, F.H.; WALTERS, S.M. 1962. Atlas of the British Flora. London: Botanical Soc. of the British Isles.
- PIERCE, R.J. 1980. Habits and feeding of the Auckland Island Banded Dotterel (*Charadrius bicinctus exilis*) in autumn. Notornis 27: 309-324.
- PIERCE, R.J. 1984. Plumage, morphology, and hybridisation of New Zealand stilts *Himantopus* spp. Notornis 31: 106-130.
- PIERCE, R.J. 1984. The changed distribution of stilts in New Zealand. Notornis 31: 7-18.
- PORTER, R.E.R. 1979. Food of the Rook (*Corvus frugilegus* L.) in Hawke's Bay, New Zealand. NZ J. Zool. 6: 329-337.
- POWLESLAND, R.G.; IMBER, M.J. 1988. OSNZ Beach Patrol Scheme: information and instructions. Notornis 35: 143-153.
- PRICKETT, N. 1983. Waitotara ki Parinihi: aspects of the archaeology of the Taranaki region. NZ Archaeological Assoc. Monograph 14: 281-329.
- PRIDAY, H.E.L. (ed.) 1952. Yesterdays in Maoriland. New Zealand in the 'Eighties. [Translation of Reischek's 1924 book.] 3rd ed. Christchurch: Whitcombe & Tombs.
- PURCHAS, T.P.G. 1979. Breeding biology of Rooks (*Corvus frugilegus* L.) in Hawke's Bay, New Zealand. NZ J. Zool. 6: 321-327.
- PURCHAS, T.P.G. 1980. Feeding ecology of Rooks (*Corvus frugilegus*) on the Heretaunga Plains, Hawke's Bay, New Zealand. NZ J. Zool. 7: 557-578.
- RAY-CHAUDHURI, R. 1976. Cytotaxonomy and chromosome evolution in Passeriformes (Aves): a comparative karyotype study of seventeen species. Z. Zool. Syst. Evolut. Forsch. 14: 299-320.
- REID, B. 1965. The Adélie Penguin (*Pygoscelis adeliae*) egg. NZ J. Sci. 8: 503-514.
- REID, B. 1971a. The weight of the kiwi and its egg. Notornis 18: 245-249.
- REID, B. 1971b. Composition of a kiwi egg. Notornis 18: 250-252.
- REID, B. 1981. A North Island Brown Kiwi and its egg. Notornis 28: 287.
- REID, B.E.; BAILEY, C. 1966. The value of the yolk reserve in Adélie Penguin chicks. Rec. Dom. Mus. 5: 185-193.
- REISCHEK, A. 1884. Notes on New Zealand ornithology. Trans. NZ Inst. 17: 187-198.
- REISCHEK, A. 1885. Observations on the habits of New Zealand birds, their usefulness or destructiveness to the country. Trans. NZ Inst. 18: 96-104.
- REISCHEK, A. 1888. Notes on the islands to the south of New Zealand. Trans. NZ Inst. 21: 378-389.
- REISCHEK, A. 1892. *Turnagra crassirostris*. Neu Seeland-Drossel. Die Pio-Pio der Maori. Mittheilungen des ornithologischen Vereines in Wien 16: 195-196.
- REISCHEK, A. 1924. Sterbende Welt. Zwölf Jahre Forscherleben auf Neuseeland. Leipzig: Brockhaus.
- RICH, P.V.; BAIRD, R.F.; THOMPSON, E.M. (eds.) 1990. The Fossil Vertebrate Record of Australasia. 2nd ed. Clayton, Victoria: Monash Univ.
- RICHDALE, L.E. 1963. Biology of the Sooty Shearwater *Puffinus griseus*. Proc. Zool. Soc. Lond. 141: 1-117.
- RICHDALE, L.E.; WARHAM, J. 1973. Survival, pair bond retention and nest-site tenacity in Buller's Mollymawk. Ibis 115: 257-263.
- RINEY, T.; MIERS, K. 1956. Initial banding of *Notornis mantelli*, 1952. Notornis 6: 181-184.
- ROBERTSON, C.J.R. 1976. The Campbell Island Teal. Wildlife - a Review 7: 45-46.
- ROBERTSON, C.J.R.; BELL, B.D. 1984. Seabird status and conservation in the New Zealand region. Int. Coun. Bird Preserv. Techn. Publ. 2: 573-586.
- ROBERTSON, C.J.R.; JENKINS, J. 1981. Birds seen at sea in southern New Zealand waters, February-June 1981. Australas. Seabird Grp. Newsl. 16: 17-27.
- ROBERTSON, C.J.R.; van TETS, G.F. 1982. The status of birds at the Bounty Islands. Notornis 29: 311-336.
- ROBERTSON, H.A. 1986. OSNZ Nest Record Scheme instructions. Notornis 33: 53-57.
- ROBERTSON, H.A.; DENNISON, M.D. 1984. Sexual dimorphism of the Chatham Island Warbler *Gerygone albofrontata*. Emu 84: 103-107.
- ROBERTSON, H.A.; WHITAKER, A.H.; FITZGERALD, B.M. 1983. Morphometrics of forest birds in the Orongorongo Valley, Wellington, New Zealand. NZ J. Zool. 10: 87-98.

- ROSS, H.A. 1983. Genetic differentiation of Starling (*Sturnus vulgaris*) populations in New Zealand and Great Britain. *J. Zool.* 201: 351-362.
- ROUNSEVELL, D.E.; BROTHERS, N.P. 1984. The status and conservation of seabirds at Macquarie Island. *Int. Coun. Bird Preserv. Publ.* 2: 587-592.
- ROUNSEVELL, D.E.; COPSON, G.R. 1982. Growth rate and recovery of a King Penguin, *Aptenodytes patagonicus*, population after exploitation. *Aust. Wildl. Res.* 9: 519-525.
- ROWE, B. 1978. Incubation temperatures of the North Island Brown Kiwi (*Apteryx australis mantelli*). *Notornis* 25: 213-217.
- SADLEIR, R.M.F.S.; TAYLOR, R.H.; TAYLOR, G.A. 1986. Breeding of Antarctic Terns (*Sterna vittata bethunei*). *Notornis* 33: 264-265.
- SAGAR, P.M. 1977a. Birds of the 1976-77 Snares Islands Expedition. *Notornis* 24: 205-210.
- SAGAR, P.M. 1977b. Birds of the Western Chain, Snares Island, New Zealand. *Notornis* 24: 178-183.
- SAGAR, P.M. 1978. Breeding of Antarctic Terns at the Snares Islands, New Zealand. *Notornis* 21: 59-70.
- SAGAR, P.M. 1979. Breeding of the Cape Pigeon (*Daption capense*) at the Snares Islands. *Notornis* 26: 23-36.
- SAGAR, P.M. 1986. Sexual dimorphism of Snares Cape Pigeons (*Daption capense australe*). *Notornis* 33: 259-263.
- SAGAR, P.M.; SAGAR, J.L. 1989. The effects of wind and sea on the feeding of Antarctic Terns at the Snares Islands, New Zealand. *Notornis* 36: 171-182.
- SCOTT, D. 1971. The Auckland Islands Flightless Teal. *Wildfowl* 22: 44-45.
- SCHAUGHNESSY, P.D. 1970a. Serum proteins of two sibling species of giant petrel (*Macronectes* spp.). *Comp. Biochem. Physiol.* 33: 721-723.
- SCHAUGHNESSY, P.D. 1970b. The genetics of plumage phase dimorphism of the Southern Giant Petrel *Macronectes giganteus*. *Heredity* 25: 501-506.
- SCHAUGHNESSY, P.D. 1975. Variation in facial colour of the Royal Penguin. *Emu* 75: 147-152.
- SIBLEY, C.G.; AHLQUIST, J.E. 1981. The phylogeny and relationships of the ratite birds as indicated by DNA-DNA hybridization. *Proc. 2nd Int. Cong. Syst. & Evolutionary Biol.*: 301-335.
- SIBLEY, C.G.; AHLQUIST, J.E.; MUNROE, B.L. 1988. A classification of living birds of the world based on DNA-DNA hybridization studies. *Auk* 105: 409-423.
- SIBLEY, C.G.; WILLIAMS, G.R.; AHLQUIST, J.E. 1982. The relationships of the New Zealand wrens (*Acanthisittidae*) as indicated by DNA-DNA hybridization. *Notornis* 29: 113-130.
- SIBSON, R.B. 1963. A population study of the Wry-billed Plover (*Anarhynchus frontalis*). *Notornis* 10: 146-152.
- SMIT, F.G.A.M. 1979. The fleas of New Zealand. *J. Roy. Soc. NZ* 9: 143-232.
- SMITH, G.T. 1974. An analysis of the functions of some displays of the Royal Penguin. *Emu* 74: 27-34.
- SPELLERBERG, I.F. 1969. Incubation temperatures and thermoregulation in the McCormick Skua. *Condor* 71: 59-67.
- SPURR, E.B. 1979. A theoretical assessment of the ability of bird species to recover from an imposed reduction in numbers, with particular reference to 1080 poisoning. *NZ J. Ecol.* 2: 46-63.
- STEWART-SCOTT, I.A.; BELL, M.J. 1987. The karyotype of *Notornis mantelli* (Takahe). *NZ J. Zool.* 14: 427-428.
- STONEHOUSE, B. 1967. The general biology and thermal balances of penguins. *Adv. Ecol. Res.* 4: 131-196.
- STONEHOUSE, B. 1971. The Snares Crested Penguin. *Ibis* 113: 1-7.
- STRESEMANN, E. 1951. *Der Entwicklung der Ornithologie ...* Berlin. [English translation: Cottrell, G.W. (ed.) 1975. *Ornithology: From Aristotle to the Present*. Harvard Univ. Press.]
- TAYLOR, R.H. 1962. The Adélie Penguin *Pygoscelis adeliae* at Cape Royds. *Ibis* 104: 176-204.
- TAYLOR, R.H. 1966. Seasonal and altitudinal distribution of Kingfishers in the Nelson district. *Notornis* 13: 200-203.
- TAYLOR, R.H. 1971. Influence of man on vegetation and wildlife of Enderby and Rose Islands, Auckland Islands. *NZ J. Bot.* 9: 225-268.
- TAYLOR, R.H. 1975. Some ideas on speciation in New Zealand parakeets. *Notornis* 22: 110-121.
- TAYLOR, R.H. 1976. Chatham Island Parakeets. *Notornis* 23: 198-200.
- TAYLOR, R.H. 1979a. Predation on Sooty Terns at Raoul Island by rats and cats. *Notornis* 26: 199-202.
- TAYLOR, R.H. 1979b. How the Macquarie Island Parakeet became extinct. *NZ J. Ecol.* 2: 42-45.
- TAYLOR, R.H. 1985. Status, habits and conservation of *Cyanoramphus* parakeets in the New Zealand region. *Int. Coun. Bird Preserv. Techn. Publ.* 3: 195-211.
- TAYLOR, R.H.; BELL, B.D.; WILSON, P.R. 1970. Royal Albatrosses, feral sheep and cattle on Campbell Island. *NZ J. Sci.* 13: 78-88.
- TAYLOR, R.H.; HEATHERBELL, E.G.; HEATHERBELL, E.M. 1986. The Orange-fronted Parakeet (*Cyanoramphus malherbi*) is a colour morph of the Yellow-crowned Parakeet (*C. auriceps*). *Notornis* 33: 17-22.
- TAYLOR, R.H.; WILSON, P.R. 1982. Counting penguins from the air. *Antarctic* 9: 366-368.
- TAYLOR, R.H.; WILSON, P.R. 1985. Adélie Penguin rookeries at Coulman Island, western Ross Sea, Antarctica. *Notornis* 32: 101-107.
- THOMPSON, C.F.; FLUX, J.E.C. 1988. Body mass and lipid content at nest-leaving of European Starlings in New Zealand. *Ornis Scand.* 19: 1-6.
- TOMKINS, R.J. 1983. Fertilisation of Wandering Albatrosses on Macquarie Island. *Notornis* 30: 244-246.

References

- TOMKINS, R.J. 1984. Some aspects of the morphology of Wandering Albatrosses on Macquarie Island. *Emu* 84: 29-32.
- TOMKINS, R.J. 1985. Reproduction and mortality of Wandering Albatrosses on Macquarie Island. *Emu* 85: 40-42.
- TURBOTT, E.G. 1967. *Buller's Birds of New Zealand*. Christchurch: Whitcombe & Tombs.
- VEITCH, C.R. 1977. Arctic waders wintering in New Zealand. *Proc. NZ Ecol. Soc.* 24: 110-112.
- VEITCH, C.R. 1978. Waders of the Manukau Harbour and Firth of Thames. *Notornis* 25: 1-24.
- VOOREN, C.M. 1973. Notes on the sea birds between New Zealand and the Bounty Islands. *Notornis* 20: 301-310.
- WAGSTAFFE, R. 1978. *Type Specimens of Birds in the Merseyside County Museums*. Liverpool: Merseyside County Museums.
- WARD, L.E. 1929. *Early Wellington*. New Zealand: Whitcombe & Tombs.
- WARDLE, P.; MACRAE, A.H. 1966. Biological flora of New Zealand. I *Weinmannia*. *NZ J. Botany* 4: 114-131.
- WARHAM, J. 1971a. Body temperatures of petrels. *Condor* 73: 214-219.
- WARHAM, J. 1971b. Aspects of breeding behaviour in the Royal Penguin. *Notornis* 18: 91-115.
- WARHAM, J. 1972a. Breeding seasons and sexual dimorphism in Rockhopper Penguins. *Auk* 89: 86-105.
- WARHAM, J. 1972b. Aspects of the biology of the Erect-crested Penguin *Eudyptes sclateri*. *Ardea* 60: 145-184.
- WARHAM, J. 1974. The breeding biology and behaviour of the Snares Crested Penguin. *J. Roy. Soc. NZ* 4: 63-108.
- WARHAM, J. 1975. The Crested Penguins. In Stonehouse, B. (ed.) *The Biology of Penguins*. London: Macmillan.
- WARHAM, J. 1977. Wing loadings, wing shapes, and flight capabilities of Procellariiformes. *NZ J. Zool.* 4: 73-83.
- WARHAM, J. 1979. The voice of the Soft-plumaged Petrel. *Notornis* 26: 357-360.
- WARHAM, J. 1980. Recent trends in sub-antarctic ornithology. *Bull. Br. Orn. Club* 100: 96-102.
- WARHAM, J. 1988. Vocalisations of *Procellaria* petrels. *Notornis* 35: 169-183.
- WARHAM, J.; BELL, B.D. 1979. The birds of Antipodes Island, New Zealand. *Notornis* 26: 121-169.
- WARHAM, J.; BENNINGTON, S.L. 1983. A census of Buller's Albatross *Diomedea bulleri* at the Snares Islands, New Zealand. *Emu* 83: 112-114.
- WARHAM, J.; FITZSIMONS, C.H. 1987. The vocalisations of Buller's Mollymawk *Diomedea bulleri* (Aves: Diomedidae), with some comparative data on other albatrosses. *NZ J. Zool.* 14: 65-79.
- WARHAM, J.; JOHNS, P.M. 1975. The University of Canterbury Antipodes Island Expedition 1969. *J. Roy. Soc. NZ* 5: 103-131.
- WARHAM, J.; WILSON, G.J. 1982. The size of the Sooty Shearwater population at the Snares Islands, New Zealand. *Notornis* 29: 23-30.
- WARHAM, J.; KEELEY, B.R.; WILSON, G.J. 1977. Breeding of the Mottled Petrel. *Auk* 94: 1-17.
- WARHAM, J.; WATTS, R.; DAINTY, R.J. 1976. The composition, energy content and function of the stomach oils of petrels (Order Procellariiformes). *J. Exp. Mar. Biol. Ecol.* 23: 1-13.
- WARHAM, J.; WILSON, G.J.; KEELEY, B.R. 1982. The annual cycle of the Sooty Shearwater *Puffinus griseus* at the Snares Islands, New Zealand. *Notornis* 29: 269-292.
- WATSON, J.S. 1954. Recovery of ringed Harriers. *Notornis* 6: 6-10.
- WELLER, M.W. 1975. Ecological studies of the Auckland Islands Flightless Teal. *Auk* 92: 280-297.
- WENZEL, B.M. 1968. Olfactory prowess of the kiwi. *Nature* 220: 1133-1134.
- WESTERSKOV, K.E. 1979. Reischek's observations of Kokako during his travels in New Zealand, 1877-1889. *Forest & Bird* 13(3): 7-12.
- WESTERSKOV, K.E. 1981. Reischek's 1890 paper on "The Kakapo (*Strigops habroptilus*) in the wild and in captivity". *Notornis* 29: 263-280.
- WHITAKER, A.H. 1972. An improved mist net rig for use in forests. *Bird-banding* 43: 1-8.
- WILLIAMS, G.R. (ed.) 1973. *The Natural History of New Zealand. An Ecological Survey*. Wellington: Reed.
- WILLIAMS, G.R. 1953. The dispersal from New Zealand and Australia of some introduced European passerines. *Ibis* 95: 676-692.
- WILLIAMS, G.R. 1956. The Kakapo (*Strigops habroptilus*, Gray). A review and re-appraisal of a near-extinct species. *Notornis* 7: 29-56.
- WILLIAMS, G.R. 1960. Birds of the Goulard Downs, N.W. Nelson. *Notornis* 8: 236-243.
- WILLIAMS, G.R. 1960. Birds of the Pitcairn Islands, central South Pacific ocean. *Ibis* 102: 58-70.
- WILLIAMS, G.R. 1960. Distribution of specimens of the Kakapo (*Strigops habroptilus* Gray) in some museums throughout the world. *Rec. Dom. Mus.* 3: 219-227.
- WILLIAMS, G.R. 1960. The birds of the Cleddau River area near Milford Sound, Fiordland. *Notornis* 8: 185-188.
- WILLIAMS, G.R. 1962. Extinctions and the land and freshwater-inhabiting birds of New Zealand. *Notornis* 10: 15-32.
- WILLIAMS, G.R. 1976. The New Zealand wattlebirds (Callaeatidae). *Proc. 16th Int. Orn. Cong.*: 161-170.
- WILLIAMS, G.R.; HARRISON, M. 1972. The Laughing Owl *Sceloglaux albifacies* (Gray, 1844). A general survey of a near-extinct species. *Notornis* 19: 4-19.

- WILSON, G.J.; TAYLOR, R.H. 1984. Distribution and abundance of penguins in the Ross Sea sector of Antarctica. NZ Antarctic Rec. 6: 1-7.
- WILSON, P.R. 1980. Effects on birds of spraying DDT and DDD in orchards. NZ J. Ecol. 3: 117-124.
- WILSON, P.R.; TAYLOR, R.H.; THOMAS, B.W. 1988. Effect of topography on seasonal distribution of forest birds in the Ohikanui, Lower Buller and Inangahua valleys, North Westland. Notornis 35: 217-243.
- WODZICKI, K.A. 1946. The Waikanae Estuary, an ecological survey of New Zealand birds. Emu 46: 3-43.
- WODZICKI, K. 1967a. The Gannets at Cape Kidnappers. 1. Population changes 1945-1964. Trans. Roy. Soc. NZ (Zool.) 8: 149-162.
- WODZICKI, K. 1967b. The Gannets at Cape Kidnappers. 2. Dispersal and movements. Trans. Roy. Soc. NZ (Zool.) 9: 17-31.
- WODZICKI, K.A.; FLEMING, C.A. 1946. Census of Gannets in New Zealand. NZ Bird Notes 2: 17-18.
- WODZICKI, K.; KENNEDY, P.; FALCONER, M. 1978. Waikanae River estuary: changes to habitat and bird fauna evident from surveys thirty years apart. NZ J. Zool. 5: 551-579.
- WODZICKI, K.; LAIRD, M. 1970. Birds and bird lore in the Tokelau Islands. Notornis 17: 247-276.
- WODZICKI, K.; ROBERTSON, F.H. 1953. Notes on the life history and population trends of the Gannet (*Sula serrator*) at the Plateau gannetry, Cape Kidnappers. Emu 53: 152-168.
- WODZICKI, K.; STEIN, P. 1958. Migration and dispersal of New Zealand Gannets. Emu 58: 289-312.
- WOEHLER, E.J.; JOHNSTONE, G.W. 1988. Banding studies of giant petrels, *Macronectes* spp., at Macquarie Island. Pap. Proc. Roy. Soc. Tasmania 122: 143-152.
- YALDWYN, J.C. (ed.) 1975. Preliminary results of the Auckland Islands Expedition 1972-1973. Wellington: Dept. Lands & Survey.



This book has been published to commemorate the fiftieth anniversary of the Ornithological Society of New Zealand. It is a collection of essays by a diverse range of members of the Society. The essays cover the history of the Society and its various schemes, reminiscences of the Society's early days, reviews of various specialised aspects of ornithology — from birds in art to bird banding — and biographical accounts of key figures in the history of ornithology in New Zealand.

Accompanied by numerous illustrations, this book is a comprehensive celebration of New Zealand ornithology.

THE ORNITHOLOGICAL SOCIETY OF NEW ZEALAND INC.

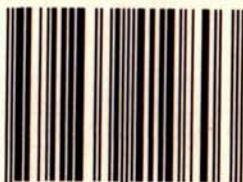
The object of the Society, which was founded in 1939, is to encourage, organise, and carry out ornithological field work, on a national scale. No special qualifications are needed for membership, excepting an interest in the study of habits and distribution of birds. Because members are scattered throughout New Zealand, the Society operates chiefly by organising co-operative investigations and by issuing publications. An annual general meeting is held in May or June, and field outings, film evenings, and addresses by experienced ornithologists are arranged through the Society's Regional Representatives in many areas.

The Society's activities include the collection of nesting records and of data on storm-killed seabirds, the promotion of special inquiries on the status of birds common and rare, and the maintenance of an ornithological library, which contains many of the world's leading ornithological journals. The Society publishes, quarterly, a journal (*Notornis*) and a newsletter (*OSNZ News*).

Further information about the Society and its activities can be obtained from the Hon. Secretary, PO Box 12397, Wellington, New Zealand.

Front cover: *Kawaupaku, Te Henga*, by Don Binney, 1967, Oil and acrylic on canvas. Collection — Library, University of Auckland.

ISBN 1-86941-080-7



9 781869 410803

RANDOM CENTURY