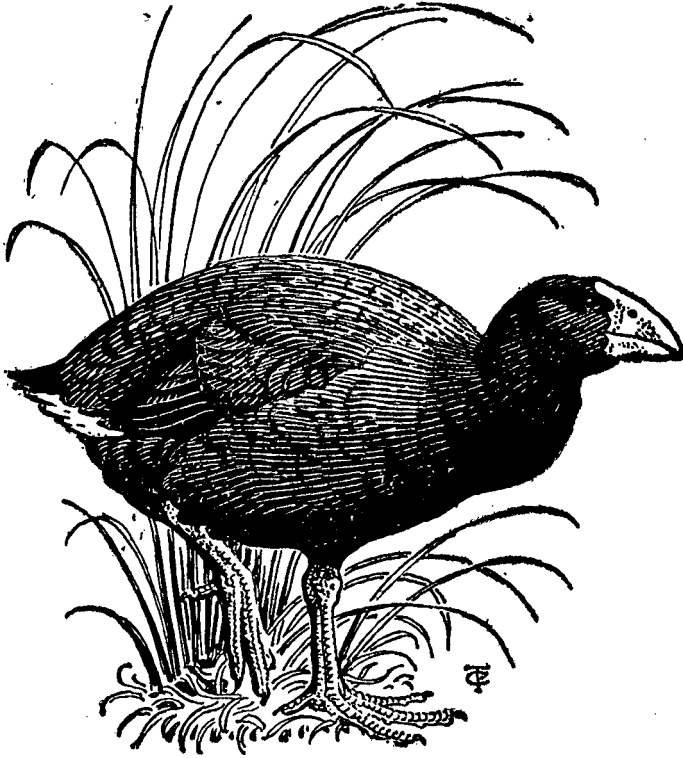


# NOTORNIS



QUARTERLY JOURNAL

of the

Ornithological Society of New Zealand  
*(Incorporated)*



Volume Thirteen, Number Two, June, 1966

# NOTORNIS

*In continuation of New Zealand Bird Notes*

Volume XIII, No. 2

JUNE, 1966

---

JOURNAL OF THE ORNITHOLOGICAL SOCIETY OF NEW ZEALAND  
(Incorporated)

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

Edited by R. B. SIBSON, 18 Entrican Avenue, Remuera, S.E. 2

Annual Subscription: Ordinary Member, £1; Endowment Member, 30/-

Life Membership, £20 (for members over thirty years of age)

*Subscriptions are a minimum of £1 a year, payable at the time of application and the first of each year thereafter.*

---

## OFFICERS 1966/67

President — Mr. A. BLACKBURN, 10 Score Road, Gisborne

Vice-Presidents:

Dr. R. A. FALLA, Dominion Museum, Wellington

Dr. G. R. WILLIAMS, Research Section, Wildlife Branch,  
Dept. of Internal Affairs, Private Bag, Wellington

Editor — Mr. R. B. SIBSON, 18 Entrican Avenue, Remuera, S.E. 2

Assistant Editor — Mr. A. BLACKBURN, 10 Score Road, Gisborne

Treasurer — Mr. H. R. McKENZIE, P.O. Box 45, Clevedon

Assistant Treasurer — Mr. D. F. BOOTH, P.O. Box 2522, Auckland, C.1

Secretary — Mr. A. T. EDGAR, Inlet Road, Kerikeri

*Members of Council:*

Mr. B. D. BELL, Wildlife Branch, Department of Internal Affairs,  
Private Bag, Wellington

Mr. B. D. HEATHER, 10 Jocelyn Crescent, Pinehaven, Silverstream  
via Trentham Camp P.O.

Mr. F. C. KINSKY, Dominion Museum, Wellington

Mr. D. McGRATH, 14 Homewood Avenue, Karori, Wellington

Mr. N. B. MACKENZIE, Pakowhai, Napier, R.D. 3

Mr. E. G. TURBOTT, Auckland Institute and Museum, Private Bag,  
Auckland, C. 1

*Co-opted Members:*

Mrs. M. BARLOW, 152 Lewis Street, Invercargill

Mrs. J. B. HAMEL, 42 Ann Street, Roslyn, Dunedin

Convener of Card Committee — Dr. G. R. WILLIAMS, Research Section,  
Wildlife Branch, Dept. of Internal Affairs, Private Bag, Wellington

Organiser of Nest Records Scheme — Miss M. M. NEILL, 40 Glen Road,  
Kelburn, Wellington, W. 1

Organiser of Beach Patrol Scheme — Mr. B. W. BOESON, Box 30  
Carterton

Organiser of Recording Scheme — Mr. A. T. EDGAR, Inlet Rd., Kerikeri  
Despatch of *Notornis* and Enquiries for Back Numbers —

Mrs. H. M. McKENZIE, P.O. Box 45, Clevedon

Librarian — Mrs. H. M. McKENZIE, Box 45, Clevedon

*Contents of Vol. 13, No. 2: June, 1966*

The Growth and Development of the South Polar Skua (Brian E. Reid) .....	71
Plate II — Three South Polar Skua Chicks in Nest Scrape .....	83
Plate III — South Polar Skua Defending Territory .....	83
Canterbury Museum Expedition to Dusky Sound (1965) (Dr. John Hall-Jones) .....	90
Plate IV — Richard Henry on Pigeon Island .....	91
Increasing Numbers of South Island Pied Oystercatchers Visiting Northern New Zealand (R. B. Sibson) .....	94
Short Note — "Paddling" in Red-billed and Black-billed Gulls	97
A Note on the Food of New Zealand Gannets (K. Wodzicki & J. Moreland) .....	98
Notes on the Foods of the North Island Kokako at Moumoukai (J. W. St. Paul) .....	99
Summary of Reports on the N.I. Kokako 1962-1964 (M. G. Macdonald) .....	101
Farewell Spit, April, 1965 (B. D. Bell) .....	104
Spine-tailed Swifts at Haast (A. Wright & H. R. McKenzie) .....	106
Reviews .....	106
Plate V — Southern Crested Grebe on Lake Fergus .....	107
Plate VI — Southern Crested Grebe at Nest .....	108
Letter .....	110
Notice .....	110
Annual General Meeting, 1966 .....	111
Summaries —	
1 Spur-winged Plover (M. L. Barlow) .....	121
2 Introduced Birds (P. C. Bull) .....	122
3 Recording Abundance of Forest Birds (J. A. Gibb) .....	123
List of Regional Organisers .....	124

## THE GROWTH AND DEVELOPMENT OF THE SOUTH POLAR SKUA (*Catharata macormicki*)

By BRIAN E. REID

Wildlife Branch, Department of Internal Affairs, Wellington

This account is based upon work carried out at Cape Hallet, Antarctica, during the summers of 1958-59, 1959-60, 1960-61, with limited observations also in 1962-63.

### METHODS

Eggs were weighed with a 0-200 gram spring balance and chicks with a 2Kg. beam balance accurate to 0.1 gm.

The methods used for measuring appendages were: *Bill length* — The standard chord of the culmen measured diagonally from the posterior of the culmicorn to the tip. *Gape Length* — A straight line from the angle of the closed gape to the tip of the culmen. *Tarsus length* — the diagonal measurement from behind the tibia metatarsal joint to the articulation of the middle toe with the metatarsus. *Toe length* — The dorsal length of the middle toe from its point of articulation to the tip of the claw. *Wing length (total)* — A straight line from the axilla to the tip of the farthest primary. *Wing length* (manus including primary feathers) — A straight line from the carpal joint to the tip of the longest primary. *Feather length* — The length of the shaft from follicle to tip. In all cases the length of the longest primary was taken.

During this study 542 weights were taken from 59 chicks of known age. A large sample was necessary because of the high mortality i.e. 18 (36 per cent.) of the 50 chicks weighed during their first week of life were dead by the end of that week. From another 29 chicks 117 sets of measurements were taken.

The work of the 1962-63 season primarily involved laboratory studies of embryological development, quantitative food requirement studies, growth correlated with nutrition, etc. A fire in late December destroyed the laboratory, equipment and all the records excepts some notes on the yolk sac and two sets of measurements.

### THE NEWLY HATCHED CHICK

The incubation time was determined by adding one day to the number of days an egg was present. Data on 295 eggs showed incubation to extend from 26 to 33 days (mean 29.5 days; S.D = 1.058). Quite audible chirping may be heard in the egg three, and sometimes four, days before the chick hatches. The hatching process, from the first visible crack in the shell to its splitting in two, usually takes from 40-56 hours.

Eight chicks weighed within 15 minutes after hatching varied from 60.8 to 75.7 (mean 69.2) grams. The lightest chick came from a light egg weighing 88 gm. Egg weights for the other seven chicks are not known but the mean weight of 38 fresh eggs (weighed within 24 hours of laying) at Cape Hallett was 97.5 gm. This suggests that the weight of a chick at hatching is approximately 70% of the weight

of a fresh egg. The one example where both the egg and chick weights are known supports this weight relationship — 60.8 (chick weight) being 69% of 88.0 (egg weight).

The chicks hatch with a yolk reserve (table 1) adequate to sustain them for up to 72 hours. Starved newly-hatched chicks were often found dead on their third day. Five of these ranged in weight from 45.6 to 55.4 (mean 51.7) grams and so unfed chicks may lose approximately 25% of their initial weight before death.

Table 1 — Yolk Weight in Newly Hatched Chicks (Gms)

Chick Weight (Total)	Yolk Weight	Chick Weight (True)	Yolk % True Weight
72.1	7.3	64.8	11.3
69.8	6.5	63.3	10.3
64.0	6.7	57.3	11.7
68.6	6.8	61.8	11.1

Externally the ingested yolk-sac is seen as a conspicuous dome-like, oval yellow 'button' on the lower abdominal surface. In one chick (64 grams with 6.7 grams of yolk) it protruded six mm. and was 13 mm. in diameter, but it is usually smaller: the mean of eight chicks being 11 x 9 x 4 mm. It is still conspicuous on 7-10 day old chicks as a hardening flat, yellow scar approximately 11 x 4 mm. Usually by the seventeenth or eighteenth day the external remnant (a small, hard, dry, withered scar) is abscessed.

Newly hatched chicks dry at varying rates. They are still damp after three hours. By the sixth hour the down on the head, back and breast is often completely dry and becoming fluffy but the lower abdomen and around the cloaca is still slightly damp. Within 9-12 hours of hatching the chicks are totally dry.

The white horny egg tooth persists variably in different chicks. Usually it remains quite distinct for the first five to seven days, and then progressively disappears. It had completely gone on one five-and-a-half day old and three eight day old chicks but was still present (although reduced) on two 10 day old chicks. Normally there is no sign of it on chicks 12 days old, although at times the bill colour remains lighter at the egg-tooth spot for another four or five days.

After hatching and before being first fed two chicks from different nests lost 13-14% of their weight in the first 14 hours when living on their yolk-reserve. Both of these chicks were fed during their first day. Weights obtained show one was given its first two small feeds when between 15 and 24 hours old. Feeding was infrequent or else small portions were given during the next 40 hours as at 65 hours the chick was lighter than it was at 39 hours and it was also 12.5% lighter than it was at hatching. It picked up later, weighing 143 grams when seven days old. The other chick was first fed when between 15-19 hours old. It was then sustained at a low level and at 32 hours was 20% below its hatching weight. It was not very lively during this

weighing and was probably close to starvation. This chick was first fed substantially (i.e. 11.3 + gm given) when approximately 56 hours old.

### PLUMAGE AND COLOUR

At hatching the wet chicks are a fairly dark bluish-grey in colour. Their blue shade is a product of the skin colour. As the down dries and becomes fluffy the chicks become a pale (often silvery) grey.

With development a gradual intensification in colouring occurs. The bill deepens from a shiny bluey-grey black to an intense lustrous black. The tarsus and toe likewise darken from blue-grey to black. The bill becomes black first (at about 23-26 days), then the webbing and toe (by about 40 days), and lastly the tarsus.

The teoptiles are a medium slate grey when they first emerge. These gradually darken, more so on the back and wings than on the chest and belly until at eight or nine weeks the back and wings are blackish-grey while the chest and underparts have deepened to a smoky slate-grey. Thereafter the colour darkens more rapidly so that by the time the fledglings leave the breeding grounds (when about 12 weeks old) their heads, chests and underparts vary from a deep grey-brown to a rich chocolate brown while their wings and backs are a dark brownish-black.

The following descriptions are of different chicks.

#### *Downy Chicks:*

Six to twelve hours old (two chicks). Down light silvery grey. Bill, shiny greyish black, darkest around the egg-tooth. Tarsus, light blue-grey; webbing, light fawn-grey; claws, grey. Eyes brown; pupils, blue.

Thirty hours old (one chick). Down, pale grey but looks pale fawn or buff in some areas — as if the very tips of the down were lightly suffused with buff. Bill, shiny dark blue-grey except around the egg-tooth where darker and blackish. Tarsus, light blue-grey; webbing, light fawn-grey. Eyes, brown; pupils, blue.

Ten days old (one chick). Down, pale grey. Appearance of blue tinge due to underlying skin colour. Bill, blue-black except for tip (in front of egg-tooth) where it is blue-grey. Tarsus, medium to light blue-grey. Toes and webbing, medium to dark grey. Iris, brown; pupil, blue.

Seventeen to eighteen days old (two chicks). Down, light grey. Contour feathers on the back approximately 8 mm. long (sheath 6-7 mm. vane 1-2 mm.). Bill, almost black and lustrous. Tarsus, light blue-grey — but with patches of dark black-grey forming (70% blue-grey, 30% black-grey). Webbing, dark grey. Iris, brown; pupil, blue.

#### *Fledglings:*

Forty-five days old (two birds). Plumage; medium smoky grey. In one bird there was a barely perceptible brownish tinge. In both specimens colouring slightly more saturated on the head and back but very even. The white base of the primaries exposed but not as broad as on the adults (i.e. feathers not fully grown) and with less distinct margins. Back and head clear of down except for one or two very small tufts. More conspicuous down patches still clinging to legs and belly and under the tail. Bill has an even, smooth black lustre. Tarsus,

blackish — the underlying blue-grey representing 40-50% of the skin colour. Toes and webbing all black in one specimen but the other had an area one half inch in diameter on the webbing of each foot just at the base of the tarsus which was unpigmented, being a watery pink in colour.

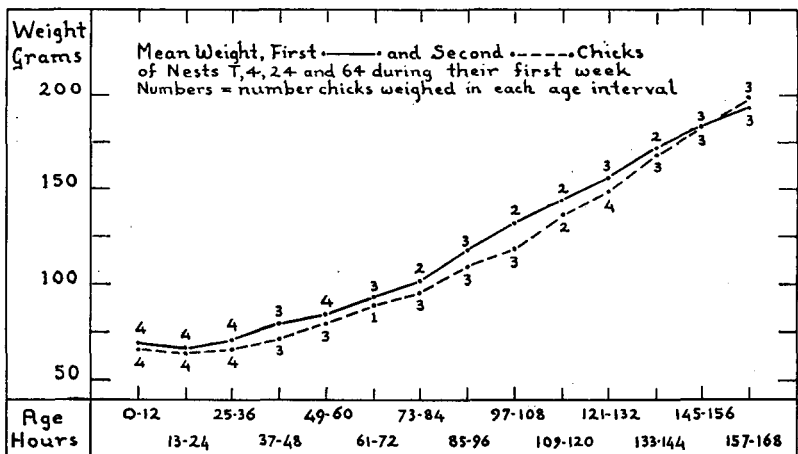
Sixty-three days old (one bird). Plumage; the head, neck, chest and belly are the same colour and degree of saturation. They are basically a warm dove-grey (Ridgway's Standard) with a faint suggestion of a brownish hue only apparent in certain lights. There is no fading of the feather tips. Colours of other specimens of a similar age range from warm dove-grey to smoky slate-grey on the belly and chest. The neck and chest are completely devoid of any yellow, straw or ochre streaks which are characteristic of adult *macconnicki* and which are also present on two-year (25 month) old birds. The back is a darker blackish-grey but the feather tips are less pigmented being a neutral grey. The feet and bill are not such an intense or lustrous black as in the adult and the tarsus is mottled with small patches of grey persisting.

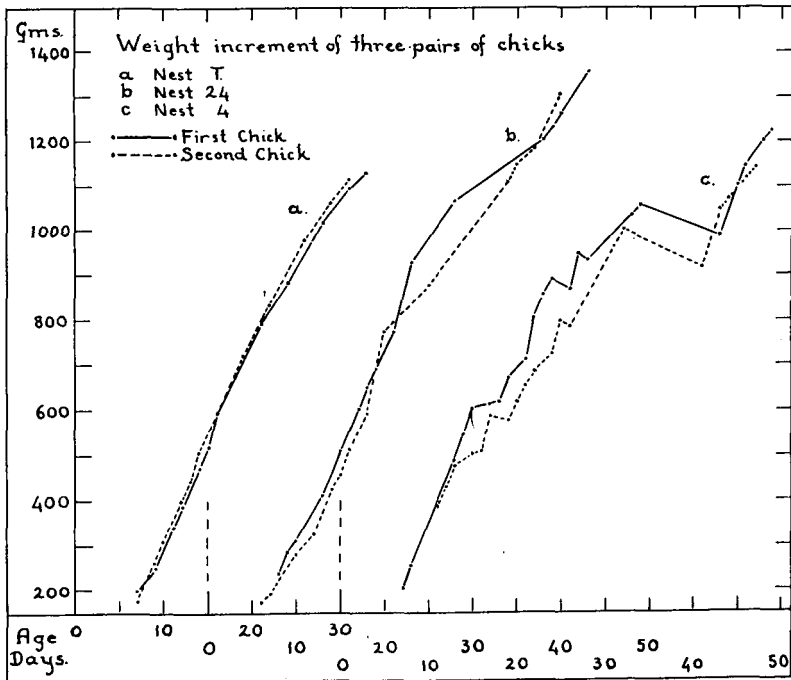
#### WEIGHTS

Young (1963a) draws attention to the limitations of weight as an index of growth. Skua chicks are often fed variable amounts at irregular intervals and weights obtained need not indicate the true relative or progressive size of chicks but merely that some have recently been fed.

In skuas the range in gross weight between well fed, "normal" and starved chicks of the same age indicates that throughout their development and particularly when nearing fledgling age the chicks can withstand a fast of several days. This ability helps reduce chick losses during some blizzards when the parents are not able to collect food.

Weights are summarised in *Appendix 1*. Chicks generally double their weight by the time they are 109-120 hours old and one did so in 97-102 hours. This chick only regained its hatching weight at 26 hours and therefore in fact doubled its weight in 71-76 hours.





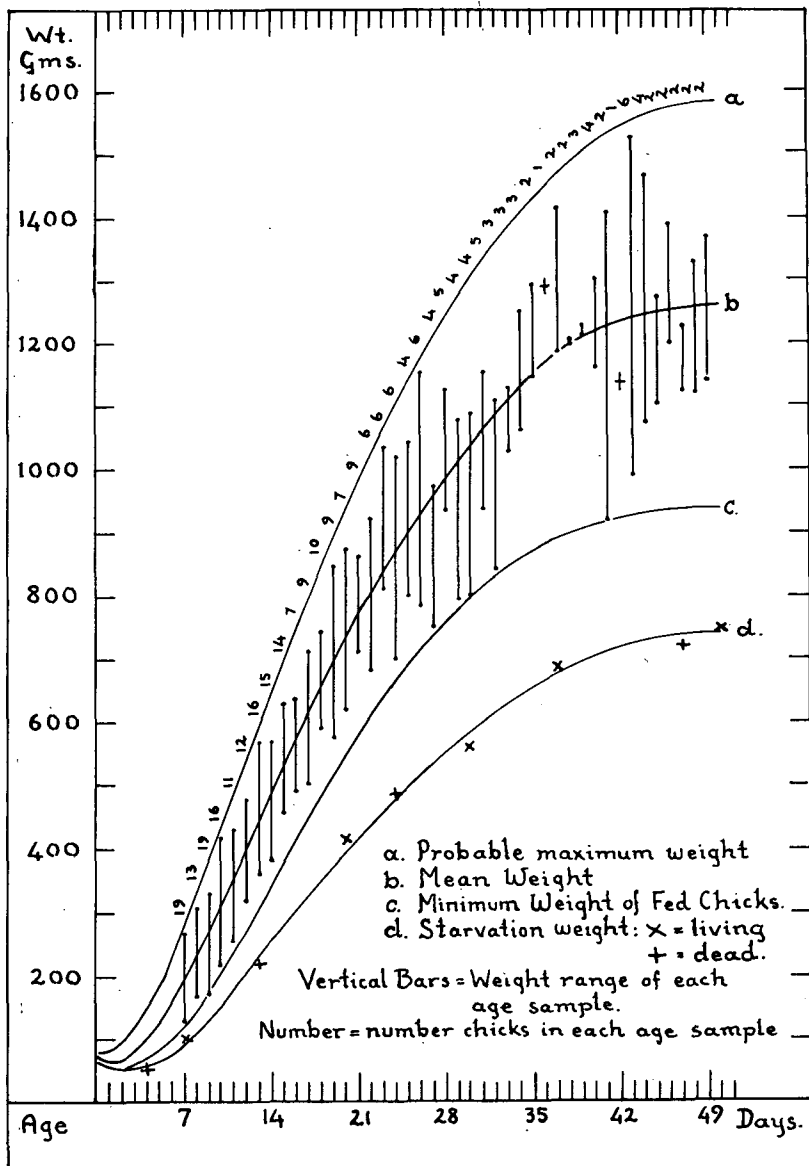
Even if emaciated specimens are excluded, there is a marked difference between heaviest and lightest fed chicks in each age group. The heaviest 55-60 hours old chick weighed 66 per cent. more than the lightest, and the heaviest 121-132 hour old chick was 52 per cent. heavier than the lightest in that age group. The greatest percentage weight increase in any given time period was 37% (41 gm) in 22 hours for a chick 100 hours old.

The mean daily increase in weight for first hatched and second hatched chicks from four nests during the first week of life is shown in *Figure 1*. At like ages these four first chicks were heavier than their younger siblings but in some other nests the younger chicks were heavier. Age for age the younger chick from one nest passed its sibling at 48 hours and remained the heavier until both were lost when approximately four weeks old. Likewise, the younger chick from another was 5.3 grams heavier than its sibling when both were 55-60 hours old.

Several pairs of chicks were weighed after their first week. Those from the three nests with the greatest number of weighings are shown in *Figure 2*. The chicks from these nests were tended by both parents (cp. Young 1963a, p. 222) and often fed together. This has given similar weight curves for the siblings in each nest.

In *Figure 3* the "probable maximum weight" curve is based on the assumption that with the large number of weights taken some chicks were probably in peak condition and also had nearly full stomachs. The "minimum weight curve of fed chicks" has been plotted along the lightest weights obtained from chicks which were either known to





live for another three days or were lively when handled. The "starved weight" curve is based on nine chicks; five living and four dead. The youngest chick contributing to this latter curve is the second chick from nest J which died towards the end of its third day. It weighed 45.6 grams and during its life had been continuously brooded but not

fed. The mean weight of fed chicks of like age (61-72 hours) is 90 (range 63-104) grams. The oldest starved chick was 50 days old weighing 730 grams. It did not respond to forced feeding and died. This chick's weight was 77% of the minimum weight of healthy chicks of the same age; 58% of their mean weight and 46% of their probable maximum weight.

Three other emaciated chicks were found. Their weights fitted approximately midway between the *c* and *d* curves in *Figure 3*. They were lost or killed before their weights dropped to the starvation threshold.

The weights of chicks at Cape Hallett substantiate Young's (1963a) observation that the later growth in rookery-fed chicks is less regular and they fail to attain the final weights reached by fish-fed chicks, the change being related to a change in the feeding habits of the adults. The mean weights of rookery-fed chicks at Cape Hallett between the ages of 35-50 days are strictly comparable with those of rookery-fed chicks of the same age at Cape Royds. However, as the following table shows, Cape Hallett chicks are significantly heavier during their first 30 days (Royds weights taken from Young's curve, p. 212).

Table 2 — Comparison Chick Weights: C. Hallett/C. Royds

Age Days	Cape Royds		Cape Hallett		Difference	
	Mean Wt.	No.	Mean Wt.	No.	Grams	Per Cent.
10	260	52	300	46	40	15.4
15	410	50	520	36	110	26.8
20	580	46	735	25	155	26.7
25	760	46	895	16	135	17.8
30	970	40	1045	13	75	7.7

No. = Number of chicks weighed

The heavier weight of Hallett chicks during their first 30 days is probably due in part to the extensive use of the station dump by these birds (i.e. the year's accumulative waste from the cookhouse) and in part to the greater natural food supply. (At Cape Hallett there were 345 breeding pairs of Adelie penguins to every pair of skuas compared with 265 pairs at Cape Royds (Taylor, 1962), (Young, 1963b) for every pair of skuas that lived almost exclusively on penguins).

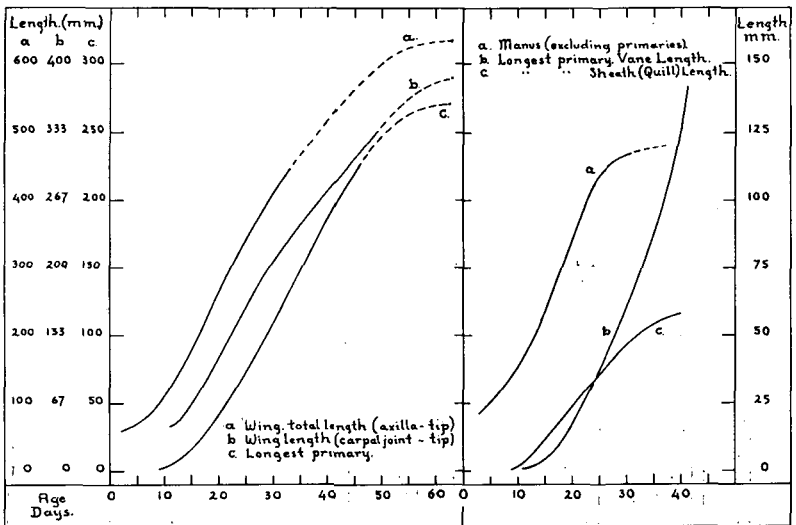
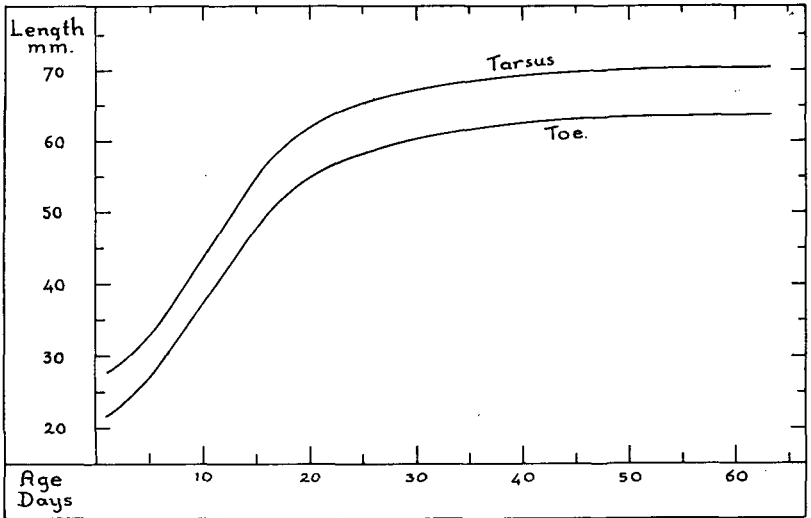
#### GROWTH (Appx. 2 and Figs. 4-7)

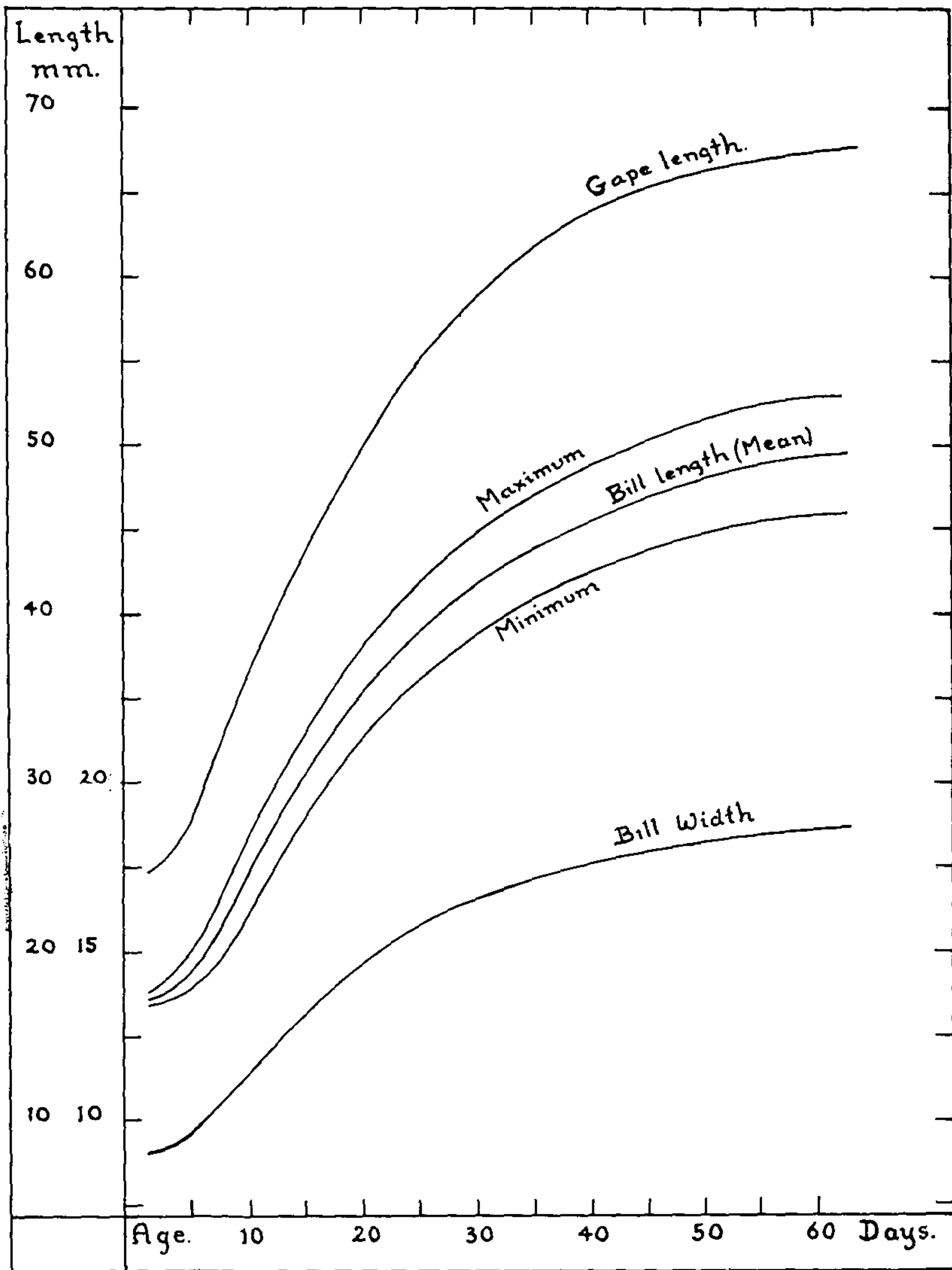
All measurements, except those for the 63-day-old fledgling, were of live chicks. They should enable future workers to determine the age of chicks to within two days.

#### RELATIVE GROWTH RATE OF APPENDAGES

Feet (*Fig. 4*) attain maximum length earlier than wings (*Fig. 5*) or bill (*Fig. 6*). Tarsus and toe lengthen at an equal rate and reach adult size simultaneously. Growth is most rapid between the fifth and eighteenth day. During this two-week period the mean length increment of both tarsus and toe is approximately 1.5 mm. a day and

nearly 60 per cent. of the total growth is made. Growth continues for another 20 to 25 days, but at a slower rate, and adult dimensions are reached by about the 40-45th day. In reaching adult size the tarsus increases threefold and the toe lengthens two and one half times. Because of their similar growth curves the size difference of six mm. between the toe and tarsus remains unaltered from hatching to maturity.





The main growth of the manus takes place between the eleventh and twenty-fourth day. During this two-week period the manus lengthens by c. 64 mm., a mean growth rate of 4.5 mm. a day. Because of feather development it was not possible to measure the manus on chicks older than 31 days, but by this age growth was slowing down and (by extrapolation) the adult size of c. 125 mm. is probably reached by the 40-45th day. In growth pattern the long bones of the

wing appear to coincide with the bones of the manus in which the start of rapid elongation lags behind the legs by about six days. By the eleventh day when the wing bones are just starting fast growth the legs (based on the growth rate of tarsus and toe) are already half grown. Thus, growth is channelled to develop one locomotory system to an efficient level before the other. Early development of the wings would serve no purpose as function is dependent on feather growth.

### FEATHER GROWTH

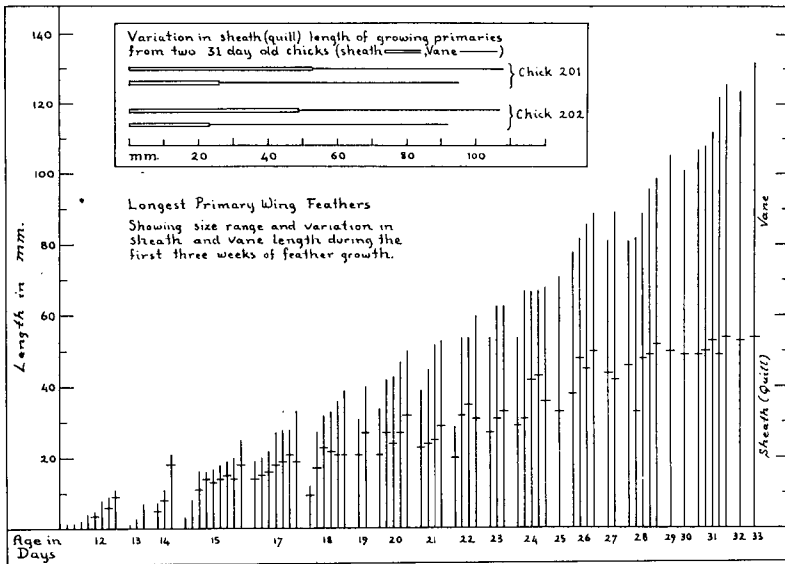
As it was not known whether primary feathers grew according to a strict pattern so that the relative length and growth rate of each feather maintained a constant relationship to the other feathers, measurements were made of the longest primary. This method was not followed by Young who sought to minimize variables by always measuring the same (i.e. seventh primary counting from the carpal joint outwards) feather. Both methods have advantages and limitations. Young's, being confined to a specific feather, is more precise, but it does not permit direct comparisons with adults where the standard measurement is from carpal joint to tip of longest primary.

Table 3 — Primary Feather Length

Age Days	Feather Length (m.m.)		Difference	
	C. Royds	C. Hallett	m.m.	per cent.
15	14	16	2	14.3
20	30	40	10	33.3
25	48	69	21	43.7
30	69	103	34	49.3
35	95	142	47	49.5
40	125	184	59	47.2
45	157	220	63	40.1

Primary feather cylinders first emerge from their follicles on the ninth or tenth day when they appear as minute stubs 0.5 mm. long. On the eleventh to thirteenth day when they are from 3-7 mm. long the protective outer sheath ruptures to expose the tip of the vane. Young (1963) observed that "for much of the growing period the quill lengthened more rapidly than the feathering was released, giving the feather a disproportionately long sheath." During the first 13-15 days of feather growth the sheath is usually longer than the vane but in 23-27 day-old chicks they are of equal length. From then on until adult size is reached the vane elongates more rapidly (Fig. 5). Measurements indicate that the most rapid growth of primaries commences around the seventeenth day when wing bones are half grown and the rate of leg growth has started to diminish.

Increase in wing length is brought about entirely by bone growth in the first ten days. Both bone and feather growth contribute during the next twenty days. At between 30-40 days growth is primarily attributable to the feathers and any increase in size after 40-45 days



is due solely to feather elongation. The most rapid lengthening of the wing is between the 15-30th days when both bone and feathers are growing rapidly. By about the thirtieth day bone growth has decreased (Fig. 5).

The proportion of vane to sheath varies appreciably in primary feathers of birds of the same age and on different feathers of the same bird (Fig. 7). In 40-45 day-old chicks the white basal portion of the primary vanes has emerged but the margin between the white and outer pigmented parts is not as sharply defined as in the adult. Contour feathers appear later than primary and secondary wing feathers.

### BODY WEIGHT IN RELATION TO WING LENGTH

Weight increases more rapidly than the rate at which the wing lengthens, but extrapolation of the limited data indicates that the ratio of adult body weight to total wing length is attained around the fiftieth to fifty-third day. As fledglings are quite competent flyers at this age, muscular development keeps pace with appendage (i.e. bone) growth. Body size and wing length increase for about another week; the latter due solely to primary feather elongation. Therefore, fledglings are first capable of flight when the wings (axilla to tip) are 95 per cent. grown. At this stage primaries may be just over 90 per cent. of their full length.

### BILL AND GAPE LENGTHS

During development the bill length increases threefold (i.e. from 17 to 50 mm.) and its width doubles (i.e. from 9 to 19 mm.). The most rapid lengthening occurs from the sixth to nineteenth day. During this two-week period nearly 50 per cent. of the growth is accomplished.

Increase of "gape length" closely parallels increase in bill length. In downy chicks the length of the bill is 70 per cent. and in adults 73 per cent. of the "gape length."

#### MOTOR CO-ORDINATION AND ACHIEVEMENT

No sooner had some newly-hatched chicks dried under their parent than they left the nest and when 12-24 hours old were frequently seen walking or squatting a few feet from the nest. This tendency to wander at an early age seems characteristic of the genus. Perry (1948) records a 24 hour old *skua* chick being three or four feet from the nest and Stonehouse (1956) mentions *lonnbergi* chicks running from the nest within a few hours of hatching. Early efforts at walking by first day *maccormicki* chicks resemble an ungainly shuffle. When standing their tarsi are but little inclined from the horizontal; thus the toes are placed well forward and are splayed apart giving a "knock-kneed" appearance. The chicks' belly is just above the ground and their centre of gravity well back so that the lightest lift on the lower bill topples them backwards. During walking the tarsi remain splayed and virtually horizontal and in contact with the ground. Imprints of a walking chick, one day old, left in a light film of snow showed the outlines of both tarsus and toe. During the first day the tarsus is used as an extension of the "foot" to give greater stability. This form of progression where, as the chicks shuffle along, the length of the pace is determined by the swing of the femur and tibio-tarsus, is probably due to an inability to hold the tarsus erect because of muscular weakness. Two-day-old chicks show a marked improvement in balance and increase in strength, and three- and four-day-old chicks (who are proficient walkers) were never observed to use the tarsus as an elongation of the "foot."

The age at which a chick first flew did not necessarily coincide with that at which it was first capable of flight, and fledglings were often reluctant to fly until a few days before their departure for the winter grounds. In general, flight is accomplished on, or about, the fiftieth day although some birds were not seen to leave the ground until approximately sixty days old. Young (1963) considers that the most important factor influencing the age of first flight is the size and siting of the territory, as chicks from large territories with gentle ridges flew earlier. At Cape Hallet, chicks from hill-side territories seemed to fly at an earlier age than those from the flat beach, and those from the north end of the beach (where the territories were larger) flew at a younger age than did chicks from the congested south end. Many of the territories in this congested area were very small and some chicks from these delayed flying, until neighbouring territories were abandoned.

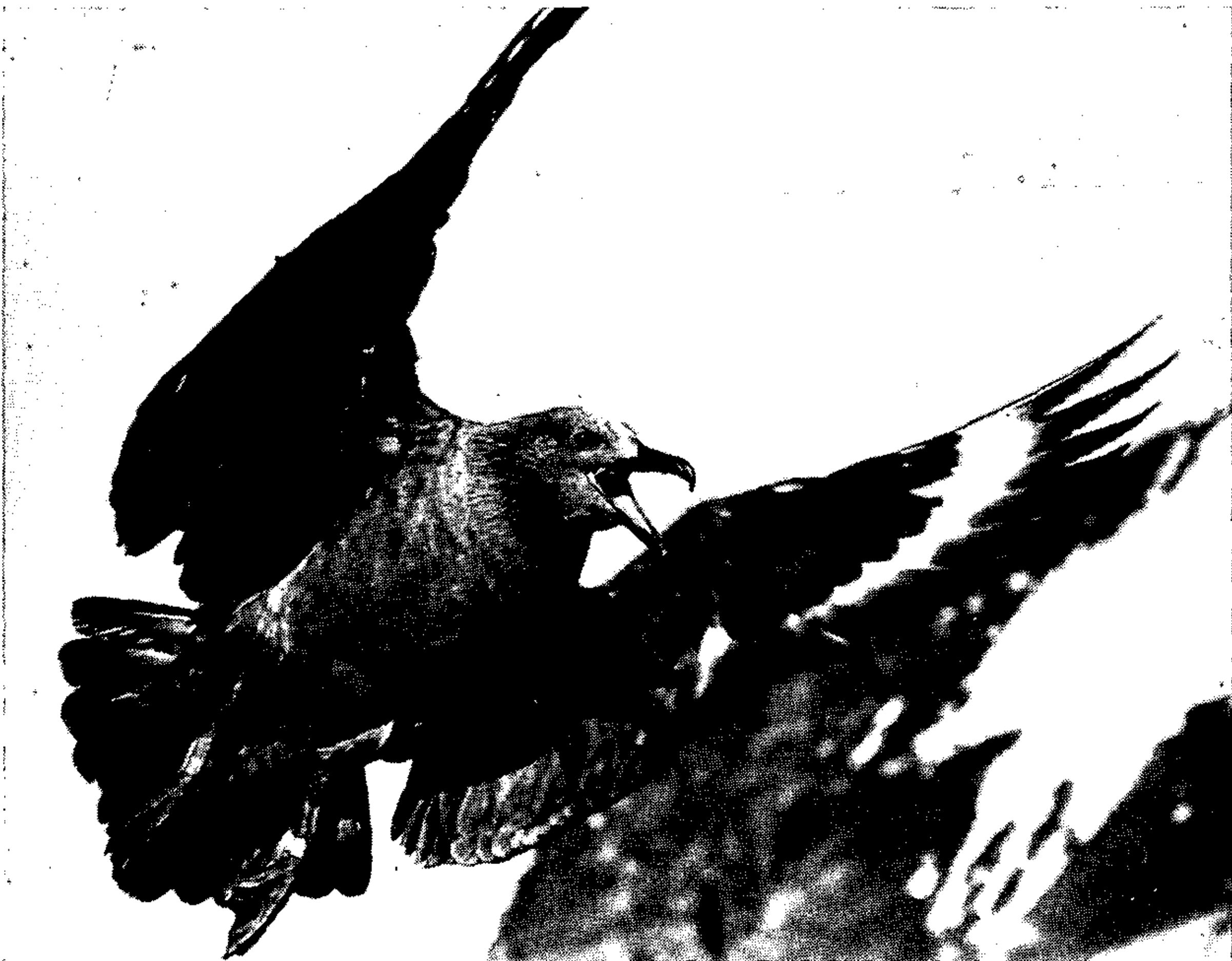
With the exception of occasional wing beating by stationary fledglings, pre-flying exercises were not noted.

Some fledglings were chased or harassed to determine at what age they could fly. Two 45-day-old fledglings ran with wings outstretched, but did not leave the ground. Another two ran, rose a few inches above the ground, flew for 10-12 feet and crash landed. A 47-day-old fledgling did not fly when hand-launched. When pursued it ran for 9-10 paces before becoming airborne. It flew for 20-25 feet without veering at a maximum ceiling of three feet and crash



[B. E. Reid

II — Nest 249, showing three chicks in the nest scrape. This pair successfully raised all three chicks, one of which was adopted.



[W. Bunker

III — *C. maccormicki* defending territory. The photographer was standing over the nest site.



landed. One 48-day-old fledgling skimmed eighteen inches above the ground in a straight course for 30-40 feet and then crash landed. Another flew over 50 feet, reached a ceiling of five feet on a curved course, and its landing was controlled. Two 49-day-old fledglings were accomplished fliers and expert at landing; a third landed imperfectly after flying for 40-50 feet at a maximum height of five feet. Two 50-day-old fledglings, when chased, circled and flew approximately 300 yards; another two flew 60-70 feet. All four displayed perfect co-ordination and balance when landing.

Young (1963a) gives the age of first flight for *maccormicki* as between 49-59 (mean 53.5) days. Perry (1948) records some *skua* fledglings flying as early as their forty-second day, and others not until their fifty-sixth day. He gives the average fledgling period as forty-six days. Stonehouse (1956) mentions one *lonnbergi* chick flying and landing inexpertly on the fifty-eighth day and another that was unable to gain height on its fifty-ninth day.

### HABITS AND BEHAVIOUR

Some chicks are belligerent; others docile. Some are sedentary and never wander far from the nest; others leave the nest on their first day and progressively cover a wider area. Some live in perfect accord with, while others bully and torment, their younger sibling. Some run when approached; others remain squatting. Some are easy to handle; others struggle incessantly.

### WANDERING

Murphy (1963) writes "Newly-hatched chicks quarrel in the nest from the date of hatching; therefore they tend to separate from one another, as a result of which one of the two is sure to ramble outside the field of conscious parental protection, whereupon it is equally certain to be pounced upon and killed by a hungry neighbour or by its own deluded parent." This statement does not distinguish between voluntary wandering and being forcibly driven from the nest. The former is not linked with sibling friction, but is apparently a manifestation of an inherent exploratory drive. It is equally apparent in solitary chicks. Quarrelling between chicks is most noticeable during their first week, and upon being driven from the nest the younger sibling often follows its tormentor back to it without rambling further afield. Wandering in chicks does not stem from fighting.

Some chicks wandered on their first day. One-day and three-day-old siblings from one nest were found sitting nine inches apart 15 feet up a rough talus slope from their nest. Two chicks from another nest were first observed sitting together on their territory perimeter (over 40 feet from the nest) when the younger chick was two and a half days old. A five-day old single chick was ensconced on its parents' roost, a steep mound four feet high and forty feet from the nest. Its parents appeared confused at being displaced and walked in a stiff, hesitant manner around the base of the mound. Later in the day they were brooding the chick on the roost.

Many chicks had completely explored their territories (ranging in area from c. 100-30,000 sq. feet) by the time they were 7-10 days old, but it was unusual to find a chick of any age straying beyond the territory perimeter. A notable exception was an adopted chick which,

although accepted by its foster siblings, never associated with them, for they were sedentary, and it wandered far afield, being seen when 10 days old 115 feet from the nest on a rough talus slope.

Chicks appear to have an awareness of both the extent and shape of their territory. Straying beyond its limits sometimes occurred after a neighbouring territory had been deserted, or occasionally if the neighbouring pair were either submissive to the chick's parents or tolerant of its trespassing. Often it was necessary to chase chicks before being able to measure them and those in the congested part of the colony ran only a few feet before crouching. Two chicks, when chased, often ran the 150 foot length of their territory but upon reaching the margin turned back towards the centre. Likewise, most chicks when pursued went so far and then crouched or turned back. Generally, the turning or stopping point was also the outer margin of the adults' aerial territorial activities. However, chicks did not always need the adults' presence overhead or a vocal signal to warn them that they were at the territory margin.

*Much of the chick's time is spent sitting and they usually remain so if approached quietly. When a few days old they often move about with head down pecking amongst the scree and moss like domestic poultry.*

#### FIGHTING

Fighting between siblings, first noted by Wilson (1907) was seen in 13 (18.3 per cent.) of 71 nests in which both chicks lived for two or more days. In twelve the oldest chick was responsible, and all fighting occurred before it was eight days old. In each instance the younger chick was missing 24-48 hours after the fighting was seen. Friction is doubtless more widespread than my hurried daily rounds would indicate, but it is not universal. In three nests where both chicks fledged they were never known to quarrel during seven weeks, and although they wandered considerably, they frequently went in the same direction together.

Young (1963a) describes examples of friction and the parents' efforts to reduce this by separating the chicks. Successful segregation was not seen at Hallett where the adults appeared incapable of coping and never intervened.

Nests where fighting occurred were re-visited on the same day and at each a similar type and level of friction was seen as previously. This suggests that enmity between chicks is of some duration and although the range in intensity of fighting is very wide, the level of hostility of individual chicks to their younger siblings hardly varies.

In all cases fighting started in the nest scrape, and the intensity could be determined by a combination of the following conditions:

1. Fighting occurred under the brooding adult.
2. Fighting happened only after the attendant adult left the nest.
3. The older chick desisted after driving its sibling from the nest.
4. The older chick followed its sibling from the nest and continued to peck.
5. Pecking of the younger sibling, once started, continued without a break.
6. The older chick stopped pecking after knocking its sibling down.

Conditions 1, 4 and 5 which were seen in three nests combined to make the most intense friction, and a combination of conditions 2 and 6 (seen at two nests) comprised the mildest friction.

The younger chicks were never seen to fight back, and if knocked down would often crouch with the back of their head and neck vulnerable. When driven from the nest they frequently returned to it after a very brief interval, often before the adult had resumed brooding the older chick.

One of the thirteen records is unusual in that the siblings were 20 and 17 days old, and the younger chick attacked and broke the older chick's neck. These chicks had never been seen fighting previously and often kept fairly close company. I am indebted for the following account to Mr. M. Pryor:—

The younger chick which had two superficial wounds was standing 45 feet from the nest. The parents were beside the older chick who was sitting on the nest. The seventeen day old chick's wounds were examined. On being returned to the ground it ran and attacked its 20 day old sibling, killing it three feet from the nest in a fight lasting less than a minute. The parents stood silently and watched. One parent nudged the dead chick; it twitched and the parent stepped back. A third nudge elicited no response and the parent dragged the dead chick 9-10 feet away from the nest. Here both parents very deliberately but rather daintily plucked the down from the chick's breast, then peeled the skin off in strips, most of which were offered to the victor. After accepting these it joined its parents and all three devoured the corpse.

#### POSTURES AND CALLS

The stooped or crouched posture of chicks when walking, standing or sitting contrasts with the erect, head high stance of adults. During their first three or four weeks chicks keep their wings fairly closely folded against the body, but when approximately one month old the wings are more loosely held and droop slightly, body, neck and head are horizontal and shoulders are bowed forward, giving the developing chick a somewhat hunched and furtive appearance. If chased, half grown birds almost fully extend their wings, but as they are often unable to maintain balance at speed, they skew and topple. Chicks of about 40-45 days frequently walk with wings loosely folded or partially extended. When running they fully extend and flap their wings and do not lose balance. Pursued chicks of pre-flight age will often suddenly stop running and crouch.

Begging may be entirely vocal or it may be accompanied by small jumps in which the young bird extends its wings obliquely. The begging sequence of a 53 day old fledgling is described below.

The parents were foraging at the rubbish tip, 500 yards away. The chick was sitting quietly sixty yards north of its territory. It started giving many shrill tremulous whistles, each lasting for two or three seconds at one- to two-second intervals. (This differs from younger chicks which emit a series of longish quavery cheeps.) After a short period the fledgling stood, then paced and finally jumped.

Nine minutes elapsed between the first call and the parent's return. She landed some twenty-five feet from the chick which ran towards her with its back slightly humped, neck stretched horizontally forward, head inclined slightly downwards and wings partly extended and obliquely aligned. This wing position in which the radius-ulna is pointed obliquely upward, outward and forward, while the manus is pointed obliquely downward, outward and backwards adds to the fledgling's furtive appearance. With the wings in this position, the joint between the forearm and hand forms an apex level with the back of the chick's skull, but well above it, while the downward and backward alignment of the manus causes the outer primaries to lightly drag on the ground.

The continuous intense whistle and the little jumps in which the partially-extended wings display the white markings on the primaries probably helps the parent locate offspring which at this stage may be well away from the territory and be either alone or with other fledglings elsewhere.

In general, fully grown young stayed within the confines of the colony, but not necessarily within the limits of their own territories. They were seldom seen flying. On three occasions fledglings were seen foraging for themselves: two were pecking at dead penguin chicks in the Adelie rookery, and another was feeding with adults on waste from the cookhouse. However, in the main they seem dependent on their parents for food until departure for the winter grounds.

#### ACKNOWLEDGMENTS

I am particularly grateful to Mr. Francis Davis (U.S. Navy) and Dr. Colin Bailey for assistance with the weighing and measuring; and to the Wildlife Service, Department of Internal Affairs for the opportunity to complete this work, undertaken as part of the New Zealand Antarctic Divisions (D.S.I.R.) Biological Research Programme.

I am indebted to Drs. R. A. Falla and J. A. Gibb, and Messrs. G. R. Williams and F. C. Kinsky for constructive comment and advice on the manuscript.

#### REFERENCES

- MURPHY, R. C., 1936: "Oceanic Birds of South America" Vol. 2. Macmillan, New York.
- PERRY, R., 1948: "Shetland Sanctuary." Faber and Faber, London.
- REID, B. E., 1964: The Cape Hallet Adelie Penguin Rookery. *Res. Dom. Mus.* 5 (4): 11-37.
- RIDGWAY, R., 1912: "Color Standards and Color Nomenclature." Washington.
- STONEHOUSE, B., 1956: The Brown Skua of South Georgia. *Falkland Islands Dependencies Survey Sci. Rep.* 14: 25 pp.
- TAYLOR, R. H., 1962: The Adelie Penguin at Cape Royds. *Ibis* 104 (2): 176-204.
- WILSON, E. A., 1907: National Antarctic Expedition 1901-1904. *Nat. Hist. Vol. 2. Zoology Pt. 2 Aves.* London.
- YOUNG, E. C., 1963a: The Breeding Behaviour of the South Polar Skua. *Ibis* 105: 203-233
- YOUNG, E. C., 1963b: Feeding Habits of the South Polar Skua. *Ibis* 105: 301-318.

Age Hours	N <sup>o</sup> . Weighed				Weights.			3-Period		Mean	
	1st	2nd	Sol.	Tot	Min	Max	Mean	1st.	2nd.	Sol.	All.
0-12	9	5	8	22	56.8	75.7	67.7	69.3	65.0	66.9	67.7
13-24	5	4	3	12	56.6	76.6	65.3	66.5	64.0	64.7	65.3
25-36	7	5	6	18	57.1	79.5	70.7	70.5	65.2	71.0	69.7
37-48	3	3	6	12	59.2	83.5	73.0	79.4	71.3	78.8	76.7
49-60	6	3	7	16	63.4	106	86.3	84.1	79.4	87.3	83.0
61-72	3	1	2	6	63.2	104	89.7	94.4	89.4	96.0	93.4
73-84	2	3	7	12	85.0	121	104.2	101.3	95.8	103.0	101.1
85-96	3	3	2	8	84.5	127	109.5	117.7	108.9	113.8	114.3
97-108	2	3	7	12	112	150	129.3	132.0	117.8	126.0	125.3
109-120	2	2	2	6	122	151	137.2	144.0	136.3	147.8	141.2
121-132	3	4	3	10	126	191	157.2	155.3	148.7	162.6	154.4
133-144	2	3	3	8	139	175	168.7	171.9	168.0	174.9	170.8
145-156	3	3	2	8	162	204	186.6	183.6	183.6	187.2	184.1
157-168	3	3	3	9	181	214	197.0	193.0	200.0	203.0	197.0

Age Days	N <sup>o</sup> . Birds	Weights.			3-P Mean	Age Days	N <sup>o</sup> . Birds	Weights			3-P Mean
		Min.	Max.	Mean				Min.	Max.	Mean	
8	13	166	309	239	229	29	4	796	1080	994	1011
9	19	156	332	252	264	30	4	802	1090	996	1015
10	16	219	419	302	297	31	5	939	1156	1054	1021
11	11	256	430	336	346	32	3	842	1109	1012	1043
12	12	319	477	400	400	33	3	1028	1130	1063	1072
13	16	362	568	453	444	34	3	1060	1253	1141	1141
14	15	380	569	478	486	35	3	1145	1296	1220	1217
15	14	458	630	528	519	36	1			1290	1271
16	7	492	637	551	568	37	2	1186	1418	1302	1264
17	9	501	713	625	608	38	2	1200	1202	1201	1242
18	10	590	744	649	659	39	3	1215	1230	1223	1224
19	9	577	852	704	693	40	4	1160	1303	1249	1212
20	7	430	877	726	734	41	2	920	1410	1165	1183
21	9	711	865	771	773	42	1			1136	1184
22	6	683	924	822	829	43	6	989	1527	1251	1215
23	6	812	1037	895	863	44	4	1072	1466	1258	1232
24	6	699	1021	872	891	45	2	1102	1274	1188	1247
25	4	800	1043	905	896	46	2	1200	1390	1295	1219
26	6	785	1155	912	909	47	2	1123	1224	1173	1231
27	4	752	976	909	954	48	2	1121	1328	1225	1217
28	5	937	1127	1042	982	49	2	1140	1368	1254	1254

Age Days	No. Birds	Bill Length			Bill Width (Mean)	Gape Length (Mean)	Tarsus Length			Toe Length (Mean)	Total (Mean)	Wing Length			Longest Primary			Primary Shaft (Mean)	Vane (Mean)	
		Mean	Min	Max			Mean	Min	Max			Manus (Mean)	Manus incl. Primary Mean	Min	Max	Mean	Min			Max
1	3	17.2	17.0	17.5	9.0	24.7	21.7	21.0	22.0	27.7										
2	4	17.5	17.3	17.8	9.3	25.2	22.6	22.0	23.0	28.7	58									
3	1	17.0	—	—	9.2	26.0	24.0	—	—	31.0	62	21.0								
5	2	18.8	18.0	19.6	9.5	27.5	26.5	26.0	27.0	32.5	70	25.0								
6	3	19.3	18.2	20.4	9.9	30.3	29.0	28.0	31.0	33.7	74	28.0								
7	1	21.0	—	—	10.5	32.0	32.5	—	—	37.0	81	30.0								
8	5	22.8	20.8	23.7	10.8	34.1	33.6	32.0	35.0	39.0	94	32.5								
9	3	24.1	23.5	24.5	11.4	36.2	35.7	34.0	37.0	40.7	108	34.0			0.5		1.0	0.5		
10	2	23.8	23.5	24.0	11.3	35.5	35.5	34.0	37.0	41.6	110	37.5			2.0	1.5	2.5	2.0		
11	2	26.7	25.2	28.2	11.8	38.5	40.0	38.0	43.0	46.0	128	41.0	43.0	38	4.7	4.7	2.5	7.0	3.2	1.5
12	8	27.4	26.0	29.5	12.3	39.6	41.9	37.0	45.0	47.8	135	43.5	45.7	40	5.3	5.3	3.0	10.0	4.4	0.9
13	3	27.5	25.2	30.2	12.5	40.0	42.3	39.0	44.0	48.7	142	46.5	51.0	44	5.8	8.2	6.5	10.0	6.6	1.6
14	3	30.0	28.8	31.8	12.9	42.7	46.3	45.0	48.0	52.0	144	52.5	59.0	54	6.8	13.0	8.0	16.0	10.3	2.7
15	9	30.5	27.9	32.2	13.2	43.3	48.9	46.0	51.0	55.1	175	60.0	69.2	52	7.5	16.0	9.0	23.0	12.2	3.8
17	7	32.2	31.0	35.0	13.9	46.4	51.4	50.0	54.0	58.3	209	68.5	83.9	70	9.7	25.0	18.0	32.0	17.3	7.7
18	6	33.8	31.4	35.6	14.1	47.5	53.7	51.0	56.0	60.5	227	74.5	92.7	68	10.3	30.0	17.0	39.0	19.0	11.0
19	2	34.8	34.3	35.2	14.6	47.0	54.0	54.0	54.0	61.0	247	83.0	107.0	104	11.0	35.5	31.0	40.0	24.0	11.5
20	5	35.6	34.4	36.8	14.8	50.0	55.2	53.0	58.0	62.0	262	84.5	112.5	101	11.7	43.0	34.0	49.0	26.2	16.8
21	4	35.8	33.5	38.0	14.8	51.2	54.8	53.0	58.0	62.0	271	88.5	118.5	105	13.0	47.5	40.0	53.0	25.5	22.0
22	4	36.9	35.3	37.7	15.5	51.0	57.2	55.0	60.0	64.2	290	96.0	129.2	98	14.5	54.0	47.0	60.0	29.0	25.0
23	3	38.2	36.0	39.5	15.6	53.7	58.0	56.0	60.0	64.7	310	104.0	146.6	145	15.0	60.0	54.0	64.0	30.3	29.7
24	4	37.9	36.5	39.5	15.6	53.6	57.5	57.0	58.0	66.2	330	107.5	153.5	142	16.2	64.5	56.0	68.0	35.1	29.4
25	1	40.1	—	—	15.5	55.0	58.0	—	—	65.0	348	106.0	165.0	—	—	—	—	—	—	—
26	4	39.4	36.8	40.8	16.2	56.2	59.2	58.0	60.0	67.0	365	112.0	174.4	165	18.7	82.0	76.0	87.0	41.0	41.0
27	2	41.3	39.5	43.2	15.9	57.5	59.0	57.0	61.0	67.5	372	187.5	180.0	195	—	82.5	80.0	85.0	37.0	45.5
28	5	39.3	37.2	41.6	16.4	56.0	57.4	56.0	61.0	66.0	381	114.0	184.0	172	19.8	89.0	79.0	98.0	40.2	48.8
29	1	43.4	—	—	16.0	59.5	58.0	—	—	68.0	396	—	205.0	—	—	106.0	—	—	—	—
30	1	43.0	—	—	16.7	60.0	61.0	—	—	67.0	—	—	208.0	—	—	104.0	—	—	—	—
31	5	41.0	38.5	44.3	17.0	58.5	59.0	57.0	63.0	66.3	425	118.0	212.6	202	22.6	109.0	97.0	126.0	43.4	65.6
32	1	44.2	—	—	16.9	61.5	61.0	—	—	69.0	—	—	230.0	—	—	124.0	—	—	—	—
33	1	42.8	—	—	17.0	59.0	60.0	—	—	67.0	435	—	226.0	—	—	132.0	—	—	—	—
36	1	44.0	—	—	17.4	60.0	62.0	—	—	69.0	—	—	244.0	—	—	156.0	—	—	—	—
40	1	45.7	—	—	17.6	64.0	61.5	—	—	67.5	—	—	280.0	—	—	187.0	—	—	—	—
41	2	46.5	46.2	46.9	17.3	63.5	63.0	62.0	64.0	71.0	—	—	276.0	2.70	28.2	190.0	178.0	202.0	49.0	141.0
43	3	44.5	43.5	45.5	17.7	62.0	61.7	61.0	62.0	68.0	—	—	288.0	2.73	29.8	208.0	196.0	218.0	—	—
45	1	45.0	—	—	17.5	64.5	62.0	—	—	69.0	—	—	300.0	—	—	220.0	—	—	—	—
46	2	45.8	44.0	47.6	18.3	65.0	64.0	63.0	65.0	70.0	—	—	310.0	—	—	—	—	—	—	—
50	1	48.5	—	—	18.2	66.0	63.8	—	—	71.0	—	—	—	—	—	—	—	—	—	—
53	1	47.9	—	—	18.6	68.0	65.3	—	—	73.0	—	—	—	—	—	—	—	—	—	—
58	1	48.5	—	—	18.5	66.5	63.0	—	—	68.0	—	—	—	—	—	—	—	—	—	—
63	1	50.0	—	—	18.8	68.5	64.0	—	—	70.0	632	—	386.0	—	—	258.0	—	—	—	—

## CANTERBURY MUSEUM EXPEDITION TO DUSKY SOUND (1965)

By Dr. JOHN HALL-JONES

---

For nearly six weeks of March and April, 1965, a Canterbury Museum expedition was based on Cascade Cove in Dusky Sound. Thanks to Mr. A. Picard's jet boat and Dr. M. Robertson's outboard, many parts of Dusky Sound, the Acheron Passage and Wet Jacket Arm were visited. The party experienced surprisingly fine weather and was able to make a number of camping trips in the Seaforth River region. Although one was able to gain a general impression of the birdlife on the water and in the bush, only two or three days were spent above the bushline. As there have obviously been great changes in the avifauna of the area since the days of Captain Cook, it may be of interest to compare our findings with the ornithological history of the area.

On his second voyage in 1773, Cook spent nearly two months in Dusky Sound. During this time he shot many duck and he describes five different types — the "painted" (paradise) duck, the grey duck and the "whistling" (blue) duck; also the black and the grey teal. Although the first four species were observed, no Grey Teal were seen. He also records the Woodhen, "which eat very well in a pye or fricassee," "the orange wattle bird," the "poy bird" (the flesh is most delicious") and the Fantail. Five geese from the Cape of Good Hope were left at Goose Cove but eighteen years later Captain Vancouver returned to find that they had all disappeared. This is not surprising as Henry describes the Wekas as "outrageous egg eaters."

Cook's great work was, of course, his excellent chart of Dusky Sound and his naming reflects his interest in the birdlife of the region.

In 1884 Andreas Reischek landed at Docherty's hut, opposite Cooper Island, and remained in the vicinity for the next six months. During this time he studied the Kakapo and amongst the introduced birds he recorded the Blackbird, Song-thrush, Goldfinch, Skylark and Greenfinch. None of these species was seen by our party. The rats which he found in such great numbers were apparently on the decrease in Henry's day and, although we camped for a night on the site of Docherty's hut, no rats were seen. Back at Cascade Cove a large portion of cheese remained intact on the beach and no rodents visited the store tent.

In 1894, Richard Henry was appointed caretaker of Resolution Island. The remains of his house on Pigeon Island were located and it was appropriate that a White Heron was seen at this delightful haven. Henry trapped a large number of Kiwi, Roa and Kakapo and transferred them to Resolution and other islands in the Sound. However, in 1900, he saw his first stoat on Resolution Island. Although several of his areas for trapping Kakapo were visited, no signs of this species were found and no drumming was heard. It is also interesting to note that only one stoat was seen during our stay in the area. Originally he saw Native Crows, Saddlebacks, Native Thrushes and Robins but, as the years went by, they disappeared. None of these species was seen



IV — Richard Henry on Pigeon Island



by our party and, although a special watch was kept, no Tuīs were recorded. Like Reischek, Henry saw the Blackbird, Song-thrush, Goldfinch and Skylark, but he found no Greenfinch. He also recorded the House Sparrow, Starling and Black Swan. Of these introduced birds, only the Black Swan and two Dunnock were seen in 1965.

Finally, after fourteen years at Dusky Sound, Henry departed for his new appointment as conservator at Kapiti Island. Fortunately, the work of this observant and resourceful man has been recorded in his annual reports to parliament and his paper on the habits of the flightless birds of New Zealand is a classic of its kind.

In recent years, Mr. K. Sutherland has devoted much time to the study of birdlife in Fiordland and we were delighted to find his name on a rock near our Cascade camp.

The party's leader, Mr. N. Duckworth, felt that Lake Mike was the most likely area for any *Megalapteryx* that may possibly be surviving. Unfortunately, his attempt to reach this area was thwarted by bad weather and bluffs. However, this was compensated for by the unearthing of two portions of the left tibio-tarsus of *Euryapteryx gravis* (Owen) from a Maori midden on Long Island. Mentioned in Henry's reports, the midden was rediscovered by Mr. A. Picard and is located at the foot of a high cliff at the west end of the island. On a preliminary examination by Dr. R. Duff and Mr. R. Scarlett, the bones include those of the Weka, Kaka, Crested and Blue Penguins. Dr. Duff points out that this is the first association of *Euryapteryx* with man in Fiordland and that the bones may have been carried from the eastern plains as raw material for the manufacture of tools.

#### NOTES ON THE SPECIES

I am indebted to Messrs. A. Picard (A.P.) and R. Cavaney (R.C.) who have added their own observations to these notes. Henry noted fluctuations in the bird populations of Dusky Sound and the fact that certain species were not seen during this six weeks' visit does not, of course, exclude them from the area.

**SOUTH ISLAND KIWI:** Although kiwis were heard on a number of occasions, none was actually seen and it can only be assumed that the species concerned was *australis*. Bill marks were frequently seen.

**PENGUINS:** Two small penguins were seen "porpoising" in Cascade Cove. Although they were thought to have been a pair of Blue Penguins, they may have been Crested Penguins.

**SHAGS:** Shags were common and were distributed throughout the Sound. Black (*P. carbo*), Pied (*P. varius*) and White-throated (*P. brevirostris*) shags were seen.

**DUCKS:** Flocks of seventy were counted in Cormorant Cove and at the mouth of the Seaforth River. Although these were mainly Grey Duck, a few Mallard Duck were identified (A.P.). A flock of twenty Paradise Duck was seen at the mouth of the Seaforth River and elsewhere small numbers were seen. On inland streams three Blue Duck were seen. Six New Zealand Scaup were seen near Nine Fathoms Passage (A.P.).

**BLACK SWAN:** Twelve were seen at Goose Cove and a few single birds were observed elsewhere.

**WHITE-FRONTED TERN:** Colonies were seen at Cascade Cove, Duck Cove and at the mouth of the Seaforth River.

**BLACK-BILLED GULL:** Seen in large numbers and were very much more common than the Red-billed Gull of which only a few were observed.

**BLACK-BACKED GULL:** Seen in small numbers throughout the Sound.

**BLACK OYSTERCATCHER:** A flock of twelve was seen near Indian Island and eight more were counted in the Sound.

**SOUTH ISLAND WEKA:** Only a few were seen and it was disappointing to find none at Wood-hen Cove (A.P.).

**KERERU:** A flock of twelve was observed near the Seaforth River and it was delightful to find two on Pigeon Island. Others were seen on occasions.

**MOREPORK:** Heard occasionally at night.

**GREEN KAKA:** Two seen (R.C.).

**KEA:** Twelve were counted in a valley near the Seaforth River.

**KAKAPO:** Ideal caves were found above the bushline but these contained only Kea feathers. No pellets, scratching holes or tracks were seen and it was noted that deer were common in this particular valley.

**KINGFISHER:** Two recorded.

**YELLOW-BREASTED TIT:** Widely distributed throughout the Sound and one of the commonest birds.

**FANTAILS:** Very common throughout the Sound. The great majority were pied but six black fantails were counted. One of the latter had white cheeks.

**GREY WARBLER:** Quite often seen or heard.

**BROWN CREEPER:** Three were seen near the tent at 1,500 feet.

**BELLBIRD:** Were very common throughout the area. Some were noticeably dark in colour.

**PIPIT:** Surprisingly enough only one bird was seen. This was on our last day at Cascade Cove.

**RIFLEMAN:** Three seen near the Seaforth River.

**DUNNOCK:** Two seen near Astronomer Point.

**HERONS:** Appropriately, the only White Heron (*Egretta alba*) seen was near the remains of Henry's cottage on Pigeon Island. A few White-faced Heron were recorded and a Reef Heron may have been seen on Heron Island.

**SOOTY SHEARWATER:** At least a hundred were counted outside Five Fingers Point in the Tasman Sea.

**BULLER'S MOLLYMAWK:** A few seen near the entrance to the Sound. Other petrels were observed but their identification was uncertain.

**CAPE PIGEON:** Homeward bound, one was seen near Chalky Inlet.

#### REFERENCES

- HENRY, R. (1895-1908): Resolution Island Reports. Append. Jour. N.Z. House Repres.  
POOLE, A. L. (1951): The New Zealand-American Fiordland Expedition. Govt. Printer.  
REED, A. H. & A. W. (1951): Captain Cook in New Zealand.  
REISCHEK, A. (1884): Notes on New Zealand Ornithology. Trans. N.Z. Inst. 17: 187.

## INCREASING NUMBERS OF SOUTH ISLAND PIED OYSTERCATCHERS VISITING NORTHERN NEW ZEALAND

By R. B. SIBSON

---

When nesting is over on the shingle riverbeds of the South Island, many thousands of Pied Oystercatchers (*H. o. finschi*) move northward to spend the latter half of summer, including the hottest months, autumn and winter on the harbours and estuaries of northern New Zealand. Some reach the far north at Ninety Mile Beach and Parengarenga; but the biggest concentrations are found in the Firth of Thames and the harbours of Manukau and Kaipara. Census figures obtained in 1965 suggest that at least 10,000 *finschi* oystercatchers now winter on the coast of Auckland and Northland.

This abundance of South Island Pied Oystercatchers in the north seems to be a comparatively recent development. During the last quarter of a century, there has evidently been, as with the Wrybill (*Anarhynchus frontalis*) a striking increase in the total population, so that in winter many more are being forced to forage further afield and to survive by migration. At the same time, as might be expected in an expanding species which takes two or three years to mature, there has been a correspondingly significant increase in the number of non-breeders which now pass the summer in flocks on northern beaches and tidal flats (v. Table I).

### MANUKAU HARBOUR

The South Island Pied Oystercatcher has been known as a winter visitor to Manukau Harbour since about 1880, the evidence being two skins locally collected and now in the Auckland War Memorial Museum. After a long interval the next report comes from the diaries of C. A. Fleming who in 1936 noted a flock of c. 24 in March and September on the flats near Puketutu, then known as Bull's Island, and Ihumatao. About this time, i.e. the mid-1930's, R. A. Falla was making notes on a flock of 2000-3000 which was accustomed to winter in the estuary of the Waimakariri on the Canterbury coast. Yet it is curious that neither E. F. Stead (1) nor H. Guthrie-Smith (2) devoted a chapter or even a few paragraphs to *finschi*, though both these great naturalists were interested enough in the other birds typical of South Island riverbeds.

In the years before 1940 when the shooting of shore-birds was permitted by law, Oystercatchers were likely to meet with a warm reception in Manukau Harbour: for the flats about Puketutu and Ihumatao were a Mecca for suburban pot-hunters; while on the Karaka coast, the shellbanks at Kidd's Bay, although ornithologically *terra incognita*, were heavily manned with godwit-shooters, when the tides were suitable.

My own studies of shore-birds along the eastern shores of Manukau Harbour began in 1939 and at somewhat irregular intervals I was able to visit roosts and feeding grounds between Otahuhu and Wiri. In

the early 1940's *finschi* was a rare bird in the area which I had under observation. For instance, more than three years were to elapse before I found an example near Puketutu; and that was a single bird on 19/4/42. In the same year on March 29th I found four at Pukaki Creek — very near where the vast new airport is; and 25 on 4/10/42 at Puhinui; so it is likely that a sizeable flock had wintered in that less accessible area. In subsequent winters bigger flocks appeared; and in 1945 after c. 450 had wintered, c. 100 non-breeders remained to spend the summer. As a result of this apparent and sudden increase I was persuaded to publish my findings (4). Since then twenty years have passed; but the increase appears to continue. More observers are making their contribution. In 1946 D. A. Urquhart began to send in valuable information from the Karaka coast. Censuses which aimed at covering all the significant parts of Manukau, both in summer and in winter were instituted; and under the organization of H. R. McKenzie the coverage has become very thorough. Even so, there are still awkward corners in Manukau, and the census figures are likely to be minimal.

These oystercatchers, as they have increased, have either re-occupied former feeding-grounds and roosts, long disused, or have discovered new ones. Thus, about 1953 a few began to frequent the rocky bays in the vicinity of the Onehunga-Mangere bridge, where children play and small boats are launched or lie at anchor. Now *finschi* is a familiar bird there and at full-tide up to 800 have been counted on a small shellbank, which has become an habitual roost at the end of very suburban Kiwi Esplanade. Much the same could be said of 'The Narrows' at Weymouth. In recent years the face of Manukau has been violently reshaped by man and the reshaping is likely to continue. As the constructors of the new Auckland Airport thrust their huge runway further and further over the tidal flats between Pukaki and Ihumatao, they encroached upon a rich feeding ground for many thousands of waders but at the same time they provided a most handy and spacious roost, which Godwits, Stilts, Oystercatchers, Knots, Dotterels and Wrybills were not slow to use. 2000 oystercatchers alone, rising solidly together, would pose a problem when the airport came into use. Census returns now show that there are at least a dozen high-tide roosts which are in fairly regular use around the whole harbour.

#### FIRTH OF THAMES

The spectacular increase suggested by the Manukau figures is corroborated by those from the Firth of Thames; where, for example, the number of summering non-breeders in 1965 exceeded any winter-count made in the 1940's. On my first visit which was made in mid-July 1941, I was surprised and delighted to find a substantial flock of *finschi*, the more so because at that time I had not seen a single oystercatcher in Manukau. A few weeks later H. R. McKenzie accompanied me to the Miranda coast and we were so impressed by its ornithological possibilities that we decided to try to arrange for at least one visit a month. Because of its comparative remoteness and the roughness of the local roads at that time, shore-birds on the west coast of the Firth of Thames had been hunted, it may be assumed, much less severely than those in Manukau. In the Firth of Thames these oystercatchers mainly frequent, both for feeding and roosting, two favourite areas; one stretching from Whakatiwai to the old limeworks

at Miranda creek; the other in the south-east corner along the stony foreshore near Thames itself. The big intervening stretch of muddy flats, into which the Waihou, Piako, Waitakaruru and Kairito debouch, is at present not much used by oystercatchers. Consequently, it is easier to obtain accurate counts and the figures should be more reliable than those for Manukau.

#### KAIPARA HARBOUR

Because of its great size and awkward shape, Kaipara Harbour will long continue to baffle the efforts of those who try to make an accurate count of its shorebirds. But from observations made in different seasons and at different points of access, it had become evident that this vast inlet must be an important wintering area, perhaps the most important in the North Island. The size of flocks of summering non-breeders at Waionui Inlet in 1953 and 1954 suggested a bigger wintering population than that of the Firth of Thames. On 16/4/61 there were c. 1200 near Tapura; and on 26/5/63 the high tide brought more than 2500 to Jordan's. When a Field Study Course was held on the Kaipara in mid-January 1965, bad weather, including gale-force winds, hindered counting. Nevertheless the very respectable tally of 3230 was reached. The figure for mid-winter is likely to be considerably higher.

TABLE 1 — Numbers of S.I. Pied Oystercatchers counted in Winter and in Summer in the Firth of Thames and Manukau Harbour

	Firth of Thames		Manukau Harbour	
	Wintering	Over-summering (Oct. 15-Dec. 15)	Wintering	Over-summering (Oct. 15-Dec. 15)
1941	75	0		
1942	130	1 (albino)		36
1943	90	0	194	?
1944	70	7	260	40
1945	44	9	450	c. 100
1946	88+	0	2500	35
1947	76	32	510+	100+
1948	148	46	710	113
1949	300	60	600	150
1950	310	34	680	?
1951	416	63	900	?
1952	580	13	527	40
1953	435	32	1111	167
1954	600	19	972	155
1955	640	58	1092	160
1956	830	31	1025	400
1957	730	44	850	500
1958	900	82	1160	270
1959	700	123	1535	350
1960	650	109	1720	475
1961	1280	185	2440	700
1962	700	131	3025	1220
1963	1146	66	4410	738
1964	835	152	4206	820
1965	1738	324	4500+	911

As the size of flocks has increased, some regular roosts may become overcrowded, especially during spring tides; and many oystercatchers, sometimes indeed the whole local population, are forced to desert the shore and look elsewhere for a resting place. Both in Manukau and Kaipara Harbours, *finschi* oystercatchers now readily resort to grassy 'resting paddocks' when tides are very high or the weather is boisterous. Most of their food, however, in the North Island is still found along the seashore, where there are wide tidal flats; yet, as was noted some years ago (5) they sometimes forage inland. An interesting instance of this came to hand at Tapora in mid-Kaipara. Here on 7/7/62 some thousands of birds of several species had been attracted to feed over wet pasture and ploughland, once the bed of a shallow lake, now drained. Together with c. 5000 Red-billed Gulls, were c. 30 Bar-tailed Godwits, a few Pied Stilts and c. 400 S.I. Pied Oystercatchers, as well as flocks of Starlings and Yellowhammers. Nearly all these birds were feeding busily. The lake-bed was about one mile inland; and the oystercatchers were clearly feeding there by choice and enjoying a change of diet; for the full tide left uncovered a huge acreage of sandy flats and the cool southerly wind was not strong enough to worry Wrybills or Dotterels on the adjacent beaches, though not a single *finschi* oystercatcher could be found remaining along them.

## REFERENCES

- 1 STEAD, E. F., 1932: Life Histories of New Zealand Birds.
- 2 GUTHRIE-SMITH, H., 1936: Sorrows and Joys of a New Zealand Naturalist.
- 3 FALLA, R. A., 1939: Rec. Cant. Mus. IV, 259-266.
- 4 SIBSON, R. B., 1945: N.Z. Bird Notes I, 107-109.
- 5 SIBSON, R. B., 1958: Notornis VII, 206-207.
- 6 SIBSON, R. B., 1963: Population Study of the Wrybilled Plover. Notornis X, 146-153.
- 7 MCKENZIE, H. R., 1965: Field Study Course, Kaipara. Notornis XII, 70-78.



## SHORT NOTE

## "PADDLING" IN RED-BILLED AND BLACK-BILLED GULLS

Fordham's (1963) reference (*Notornis* 10, 206) to "paddling" in the Black-backed Gull (*Larus dominicanus*) reminded me of similar behaviour seen in the two smaller species of Gull. I have seen this once since reading Fordham's account. It was on 8/2/64: a very warm day (c 80° F) with a moderate S.E. wind. A mixed flock of Red-billed Gulls (*L. scopulinus*) and Black-billed Gulls (*L. bulleri*) were feeding on a sandy flat at the Waimakariri mouth. This flat was periodically covered by a wave of about two inches. As both species showed the same behaviour only one description is given. The bird would work its feet into the soft sand by rapid "marking time" and this caused it to move slowly backwards. The sand around the feet was considerably disturbed and the birds were seen occasionally to snatch some small item of food and eat it. Later examination revealed a large number of small polychaete worms in the sand. Having worked itself some few feet backwards each bird would step out and either stand watching the others or return and work a similar stretch. A similar "marking time" was seen in Red-billed Gulls at the Heathcote-Avon estuary by Miss E. Andrews (pers. comm.). This observation was in early March 1966 and would probably be of the same behaviour pattern.

— DAVID G. DAWSON

## A NOTE ON THE FOOD OF NEW ZEALAND GANNETS

By KAZIMIERZ WODZICKI, *Animal Ecology Division, D.S.I.R.*  
and JOHN MORELAND, *Dominion Museum*

According to Oliver (1955, p. 239) the food of the Gannet (*Sula bassana serrator*) consists of small surface fish such as garfish, herrings and young mullet, but squids are also taken. The present note describes food samples from three gannetries, and from an adult bird outside the nesting season.

The material examined includes nine vomits collected on White Island, Bay of Plenty, five in January 1947 and four in November 1949. (Wodzicki and Robertson 1959). Eight were obtained at Cape Kidnappers gannetry, Hawke's Bay, one in October and seven in December 1964, but one was unidentifiable. Finally a single regurgitation was collected by Dr. R. A. Falla on 20 July, 1948, on the Little Solander gannetry, Foveaux Strait.

Table I compares the prey identified in the White Island sample with that from Cape Kidnappers gannetry and gives the numbers and approximate size of each species. In addition the White Island sample contained remains of a perch-like fish, possibly of the family Serranidae and of a small specimen of a puffer fish, *Spheroides spp.*

TABLE I — Food of New Zealand Gannets

Species	GANNETRY			
	White Island		Cape Kidnappers	
	No.	Size	No.	Size
Squid, <i>Nototodarus sloanii</i>	1	—	—	—
<i>Nototodarus spp.</i>	—	—	8	150-300 mm.
Horse mackerel, <i>Trachurus novaezelandiae</i>	4	150-280 mm.	1	240 mm.
Anchovy, <i>Engraulis australis</i>	23	60-135 mm.	53	60-110 mm.
Sardine, <i>Sardinops neopilchardus</i>	3	—	6	20-150 mm.
Piper or garfish, <i>Reporhamphus ihi</i>	1	—	10+	240 mm.
Yellow-eyed Mullet, <i>Aldrichetta forsteri</i>	3	—	—	—
Barracouta, <i>Thyrsites atun</i>	17	150-200 mm.	—	—
Flying fish, <i>Cypselurus spp.</i>	7	—	—	—
Ocean piper, saunty or needle fish, <i>Scomberesox forsteri</i>	—	—	3	120 mm.

The vomits varied considerably in weight and size from about 100 to 400 g. (about one sixth the weight of an adult gannet) and contained fish ranging from 20-300 mm. in length. Anchovy 60-150 mm. long and sardine or pilchard 20 to 150 mm. long were found in six regurgitations. A squid (*Nototodarus spp.*) was the next most common species in the Cape Kidnappers sample, being recorded in four out of seven regurgitations.

The Little Solander sample regurgitated by a bird sitting on an empty nest contained 5 juvenile specimens of *Mendosoma lineatum*, a southern species, common in Foveaux Strait. The fish were approximately 120 mm. long, and Dr. Falla stated that there were many of that size collected in the vicinity of the island at the time of his visit.

Dr. E. G. Slack, Department of Zoology, Victoria University of Wellington, supplied the following information: "In the course of observations on pilchards (*Sardinops neopilchardus*) in Marlborough

Sounds, Tasman Bay and Golden Bay, Gannets were seen diving regularly from September through to May where echo soundings indicated concentrations of pilchards. One bird was shot and found to contain several pilchards about 150 mm. in length but no other fishes. Normally Gannets occur in groups of from two to six birds but on 21/4/66 about 100 birds were seen diving in Golden Bay. On this occasion no bird was taken but several kahawai (*Arripis trutta*) which were feeding in the locality with the Gannets, were caught and found to have been feeding exclusively on pilchards."

The fish eaten by Gannets during their nesting season are mainly coastal, although many range out to the edge of the continental shelf in surface or subsurface water. Even the oceanic flying fish and saunty may occur within a few miles of the coast. Anchovy, sardine and saunty are abundant in spring and summer south to beyond Kaikoura and often enter bays and harbours. This dependence on coastal fish agrees with Norris' (1965) observations on gannet distribution: on two occasions when his ship passed 25 miles off Cape Kidnappers during November, the middle of the nesting season, no Gannets were observed. From these and other observations Norris concluded that Gannets appear to be "coastal rather than offshore in their distribution."

Collections of food from other gannetries and information on the species eaten in the non-breeding season and by different age groups would help to give a fuller picture.

#### REFERENCES

- NORRIS, A. Y., 1965: Observations of Seabirds in the Tasman Sea and in New Zealand Waters in October and November, 1962. *Notornis*, XII, 2: 80-105.
- OLIVER, W. R. B., 1955: *New Zealand Birds*, Second Edition. A. H. and A. W. Reed, 661 pp.
- WODZICKI, K., and ROBERTSON, F. H., 1959: Birds, with a Note on the Mammal *Rattus exulans* (Peale) in "White Island" comp. by W. M. Hamilton and I. L. Baumgart. N.Z.D.S.I.R. Bull. 127: 70-82.



## NOTES ON FOODS OF THE NORTH ISLAND KOKAKO AT MOUMOUKAI

By J. W. St. PAUL.

In and about the heavy bush of Moumoukai, near Clevedon and about twenty-four miles in a straight line from Auckland, I have lived and worked for over sixty years within sound of Kokako song. I have spent a great deal of time in the bush and have always watched birds while working and hunting. The Kokako (*Callaeas cinerea wilsoni*) has perhaps been particularly interesting because of the difficulty of studying it. There is no hope of following it to see what it does in the course of a day. It will hop quickly through the trees, glide across a gully and there is no more to be seen of it. Almost constantly on the move it seldom feeds long on any one thing. In its daily circuit it probably partakes of many kinds of food. Also its foods will vary from one area to another, so it is hoped that these notes will encourage others to bring forward more details of its food habits.

In the following table the figures in the column headed "Frequency Rating" express the proportions of observations made for each food, i.e., old leaves of raurekau were eaten approximately forty times as often as were the old leaves of tawa.



	Frequency Rating
LEAVES:	
Tawa ( <i>Beilschmiedia tawa</i> ) Old leaves	1
Young leaves, mainly in spring	20
Toro ( <i>Myrsine salicina</i> ) Older leaves	1
Leaf shoots, spring and summer	30
Pigeonwood ( <i>Hedycarya arborea</i> ) Old leaf. Much seen being collected and fed to young in nest, among other foods (McKenzie, Notornis IV, 73) but not on any other occasion.	
Raurekau ( <i>Coprosma australis</i> ) Old leaves. The main leaf food in winter when no fruit is available	40
Young leaves	10
Clover	Once
Puka ( <i>Griselinia lucida</i> ) Base of leaf stem and the stipule. These are sappy and somewhat juicy. The stalk and blade are not eaten	3
Phymatodes diversifolium (Family Polypodiaceae) The white end of the rhizome is eaten in the spring	10
Probing in moss on branches may be for an unknown food or for water.	
Reports from other areas:	
Mangamange ( <i>Lygodium articulatum</i> ) Sporangia. Observation D. V. Merton, Great Barrier Is., Oct. 1963 (B. D. Bell and D. H. Braithwaite, Notornis X, 383).	
Mapou ( <i>Myrsine australis</i> ) Young leaves. Observation D. V. Merton, Great Barrier Is., Oct. 1963 (B. D. Bell and D. H. Braithwaite, <i>ibid.</i> )	
Weinmannia sp. Young leaves? Observation J. W., R. and R. B. St. Paul, Golden Cross, Waitekauri, near Waihi, 27/5/65.	
White Rata Vine ( <i>Metrosideros perforata</i> ). Observation J. W., R. and R. B. St. Paul, Golden Cross, 27/5/65. The tender young leaves at tips of branches.	
FRUIT:	
Pigeonwood. Ripe	10
Green	5
Raurekau. Ripe	30
Green	5
(Some green fruit was fed to young in nest.)	
Miro ( <i>Podocarpus ferrugineus</i> ) Ripe	10
Not a staple food as with the N.Z. Pigeon.	
Wineberry ( <i>Aristotelia serrata</i> ) Ripe and partly ripe	4
Supplejack or Kareao ( <i>Rhipogonum scandens</i> ) Ripe	20
The main berry food in winter.	
Putaputaweta ( <i>Carpodetus serratus</i> ) Ripe	20
Throughout most of year.	

## SUMMARY OF REPORTS ON N.I. KOKAKO 1962 - 1964

By M. G. MACDONALD

---

“Classified Summarised Notes” was an annual feature of the Society’s publications until December 1961. In most of the lists published after the first Annual Report in 1939-1940, there is a report on the small colony of N.I. Kokako (*Callaeas cinerea wilsoni*) in the Hunua Ranges near Clevedon. Less frequently, there are references to observations in other parts of the North Island. Since the institution of the present scheme in 1962 (see *Notornis* Vol. 10, Nos. 3 and 4), a much greater volume of reports has been recorded for this species, and the summary of these presents a more comprehensive picture of the known range of the Kokako. In the following summary, reports contained in “C.S.N.” have been included where appropriate.

While most of the reports received are the results of members’ observations, a good deal of worthwhile information has been collected from local newspaper articles and from conversations with local people associated with bush work and sent in for filing. As will be seen from the summary, a useful feature of many of the reports has been the attempt to ascertain the actual number of Kokako in a given locality. Where this species is concerned, more information of this nature, rather than the recording of a generalised statement such as “widely distributed,” could perhaps lead to some conclusions regarding the present population. More fieldwork is needed, but from the present incomplete state of our knowledge it appears that small groups of Kokako persist in many of the remaining bush areas of the North and Great Barrier Islands, the most promising parts being those above about 1000ft. on the N.I. west coast ranges from the Waikato southwards into eastern Taranaki and the King Country, and the areas in bush to the north of the Volcanic Plateau through the Urewera Country to the Raukumara Range. This order of localities has been followed, more or less, in the summary.

### DISTRIBUTION SUMMARY

#### NORTHLAND:

*Puketi Forest* (west of Kerikeri). Kokako were seen in Sept. 1962 by R. Lawn, N.Z.F.S. (per A. T. Edgar).

*Tutamoe Range* (east from Waipoua Kauri Forest). A specimen from here was sent to the Auckland Museum (C.S.N., *Notornis* VI, 7, Jan. 1955).

#### CLEVEDON:

*Moumoukai, Hunua Range*. The usual numbers were present during the 1961/62 and 1962/63 summers (J. W. St. Paul).

#### RAGLAN:

*Kokako Trig* (1114ft., on Hakarimata Range to the north of the Hamilton-Raglan highway). Two Kokako were seen within  $\frac{1}{2}$  mile of the trig in Nov. 1960 and on Feb. 5th 1961 (J. L. Kendrick). A dead half-fledged bird was found on Feb. 18th 1961 (L. Templer). In Mar. 1961, two birds were seen feeding

young at a nest 40ft. up in a kiekie clump (J.L.K.). An extensive search made in April 1962 failed to locate Kokako elsewhere in the Range (J.L.K.). Refer also C.S.N. VI, 7, Jan. 1956. *Bridal Veil Falls* (on Raglan-Kawhia road). Kokako were seen on many occasions around 1920 by J. L. G. Martyn, whose farm adjoins the Bridal Veil Falls Scenic Reserve, but they now "seem to have disappeared from this area" (N.Z. Herald, 15/9/62).

#### KAWHIA:

*Te Rauamo* (on main Te Awamutu-Kawhia road, Pirongia Range). D. Jenner had a close view of Kokako in Oct. 1962.

*Hauturu*. A pair was reported by D. Norman in 1959 (W. S. Sutherland).

*Oparau*. A group, estimated to be eight in number, has been under observation by J. L. Kendrick since Aug. 1964 in the near vicinity of the Waikato Junior Naturalist Club Lodge.

*Taharoa*. On the track between the settlement and the Kawhia Harbour (south), Kokako were seen in Feb. 1962, and were in good song (J.L.K.).

#### MARAKOPA - WAITOMO:

*Vicinity of Te Anga*. Kokako have been heard here by T. Brown (per M. G. Macdonald), and two were seen by J.L.K. in May 1964.

*Whareorino* (2130ft. peak south of Marakopa). The activities of one bird were watched and the calls of others heard in June 1961 (J.L.K.).

Further report on the Kawhia-Waitomo areas appear in C.S.N. in VI, 3, Jan. 1954.

#### RANGITOTO RANGE (east of Te Kuiti):

One Kokako was photographed and others heard by P. McLean in the vicinity of Rangitoto Trig (2832ft.) near the headwaters of the Waipa River (per M.G.M.).

A colony was reported by M. Black (Feb. 1964) to be at Pureora Forest, but it was not found by a party which went to look for it (G. Yerex, Feb. 1964).

A. E. Beveredge records (1964) that an old bushman at Pureora Forest recalls having heard Kokako there frequently twenty years ago, but he has not heard them in recent years. However, a description of a Kokako was given to him by a logging ranger there in 1958.

An honorary Forest Ranger at Ngaroma, C. Bryan, reports presence of Kokako in that area still (A.E.B., 1964).

#### TARANAKI - WANGANUI:

*Waitaanga* (extensive bush area west of Ohura). Two Kokako were seen and heard by M. G. Macdonald near Kokako Trig (1711ft.) in Dec. 1962. A local resident (V. Till) has seen Kokako regularly at this and two other locations nearby.

A group of about 15 Kokako were seen by A. Machaado near Rerepahunu Falls in May 1955 (per M.G.M.).

A Kokako shot near Ohura in June 1964 was sent to the Taranaki Museum. Another was shot in the Tongaporutu Valley about Feb. 1963 (per M.G.M.).

*Tahora.* A small group at Skinner Hill (1483ft.) has been under observation by M. G. Macdonald, R. W. Macdonald and B. Tucker. Four birds were seen in Aug. 1962, one in Dec. 1962, and three in Sept. 1963.

Calls were heard at another locality nearby in Sept. and Dec. 1962 (M.G.M.).

*Whangamomona.* Calls, believed to be those of Kokako, have been heard at the school for some time (D. Capon, per M.G.M.).

*Upper Waitotara River.* Calls were reported by Wanganui Tramping Club members in 1960 (R.W.M.).

*Wanganui River.* In C.S.N. in Bird Notes I, 7, of Dec. 1944, W. P. Meads records that Kokako are present in some numbers near Pipiriki.

Calls have been heard near the Mangatiti Tributary, but not in recent years (R.W. M. 1964).

*Egmont Park.* Calls, suspected to be those of Kokako, have been reported recently from the western parts of the park (G. G. Atkinson and Dr. E. Gibbons, per M.G.M. 1964).

#### GREAT BARRIER ISLAND:

Many calls, indicating a fair population, were heard by J.L.K., D. V. Merton and J. Spiers in Oct. 1963 in the Ahuriri catchment, the neighbourhood of Mt. Hobson, and in a gorge near Miners Head, where two birds were seen.

#### COROMANDEL RANGE:

*Waitekauri.* Several Kokako seen by R. McKenzie and H. Morgan, and others heard in March 1949 (N.Z.B.N. III, 160).

Calls were heard in Wentworth Valley, behind Whangamata, in 1958 (F. Morsey, 1964), and a pair was reported at Papa Aroha (C. A. McCall).

#### BAY OF PLENTY - ROTORUA:

*Mamaku.* Kokako were heard and observed in Sept. 1962 on the track to the Mayors Waterfall, about 12 miles in from the Hamilton - Tauranga highway (J.L.K.).

Calls have been heard on the Mamaku Plateau "N.W. Opuiaki Stn. and N.E. Mangarewa Stn." (per R. W. Jackson, 1964), and the bird is scattered singly or in pairs throughout the Mamaku and Kaimai Ranges (H. Lyall, 1964).

Kokako are reported to be in Orope Bush (Mrs. R. V. McLintock), and in the Mangarewa Gorge (F. Moresby, 1960), both between Rotorua and the Tauranga area.

Birds were observed in the late 1930's in Brakes Bush, between Oturoa Road and the Rotorua - Hamilton highway (W. H. Tong: N.Z. Herald, 1962).

*Te Puke.* Two Kokako were seen and more were heard by J. Armstrong in Jan. 1963 on a forest bluff behind Mr. T. Diprose's property on No. 3 Road (R. M. Weston, 1964).

*Pongakawa Valley.* Small groups of 3 or 4 were seen by J. Penniket on four occasions in 1943. One bird was shot (per R.W.J., 1964).

*Rotorua Lakes.* R.W.J. records a call near Hongi's Track (1964), from where there have been persistent reports in C.S.N. through the years. H.L. reports that the birds are distributed throughout the bush country to the east of Lake Rotorua.

H. W. Axbey saw two Kokako to the east of Lake Tarawera in 1949 (per H.R.McK.).

#### UREWERA:

Two Kokako were seen in Aug. 1962 at Tutaepukepuke clearing near Te Whaiti (M. J. Carswell, N.Z.F.S.). A persistent call was heard near Te Whaiti school about 24 years ago (J. Hill, N.Z. Herald, 18/9/62).

Kokako were sighted by a Mr. Price in June 1964 near Galatea "on a ridge above a deerstalker's hut and helicopter landing ground at a site between the Waiohau and Tangamoko Streams" (Miss V. Rucroft, per H.R.McK.).

Near Maungapohatu in Mar. 1962, R. M. Weston with K. W. Moore recovered a nest blown from a tree, believed to be of this species.

#### RAUKUMARA:

*Motu.* A group of 12 Kokako was seen in Motu Bush in 1959, but the bird appeared to be absent in 1963 (A. Blackburn). They have been reported from several areas near Toatoa and from many localities throughout the southern parts of the Raukumara Range (A.B.).

*Tangitirau Stream, Raukohore Valley.* One Kokako was seen by J.L.K. in 1961.

#### TARARUA RANGE:

One Kokako was observed by N. Simpson (Wanganui Tramping Club) in Jan. 1961 on the Tauwharenikau Ridge about 500ft. above Cone Hut (J. D. O'Brien, per B. D. Bell).

*Nil Reports* were received from the Regional Representatives in Hawkes Bay and Manawatu.



## FAREWELL SPIT, APRIL 1965

By B. D. BELL

The high tide period of April 6 and 7 was spent on Farewell Spit, between the 6 and 12 mile, by a party including J. L. Kendrick, J. S. Adams, R. A. Anderson and the writer. The trip was planned to give wader experience to fellow wildlife officers. The trip proved so outstandingly successful in the number of rarer species seen that a short record seems called for.

The weather throughout was fine; there was a strong westerly wind on both days. The central sand flats of the Spit were mainly dried out, except for a shallow extended pool at the six mile and a few deep unattractive pools spaced along forward of the 12 mile. The tide was not a spring high tide; and two suitable roosting banks were available on the inside of the spit at the 2 and 12 mile respectively.

It was interesting to find that many of the waders had not yet left for the north but a high proportion had assumed breeding plumage. Two new waders were added to the list from Farewell Spit, namely American Whimbrel (*Numenius phaeopus hudsonicus*) and Wandering Tattler (*Heteroscelus incanus*). The former was found at the 12 mile on the inside of the Spit associated with godwits and curlews. Our attention was drawn to it by the call. It appeared slightly smaller than a godwit and was very alert. It did not take up the "camel" stance I had seen in Asiatic Whimbrels. We were able to flush it several times and were all quite satisfied that the back had the uniform dark pattern of the general plumage.

It was most interesting to find the Wandering Tattler as we had been watching two Grey-tailed Tattlers in the centre of the Spit shortly before crossing to the inside, where we found this other tattler feeding on the *Zostera* flats as the tide receded. The bird had to be flushed several times before it gave its distinctive trilling call. The two Grey-tailed Tattlers offered an informative comparison, as one was in eclipse plumage while the other was in full breeding dress.

Little attention was paid to the larger waders — Bar-tailed Godwits, South Island Pied Oystercatchers, Black Oystercatchers and Knots — as these tended to congregate on the outside beach and spits on the inner side of the Spit. Three Long-tailed Curlews were seen at the 12 mile. The most prominent wader in the section which we covered was undoubtedly the Turnstone and we estimate the number seen (supported by counts) at c. 400, of which 80% would be in breeding plumage. The other common species was the Banded Dotterel whose numbers we put at 200+.

However it was the variety and numbers of the smaller waders which made the scene. Of the northern migrants, with the exception of the Pacific Golden Plover, about 50% were well advanced in attaining breeding plumage. The figures shown are those for birds actually counted and are therefore the minimum number present as large portions of the Spit were not visited. However, from past experience, the area covered has proved to be the most productive: —Golden Plover 3; New Zealand Dotterel 3; Wrybill 3; Greenshank 2; Sharp-tailed Sandpiper 12; Curlew Sandpiper 7; Red-necked Stint 25; and Pied Stilt 1.

In addition to the waders a few other interesting birds were seen and are worthy of note. At Freeman's pond at the base of the Spit 400+ White-throated Shags were counted when temporarily disturbed from their night roost. Between the 6 mile and 12 mile on the inside of the Spit 126 White-faced Herons were counted. This total was made up of two flocks of 96 and 30. At the 6 mile again on the inside of the spit 2 Royal Spoonbills roosted over high tide. As we were returning along the Spit a Pomarine Skua was seen flying seawards. Although only an occasional White-fronted Tern was noted the number of Black-fronted Terns (including a high proportion of juveniles) was estimated at 200+. At the 12 miles 7+ Welcome Swallows were seen. These were probably the same birds the Freeman family had seen about the base of the Spit for several days prior to our visit.

27 other species typical of the Spit were seen but the numbers were not recorded.

## SPINE-TAILED SWIFTS AT HAAST

By A. WRIGHT and H. R. McKENZIE

It is not unusual for stray rare birds to be reported from the south-west coast of the South Island. At the new Haast Bridge, in the early evening of 16/11/65 a party of six Spine-tailed Swifts (*Chaetura caudacuta*) was observed hawking in wide sweeps but keeping in a loose flock. From 1730 hours to later than 1830 hours, first at the southern approach to the bridge and latterly a few hundred yards along the road towards Haast township, they worked consistently in light rain and still air. Attention was drawn to the first bird seen because of its large size, the swinging soaring flight, the swept back wings, the stumpy fore-end, the generally dark colour, and, next, the short square-ended tail. Five other birds quickly appeared. Owing to the dim background of rain and cloud it was hard to discern colour features until the swifts flew in front of large dark trees which stood in groups not far away. This they did only one at a time, so that we could not determine the amount of white on each bird. It seemed that one or perhaps two had the full amount of white while the others were thought to be darker, perhaps immature birds. All had the short square ended tail and other features of the first bird seen. When one would fly low over the car at a few feet, no further details could be observed because of its great speed. It was agreed that the most coloured bird or birds had light on front of neck and upper breast and had broad stripes from below the "shoulder" along the sides below the outstretched wings and converging to somewhere about the vent. The lower back and upper rump showed light but this was not definite. On the way back to A. Wright's Wildlife lodge up the Haast River A.W. called on a deer-meat hunter, T. F. Trevor, who had a good knowledge of the Australian back country and asked him to describe a Spine-tailed Swift. This he did without hesitation, confirming what we had seen, calling the light bands along the sides speckled, which was later found to be more correct and calling the back speckled which was not quite right as it is more a smooth off-white. He described the feeding habit, saying that it was mostly seen at evening.

Later study by H.R.McK. of mounted birds in the Canterbury Museum and Auckland War Memorial Museum further confirmed the identification. The only other swift of similar size and general colouration is the Eastern and Australian Fork-tailed Swift (*Apus pacificus*). The birds seen definitely did not have forked tails.



## REVIEWS

*More New Zealand Bird Portraits* by M. F. Soper, A.R.P.S., Whitcombe & Tombs Ltd., 32/6.

Dr. Soper's studies and photographs of New Zealand birds, made after long hours in the field and the hide, are now so well known that they need no recommendation. This book is in every way a worthy sequel to the first, upon which it was your reviewer's happy task to comment in *Notornis* X, 307-308.



IM. F. Soper

V — Southern Crested Grebe on Lake Fergus.

In his earlier volume the author was concerned mainly with some inland species of Otago and Southland. In its successor his interest is primarily with some of the spectacular birds of the South Island coast from Otago and Fiordland to the islands of Cook Strait. Portraits of Penguins, Albatrosses, Petrels, Shearwaters and Shags pass before the eyes of the reader in an extended avian beauty parade. At the same time Dr. Soper fills some gaps among the inland birds with notable studies of Great Crested Grebe, Falcon, Blue Duck and Kea.

Dr. Soper's observations on behaviour are always acute and often original and his text is pleasantly evocative. For example his critical ear detected three distinct seasonal songs for the Bellbirds of Queens-town. Here surely is a challenge to North Island students of bird-song,





M. F. Soper

VI — Southern Crested Grebe. The bird has just returned to the nest and is uncovering the egg.

who are lucky enough to pass their days in 'Bellbird country.' Thoughtful remarks in the chapter on the Kea are an important contribution to the literature of this contentious subject.

In a short introduction, the author reveals some of his technical secrets. Modestly he claims that his book is "a miscellany and complete life histories are beyond its scope." Let us hope that another miscellany is on the way; and that a handsome clutch of two will receive an addition, marked with equal richness. Author and publisher have co-operated to produce a beautiful book; further proof, if need be, of New Zealand's growing maturity in yet another field of civilised endeavour.

— R.B.S.

★

*Birds of the Atlantic Islands*, Vol. II, D. A. Bannerman, Oliver & Boyd, 84/-.

This massive volume is restricted to the Madeiran islands. It is in the accepted Bannerman tradition. The author's personal experience of Madeira goes back for more than half a century; and he is nothing if not thorough in the study of possible sources of information, as is shown by the long bibliography. Most ornithologists who have visited the Madeiran archipelago in recent years have appraised him of their findings. The result is an authoritative volume, excellently illustrated, which will not be superseded for a very long time.

An 'Historical Introduction' with, of course, special reference to the ornithological exploration of the group is justifiably detailed, containing many names familiar to devotees of the tubinares. Aviculturists, too, may be interested to learn that by 1687 the commercial traffic in *Serinus canarius* was in full swing. In 1772 Captain Cook on the Resolution with the Forsters on board dropped anchor at Funchal. In a chapter specially written by the Curator of the Museo Municipal do Funchal, geographers will find an admirable account of the natural features and climate.

Perhaps the most relevant section for New Zealand ornithologists is that on the petrels and shearwaters. D. M. Henry's plate of *Pterodroma mollis* is most attractive. Surely this rare 'gadfly' is a near relative of our own now elusive Mottled Petrel (*Pt. inexpectata*). In 1934 Mathews described two distinct races of the Soft-plumaged Petrel from the Madeiran islands; and this distinction is upheld by modern research.

All thoughtful naturalists are alive to the problems of the conservation of insular avifaunas. These problems are much the same the world over. As the result of hunting and deforestation the endemic pigeons of Madeira have become very rare birds. Insecticides are frequently mentioned as possible agents in the growing scarcity of some small birds, e.g. Linnet Goldfinch. Introduced vermin and 'mutton-birding' are a threat to the 'cagarra' and other petrels.

Once in a while the reader is pulled up with a jolt. On p. 38 New Zealand is mentioned and it is stated that the Bobwhite Quail has been 'successfully' introduced. Any recent reports? On p. 189 it is curious to see the Kildeer mentioned as an African species. On p. 100 an unwanted *i* has crept into the spelling of Petronia. These are very minor flaws. An ambitious project is splendidly on the way.

— R.B.S.



*Birds of a Salt Field* by Roy P. Cooper.

Vast evaporating ponds constructed in South Australia by a subsidiary of Imperial Chemical Industries of Australia and New Zealand Ltd. were early proclaimed a bird sanctuary, and have provided an enormous area attractive to many birds, so that about 200 species have been recorded from it. Roy Cooper's booklet (62 pp.) was recently produced by I.C.I.A.N.Z. Ltd., and covers 130 species regularly inhabiting the salt field, giving excellent descriptions, habits, and habitats of each species. A particularly fine feature of the publication is the 50 photographs, several in colour, all but two being taken by the author, who is recognized as one of Australia's leading bird photographers. The species described are much the same as those to be found on any of the various salt fields in southern Australia, so a first class reference book to such areas has been produced. The edition is strictly limited, but while stocks last, copies may be obtained gratis by writing to the Advertising Manager, I.C.I.A.N.Z. Ltd., 1 Nicholson Street, Melbourne, stating that you are a member of O.S.N.Z. A further edition is promised for later in the year.

— A.B.

## LETTER

---

Sir,

In Mr. McAllum's detailed survey of Paradise Duck sex ratios (*Notornis*, March 1966, p. 85) he poses some questions which I think I can answer, or at least suggest where to seek answers. My own records entirely lack observations of "flocks" except at mid-summer when all birds are dwelling in harmony in crowds where chicks (i.e. those only a few months old) are in full plumage and where all adults are in full moult and flightless. I also have no knowledge of the age at which these birds pair or breed. The fact that all birds are in adult plumage well before six months old suggests that they should be in "breeding condition" as yearlings, though some doubt is cast on such an assumption by the fact that round about mid-winter, when hens are thinking about returning to their respective nesting grounds, they will go off prospecting with four, five or six males in attendance. In all probability the "extras" are last season's chicks (not necessarily all her own) who have not yet found a mate. There could well be one or two widowers among the attendants, too.

Mr. McAllum's figures showing sex records close to 50/50 from shooters' bags in May could relate to pairs already established in their nesting areas, where they would form part of a gunner's mixed bag.

A closer analysis of the data from which his tables are compiled might account for the discrepancies (31.5% males and 68.5% females) during November 1960 for four flocks totalling only 181 birds, and the proportions for Sept. and Nov. 1962. After all, there must be some valid explanation for figures which vary so markedly from the 50/50 conclusions drawn from 5435 birds observed during March and April as well as the grand total of 7490 birds.

Leg banding of flightless birds which can be sexed from colour of head (adults at mid-summer and chicks late October and early November) coupled with shooters' reports may, one day, give positive results. In the meantime I am personally pretty confident that averages over a wide area are very close to 50/50.

— MAURICE E. W. FITZGERALD

81 Beach Road,  
Tauranga.

— ★ —

## NOTICE

---

### KERMADECS EXPEDITION

Applications are invited to join the 1966 expedition to the Kermadec Islands, departing per H.M.N.Z.S. Endeavour about 10th November, and returning to N.Z. per H.M.N.Z.S. Inverell in mid-January. Applications should be made to A. T. Edgar, Inlet Road, Kerikeri, and applicants will be subject to selection by the Kermadec Expedition Sub-Committee.

## ANNUAL GENERAL MEETING

### Wellington, 28th May, 1966

---

About 60 members and friends attended.

Mr. A. Blackburn delivered as his Presidential Address a further paper on the Nesting of North Island Fantails.

Mr. H. R. McKenzie presented O.S.N.Z. and Card Committee accounts and report by Hon. Treasurer, which were adopted. The President explained the Kermadec Sub-Committee account. The Nest Record Scheme report was read by Miss M. M. Neill, and the Library report read on behalf of Mrs. H. M. McKenzie. Mr. C. J. R. Robertson summarised the Banding Report, and the Secretary summarised reports of Recording Scheme and Beach Patrol Scheme. The last-named showed a sharp drop since last year, but a member explained that a large batch of records had not yet been sent to the organiser.

It was announced that membership as at 31st March, 1966, was 918; that the Field Guide is expected to be published in June in U.K.; that Council has appointed a sub-committee to study the possibility of producing a small book on New Zealand ornithology, based on work already published by Mr. B. D. Heather; and that negotiations are in progress for a projected second expedition to the Kermadec Islands. It is hoped to hold 1967 A.G.M. in Dunedin; Field Study Courses are planned for Nelson (October 1966), Farewell Spit (January 1967) and Hawke's Bay (October 1967).

The Bailey Prize for the best contribution by a Junior member to the Recording Scheme has been awarded to T. R. Calvert; the Peter Child Prize has been awarded to J. Hilton for his sustained and outstanding contribution to the Nest Record Scheme.

There being no other nominations, Messrs. Edgar, Heather, McKenzie and Sibson were declared re-elected. Mr. H. R. McKenzie announced his intention to retire when a replacement becomes available.

A number of motions to alter the Constitution were put to the meeting. Minor motions of a routine nature were passed without comment. The major motions provoked much useful comment and discussion by members, including Mr. J. M. Cunningham, who was largely responsible for drafting the original constitution, and gave freely of his knowledge and talent in re-casting the motions set out in the Agenda to a form in which they were acceptable to the meeting. The major motions, as passed by the meeting, were as follows:—

(1) "That the Constitution be amended to replace the offices of North Island Vice-President and South Island Vice-President by the office of Vice-President, but without reducing the present size of the Council or interrupting the term of service of the present holders of these offices."

(2) "That paragraph 14 of the Constitution be deleted and that a new paragraph 14 shall read as follows:—

14. (a) The Council of the Society shall consist of not less than twelve officers: a President, a Vice-President, a Secretary, a Treasurer, an Editor of the Society's journal, and not less than seven other officers.

(b) The offices of Secretary and Treasurer may be combined, thus creating a vacancy which may be filled in the usual manner.

(c) Council shall have power to co-opt additional officers.

(d) Officers shall be members of the Society."

The President announced that two members resident in South Island would now be invited to accept office as co-opted members of Council for a period of one year.

Dr. R. A. Falla proposed that Mr. H. R. McKenzie be elected Honorary Life Member of the Society. This proposal was seconded by Dr. G. R. Williams, supported by Mr. J. M. Cunningham, and was received with acclamation. In the course of proposing the motion, Dr. Falla read a citation, as follows:—

"Members are well aware of Ross McKenzie's services to the Ornithological Society of New Zealand. He is a foundation member of the Society who has served it as Recorder, North Island Vice-President, President and Treasurer. Administrative service to O.S.N.Z. is of itself no criterion for the honour of Life Membership; there is no suggestion to create a precedent; Ross McKenzie is in a class by himself not only as an administrator but as a distinguished field ornithologist. During the last 27 years he and others have done much valuable work on ornithological investigation of northern harbours. His travels throughout the Dominion have enabled him to make contact with a vast number of people; through these personal contacts his enthusiasm has encouraged and stimulated innumerable individuals to an interest in field ornithology, and has helped to produce many good observers and a great volume of useful information. Distinguished overseas ornithologists visiting this country regard Ross as highly as do his own countrymen; to meet him is a "must"; to be conducted by him to places of ornithological interest is a highlight of a New Zealand tour. Over the years, no single person has contributed so much to the growth and 'mana' of the Society. Honorary Life Membership is the highest honour the Society can bestow. Truly and with certainty it can be said of Ross McKenzie that he has rendered distinguished service to the Society and to ornithology, and is deemed worthy of the honour."

Mr. McKenzie thanked the meeting for this mark of appreciation of his services to ornithology and to the Society, but stated that he was obliged to decline the honour, as a matter of principle. The meeting accepted Mr. McKenzie's decision with regret, and signified the warmth of its regard for Mr. and Mrs. McKenzie by further acclamation, led by Mr. J. M. Cunningham.

Under General, Mr. M. J. Williams drew attention to reproduction of tables and listing of references in a recent issue of *Notornis*. Mr. R. B. Sibson briefly replied. Mrs. M. Barlow, speaking for Southland and Otago Regions, extended congratulations to Council and to the Editor on the balanced content and continuing standard of *Notornis*. Members raised the matter of possible alterations to Nest Record and Beach Patrol cards, for consideration of Council. Messrs. J. M. Cunningham and E. Dawson spoke on the Reviewing Panel (Ornithological Abstracts). The President explained that part of this material is now

ready for publication. Dr. Westerskov recommended for consideration of Council the formation of a Rare Birds Committee. Mr. D. Dawson drew attention to bird paintings by Mr. Digby Graham.

The President extended a vote of thanks to Dr. Falla, Mr. J. A. Bartle, and the committee of ladies who kindly provided tea.

A conference of Regional Representatives was held on the morning of 28th May, and produced useful results. In the afternoon of 28th and on the morning of 29th May members had the privilege of listening to six talks, as follows:

Utilisation of Nest Record Schemes —	Mr. A. Blackburn
Southland Spur-winged Plover Study —	Mrs. M. Barlow
Introduced Birds of New Zealand —	Dr. P. C. Bull
Recording Abundance of Forest Birds —	Dr. J. A. Gibb
Banding Schemes — Red-billed Gulls —	Mr. L. Gurr
Penguin Studies —	Mr. F. C. Kinsky

In addition, two films by Harold Pollock were shown, one on Herons, one on the Superb Lyre Bird. Thanks are due to Dr. Westerskov for bringing these splendid films from Dunedin.



## HON. TREASURER'S REPORT

### Year Ending 31/12/65 (Nine Months)

The financial period of nine months ending 31/12/1965 shows a surplus of £37/9/9.

The Christmas Card Committee's statement is submitted separately as usual. The present project is being wound up, the results being no longer worth the free labour and management involved. The Scheme has provided £1467 in cash at no expense to the Society, a splendid effort by Mr. B. S. Chambers and his helpers. A similar scheme is being inaugurated in Wellington by Council.

No audited statement has been supplied by the Kermadecs Expedition Committee but a memorandum of its affairs shows that the loan of £720 to it is adequately covered at present.

The total investment in ordinary shares in public companies is now £2500/10/-, being almost exactly the amount of the cash portion of the Lenz legacy. The market value at 31/12/65 is £2353/15/-, being down £146/15/-. Steady recovery is expected. Charts of the shares position are available for study and copies will be supplied to members on request.

Messrs. Chambers, Worth & Chambers are heartily thanked for again auditing the books free of charge.

On behalf of the Society and myself I thank Mr. D. F. Booth for his work as Asst. Treasurer and he and Mr. B. S. Chambers for instituting a new method of dealing with cash receipts.

H. R. McKENZIE,  
Hon. Treasurer, O.S.N.Z.

## BALANCE SHEET AS AT 31st DECEMBER, 1965

March 1965		December 1965	£	s.	d.	March 1965		December 1965	£	s.	d.
	<b>Current Liabilities</b>						<b>Current Assets</b>				
323	Sundry Creditors		216	6	0	956	Bank of New Zealand		167	3	11
75	Subscriptions in advance		74	14	7	59	Sundry Debtors		59	13	6
398			291	0	7	1015			266	17	5
	<b>Reserves</b>						<b>Stocks on Hand</b>				
700	Life Subscriptions, Special Appeal and Christmas Card Scheme		700	0	0	300	Copies "Notornis," etc.		300	0	0
	Special Publications Fund	139 2 6				720	<b>Loan to Kermadecs Fund</b>		720	0	0
139	Add transfer from Accum. Funds	360 17 6	500	0	0		<b>Investments</b>				
	Minor Expeditions Fund	30 0 0				700	Auckland Electric Power Board		700	0	0
30	Add transfer from Accum. Funds	120 0 0	150	0	0	1000	Dunedin City Council Debentures		1000	0	0
869			1350	0	0	1532	Shares in Public Companies		2500	10	0
	<b>Accumulated Funds</b>					3232			4200	10	0
4409	Balance 1/4/65		4499	14	7		<b>Library</b>				
253	Bequest					500	At Valuation		500	0	0
-	Transfer from Christmas Card Fund		250	0	0						
-	Excess of Income over Expenditure		37	9	9						
4662			4787	4	4						
	Transfer to Special Publications Fund	360 17 6									
-	Transfer to Minor Exd. Funds	120 0 0	480	17	6						
4662			4306	6	10						
162	Less Excess of Expenditure over Income		-	-	-						
4500			4306	6	10						
5767			£5947	7	5	5767			£5947	7	5

## Income and Expenditure Account for Nine Months Ended 31st December, 1965

March 1965	December 1965	£ s. d.	March 1965	December 1965	£ s. d.
846 Printing & Distributing "Notornis" ....	675	12 5	817 Subscriptions, including Life ....	805	2 6
85 Less Sales "Notornis," etc. ....	65	11 6	26 Donations ....	16	0 5
761	610	0 11	138 Interest Received ....	90	7 9
49 Postages ....	22	8 6	4 Dividends Received ....	45	1 6
-- Field Study Courses, loss ....	16	4 3	12 Field Courses, Surplus ....	-	-
96 Printing & Stationery ....	61	3 7	163 Excess of Expenditure over Income ....	-	-
153 General Expenses ....	94	6 2			
23 Income Tax ....	34	16 9			
78 Contribution to Banding Scheme ....	80	2 3			
- Excess of Income over Expenditure ....	37	9 9			
1160	£956	12 2	1160	£956	12 2

ANNUAL GENERAL MEETING

### Auditors' Report

We report to the members of the Ornithological Society of New Zealand (Inc.) that we have examined the books, accounts and vouchers for the Society and also those of the Card Committee for the nine months ended 31st December, 1965. We certify that, in our opinion, the income and expenditure accounts for the Society and the Card Committee are properly drawn up to show the true position at that date. We also certify that the Balance Sheets for the Society and the Card Committee are properly drawn up and show the true financial position of the Society as at 31st December, 1965, but advise that whilst we have satisfied ourselves that the sub-committee administering the Kermadec Expedition Fund have funds in their bank account in excess of the advance made from the Society's main account, no permanent records are available for audit, nor has a statement of receipts and payments, nor income and expenditure account, nor balance sheet been prepared to December 31, 1965, so that we have been unable to examine these records and report thereon.

17th May, 1966

CHAMBERS, WORTH &amp; CHAMBERS, Auditors

115



## LIBRARY REPORT

### May, 1965, to December 31st, 1965

---

The interest in the Library, though not excessive, is quite pleasing and worthwhile. Most of the borrowings are postal. Since the publishing of the "Catalogue of Library of the Ornithological Society of New Zealand, Inc., Sept. 1965" there have been thirty-three copies despatched and considerable use has been made of them. The circuits which were abolished have been replaced by individual borrowings and this has proved satisfactory and is building up. Books and periodicals borrowed over this period number sixteen.

A typewriter has been purchased and some binding which was authorised is still to be achieved.

The provision of a room in the Auckland War Memorial Museum is a wonderful facility for the Society. Warmest thanks are accorded the Museum Librarian, Miss Enid Evans, and her staff for ready guidance and advice. Thanks, too, are proffered to O.S.N.Z. members who have assisted.

— HETTY MCKENZIE, Hon. Librarian



## CARD COMMITTEE

---

This is my final report as convenor of this sub-committee during 1965. When we look back over the last years and realize that this committee has raised nearly £1,500 in addition to accumulating some valuable printing blocks, I think you will agree that the committee has achieved that which it set out to do.

During 1965, no cards were produced though we had intimated that this was our intention. The problems of arranging a suitable artist were difficult because of the artist being unable to meet the deadline. Each year there were rising production costs and increasing postage rates and although our price did not alter during the period, sales were slowly falling because of competition from similar organisations. The committee, therefore, decided not to produce an inferior card by rushing the production and instead they met orders from limited amounts of stock held over from the previous year. Proceeds from such sales have been included with donations in the accounts.

On behalf of my outgoing committee I thank those Auckland members who helped with the packing and checking over the years. I thank you members for your generous support which, through profits, amply rewarded the committee's efforts.

— B. S. CHAMBERS

## CARD COMMITTEE ACCOUNTS

### REVENUE ACCOUNT FOR NINE MONTHS ENDED 31st DECEMBER, 1965

	£	s.	d.	£	s.	d.
<b>Income:</b> Donations	22	4	6			
Interest	28	7	0			
				50	11	6
Postages and Bank Fees					7	6
Net Revenue to Accumulated Funds				50	4	0

### BALANCE SHEET AS AT 31st DECEMBER, 1965

	£	s.	d.
Accumulated funds at 31/3/65	1117	2	4
Add Current Surplus		50	4 0
		1167	6 4
Less Transfer to General Account		250	0 0
Balance remaining	£917	6	4
This is invested as follows:—			
Bank		865	6 4
Printing Blocks		40	0 0
Accrued Interest		12	0 0
		£917	6 4

## THE NEST RECORD SCHEME: 1965 - 1966

During the year ended May 23rd, 1966, 781 nest record cards were received, almost as many as the total of 801 for the year 1964-65. This number includes over a hundred cards for the years 1963 and 1964 that were not forwarded in time to be included in last year's total.

Cards were received from 41 contributors, whereas last year's contributors numbered 54. It seems, therefore, that while some members have increased their contributions, there is still a need for wider interest and participation in the scheme. There were no cards at all this year from the Wellington region. It was disappointing to find the names of some former contributors missing from this year's list. However, it is a pleasure to welcome new contributors and to see the enthusiastic response from some of the junior members. In regions where there is an especially active local branch, the work of junior members is most promising.

Records for Brown Quail and North Island Fernbird have been received for the first time. This year the Fantail records have been separated into North Island Pied and South Island Pied. There is still no intake for the Black Fantail. A number of species represented in last year's records are missing from this year's list. The large increase in the intake for Blackbird, Song Thrush and House Sparrow is due in large measure to the efforts of Dr. J. E. C. Flux of the Animal Ecology Division of the D.S.I.R. and of J. F. Hilton, Peter Jackson and D. G. Dawson of the Christchurch Branch of O.S.N.Z.

During the period under review, Dr. Flux has prepared a paper now in the hands of the publishers, on his observations on nesting success particularly of Song Thrushes. J. E. Hilton is working on an analysis of the Blackbird cards. In addition, the cards for Skylark and Pipit, House Sparrow and Red-billed Gull are being consulted by G. Tunnicliffe, D. G. Dawson and J. Mills respectively, all of whom are preparing material for a thesis.

Increase or decrease in the intake for individual species appears to bear no relation to numbers or distribution of species, but rather to reflect the efforts and interests of individual contributors. A glance at the species list shows that the coverage for many of our native and introduced species is still far from complete, and that a study of nesting success for many of our birds is still a wide open field.

— MARGARET M. NEILL

★

### LIST OF CONTRIBUTORS

Contributions of 20 or more cards are shown in brackets.

J. H. Allan, A. F. Barwell, John F. Bell (79), A. Blackburn (43), Mrs. B. Brown, R. Bushell, D. E. & T. R. Calvert, P. Child (20), J. C. R. Claridge, Robert Cowan (59), J. A. Cowie, D. G. Dawson (in conjunction with J. E. Hilton and P. Crosier — 28), A. T. Edgar, J. V. Elliott, Dr. J. E. C. Flux, assisted by Mr. Porter and Mr. Taylor (104), Robin Gallienne, G. Harrow, J. E. Hilton (150), J. R. Jackson (36), Peter Jackson (61), Peter Jackson and David Burt (24), R. T. Lawrence, N. J. Ledgard, G. D. Leitch, David J. Lewis, Mark G. McNeilage, D. V. Merton (22), G. H. Moon, Kenneth P. Pomeroy, M. Raskin, P. J. Reese, Gillian Reeve, M. F. Soper (24), Richard M. Wallace, Christchurch Branch O.S.N.Z., Gillian Poulton.

## SPECIES LIST OF NEST RECORD CARDS

SPECIES	Previous Total	1965-66	Total	SPECIES	Previous Total	1965-66	Total
North Island Kiwi	1	-	1	Wrybill	8	1	9
Stewart Island Kiwi	1	-	1	Pied Stilt	167	9	176
Great Spotted Kiwi	1	-	1	Black Stilt	2	4	6
Yellow-eyed Penguin	10	-	10	Southern Skua	1	-	1
Little Blue Penguin	57	-	57	Black-backed Gull	199	8	207
White-flipped Penguin	11	1	12	Red-billed Gull	35	1	36
N.Z. Crested Penguin	2	-	2	Black-billed Gull	89	11	100
Southern Crested Grebe	2	-	2	Black-fronted Tern	170	5	175
N.Z. Dabchick	1	-	1	Caspian Tern	19	-	19
Wandering Albatross	11	-	11	Antarctic Tern	3	-	3
Light-mantled Sooty Albatross	4	-	4	Fairy Tern	7	1	8
Fairy Prion	16	-	16	White-fronted Tern	15	1	16
Flesh-footed Shearwater	1	-	1	Grey Ternlet	5	-	5
Sooty Shearwater	3	1	4	N.Z. Pigeon	15	8	23
Fluttering Shearwater	7	-	7	Rock Pigeon	57	2	59
Allied Shearwater	3	-	3	Kaka	4	4	8
Black Petrel	1	-	1	Kea	45	6	51
Grey-faced Petrel	13	1	14	N.Z. Parakeet	3	1	4
Kermadec Petrel	1	-	1	Yellow-crowned Parakeet	2	1	3
Pycroft's Petrel	1	2	3	Shining Cuckoo	3	-	3
White-faced Storm Petrel	5	-	5	Morepork	4	3	7
Diving Petrel	51	-	51	Little Owl	13	-	13
Gannet	4	-	4	Kingfisher	35	7	42
Black Shag	45	1	46	South Island Rifleman	40	4	44
Pied Shag	18	-	18	Rock Wren	7	4	11
Little Black Shag	1	-	1	Skylark	82	-	82
White-throated Shag	11	-	11	Welcome Swallow	59	16	75
King Shag	18	-	18	Fantail	78	-	78
Spotted Shag	5	-	5	N.I. Pied Fantail	18	18	36
Blue Heron	21	3	24	S.I. Pied Fantail	3	3	6
White-faced Heron	8	2	10	Pied Tit	-	-	-
Bittern	2	-	2	(White-breasted Tomtit)	12	-	12
Canada Goose	20	1	21	Yellow Breasted Tomtit	17	4	21
Mute Swan	9	-	9	North Island Robin	7	-	7
Black Swan	37	1	38	South Island Robin	14	1	15
Paradise Duck	6	-	6	North Island Fernbird	-	2	2
Grey Teal	9	-	9	South Island Fernbird	7	2	9
Brown Teal	2	-	2	Brown Creeper	2	-	2
Grey Duck	53	12	65	Whitehead	6	-	6
Mallard	33	2	35	Yellowhead	11	2	13
Shoveller	11	-	11	Grey Warbler	52	6	58
Black Teal	6	-	6	Song Thrush	586	220	806
Harrier	48	-	48	Blackbird	517	198	715
N.Z. Falcon	4	1	5	Hedge Sparrow	90	8	98
Pheasant	8	3	11	N.Z. Piiit	22	6	28
Brown Quail	-	1	1	Bellbird	12	4	16
Californian Quail	13	1	14	Tui	8	13	21
Chukor	1	-	1	White-eye	77	5	82
Banded Rail	2	-	2	Greenfinch	59	8	67
North Island Weka	4	-	4	Goldfinch	205	11	216
South Island Weka	2	3	5	Lesser Redpoll	38	4	42
Pukeko	69	8	77	Chaffinch	76	19	95
Australian Coot	4	-	4	Yellow Hammer	23	1	24
South Island	-	-	-	House Sparrow	245	53	298
Pied Oystercatcher	94	1	95	Starling	126	32	158
Northern Oystercatcher	17	2	19	Myna	12	1	13
Black Oystercatcher	28	-	28	White-backed Magpie	10	2	12
Spur-winged Plover	26	-	26	Magpie (Species not indicated)	-	6	6
Banded Dotterel	140	3	143	North Island Saddleback	3	4	7
N.Z. Dotterel	41	1	42				
					4427	781	5208

## RECORDING SCHEME Report for 1965/66

Outstanding contributions were received from Southland and Otago, and much useful information came in from many other Regions, but very little from Auckland or Wellington and none at all from Marlborough, Nelson and Wairarapa. I am grateful to those who have supported the scheme and hope that in 1966/67 many who have not yet done so but who have information to offer, will send their notes for incorporation in the species files. Many members have a store of valuable material in their notebooks, and it is important that as much as possible of this should be recorded before it is forgotten or lost.

Good use has been made of the scheme during the year. The files for N.Z. Thrush, Spur-wing Plover, Blue Duck and North Island Kokako have been sent out to members who are working on those species. A summary of information on N.I. Kokako will shortly appear in *Notornis*, and a recent paper on Welcome Swallows owed much of its distributional data to the Recording Scheme.

Useful locality lists have been received for Waikaremoana and Eastern Taranaki.

A summary of important unpublished records is being prepared and will be sent to the Editor when ready.

The following is a list of contributors:—

*Southland*: Mrs. Barlow, T. Smith, R. R. Sutton.

*Otago*: J. H. Allan, Mrs. Buchanan, G. Chance, P. Child, Mrs. Fitzgerald, Mrs. Hamel, A. Harris, H. W. M. Hogg, Mrs. B. Kelly, D. Kelly, Mr. and Mrs. McKellar, I. G. McLaren, I. L. McVinnie, J. Middleditch, A. Nuttal, W. T. Popplewell, E. Sheat, Dr. Soper, Mrs. L. E. Walker, Dr. K. Westerskov.

*Canterbury*: P. Crosier, Miss Davis, B. Detlaff, J. Hilton, J. R. Jackson, D. McMillan, G. Tunnicliffe.

*West Coast*: P. Grant, T. Hartley-Smith, A. Wright.

*Wellington*: B. D. Bell, Dr. Falla, F. C. Kinsky, H. L. Secker, Miss M. Walton.

*Wanganui*: R. W. Macdonald.

*Manawatu*: E. Dear, E. B. Jones.

*Taranaki*: R. Allan, W. Bysouth, F. J. Finer, M. G. Macdonald, W. R. Marsden, D. G. Medway.

*Hawke's Bay*: Mrs. Drake, B. D. Hankins, N. B. Mackenzie, Mrs. Waters. *Gisborne*: A. Blackburn.

*Bay of Plenty*: V. Davis, M. E. Fitzgerald, Mrs. McLintock, R. St. Paul, R. M. Weston.

*Volcanic Plateau*: A. Cragg, R. W. Jackson, H. Lyall.

*Waikato*: C. R. Buckeridge, M. P. Daniel, P. J. Howard.

*South Auckland*: Miss S. Douglas, Miss A. Goodwin, D. A. Lawrie, J. Lownsborough, H. R. McKenzie, W. Moislely, Mrs. Urquhart, D. Walter.

*Auckland*: Miss L. J. Bishop, R. H. Blanshard, D. V. Merton, R. B. Sibson, E. G. Turbott.

*Kaipara*: Mrs. M. J. Barron, F. P. Hudson.

*Northland*: S. Barrett, T. R. and D. E. Calvert, R. Cowan, C. W. Devonshire, H. A. Findlay, Miss G. Poulton, Miss R. Reeve, Mrs. K. Reynolds, M. Ross.

## SUMMARIES

### (1) SPUR-WINGED PLOVER STUDY

By MAIDA L. BARLOW

Southland O.S.N.Z. membership is small and scattered. Those who do active field work thought that they would accomplish something of more scientific value by concentrating on one species and studying it thoroughly, rather than taking individual bites at the large "cherry" of varied bird life in the Southland area.

The Spur-winged Plover (*Lobibyx novaehollandiae*) was chosen for the following reasons:

1. Its successful establishment in the south, and its continuing spread, posed challenging questions.
2. Some aspects of behaviour appeared to be changing, particularly in the matter of aggression.
3. The original breeding area in this country, and possibly the area most closely populated by the species in New Zealand, was close at hand.

Early in 1965 a study plan was made, bearing in mind that the plan, in a raw study such as this, is a tool, not an objective. The topic was looked at from three main aspects, to be studied over a period of, say, five years:

1. Population study; distribution and movement.
2. Statistics of egg fertility; clutch size; incubation dates; chick growth rates; chick mortality percentage; hatching percentage; fledging.
3. Behaviour study.

Our study is still at an early stage. My main purpose here is to make members aware of what can be done, by a small and scattered group of busy people, each contributing within his particular competence to a team effort.

Members have participated in the following ways to date:

- B. D. Heather: help with planning.  
 S. L. Lobb: supplied materials for, and made, four drop-traps.  
 J. Mackintosh: adapted four pairs of pliers to fit the E-band; organised the conversion of aluminium bands to colour-bands.  
 R. R. Sutton: electroplating of monel bands.  
 B. W. Mazey: cyclostyling and distribution of questionnaire.  
 R. R. Sutton, P. M. Muller, R. Bond and M. L. Barlow make up the field team. Wives and husbands contribute nobly by gumboot-drying, child-minding and helping with the field work at times.

Other members record and report all sightings of the species.

A team effort such as this has advantages over the one-man study. Individually, the time we can give to the work is limited; collectively, it reaches quite impressive proportions. We share our problems, findings and field methods, and thus learn from each other. By working in such a team the individual has others, as vitally interested as himself, with whom he can discuss the fine points which continually arise in such a study. The ornithologist can pursue his enthusiasm to the point where he has no-one to discuss it with, because his own knowledge is so specialised. This may be the way to scientific advance, but it is also the road to the loneliness of the ivory tower.

Group work can achieve the scientific result. At the same time, it can increase the worker's joy in life, and save him from the psychiatrist!

### REQUEST FOR INFORMATION

Members living or travelling in the South Island are asked to look for leg-bands on any Spur-winged Plovers they see. Recorded sightings of banded birds are vital to our knowledge of the movements of this species.

Individual colour-banding is being carried out. Each combination includes a monel band (giving aluminium colour). Some birds carry untreated monel bands, which are difficult to see. This difficulty has been overcome by electroplating the monel bands, and birds banded since October 1965 carry such bands. A few birds banded before 1965 carry a single aluminium band. Since 1965, some birds carry two bands (a colour and a monel), many have three bands, and from the end of 1966 birds will carry four bands. No bird has more than two bands on a leg. It is important to note:

(1) Whether the bands are on the bird's left or its right leg; and (2) The order of bands from above; e.g.

R/A. B. Red over (i.e. above) aluminium on the left leg; blue on the right leg.

A/O. A. Aluminium over orange on the left; aluminium on right.

— W.A. No band on left; white over aluminium on right.

Please record any such sighting accurately and immediately. *Write it down at once!* If possible, and certainly if in any doubt, ask a second person to check the combination colours and order. Report, giving also date, locality and whether bird alone or with a flock, to The Banding Officer, Dominion Museum, Wellington; or to the writer.

(Mrs.) Maida L. Barlow,  
152 Lewis Street,  
Invercargill.



## (2) INTRODUCED BIRDS

By P. C. BULL, *Animal Ecology Division, D.S.I.R., Lower Hutt*

The success of introduced birds in living in close association with man often brings them into conflict with his interests, thus leading to economic problems and strong pressures for destruction of the offending species. On the other hand, the same birds often have important aesthetic, scientific, educational, sporting or economic values. Proposals to control birds must be examined in relation to these positive values, and adopted only if the need is real and means exist to achieve control effectively, humanely and at an acceptable cost. Since we invariably lack the information needed for such an assessment, the Animal Ecology Division of D.S.I.R. has recently established a small unit to study introduced birds in agricultural lands in Hawke's Bay. Attention is being given to methods of assessing damage to crops and ways of controlling it, but the main emphasis of the work is on long-term studies of the ecology of the main problem species (Rooks, Mynas and House-Sparrows) including such aspects as numbers, reproduction, survival, movements and food.

Rooks were found to feed largely on earthworms and insects, especially beetles, fly larvae and caterpillars. They also caused considerable damage to newly sown crops of peas, pumpkins and cereals; maize crops sometimes had to be resown. A survey last year showed that 69 breeding rookeries were distributed over some 1150 square miles and contained at least 3557 nests. Further, there is good evidence of a recent increase in both the breeding and feeding ranges of Rooks in Hawke's Bay. These findings raise three important problems: was the spread accelerated by recent attempts to control the birds at established rookeries?; will the birds continue spreading and perhaps reach the vulnerable maize-growing areas near Gisborne; and should an attempt be made to prevent this by a control programme based on new poisons and immobilizing drugs? These questions cannot be answered till more is known of the birds' ecology and the effectiveness of the drugs.

Decisions on the need for bird control and the widespread concern at the possible effects of toxic chemicals both demand more reliable information on changes in the numbers of our common birds. In Britain very useful information of this kind is being obtained by the British Trust for Ornithology through its "Common birds' census." Our Society needs urgently to increase its numbers of competent ornithologists interested in common birds so that it can mount a similar scheme.



### (3) RECORDING ABUNDANCE OF FOREST BIRDS

By J. A. GIBB, *Animal Ecology Division, D.S.I.R.*

In perusing the writings of our early ornithologists we are sometimes frustrated at being unable to interpret their observations on the abundance of our forest birds. How will ornithologists 50-100 years hence regard our observations now?

In parts of the world with a rich avifauna, each species occupies a relatively narrow ecological niche in the community. Consequently the compilation of a species list is more revealing with a rich avifauna than with a sparse avifauna in which each species occupies a broad spectrum of environments. Nonetheless a systematic collection of species lists for N.Z. forests is urgently needed, and could be organised by this society. But species lists need supplementing with some indication of abundance.

Terms such as 'common,' 'few,' 'scarce' and 'rare' are better than nothing, but only just. Ideally we need many more complete censuses of specific areas, such as those undertaken by Kikkawa; but a census is often impracticable, and there are ways of bridging this gap between the unadorned species list and the complete census, without recourse to using vague adjectives.

Perhaps the simplest and most informative method is to record the species contacted in a given period of time, either as spot checks along predetermined routes or continuously on slow walks. The time periods or intervals must be standardised; on walks, a 15-minute time interval is convenient. This method of recording species, not numbers, contacted tends to under-emphasise common species, and to over-emphasise less common species, but as the information is quantitative it is possible to compare densities from place to place, or time to time.



As the frequencies with which different species are contacted depend partly on their conspicuousness, I also record for each bird contacted, (a) whether it was first seen or first heard, and (b) the minimum distance at which it was contacted.

In the Urewera National Park around L. Waikaremoana in January 1966 the following species of birds were recorded, given here in declining order of frequency based on 86 15-minute periods: Grey Warbler, Rifleman, Pied Tit, Bellbird, Tui, Whitehead, Chaffinch, White-eye, Blackbird, Parakeet, Kaka, Fantail, Long-tailed Cuckoo, Shining Cuckoo, N.Z. Pigeon, Song Thrush, Harrier. The order of abundance was virtually the same when based on the numbers of birds contacted; but how does this recorded order of abundance compare with actual abundance? The difference is largely a function of the distances at which the members of each species were contacted, and of their conspicuousness.

Only about 13% of all the birds contacted were first detected by sight, and the rest by sound; and this observer seldom contacted birds by sight at distances greater than 20 yards. Moreover, 99% of the Rifleman, to take an extreme example, were contacted within about 20 yards of the track; whereas Grey Warblers for instance were contacted in fair numbers, mostly by sound, out to distances of 80 yards. Whilst it appears that Rifleman are not repelled by the observer, other species such as Bellbirds and Chaffinches probably are; and one knows from experience that yet other species (Fantails, Robins, Whiteheads) are sometimes attracted to the observer.

Thus characteristics of the birds themselves and of the observer complicate interpretation of measures of abundance made from field counts; but as detailed censuses of small areas are so time-consuming, we must face up to the problems if ever we are to obtain satisfactory measurements of the abundance of forest birds.

#### LIST OF REGIONAL REPRESENTATIVES, 1966/67

- FAR NORTH: A. T. Edgar, Inlet Road, Kerikeri (Acting)  
 NORTHLAND: A. T. Edgar, Inlet Road, Kerikeri (Acting)  
 AUCKLAND: M. J. Hogg, 27 Woodside Crescent, St. Heliers,  
 Auckland E.1  
 SOUTH AUCKLAND: H. R. McKenzie, P.O. Box 45, Clevedon  
 WAIKATO: Mrs. M. L. Templer, 22 Mardon Rd., Fairfield, Hamilton  
 BAY OF PLENTY: R. M. Weston, 250 River Road, Kawerau  
 VOLCANIC PLATEAU: R. W. Jackson, 9 Kentrick Road, Rotorua  
 GISBORNE/WAIROA: A. Blackburn, 10 Score Road, Gisborne  
 TARANAKI: D. G. Medway, P.O. Box 476, New Plymouth  
 WANGANUI: R. W. Macdonald, 127 Ikitara Road, Wanganui East  
 MANAWATU: E. Dear, Kopane, R.D. 6, Palmerston North  
 HAWKES BAY: N. B. Mackenzie, Pakowhai, Napier R.D. 3  
 WAIRARAPA: K. Cairns, 177 Colombo Road, Masterton  
 WELLINGTON: J. A. Bartle, 37 Sefton Street, Wadestown,  
 Wellington W. 2 (Acting)  
 NELSON: B. Ashby, 27 Tennyson Crescent, Stoke, Nelson  
 MARLBOROUGH: S. R. Kennington, Box 40, Seddon  
 CANTERBURY: D. G. Dawson, 100 Marshland Road, Shirley,  
 Christchurch  
 WESTLAND: P. Grant, 10 Hinton Road, Karoro, Greymouth  
 OTAGO: Mrs. J. B. Hamel, 42 Ann Street, Roslyn, Dunedin  
 SOUTHLAND: R. R. Sutton, P.O. Lorneville, Invercargill  
 STEWART ISLAND: R. H. Traill, Halfmoon Bay, Stewart Island