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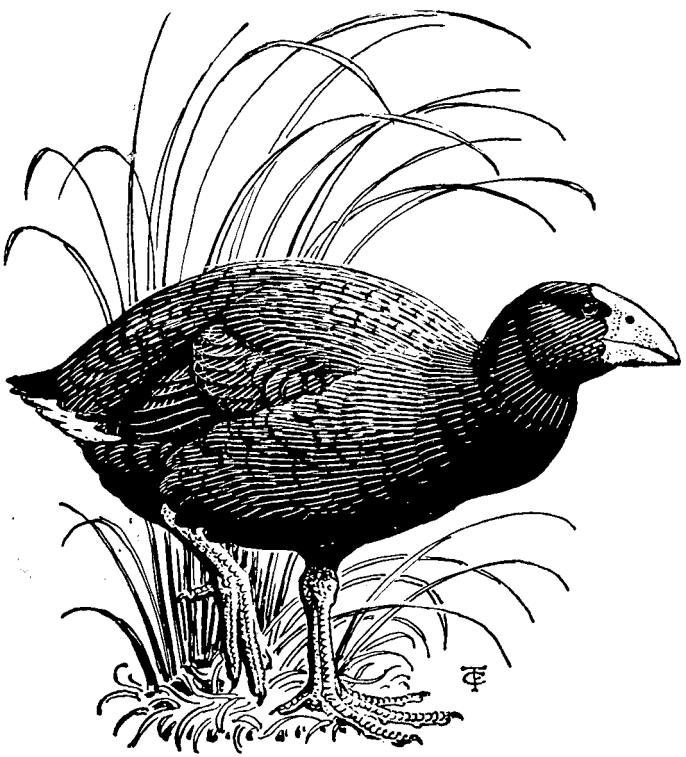
Notornis

In continuation of New Zealand Bird Notes.



Bulletin of the Ornithological Society of New Zealand.
Published Quarterly.

NOTORNIS

In continuation of New Zealand Bird Notes.

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CONTENTS.

COVER DESIGN.—The society is pleased to be able to present a new cover design of a notornis, executed by the eminent English artist, C. F. Tunnicliffe.

FAIRY TERN INQUIRY.—Members are invited to participate in an inquiry being organised by Miss N. Macdonald, Keppoch Lodge, Sale Street, Howick, Auckland, concerning the numbers, breeding localities and winter distribution in New Zealand of the fairy tern. This bird is not to be confused with either the white-fronted or the black-fronted tern, both of which have a wide distribution, whereas the fairy tern is exceedingly scarce and is much smaller than these birds. In view of its rarity, members sending information are requested to give details of the bird's appearance and plumage to establish its identity. A questionnaire has been prepared by Miss Macdonald and members who can supply information about this bird should communicate with her at the address stated above.

ANNUAL MEETING.

The annual meeting of the Ornithological Society of New Zealand was held in Christchurch on Friday, May 16, 1952. The president, Mr. E. G. Turbott, presided over an attendance of about 30. Several apologies for absence were read.

The Christchurch Regional Organiser, Mr. E. W. Dawson, gave details of arrangements for the field trip for the following day.

Mr. Turbott spoke to the meeting of the essentially co-operative nature of the society, pointing out that another of the main objects had been achieved. This was the providing of ready means for the recording of ornithological information on a national scale. In this respect the ringing scheme, nest records cards and beach patrol cards were especially mentioned. The "special inquiries" perhaps needed more regular advertising to members, but provided a further means for co-operative work. Mr. Turbott said that in retiring from the position of president, he wished to refer specially to the work of the hon. secretary, Mr. J. M. Cunningham, over the past few years. Mr. Cunningham had given freely of both his time and his outstanding organising ability, and the successful establishment of the ringing scheme and the other permanent schemes for recording members' observations, were his work. The happy spirit of co-operation which existed between all aspects of interest in ornithology was stressed by Mr. Turbott.

The twelfth annual report, for the year ended March 31, 1952, presented by the hon. secretary, Mr. J. M. Cunningham, stated:—A glance at "Notornis" will show that progress has continued. The year has seen the completion of volume 4 and the issue of a special number devoted to the takahe, for sale to the public. As will be shown in separate reports, the library is growing beyond all recognition, and is being increasingly used by members; the ringing scheme is prospering and the future pattern of research becoming plainer; the checklist, which will be the most important project the society has yet sponsored, is nearly complete; proposals for incorporation have been formulated and will be presented shortly. A pamphlet showing the aims of the society and how members can help was distributed to all members and should be carefully studied. It contains much information in condensed form which is of value to those new and present members wishing to know more of present activities, prices of back numbers, etc.

A new permanent investigation, the beach patrol, was commenced, and its success will be dependent on the number of cards filled in by members. It is surprising how much can be learned from a list of localities and dates on which specimens were washed ashore if sufficient numbers of members co-operate. Provision is made for measurements of the corpses, but though desirable, this is not in any way necessary for the success of the scheme. It is anticipated that with the ringing scheme, the nest records will prove one of the most valuable lines of research followed by the society. Statistical analyses can produce much information from cards incompletely filled in. Mr. J. King reports, however, that although many cards have been issued, members are disappointingly slow in sending in their completed cards, only Dunedin members, Miss N. Macdonald and Mr. J. M. Cunningham having forwarded any quantity of cards. In England, The British Trust for Ornithology makes the greatest use of similar cards, and it is of interest to note that in 1950 about 5000 cards were sent in by over 100 members. It is stated: "Since the value of the scheme largely depends on the collection of an unbiased sample of nest records, it is quite essential that contributors should not select for record only those nests which may seem of greatest interest. For every nest with eggs or young should be recorded, even if it is visited only once or totally destroyed the very next day." The same applies in New Zealand.

The finances of the society have been buoyant, and the number of members and current income, are a record. A new low record is also apparent in the subscription arrears. There are a total of 660 members (an increase on last year of 107), consisting of 475 ordinary, 145 endow-

ment, 39 life and one hon. life, members. One hundred and forty have paid their subscriptions in advance and there are 26 still in arrears. Due to increase in printing costs and bigger issues of Notornis, the cost per member of Notornis has risen to 8s. 10d., and it is evident that the continued support of members by increasing their subscriptions to endowment rates and making donations, is a big factor in the financial success of the society during the past year.

INCOME AND EXPENDITURE ACCOUNT for the Year ended 31/3/52.

INCOME.	£	s.	d.	EXPENDITURE.	£	s.	d.
Subs., 1951, and Arrears	200	10	0	"Notornis,"—			
Donations, General and Illustrations Fund	10	14	3	Vol. 4, Nos. 5—8	140	8	6
Sales, Back Numbers	30	3	3	Illustrations	32	17	8
Sales, Takahe	72	9	0	"The Takahe" issue	46	9	2
Interest, P.O.S.B.	9	3	0	Envelopes	9	9	9
Typing Expenses drawn from Checklist Reserve	2	13	3	Stationery	16	12	2
				Typing Envelopes, Etc.	11	19	0
				Postages	19	15	3
				Library Expenses	18	3	2
				1951 Annual Meeting Exs.	2	15	4
				Sundry	10	12	4
				Ringing	3	14	10
				Excess of Income over Expenditure, transferred to General Reserve	12	15	7
	£325	12	9		£325	12	9

BALANCE SHEET as at 31/3/52.

LIABILITIES.	£	s.	d.	ASSETS.	£	s.	d.
Subs. paid in Advance	203	0	0	Subs. in arrear, estimated to realise	2	5	0
Sundry Creditors (a/cs. due but unpaid)	20	12	6	Stationery on Hand	10	14	6
Checklist Reserve	17	6	9	Cash	13	10	0
General Reserve	166	13	1	P.O. Savings Bank	363	15	5
				Bank of New Zealand	17	7	5
	£407	12	4		£407	12	4

(A more detailed statement of accounts, certified "audited and found correct—F. E. Wells, 2/5/52," was presented to the annual general meeting, and copies may be obtained on application.)

Miss H. Laing has acted during the year as hon. assistant-treasurer, handling all subscriptions and the society is deeply indebted to her for this generous help. Our thanks are again offered to Mr. F. E. Wells for his auditing of the accounts.

Report of the Checklist Committee, 1951-52 (Mr. C. A. Fleming, convener).—The original draft checklist had been completely revised in the light of the committee's decisions before the end of 1951, and has since been re-typed by Mr. D. H. Brathwaite. The list will be ready for publication as soon as members of the committee have had the chance to check the revised draft. In tabling the manuscript at the annual general meeting, 1952, the Checklist Committee recommends that the committee of the Ornithological Society of New Zealand be empowered to take the necessary steps for its publication as soon as possible.

The report of the Ringing Committee (convener, Mr. J. M. Cunningham) stated:—In the second full year of the operation of the scheme we are again able to report that considerable success has been achieved. Owing to the late arrival of some members' schedules it is not possible to present to this meeting a full summary of operations, but during the year 2797 birds of 21 species were ringed by 24 operators and their helpers, and 136 recoveries were made. This latter figure includes many chicks found dead where ringed, which are for summary purposes treated as recoveries, and which emphasise the heavy mortality in most nesting colonies of seabirds. Apart from these, other recoveries continue to be made in unexpectedly large numbers, and these are the commencement of a series which will in time, contribute greatly to our knowledge of birds and their movements in the country. The society now has on file, details of the ringing of 9584

birds, and 539 recoveries. Colour ringing is playing its part, and already a number of birds have been seen with colour rings, and their movements thus traced. It is emphasised that under no circumstances should members use colour rings of other than the allotted colours, and then only when they carry the list of combinations with them when ringing. A single lapse of memory may result in the wrong combination being used, and this would invalidate all colour ringing done with the correct combinations of colours. Some operators are developing the technique of feeding ringed gulls and reading the ring numbers through field glasses, and this will become an increasingly valuable way of getting recoveries. Further rings were supplied during the year for use on Heard and Macquarie Islands, and two more recoveries from the former are reported. Rings were also supplied to the C.S.I.R.O. for the ringing of gannets in Australia, and this operation will be complementary to gannet ringing in New Zealand. These rings are being replaced by the Australian Government. The system of keeping the records has proved satisfactory over two seasons, and rings and records will now be taken over by the Dominion Museum. In view of the increasing number of applications from members to ring, the whole question of issue of rings will have to be considered by this committee during the coming year.

Members were interested in a ring taken from a giant petrel near Valparaiso and which had been placed on the bird at Heard Island.

Report of Constitution and Incorporation Sub-Committee, presented by Mr. E. G. Turbott, chairman.—One lengthy meeting of the committee has been held and considerable interchange of views and opinions carried out by correspondence. However, there has been some difficulty in arranging for the full committee to meet and this has delayed the work to some extent. On behalf of the committee I have to report that the proposals for the new constitution are not yet ready for presentation to members. The committee is anxious to carry out the fullest possible discussion before submitting its proposals, but it is hoped that the draft will be completed early in the present year, and copies of the proposed constitution will then be printed and sent to all members. A special general meeting will probably be called later in the year to discuss and vote upon the new constitution.

The report of the Hon. Librarian (Mr. E. G. Turbott) stated:—The formation of a Library Committee which will negotiate exchanges, purchase books and periodicals, and arrange for reviews has been finalised. Members of the committee are: Messrs. E. G. Turbott (chairman), R. H. D. Stidolph, R. B. Sibson and Professor B. J. Marples. The year's total borrowings from the Library have been 63. Books and pamphlets, apart from periodicals, added during the year number 14. Preliminary arrangements for the circulation of current issues of periodicals to members in Wellington and Dunedin have been made, and this system will be initiated during the coming year. Periodicals taken currently remain at ten, of which eight are received by exchange: these include "Bird-Banding," arrangements for which had not been completed in time for inclusion in the list of the library published last year. It should be noted that four additional periodicals (only issues of ornithological interest) are received on exchange, a total of five being mentioned in error in last year's report. In addition to periodicals, the society acquires on its exchange basis publications of the Edward Grey Institute of Field Ornithology, Oxford, and of the British Museum (Natural History), in the latter case issues of ornithological interest only being received. A number of requests for further exchanges have been received and will be considered by the Library Committee. Finally, the society is again grateful to Miss Enid Evans, librarian of the Auckland Institute and Museum, for her continued interest and assistance. During Miss Evans's absence from the Museum, the assistant librarian, Mr. M. Hitchings, has kindly undertaken the work of cataloguing and despatch of books to members.

It was resolved "that the incoming committee consider raising the subscription to 10s. for ordinary members and £1 for endowment members, suitable provision being made for junior members if practicable."

A Checklist Publication Committee consisting of Messrs. C. A. Fleming, J. M. Cunningham, R. H. D. Stidolph and R. B. Sibson was set up to investigate methods of publication, and the general committee was authorised to publish the Checklist.

The Constitution Committee consisting of Messrs. E. G. Turbott, J. M. Cunningham, C. A. Fleming and Dr. W. M. Hamilton, was re-appointed.

There was some discussion on the advisability of reprinting the early issues of the society's publications which were cyclostyled, and the meeting, Mr. Cunningham only dissenting on the ground of possible financial loss, endorsed the retiring committee's decision to reprint them, at a cost not to exceed £150.

Thanks were expressed to Mr. Dawson for arranging the meeting and to the Canterbury University College authorities for making a room available. Dr. R. A. Falla gave a commentary on his fine colour films of sub-Antarctic bird life. These were greatly appreciated and admired by those present, and the evening concluded with supper.

The field trip was held the day after the annual meeting. A busload of happy ornithologists left Victoria Square for, appropriately enough, Birdling's Flat. From here the party moved to Lake Forsyth, where an amazing congregation of waterfowl was observed. Though the early part of the day was fine but cold, a drizzle, which commenced while the party was in a patch of bush having tea, developed into heavy rain during the journey home. Members visiting Christchurch made further excursions to various estuaries the following day.

Editorial Consultative Committee.—The committee has appointed a committee of six as an Editorial Consultative Committee. It will act only as an advisory body on such matters as acceptance for publication of records which are in any way doubtful.

INVESTIGATIONS OF PREDATORY BIRDS.—Harrier hawks have been ringed by research workers, and members are asked to co-operate in the investigations now taking place. An official statement reads: The Animal Ecology Section of the Department of Scientific and Industrial Research, in conjunction with the Ornithological Society of New Zealand, is carrying out an investigation of the harrier by marking the birds with metal bands on their legs. The bird is of considerable interest as a predator of both game birds and rabbits, yet very little is known about its behaviour and habits. Marking these birds should provide much information not only about their movements but also give some indication of how effective is the bounty system that is worked in some districts to control their numbers. Already some results have been achieved from this study, and a hawk which was marked in Hawkes Bay in April, 1952, was found near Lake Waitaki, North Otago, over 500 miles away, a month later. Anyone finding a marked bird is asked to send the ring to the Dominion Museum.

UNUSUAL PLUMAGED OYSTERCATCHER.—On April 14, 1952, on the tidal flats at Aramoana, near the entrance to Otago Harbour, were several flocks of South Island Pied Oystercatchers (**Haematopus finschi**). On the edge of the incoming tide, in close association with two pied oystercatchers and two stilts, was another oystercatcher with the head, nape, and throat a light fawn. Except for a few streaks of the same colour on its back, the rest of its plumage was white. The legs and bill were orange-red, but the colour of the eye was not seen. An incoming wave put to flight a flock of over 20 pied oystercatchers in the vicinity, and, as they flew past the bird we were observing it joined the flock where it looked very conspicuous in the centre of it. Present with I.T. and L.E.W. were two members of the Dunedin Naturalists' Field Club, Mrs. M. E. Hickman and Mr. J. G. Walker, who also observed the strange-looking oystercatcher.—I. Tily and L. E. Walker.

THE TUI AND ITS FOOD PLANTS.

By Charles McCann, F.L.S., Wellington.

The role some birds play, directly and indirectly, in the economy of plant-life is well-known. Some act as "controls," keeping the balance in both the animal and vegetable kingdoms; some act as distributors for the plant world, inadvertently carrying seed from one place to another; others perform the duties of scavengers; and yet again there is a group of birds whose relation to the plant world is not so obvious, yet they play a most important role, for in their absence, some plants would not produce sufficient seed to ensure the survival of the species. To this group belong the nectarivorous birds (or nectar-feeders) which serve as cross-pollinators. Although self-pollination is not wholly harmful in itself, there is the danger of the perpetuation of an unwelcome character becoming established to the detriment of the plant itself; hence cross-pollination is to be preferred. It produces a more balanced set of characteristics enhancing the possibility of survival.

Although these generalizations are common knowledge, we have yet much to learn of the interrelation between plants and their specific avian or other visitors. As is usual in this world, "there is nothing for nothing, and mightly little for nought!" Usually, the association is of mutual benefit to the partners. In some instances the life-cycles of the two, plant and bird (or insect), are so intricately interwoven that there is a possibility of one or the other (or perhaps both) disappearing in the absence of its associate unless a new partnership is established. Happily, in most instances, the coupling is not so restricted, and so the security of the species is assured. Nature, herself, often steps in to provide means of self-pollination, thus giving the species another chance of survival.

A point worthy of note is that when there is a linkage of avian and plant life-cycles both betray reciprocal adaptations. Naturally, the question arises: "Did the bird adapt itself to the plant or the plant to the bird?" The question is unanswerable; but it seems fairly certain to assume that in the course of the slow process of evolution the necessary "inter-serviceable characters" were gradually evolved together so as to bring about the mutual relationship between plant and bird. With these brief observations I must leave the subject of the evolution of adaptations and turn to the subject in hand. Here I propose to deal with the nectarivorous habit of the tui (**Prosthemadera novaeseelandiae** Gmelin) and some of the food plants associated with and adapted to it: the kowhai (**Sophora tetraptera** Mill.) and the puriri (**Vitex lucens** Kirk). These observations are based on a close field study and on a comparative study of the inter-related characters.

It is well-known that the tui is a nectarivorous bird or honey-eater and that the extremity of its tongue is brush-like, a special provision admirably suited to its nectar feeding habit. Although the tui is predominantly a nectar feeder there is ample evidence to show that it supplements its diet with various insects and also succulent fruits, particularly at times when suitable nectariferous flowers are in short supply. The supply of flowers undoubtedly controls the movements of the tui in a district, reappearing in the same area when the edible fruits are available. However, there is good reason to believe that during the "active feeding period" the bird obtains sufficient nectar, which is stored in the shape of fat, to tide it over the lean period of the winter months, when but a few plants are in bloom. This would mean that the tui is at the peak of fitness by the beginning of winter. (A similar tiding-over of lean periods I have observed in nectarivorous bats of the family **Pteropidae.**)

As already observed, the tongue is brush-like, and is, perhaps, the most highly evolved organ of the bird adapted to its nectar-feeding habit. A brush-like tip is most suitable to collection of the viscid fluid. On closer examination, under high magnification, the brush-like tip is found to be composed of four finely attenuated arms, each arm being provided with very fine bristles. Each of the arms is provided with a large blood vessel. The advantage of these divisions of the extremity appears to be that they

can be separated or united 'like forceps' to collect the nectar more readily and in greater quantity. The main body of the tongue is deeply canaliculate, enabling the nectar collected to flow more easily towards the gullet.

In addition to the specialized tongue, the curvature of the bill must be taken into account. Its curvature is such that the curve closely conforms to the curvature of the filaments of the adapted flowers. This relationship we do find between the tui and the kowhai and the puriri. The filaments form a guide, restricting the direction of the inserted bill, to the base of the flower, where the nectar is secreted and imprisoned. So far we have been dealing with the adaptations observed in the bird, but what of the reciprocal adaptations of the flowers? Although the main principle is similar in the case of both plants, it will be more convenient to treat each species separately.

Kowhai.—It is necessary to pay a little attention to the structure of the plant in order to explain the behaviour of the bird more clearly. The branches of the kowhai are somewhat flaccid and the inflorescences are mainly towards the extremity of the branches. These bend or sway readily with each puff of wind. In addition, the individual flowers are pendulous and move freely on the rather long pedicels—they are almost versatile. Both of these points are rather important factors when considering the method of nectar extraction employed by the bird. The calyx is obliquely cup-shaped, the ventral portion (the part covering the keel petals) is longer and turned slightly upwards. The petals are clawed at their bases. The stamens, 10 in number, arise from the margin of a rayed saucer-shaped disc. The disc secretes the nectar. The bases of the filaments are closely set, with the exception of the dorsal-most pair, under the claw of the standard. Between them there is a greater gap than between any of the other filaments. The reason for this separation we shall see presently. The lower portions of the filaments are connivent and form a 'cage' immediately above the disc, in which the nectar is held. Arising from the centre of the disc is the pistil. It forms a 'stopper' to the connivent filaments. The nectar imprisoned in this cage is not easily displaced.

On opening, the flowers are a greenish-yellow; the stamens and pistil are subequal in length, but the nectar is not profuse. Soon after opening, the stigma overtops the anthers (before the latter dehisce) thus obviating the possibility of immediate self-pollination. At the same time the secretion of nectar increases and the colour of the flower deepens to a more pronounced yellow. Old flowers become cadmium yellow. The stigma matures before the anthers dehisce. As birds are known to be able to discriminate between different hues, it seems possible, and even likely, that the differential colouring acts as a guide to the bird, leading it to the blooms containing the most nectar.

Usually, the visiting bird perches above the flowers and lifts each bloom in turn by probing its bill into the depths of the flower. In doing so the standard is used as the lever and the flower is turned upside down, thus bringing the extremity of the bill to the point where there is the greatest division between bases of the stamens (the dorsal pair). At the same time the inversion of the flower brings the stigma in contact with the bird's forehead and the stigma ploughs its way through or over the feathers of the forehead and crown, followed by the anthers. The pollen from the anthers besmears the forehead and lores. Should the bird have visited a flower previously, the stigma is dusted with extraneous pollen before the bird receives a fresh coating of pollen to carry to another stigma. Thus the supply of fresh pollen is maintained and fresh stigmas dusted, cross-fertilization resulting. However, although the plant and the bird appear to be admirably adapted to each other, it seems evident that the plant is not entirely dependent on this mode of pollination alone, but that chance self-pollination does occur. This is effected by insect visitors, such as small Staphalinids and thrips, which tenant the flowers, and possibly, also, by flies (**Diptera**). That the plants are not entirely dependent on their avian visitors for the propagation of the species is borne out by the fact that plants not visited by tuis also produce viable seed.

Apart from the tui, which appears to be the legitimate pollinating agent, some other birds have learned of the presence of the nectar in the flowers of the kowhai, and, although not adapted for the 'job,' have found a means of getting at the nectar store. This they do by nibbling a hole out of the calyx into the 'cage' in which the fluid is imprisoned. The two species which have devised this means are both Fringillids, the house sparrow (**Passer domesticus** Linn.) and chaffinch (**Fringilla coelebs** Linn.).

When feeding from flowers situated above it, the tui adopts the same method of insertion of its bill, with the standard below its chin, and the stamens and stigma above. In no instance have I observed the tui probe the flowers from a pendant position on the kowhai. The weakness of the branches makes this an inconvenient stance.

Puriri.—The branches of the puriri, unlike those of the kowhai, are rigid. Likewise, the blooms stand away from the branches on rigid peduncles and pedicels. The calyx and corolla are campanulate, the latter with four spreading lobes. The dorsal surface of the corolla is distinctly arched. The four stamens are adpressed to, and conform to the curvature of the corolline cup and the dorsal segment. The ovary is situated in the calyx and is surrounded by a long pistil which very slightly exceeds the length of the stamens but hangs more ventrally than they do, so that it contacts the head of the visitor before the anthers. The ovary is surrounded by nectar and the entrance to the calyx cup is guarded by the bases of the filaments which are angularly bent over it. The bent portion of the filaments are villous, a character which enhances the protection to the stored nectar. Once more, as in the case of the kowhai, the curvature of the dorsal portion of the corolla and the stamens conform closely to the curve of the tui's bill.

As the flowers stand out on somewhat stiff peduncles and pedicels, the tui has to reach out to them to obtain the nectar, without putting undue strain on the joints. This the tui achieves by performing all manner of gymnastics on the branches. The stiffness of the branches, unlike those of the kowhai, makes the performance possible. On the puriri, the tui may be seen holding on to the branches at all possible angles, including the pendant posture.

The stigma is the first to contact the head of the tui, and it is followed by the anthers. Thus the pollen of one flower is conveyed to the stigma of another. The anthers and stigma of this smaller (than the kowhai) flower do not reach to the same height on the head as do those of the kowhai, the anthers just reaching the feathers posterior to the nostrils. A point worthy of notice here is that, in the tui, the feathers of lores are markedly different from the rest of the head, appearing like black velvet. Are these feathers of special value in the collection of pollen? If so, we have a further adaptation of the bird towards its service to the plant. However, I must leave this an open question until more light is available on the subject.

The Tui.—The tui is too well-known to need description, although it is more often heard than seen, but a few brief remarks on the habits observed will not be out of place. Its loud metallic and liquid notes betray its presence in the forests or in the garden. During the breeding season it establishes territorial rights over certain areas and over certain trees when in bloom. When feeding, it will not tolerate the presence of any other birds, no matter how small, on the same tree. It will pursue the intruder through the branches until it leaves the tree. However, it will tolerate another one of its own species.

During the intervals between feeding, it sits on one of the inner branches of the tree, and, after wiping its bill on the bough, commences its song. Usually it starts off with a couple of loud metallic notes and then lapses into a 'whispering' song of fine high-pitched notes* (some quite inaudible—the beak and white bib keeping time the while) and these are terminated by a couple of harsh squawks, the head, with open bill, being thrown backwards with each squawk. This may be followed by other

* Similar to the habit and notes of a starling (**Sturnus vulgaris** Linn.).

metallic notes or the bird will relapse into the 'whispering' song, before it embarks on another further brief period of feeding. Each song is frequently interrupted by much bill-wiping on the branch.

When not feeding, the tui will often sit upon some bare twig in the open and continue for a considerable time in full song. On the arrival of the mate, she is greeted with a small courtship dance which is comprised of an up-and-down motion accompanied by some feeble notes. The greetings over, the pair settle down to feeding once more, or one flies off.

G. M. Thomson (Trans. N.Zeal. Inst. xiii (1880) p. 241) published an extensive and interesting article on the fertilization of flowers in New Zealand. In the course of his paper he refers to various ornithophilous flowers, and reference is often made to the tui in the role of a pollinating agent. Among the plants visited by the tui, Thomson makes special reference to: "**Clianthus puniceus, Sophora tetraptera, Metrosideros lucida,** etc., **Loranthus (Elytranthe) colensoi (?), Dracophyllum longifolium** occasionally, and **Phormium tenax.**" Of these, I have dealt with the interrelation between the kowhai and the tui. However, my remarks were confined to the arborescent forms, and, perhaps, would not apply equally well to the smaller prostrate forms (such as **S. prostrata**).

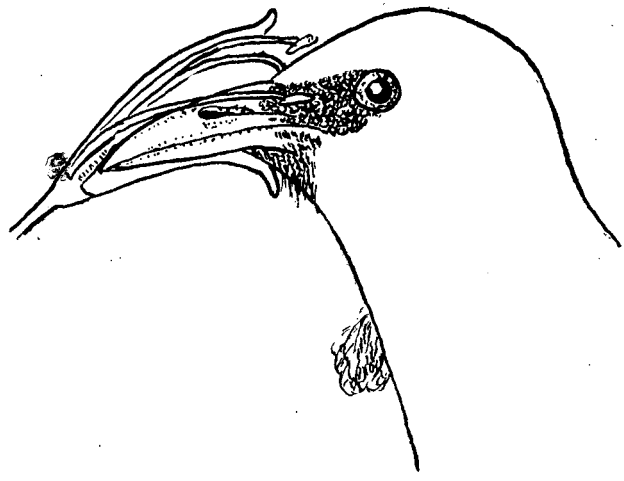
In the prostrate forms there is a marked reduction in the size of all the vegetative and floral parts, and, accordingly, there would be some difficulty in regarding them as truly ornithophilous forms adapted to the requirements of the tui. Whether the tui visits these dwarf forms is a moot point, but, as birds will often visit flowers not specially adapted to their particular needs, there is no point in pursuing this observation further.

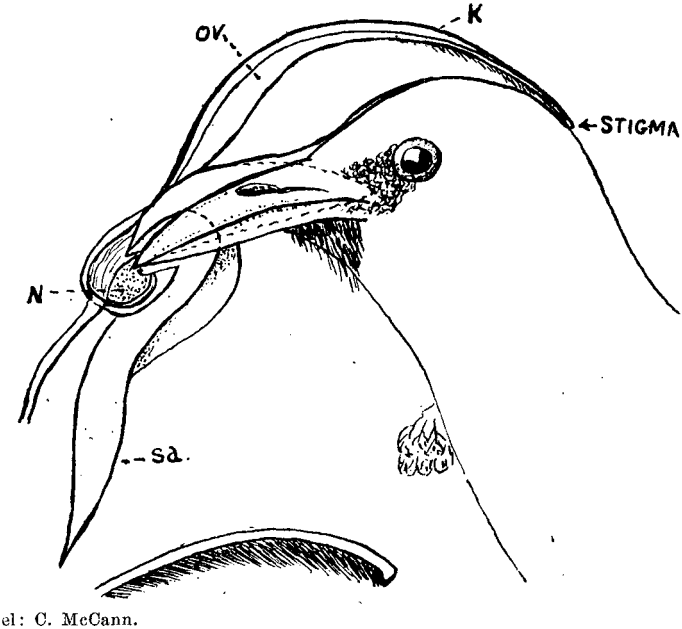
In keeping with the prostrate habit, and consequent reduction of the vegetative organs, the floral structures have altered their dimensions. The inflorescence is reduced to one to three blooms (two being more frequent). However, there appears to be an increase in the length of the pedicels. The standard is comparatively shorter in relation to the length of the other petals than it is in the arborescent forms. The most important change in structure, from our present angle, is the shortening of the stamens, and particularly the length of the pistil. Under such circumstances the stigmatic surface is brought nearer the anthers, thereby facilitating self-pollinization, either by direct contact, or by flower-inhabiting insects. That self-pollination does often occur in the species is, I think, beyond all doubt. There does not appear to be any outward difference in the appearance between the pollen of the arborescent and prostrate forms. The reduction in size of the entire plant may possibly have arisen from some genetic factors brought about by continued self-pollination on the one hand—the dwarf character being dominant—and the adaptation of the plant to wind-swept terrain. However, these suggestions are merely hypothetical and require thorough investigation from the angle of the geneticist.

In my opinion, the kowhai represents a single variable species, and possibly, some of the extreme variants are on their way to extinction. The rarity of some of the variants and the gradual restriction in the distribution of the species in the wild state suggests this.

Clianthus puniceus Banks & Sol.—Turning to another leguminous species **Clianthus puniceus**, Thomson regards it also as an ornithophilous flower. Quite rightly, but I think some explanation is needed. There appears to be no doubt that **Clianthus** was predominantly (I use the past tense deliberately) an ornithophilous species in the past and, perhaps, still is to a lesser degree, but it seems to be departing from this mode of pollination and becoming more readily self-pollinated. Why this change is taking place it is difficult to surmise. I will discuss this somewhat empirical statement after I have made some observations on the actual construction of the flower and an analysis of Thomson's remarks. Regarding the distribution of the species, Cheeseman writes: "Exceedingly rare and local in a wild state and fast becoming extinct."

Clianthus is a small underscrub with somewhat rigid branches. The inflorescence is many-flowered; the peduncle pendulous and very flexuous;



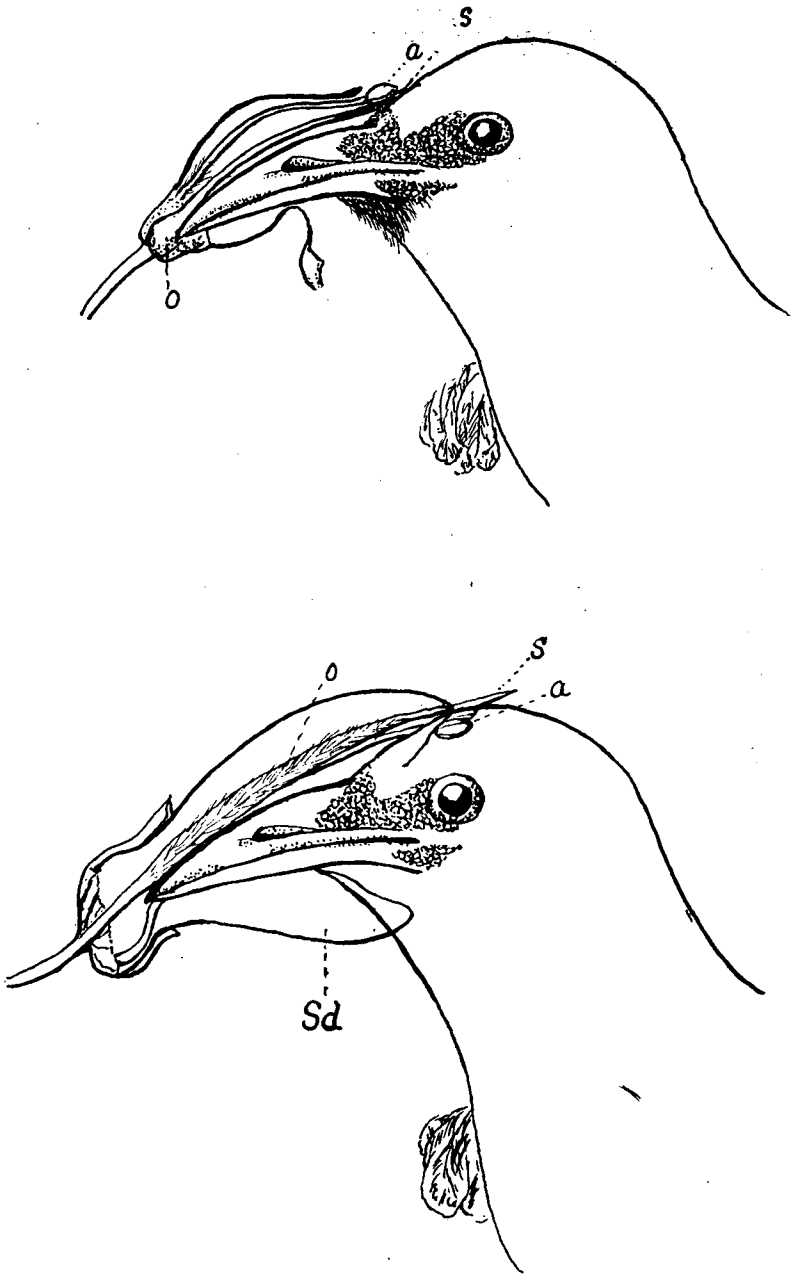


Del: C. McCann.

Upper.—TUI AND N.Z. FLAX.

Lower.—TUI AND KAKA-BEAK.

K, keel petal (in longitudinal section); N, nectar chamber; Ov, ovary; Sd, standard petal. Lateral petal shown detached at bottom of plate.



Del: C. McCann.

Upper—TUI and PURIRI.

Lower—TUI AND KOWHAI.

A, anther; O, ovary; S, style; Sd., standard petal.

pedicels elongate and pendulous also. Under the circumstances the flowers swing readily and are able to rotate. The calyx is cup-shaped. Within the calyx is a disc from the margins of which arise the stamens. The standard is large and showy, and is strongly reflexed from its base; the lateral petals are about half the length (variable) of the keel and slightly spreading; the keel petals are united into a strongly curved, boat-shaped structure, the upper margins conniving above (often overlapping, and convolute, particularly towards the apex), but leaving a narrow opening at the base of the standard. The stamens, ten, are diadelphous, one free, and the remainder united to form a tube. The base of the free stamen forms a wide loop, arching above the nectariferous chamber before entering the keel; the bases of the remainder are united to form a 'bowl', below the arch of the free stamen, for the reception of the copious secretion, and thence continue united for about three-quarters of their length to form an open tube embracing the pistil; finally terminating in free ends for the rest of their length. The stamens are shorter than the keel and do not extrude. The pistil arises from the centre of the nectariferous disc, passes through the staminal tube, closely adpressed to the lower side of the keel, and, finally out through the convolute apex of the keel. The pistil is glabrous till above the ovary, thence a longitudinal row of dense, forwardly directed bristles extends along the upper surface of the style to its extremity. The significance of this 'brush' will be discussed below.

In bud, the free ends of the stamens are reflexed towards the opening in the keel at the base of the standard, but as the flowers open, the free ends of the stamens straighten out and surround the style (one or more may remain reflexed), the solitary one often remaining in its original position. As already remarked, the anthers dehisce before the flower opens (in bud) and the pollen collects around the style, and some of it works its way up to the upper margins of the keel. The pollen grains are ellipsoid, smooth, and adherent (viscid). Gradually the pollen moves forward towards the extremity of the style. Apparently, the forward progress of the pollen is maintained by the movement of the style within the keel as the flower is moved about by the wind or by visitors—the line of bristles moving the grains along the tube to the stigmatic surface. The whole mechanism is suggestive of a device suited to self-pollination, but the possibility of cross-pollination still remains. The latter mode may be achieved either by contact of the protruded stigma with the pollen on the margins of the keel petal of adjacent blooms, or by a visitor.

Experimentally, the slightest pressure on the keel forces the style out of the convoluted extremity of the petal, and, together with it, a quantity of pollen—the 'brush' acts in the same manner as does a brush in a flue. Repeated pressure and release merely brushes out more of the pollen—the tip of the petal cleaning the 'brush' as it retracts. In relation to the head of the tui the effect is the same. If the bill of the tui is inserted into the opening of the keel at the base of the standard the pressure forces back the keel and the extremity of the petal reaches to the occipital region. At this point the style is exerted and a quantity of pollen is deposited. In this manner cross-pollination could result. However, as bushes not visited by these birds produce a certain amount of viable seed, it stands to reason that the flowers must have been pollinated by some other means.

If we examine the contour of the keel petal more closely it will be noticed how nearly its lines conform to the shape of the head of the tui. The lateral petals appear to act as a guide to the opening at the base of the standard. As the flower is inverted by the tui, the contents of the 'bowl' naturally flow downwards to the point where there is the greatest space between the bases of the stamens.

Thomson had observed that the anthers dehisce before the flowers open (in bud) and that the pollen collects towards the apex of the keel (carina) and lodges in the hairs of the style (p. 242). As the anthers dehisce in bud and the pollen accumulates in the keel, there is no need for the extrusion of the anthers. The stamens are actually shorter than the keel, but Thomson states: "The filaments of the stamens are so long as to

exceed the carina, but many of them are bent completely back for part of their length." He remarks that the flowers are diligently searched by birds, and that "In inserting their heads into the flowers they push back the carina with considerable force; this retains its hold on the style for a time, until the pressure is too great, when the latter is jerked forward by its own elasticity, and throws out the accumulated pollen on the intruder's head." This last observation is not in keeping with the construction of the flower, and it would suggest that the bird's head is covered in a cloud of pollen dust! whereas in Nature the pollen is 'swept' out of the extremity of the petal by the 'brush'-like style.

As in the case of the dwarf forms of the kowhai, it seems possible that the continued inbreeding of this species is, perhaps, leading to its gradual but sure extinction in the natural state, unless some change comes about in its mode of pollination. However, much field observation and cytological study is needed before any definite conclusions can be reached.

Metrosideros spp.—Regarding **Metrosideros lucida** Thomson, (p. 263) appears to be uncertain, for he writes: ". . . but are probably aided in their fertilization by the numerous tuis and honey-birds which frequent **them for the sake of their honey.**" After much observation, I feel that none of the **Metrosideros** flowers are ornithophilous but are entomophilous. That nectarivorous birds visit unadapted flowers for the sake of the nectar there is no doubt, but they do so in the role of a 'thief' and are of no assistance to the plant, except by accident. As my observations are still incomplete, I must leave them for a future occasion. However, I cannot refrain from remarking that although there are many pohutukawas in flower in my neighbourhood, the tuis have not returned to the district.

Phormium tenax Forst.—There appears to be no doubt that the flowers of **Phormium tenax** are adapted to cross-pollination by the tui. The peduncles and pedicels are rigid, affording suitable and convenient perching facilities. Further, it will be noticed that the flowers themselves are curved along the lower surface, and the opening of the perianth is always turned skywards. The curvature of the pistil and stamens conform to the lower curvature of the flower. The nectar is held in place between the trequetrous ovary and the bases of the stamens, and the position of the open flower prevents it from oozing out. Nectar is profuse. The stamens bunch together and lie adpressed against the lower surface of the perianth. They overtop the corolla. The style is shorter than the stamens and curves slightly more upwards, thus being free from contact with the anthers. In this position the stigmatic surface contacts the 'brow' feathers of the visitor before the anthers, thus ensuring cross-pollinization if the head of the visitor is already dusted with pollen from a previous visit to another flower.

In the case of **Phormium**, the tui sits on the branch above the flower, and probes into its depth from above. As it does so, the up-turned style contacts the 'brow'; this is followed by the separation of the stamens (as the bill is forced in) into a semi-circle round the bill, and, as the maximum depth is reached, the anthers come in contact with the crown and lores, besmearing the feathers with a liberal coating of pollen. The pollen is tetrahedral and clings readily to the plumage.

Fuchsia excorticata Linn.—With regard to the flowers of **Fuchsia** (p. 264), Thomson writes: "They appear to be fertilized only by tuis and honey-birds. As in the case of other plants frequented by these birds, viz., . . . the fuchsia flowers are pendulous, affording no resting place for insects, while the great quantity of honey secreted would drown any but a large form furnished with a long trunk." Although I have seen tuis visit the flowers of **Fuchsia**, I am inclined to the opinion that it is not adequately suited to fill the role of a pollinating agent in this instance, as the curvature of its bill and the configuration of the flower are by no means adapted to each other. The strong constriction of the corolla above the ovary and the position of the stamens, together with the greatly elongated style, appear to rule this out. However, I have noticed that the bell-bird (**Anthornis melanura** Sparrm.) is a more frequent visitor to the flowers of

this species, but in the absence of sufficient data I cannot discuss the matter much further. Nevertheless, I feel I cannot leave the subject without commenting on Thomson's objection to the possibility of insect pollination. His main objections rent on the pendulous character of the flower and the absence of a 'landing stage' for the insect visitor. There are several moths with a sufficiently long proboscis to enable them to reach the nectar cup by landing on the flower itself and stealing the nectar without being of service to the plant at all. However, that is beside the point. The much exerted style, with its spherical stigma, provides a sufficient landing stage for a visitor, which if covered with pollen from other flowers would effect cross-pollination. Having landed on the pendulous style it would then proceed upwards along it to the nectar cup, and in doing so would have to crawl over the anthers which lie adpressed to the style and thus receive a fresh dusting of pollen. Under such circumstances, there is every possibility of some insects (moths) serving as pollinating agents. However, the pollination of the **Fuchsia** needs further study.

SILVEREYE IN RELATION TO AGRICULTURE.—The N.S.W. Gould League is carrying out an investigation concerning the food of the silvereye, with particular reference to the fruit-growing industry. A questionnaire has been prepared relative to the numbers of this species present in a district, evidence of migration, food in different seasons of the year, whether considered beneficial or harmful, control measures (if necessary) breeding and evidence of the bird spreading noxious weeds. Members having information on the lines indicated should send same to the Horticultural Division of the Department of Agriculture, Wellington.

NOTES ON SHEARWATERS.—Among the remains of petrels found during the summer by the writers were three birds of particular interest. The first two specimens were short-tailed shearwaters (**Puffinus tenuirostris**) one being found by M.B.G. at Muriwai on 21/12/51, and the other at Bethells on 29/12/51 by G.E.T. The plumage of these two birds was quite distinct from any examined in the Auckland Museum collection. The underparts were paler than the upper parts, with a definite whitish area round the chin and throat and also on the under wing coverts, the latter being quite as marked as in many sooty shearwaters (**P. griseus**). This variation from the normal wholly dark plumage has been noted by D. L. Serventy ("Birds of Western Australia") but does not seem to have been recorded previously in New Zealand. The following are the measurements of the Muriwai bird: Wing, 260 m.m.; tail, 111 m.m.; tarsus 49.5 m.m.; mid-toe and claw, 57 m.m.; culmen, 32.1 m.m. Bethells bird: Wing, 267 m.m.; culmen, 34.6 m.m. The third specimen was a sooty shearwater found on 27/12/51 at Bethells. (G.E.T.) This bird, which must have been ashore for at least ten days, had a fully developed and hard shelled unbroken egg protruding from its abdomen. The egg measured 71.1 x 49.0 m.m.—G. E. Thomas and M. B. Gill, Auckland.

DISTRIBUTION OF KAKAPO.—The Department of Internal Affairs is asking for the assistance of members in efforts to locate areas in which the kakapo exists. A circular has been prepared for distribution to those likely to be able to assist the Department. The information is being sought with a view to taking steps to conserve this bird, as reports indicate that it is decreasing rather rapidly in numbers. The main kakapo signs that should be looked for are set out. These include small oval masses of well-chewed vegetation (pellets) to be found among tussock. They are about three-quarters of an inch long. The pellets may still remain attached to the roots by a short length of unbitten leaf blade. Although they are inconspicuous, the pellets are the most common sign left by the bird. Kakapo feathers are olive-green and yellow, barred with brown. Any likely feathers should be kept. The bird calls during the night, the male having a booming note in the breeding season, repeated five or six times and sounding like a muffled drum. A hoarse cough or a grunt also is uttered. The kakapo is not known to occur nowadays in the North Island and is confined to the mountainous country of the South Island.

NESTING OF NEW ZEALAND DOTTEREL, 1950.

By H. R. McKenzie, Clevedon.

The nesting activities of 1948 and 1949 at Mataitai, Clevedon, ("Nesting of New Zealand Dotterel," Notornis, Vol. 4, No. 2, p. 24) were followed by a further successful season in 1950. Two pairs of birds laid three clutches, each of three eggs, from which four chicks were known to reach the flying stage. This may appear to be a poor percentage, but I think it is quite good for the species and for the particular locality. One egg of the clutch of three often fails, while in this place there is also risk from wandering cattle, dogs, cats, hedgehogs, rats, stoats, hawks and gulls. Fortunately, ornithological interest is so general in Clevedon that there is little risk of egg-stealing or of wanton destruction of chicks.

No. 1 NEST.

July 8.—Two pairs in fine red colour, showing some territorial aggression.

August 5—No. 1 pair had an empty nest. This was a sham or "play" nest, larger and deeper than the true nest. No. 2 pair and three other birds were present. Of the three younger birds one was partly coloured and two quite pale.

August 15.—Empty nest had been trampled by cattle. Pair still on territory.

August 19—Less demonstrative than before.

September 10—Nest, two eggs, found by member, Miss L. M. Burnside. Male bird made great fuss.

Sept. 11—I watched from 9.47 a.m. to 4.28 p.m. A duck-shooter's old mai-mai about 70 yards from the nest served well as a vantage point. The behaviour noted showed that incubation had not yet begun. 9.47 a.m., from road, one bird on nest; 10.6 a.m., left nest as I passed to mai-mai beyond. 10.17 a.m., I entered mai-mai. 10.27 a.m., female went on nest; 10.42 a.m., left; 10.55 a.m., male sat; 11.13 a.m., male got up and reached for nest material. He picked up pieces of dry grass and small pieces of shell which he sometimes threw past one shoulder or the other; sat again. 11.38 a.m., "nest building" again; 12.9 p.m., changed over. Did not see male leave but saw female come on; male stretched himself and flew off to flats. 12.29, female left; 12.35, male sat; 12.38, male left.

This behaviour continued until I disturbed them at 2.36 p.m. Again watching by telescope from the road, I saw both the male and female playing at nest-building. They would reach out for material, become absorbed in this pursuit, gradually leave the nest, and finally walk away as if they had forgotten all about it. Once, when the female approached the sitting male he left in a crouching run, then turned and pursued her, in a hectoring attitude. The desultory sitting by turns continued. At 2.36 p.m. there were still two eggs.

Sept. 12.—6.5 p.m., three eggs. It appears probable that no egg was laid on the 11th, and that the third egg was laid in the earlier part of the 12th. I have found through long experience with many species that birds usually, though not invariably, lay in the morning.

Sept. 13.—3.16 p.m., from road bird seen sitting. 4.12, approached along fence to obtain better view. Female took alarm and left nest. I then crossed the tide-flat, passed the nest and went on to the mai-mai. 4.56 p.m., entered mai-mai. 4.58 p.m., female went on nest, although she had watched me enter the mai-mai and could still see me in it; 6.0 p.m., being unable to stay any longer I gave up the wearying task of watching the stolidly sitting bird. She was certainly incubating. The male did not now approach the nest at all, but remained on guard, chasing small birds from the territory. The change from the erratic behaviour of the 11th was most marked.

October 6—Members, Miss M. J. McCallum and F. Murray, watched for the purpose of noting incubation behaviour. This proved dull work as the female sat steadfastly.

Oct. 7.—6 p.m., three eggs, all cracked a little.

Oct. 8.—6.15 p.m., no alteration noted.

Oct. 9.—6.10 p.m., one chick showing. The other eggs cracked further.

Oct. 10.—6.25 p.m., no change since the 9th.

Oct. 11.—6.10 p.m., three chicks hatched. Two close together and one a foot away from them; all four feet from nest. Very quiet, so newly hatched.

Oct. 24.—The three chicks, now 13 days old, were found marooned by the tide on a small sand-bank. When a rescue was attempted they swam 24 feet to the shore with ease and apparent confidence.

Oct. 28.—Three chicks seen. A fine even brood.

Nov. 29.—*Two strongly flying chicks with parents. One missing.* Unfortunately the date of flying was not obtained owing to my being away on holiday. These two young birds could be distinguished from all of the others for some months and may possibly still be there. The missing one was probably killed before it could fly. Although the area was visited frequently these older chicks were usually hidden so could not readily be checked for casualties. Also we always avoided disturbing the birds unduly.

No. 2 NEST.

September 11.—An empty nest was found on another sand-bank about 70 yards from No. 1 pair. This territory had been appropriated for some time.

Sept. 12.—Still one empty nest. From this date the pair continued to make play-nests until the end of October. They would have six or eight at once and would spasmodically desert some and make others. These activities extended along the narrow spit for 60 yards until the last ones were subject to being covered by high tides. These we filled in so that they might be persuaded to keep to the higher ground. We made a determined effort to obtain a clutch-laying record, hoping to see the empty nest one evening, the egg the next, and so on to the completion of the clutch. To do this we had to travel nearly seven miles by road, cross a boggy field and then 200 yards of mudflat. This was done every day for 30 days. By this time we thought that they would not breed, so slackened our watch to two or three days together and then missing three or four, hoping to chance upon the right time if the eggs were laid. This tedious work could not have been carried out without the splendid work of Miss G. M. Cowles, F. Murray and other members. When I could not take my car, F. Murray and W. W. Renouf provided vehicles. Once when no car was available, Miss Cowles valiantly did the trip alone by cycle on a rough metal road, in very hot and dusty conditions. After all this devoted effort, the nest was found on November 1 by a visitor, Mr. R. H. D. Stidolph, with the complete clutch of three eggs. I had stood within two yards of it two days earlier and not seen it. Mr. Stidolph, knowing nothing of our extended vigil, came back very pleased with his find, but was somewhat taken aback, I am afraid, by the things I said. Such, however, are the fortunes often to be expected in bird-watching.

Nov. 1.—Three eggs. Female incubating.

Nov. 25.—10.30 a.m., two of the three eggs cracked a little.

Nov. 26.—6.15 p.m., one egg a little broken, one cracked.

Nov. 27.—6.35 p.m., one chick in nest; one egg with hole in it.

Nov. 28.—6.45 p.m., two chicks a few feet away from nest. The third egg contained a dead chick.

Dec. 25.—One chick ringed; No. 5901 on left leg; red sight ring on right leg.

Dec. 26.—The other chick ringed; No. 5902 on right leg, red sight ring on left leg. The two chicks were frequently seen from this time to date of flying.

Jan. 17, 1951.—No. 5901, when pressed, flew falteringly with a parent flying each side of it. No. 5902, when cornered, fluttered five or six yards just off the ground twice and thereafter could only run.

More will be written of the subsequent doings of these ringed birds.

No. 3 NEST.

This was almost certainly made by the owners of No. 1 nest. It was noted that the parents of the first two chicks were no longer with them and that they had evidently returned to their old territory, the new nest being only 16 feet from the site of No. 1. There were only two pairs of adult breeding birds in the locality so that there is little doubt that it was a case of one pair having two broods in one season.

Dec. 25—Nest, three eggs, found by my son, R. R. McKenzie. We had been ringing chick No. 5901 when the behaviour of the birds attracted us to the spot.

Jan. 13, 1951.—Two eggs chipping, one whole. The whole one later proved to have a large dead chick in it, having been almost ready to be hatched.

Jan. 14.—Of the two chipped eggs one had a hole in it.

Jan. 15.—One chick four feet from nest. One egg with cracks and two small holes in the shell.

Jan. 16.—Two chicks gone from nest.

Feb. 7.—One small chick. The other was not seen again.

March 2.—Ringed surviving chick of this brood, No. 5903, and put red sight ring above metal ring, both on the left leg. It was 46 days old when ringed and showed no signs of flying. It seemed strong and healthy and could run as fast as the others had done. It was certainly not injured when ringed. It is thought that a dog which prowls the flats may have killed it as it was not seen again.

SUMMARY.

The period covered by the laying of the eggs was not observed in any of these three nestings. It is obvious that such a record will be very difficult to obtain.

Incubation Periods.—No. 1 nest, either 29 or 30 days. No. 2 nest, 28 and 29 days, or more. The bird was already incubating when found by Mr. Stidolph, so the period could easily have been longer. No. 3 nest, no record; nest found after incubation had well begun.

Hatching to Flying Periods.—No. 1 nest, something under 49 days; not a complete record; date of first flying was missed. No. 2 nest, one chick flying weakly at 50 days; one scarcely flying at all at 50 days. No. 3 nest, one chick last seen at 46 days; no sign of flying; it did not even extend its wings when running at its utmost so should have taken well over 50 days to fly had it lived.

The early nesting record of 1949, two eggs on September 11, has apparently been improved upon by one day, i.e., two eggs on September 10, 1950. It appears that this early nesting is not general. Buller, quoting Potts, states that eggs and young have been seen in October and November. Guthrie-Smith ("Mutton Birds and Other Birds," pp. 102-104) states that they arrive on the breeding grounds on Stewart Island about the middle of October. However, some must arrive earlier, since he found a tiny chick on November 7. From the evidence obtained at Clevedon it would seem that the first egg of the clutch would have been laid about October 3 and the birds would have been present for some time before that date. Falla, 1940, mentions territorial attachment from September 1st onward. The dates given by these writers probably indicate the normal commencement of the breeding season.

WHITE-FACED HERON IN NEW ZEALAND.

By R. H. D. Stidolph, Masterton.

The white-faced heron (**Notophoyx novaehollandiae**) has shown a remarkable increase in numbers in New Zealand during the last ten years.

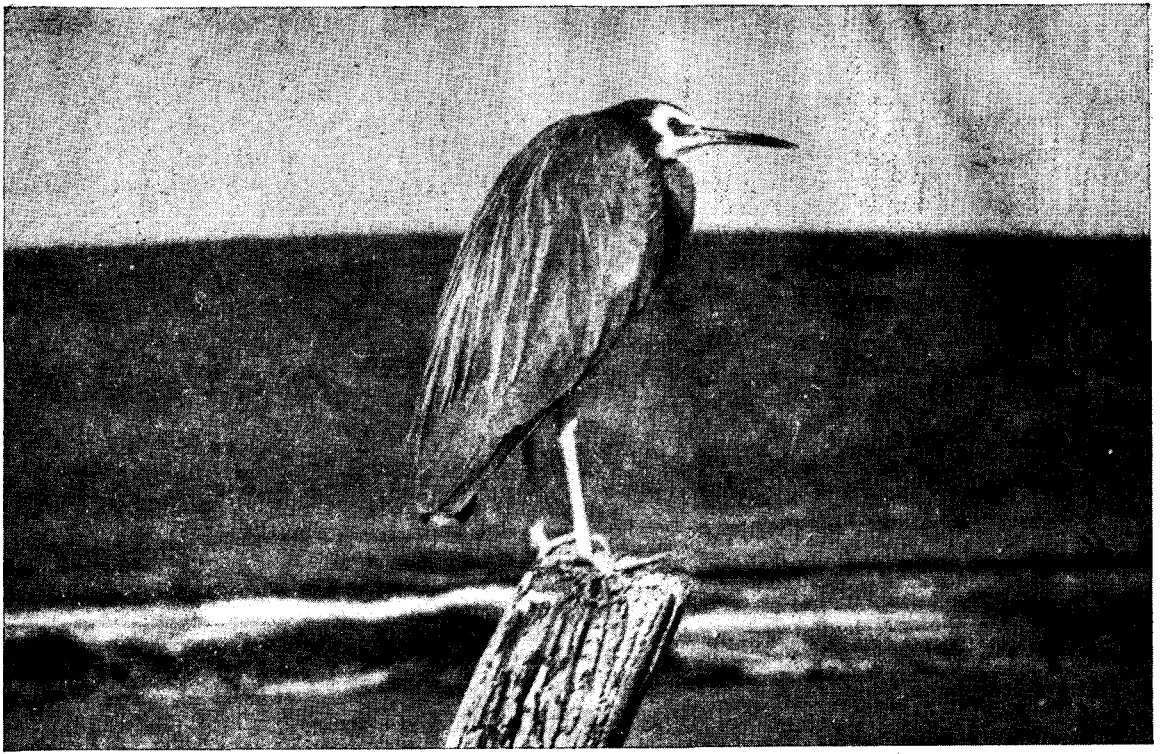
A perusal of the literature relating to this bird indicates its general rarity prior to 1940. Most of the published bird lists up to that year make no mention of it and the few that do, refer to its scarcity. Although there has been some confusion between this species and the coastal-frequenting reef heron (**Demigretta sacra**) under the general name of "blue crane," it is significant that competent bird observers, until 1940 onwards, have few definite records of the white-faced heron, either in the North or the South Island.

Only thirteen records of the occurrence of this heron in the period of European settlement up to the end of 1939 can be traced, these relating to twelve localities and to not more than two birds seen together. It is possible that there are a few additional records, those relating to "a pair" seen on Lake Taupo in October, 1875, and to one at Lake Rotoiti, in October, 1884, which were listed by Buller under the reef heron, but are more likely to have been the white-faced heron. The reef heron is a coastal bird. The records of Reischek of **Ardea novaehollandiae** in the West Coast Sounds are regarded as referable to the reef heron.

From the beginning of 1940 to the end of 1951 there are 43 records in 32 localities, these including as many as 36 birds in one group, with other instances of 20, 12 and 7 birds having been seen together. Thus, we have 13 records over a period of 100 years (1840 to 1939) and 43 records in 12 years (1940-1951). Even making allowance for the larger number of bird observers at the present time, it must be remembered that it is unlikely that a bird of its size would escape detection in earlier days even by those not interested in bird-life. Moreover, there are definite statements that the bird has appeared in certain widely-separated districts only in the last few years.

In a somewhat contradictory reference to the white-faced heron in the "Wellington Evening Press," by Mr. Edward Wakefield, quoted in a footnote by Buller (1888), it is stated that the bird breeds in New Zealand "sometimes," this statement evidently being based on the observations of a resident of Blind Bay (Nelson). No published record of the nest, eggs, or young of this bird in New Zealand is known except that of B. A. Ellis relating to Shag Valley, Otago (1941-1944), though there are good reasons to believe that the bird has bred elsewhere before and after these known instances. Dr. R. A. Falla has stated his belief (1941) that it "seems likely it has been a common breeding species there (referring to Westland) during the whole period of European settlement and before, and that it has somewhat similar winter dispersal habits to those of the white heron. Local observers consider that it has always been a much more plentiful bird than the white heron." If the bird had been as common in Westland (prior to 1940) as the above statement would seem to suggest, it is strange that more birds of this species did not turn up elsewhere in New Zealand during the dispersal period.

Although the white-faced heron and the reef heron sometimes are to be found in the same locality there is no reason why they should be confused. In colour, the white-faced is a much lighter bird than the reef heron, appearing almost white, while the other is almost black, that is, if viewed in a good light. Moreover, the white-faced heron in flight shows the distal portion of the wings much darker than the remainder, whereas in the reef heron, the whole of the wing is the same dark shade. The white-faced, too, is a slimmer looking bird, the reef heron being of a more stocky appearance. The reef heron is essentially a bird of the coast, though it is to be seen sometimes a mile or two up a mud-flanked river. On the other hand, the white-faced may be seen on tidal harbours and estuaries as well as in inland areas, where it frequents swampy land, lagoons and lakes—areas quite beyond the normal habitat of the reef heron. In nesting



WHITE-FACED HERON, at Karaka, Manukau Harbour. Photo: D. A. Urquhart.
One of twelve birds seen there in the winter of 1951.

habits the two birds also differ, the reef heron breeding among rocks on the coast or on islands, and occasionally low down in cavern-like places in trees overhanging the water, whereas the white-faced usually has its nests high up in lofty trees.

There is insufficient evidence to determine whether the greater number of birds now to be seen has resulted from natural increase or from an influx of birds from Australia, though it appears that there is an ecological niche in which this bird seems to be quickly establishing itself. It may be of some significance that there is also an apparent increase in the numbers of the white heron (**Casmerodius albus**) indicated by the many birds now seen in the period of winter dispersal. In earlier days it was an event to see a solitary white heron in any one North Island district; now as many as four and five may be seen on one lake or lagoon. The numbers now reported from both islands in the winter period suggest that there may be one or more unknown breeding colonies in addition to the one near Okarito.

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A NOTE ON FLUTTERING SHEARWATERS.—The fondness of fluttering shearwater (**P. gavia**) for inshore waters was demonstrated in rather a remarkable manner on May 21 at the northern end of Goose Bay, Kaikoura. To judge by the excitement of the gulls, mainly red-billed, with a few black-billed and black-backed, the sea around the rocks was swarming with some favourite food. Just outside the line of rocks, riding a smooth swell, were about three hundred fluttering shearwaters. From time to time they would take to flight, only to return shortly to the same place. It was then that I noticed that some of the shearwaters were swimming and feeding inside the outer fringe of rocks with swaying kelp on all sides of them. As they were scarcely half a chain distant from me I was able to see that they had two distinctive methods of diving. Sometimes the actual dive was preceded by a little leap out of the water; sometimes there was no leap but they half-opened their wings and seemed to push themselves under the water. Often on surfacing they stood on their tails and shook their wings as if to adjust the feathers. Such feeding close inshore would only be possible if the breeze were blowing off the land. On May 21 the wind was a light north-wester. It would be interesting to know if anyone else has observed fluttering or other shearwaters behaving in a similar manner when conditions were such that they could safely feed so close inshore.—R. B. Sibson, Auckland.

NOTES ON THE GANNET.—These observations were made from my sword-fishing launch, Lone Star, up to seven miles off-shore from Whangaroa Heads. I was out several days each week throughout the season. Records of young gannets seen are: January 27, 1951, 1; Jan. 29, 1; Feb. 9, 3; Feb. 19, 1; March 2, 2; March 3, 1; March 4, 2. All of these birds were flying north singly, not feeding and taking no notice of any adult birds which were at times in their vicinity. The adults took no particular direction. On March 12, one of mixed plumage (white breaking through) was feeding on piper. Although out in the ocean, it was not high diving but using the long slanting dive which is normally adopted when fishing in very shallow water.—T. M. Roberts, Whangaroa.

RINGING OPERATIONS.

SUMMARY FOR THE YEAR ENDED MARCH 31, 1952.

Compiled by J. M. Cunningham, Masterton.

The following is a statistical summary of the birds ringed and recovered during the past year. It includes a number of birds of various species outside the normal scope of the society's scheme, ringed by special permission of the Hon. Minister of Internal Affairs, and also some birds ringed with other than the society's rings, but details of which have been provided by the operators. No distinction is made in either case. The grand totals, by incorporating the totals published in "Notornis," Vol. 4, No. 6, thus include details of all ringing of which the records are on the society's files. Recoveries this year are not given in full detail but some are grouped. It should be noted that this year only those recoveries made up to March 31, 1952, are included; recoveries made since then will be published later.

BIRDS RINGED. (*Denotes colour rings used.)

Species. Operators and Where Ringed.	Totals for 1951-52. Ringed.	Recovd.	Grand Totals to 31/3/52 Ringed.	Recovd.
ALBATROSS—Light-mantled Sooty		1	23	10
ALBATROSS—Royal			374	12
ALBATROSS—Wandering			30	1
BLACKBIRD		4	167	10
*P. C. Bull, Lower Hutt	79			
H. L. Secker, Wellington	15			
CHAFFINCH			4	
DOTTEREL—Banded			32	
*M. J. S. Black, Rotorua	3			
*J. M. Cunningham, Wairarapa, Wanaka	2			
*E. W. Dawson, Canterbury	2			
*H. R. McKenzie, Firth of Thames	7			
*R. B. Sibson, Firth of Thames	1			
*R. H. D. Stidolph, Wairarapa, Ellesmere	2			
DOTTEREL—New Zealand		1	3	2
DUCK—Grey			1	
DUCK—Paradise			4	
FANTAIL—Pied			19	3
GANNET		6	490	8
D. L. Serventey and C.S.I.R.O., Aus.	17			
P. A. S. Stein, Horu Horu	198			
K. A. Wodzicki and F. H. Robertson, Cape Kidnappers	106			
GODWIT—Bar-tailed			1	
GREENFINCH			12	
L. Gurr, Marlborough (1943)	2			
GULL—Black-backed		15	683	16
J. M. Cunningham, Porangahau, Wai.	21			
G. W. Gummer, Rangitoto	524			
L. Gurr, Nelson	52			
F. C. Kinsky, Baring Head	23			
W. R. Marsden, New Plymouth	1			
P. A. S. Stein, Hauraki Gulf	10			
GULL—Black-billed		10	632	10
M. J. S. Black, Rotorua	31			
*D. H. Brathwaite, Napier	60			
*J. M. Cunningham, Napier	26			
*E. W. Dawson, Canterbury	179			
GULL—Red-billed		9	321	15
*J. M. Cunningham, Porangahau, Wai.	30			
L. Gurr, Nelson	14			
W. R. Marsden, New Plymouth	13			
J. H. Sutherland, The Brothers	50			

BIRDS RINGED. (*Denotes colour rings used.)

Species. Operators and Where Ringed.	Totals for 1951-52. Ringed.	Recovd.	Grand Totals to 31/3/52 Ringed.	Recovd.
HARRIER		17	81	18
J. S. Watson, Hawke's Bay	69			
HEDGE SPARROW		1	25	1
P. C. Bull, Lower Hutt	8			
KEA			7	
C. H. Tyndale-Biscoe, Canterbury	7			
KOKAKO			3	
MAGPIE—White-backed			1	1
PETREL—Diving		2	52	3
J. H. Sutherland, The Brothers	49			
R. B. Sibson, Auckland	3			
PETREL—Giant		3	1	2
A.N.A.R.E., Heard Island. (Numbers ringed not yet known.)				
PETREL—Grey-faced			1	
PHEASANT			710	197
PRION—Fairy			51	
J. H. Sutherland, The Brothers	31			
PUKEKO			2	
QUAIL—Californian			22	
RAIL—Banded			4	
D. A. Urquhart, Auckland	4			
SILVEREYE			4760	183
H. L. Secker, Wellington (1943-47)	458	27		
SKUA—Southern			6	
SHEARWATER—Sooty			14	
W. H. Dawbin, Wellington	14			
SHEARWATER—Fluttering			2	
R. B. Sibson, Auckland	2			
SPARROW—House			7	
STARLING			33	
C. A. Fleming, Wellington	3			
STILT—Pied			15	
M. J. S. Black, Rotorua	2			
*H. R. McKenzie, Auckland	11			
*R. H. D. Stidolph, Wairarapa	2			
STORM PETREL—White-faced			3	
R. B. Sibson, Auckland	3			
TERN—Caspian			6	
TERN—White-fronted		38	899	40
*D. H. Brathwaite, Napier	100			
*J. M. Cunningham, Napier	92			
J. C. Davenport, Auckland	178			
L. Gurr, Nelson	109			
W. R. Marsden, New Plymouth	55			
H. R. McKenzie, Clevedon	50			
J. H. Sutherland, The Brothers	50			
THRUSH—Song		2	63	6
*P. C. Bull, Lower Hutt	23			
H. L. Secker, Wellington	2			
WARBLER—Grey			16	1
YELLOWHAMMER			4	
L. Gurr, Marlborough (1943)	4			
Numbers ringed and recovered, 1951-52	2797	136		
Numbers ringed and recovered to 31/3/51	6787	403		
Numbers ringed and recovered to 31/3/52	9584	539	9584	539

RECOVERIES.

ALBATROSS, Light-Mantled Sooty (**Phoebetria palpebrata**).

24A, ringed by J. H. Sorensen (adult), 25/11/47, Campbell Islands; was reported nesting there, 4/12/51.

BLACKBIRD (**Turdus merula**).

These four recoveries are of birds re-trapped or found dead where ringed within a few months of ringing.

CHAFFINCH (**Fringilla coelebs**).

Z 7 858, a close-ring, was removed from a bird "probably a chaffinch" killed by a cat, Heretaunga, Wellington, and given to the Dept. of Internal Affairs. It may have been an escaped cage bird, but any member knowing anything of it is requested to inform the convener.

GANNET (**Sula serrator**).

15236, ringed adult 15/1/51, at Cape Kidnappers, was found nesting in almost the same place, 19/1/52.

Three birds, ringed as chicks, were found dead where ringed soon after.

GULL, Black-backed (**Larus dominicanus**).

13501 and 13793, ringed as chicks, on 18/11/51 and 16/12/51 respectively, on Rangitoto Island, took the baits on fishing lines near the island 21/2/52 and 4/3/52. The latter bird was released bearing the ring intact.

Seven birds, ringed as chicks on 16/12/51 or 29/12/51, on Rangitoto Island were found injured or dead of injuries on various dates in March, 1952, in the vicinity of Auckland—none more than about five miles from where ringed.

Six birds ringed as chicks were found dead where ringed soon after.

GULL, Black-billed (**L. bulleri**).

9185 ringed as a chick 26/12/51, Ashley River, was found dead 31/1/52 about three miles down the river.

9922 and 10267, ringed as chicks, 3/12/50, Ashley River, were seen 14/11/51 at the Ashley Mouth.

10779 ringed as a chick 18/1/52 at the mouth of the Tutaekuri River, H.B., was found dead 22/3/51, about 10 miles inland on the Ngaruroro River, near Fernhill, H.B.

Four birds ringed as chicks in November and December, 1951, in the Ashley River, were seen on various dates in March, 1952, in two localities in Christchurch.

One bird, ringed as a chick, was found dead where ringed a few days later.

GULL, Red-billed (**L. novaehollandiae**).

B 1237 and B 1248, ringed by L. Gurr, as chicks, 24/12/44, on the Boulder Bank, Nelson, were seen by him 14/1/52 at the Port, Nelson.

9335, ringed as a chick 14/1/51, Boulder Bank, was seen in Nelson, 18/12/51, and at the Port, Nelson, 14/1/52.

9355, ringed similarly, was seen 18/1/52, at the Port, Nelson.

9415, ringed as a chick 21/1/52, Boulder Bank, was caught and released, ring intact, 4/2/52, in Nelson City.

10063, ringed as a chick 15/12/51, on The Brothers Island, Cook Strait, was caught in a fishing net and the ring removed, 15/3/52, on Makara Beach, some 15 miles across the Strait.

The birds reported "seen" were fed with bread, and the ring numbers read at close quarters with binoculars. In addition, birds bearing the coastal Canterbury colour combination, and which were ringed in the Ashley River, November and December, 1951, have been seen on six dates in 1952 in two localities in Christchurch, about 20 miles south, and one in New Brighton, a nearby beach. Ringed "gulls" have also been reported from Nelson and Kairakau Beach, 30 miles south of Cape Kidnappers.

HARRIER (**Circus approximans**).

Of the harriers ringed at Hynish, H.B., between March, 1951, and 1952, six have been retrapped and eight have been killed, all within six miles of where ringed.

HEDGE SPARROW (**Prunella modularis**).

3130, ringed adult, 4/1/52, in Lower Hutt, was again recorded where ringed on January 4, 7, and 22, and was killed by a cat 20/2/52, nearby.

DIVING PETREL (**Pelecanoides urinatrix**).

5282, ringed adult, 19/7/51, on The Brothers Island, Cook Strait, and again recorded 1/9/51, was found dead near the Lighthouse, 1/11/51.

5284, ringed adult 22/7/51 on The Brothers Island, was found where ringed 8/8/51, 12/9/51 and 13/11/51.

GIANT PETREL (**Macronectes giganteus**).

16693, was ringed 6/3/51 at Heard Island at a probable age of 2½ months and it began flying in the middle of April. It was shot by a fisherman at the end of January, 1952, at Laguna Verde, on the coast a few miles south of Valpariso, Chile.

16713, ringed similarly, was shot early in February, 1952, by fishermen at San Antonio, a port 40 miles south of Valparaiso. The rings were returned by Edwyn P. Reed, Asessor Technico, Direccion de Pesca y Caza, Valparaiso.

SILVEREYE (**Zosterops lateralis**).

27 recoveries are included in the records just received of 183 birds ringed in 1943-1947.

TERN, White-fronted (**Sterna striata**).

6233, ringed as a chick 7/1/52, Motutapu Island, Auckland, was found dead under power lines, 26/2/52, at Devonport.

37 birds ringed as chicks in the various colonies were found dead where ringed soon after.

THRUSH, Song (**Turdus ericetorum**).

4432, colour-ringed, age not known, 31/7/51, at Lower Hutt, was seen where ringed in August and October, and was found dead 19/11/51.

4431, ringed similarly 29/7/51, was seen several times weekly until 2/9/51, and was killed by a cat 2/10/51 nearby.

KAKAS IN SETTLED COUNTRY.—Miss E. Strange, Te Aroha, wrote on 15/5/52 that for several weeks past there had been ten or twelve kakas (**Nestor meridionalis**) at their farm, some five miles from the nearest bush (Mt. Te Aroha). The birds were probably attracted by the old orchard with a good deal of fruit. As, according to Miss Strange, this is an exceptional occurrence here, it is suggested that members take special note or make inquiries for similar records in their district. Evidence of a more widespread irruption during the autumn or winter into settled country would be of interest.—E. G. Turbott, Auckland Museum.

EUROPEAN WASP.—The Department of Internal Affairs, Box 8007, Government Buildings, Wellington, has received reports which suggest that the newly acclimatised wasp **Vespa germanica**, in the Rotorua Acclimatisation district may be competing with birds for food, namely, nectar and fruits of forest trees. It is possible that this may have harmful effects on such species as the tui and the bellbird in upsetting their seasonal movements in seeking food supplies. Any member having information bearing on wasp-bird relationships in New Zealand is requested to inform the Department.

RANDOM JOTTINGS ON THE HEDGE SPARROW.

By H. L. Secker, Wellington.

Tucker (infra op. cit) implies that the British race of the hedge-sparrow (**Prunella modularis occidentalis**) is fundamentally a bird of the glades and fringes of broad-leaved woods spreading from there to artificial habitats of gardens, hedgerows and plantations of pines. It also frequents low scrub covering moorlands. The European hedge sparrow (**Prunella modularis modularis**) inhabits conifer woods to a greater extent and is a dweller of mountain scrub.

In the Wellington peninsula the hedge sparrow, long introduced from Britain continues to favour the tastes of its parent race. The hedge sparrow keeps to the fringes of native woodland; it frequents gardens and plantations. In the Makara area and other parts of the peninsula the hedge sparrow similarly inhabits the low thickets of **Cassinia leptophylla** growing on hillsides, also scrambling patches of a twiggy **Coprosma** which grows extensively in places near the sea. This vegetation is a New Zealand counterpart of the heath plants of British moorland. The coprosma and cassinia thickets grow from three to four feet tall. The cassinia covers hillsides extensively over an area of several square miles.

To a slight extent habits may appear to reflect the tastes of the European subspecies. The hedge sparrow inhabits scrub on steep wind-swept hillsides up to heights of 1200 feet. Reports, however, suggest that the species is not in New Zealand an inhabitant of actual mountain country, except in the vicinity of Lake Te Anau.

The precise food eaten by the hedge sparrows which inhabit these shrublands near Wellington city is unknown to the writer. Without doubt food must predominantly consist of insect matter in gardens, but in view of the fact that the species eats hemp seed freely, and also crusts of bread, the birds in the shrublands may possibly eat seeds of grasses. Under the cassinia thickets soil is hard through hefting of sheep, and insect matter cannot be excessively abundant. In pine plantations in the city, hedge sparrows in association with chaffinches (**Fringilla coelebs**) have been seen to probe pine cones and to remove seeds. Whether the birds ate the seeds removed in the manner that blackbirds will eat the seeds of **Phormium tenax** could not be recorded owing to defective light at the time of observation.

Some degree of territorialism appears to be evident throughout the year in the Wellington population of hedge sparrows. Birds possibly anticipating remating (c/f. Fisher, "Watching Birds," 1940, p. 162, or Marshal, Emu, 50, 1951, p. 267) from observations tend to re-establish territories in January in suitable places. The degree of permanency of the territories apparently set up after the summer solstice is unknown to the writer. At this time a note pitched in high key, which implies threat or warning is given, usually in the presence of other birds. The manner of delivering the note undoubtedly indicates establishment of territory. Moreover, in April, quarrels accompany use of the note. There is some use of part song also which indicates the establishment of territory (vide Fisher, 1940, op. cit.). Part song is delivered intermittently throughout the late summer into the autumn and the winter, increasing to full song in early spring.

In some years, apparently when weather conditions are mild, part song is regularly uttered. In other years, part song is not heard to any extent between late autumn (April 25-30) and early spring (July 20-31), except for an occasional burst of song notes during unstable weather. Whether birds not singing on account of bad weather temporarily desert the areas which they seem to defend as territories after the manner of **Erithacus rubecula** in Britain, as recorded by Lack, is unknown.

Record of Part Songs Noted at random in Karori and North Makara Valleys, Wellington, 1943-51:—January, 17/1/47, 1948: most days. February, 1/2/47. March, 1/3/47; 5/3/46; 11/3/46; 23/3/50; 29/3/46. April, 1/4/50; 3/4/43; 6/4/47; 20/4/46. May, 8/5/43; 15/5/43; 23/5/43;

24/5/47; 30/5/43. June, 8/6/43; 8/6/46; 14/6/47, 22/6/47; 20/6/43; 23/6/50; 26/6/43; 30/6/51. July, 3/7/43; 9/7/43; 10/7/43; 20/7/46; full song developing. August: Full song established.

Further habits of hedge sparrows also suggest that some form of territory is held by birds in autumn and early winter. The mannerism of wing flicking characteristic of territorial behaviour in spring is sometimes to be seen in March, and in May. Again, full song, indisputably evidence of territorial behaviour (*) has been recorded on April 20, 1946, between 1500 and 1600 hours in the North Makara Valley. In steep gullies smothered in thick growth of cassinia, **Griselinia littoralis**, gorse and fuchsia, birds at distances estimated at 100 yards apart were singing lustily.

In addition to part song and occasional full song, the hedge sparrow early in autumn has been heard to deliver a form of whisper song, without turgid quality, and distinct from part song, and full song. This song is likewise distinct from courtship subsong. This particular song may have affinities with the whisper song of the blackbird (**Turdus merula**), which the writer feels convinced arises from emotional disturbances in the mind of the bird, given particularly during autumn and early spring, but at other times also. (Vide Secker, N.Z. Bird Notes, Vol. 2, 6, 1947, p. 132). This sort of song seems to have no territorial significance. For example, in November, 1945, a blackbird, from its actions evidently a migratory and not a local bird, at Florence, Italy, was heard giving vent to this form of song.

There exists a second phase of subsong given in the presence of another bird. This song is characteristic of nuptial display prior to copulation of mated birds. There is close similarity with the accentor's subsong and that subsong delivered by the male blackbird in spring before its mate, mated Richard's pipits (**Anthus novaeseelandiae**) on winter feeding grounds, and white-backed magpies (**Gymnorhina hypoleuca**) when apparently engaged in pairing up in autumn (personal observations).

It is generally known that in the blackbird the male in hunched and crouched position, its body rigid, delivers before the female the courtship subsong. In the hedge sparrow the song is delivered, according to personal observations, without this crouching stance, but with rapid vibration of the wings. On these occasions the notes delivered often have sunk below the level of audibility.

In this case, the male appears to supplicate the female by song, but it appears also that the female will supplicate the male by form of display until the ultimate moment arises when both birds of the pair are attuned physiologically for successful copulation. As regards this display, on 20/9/43, of a pair seen together, one bird was seen to crouch, erecting and quivering its tail, its mate making rhythmical darting movements at the region of the cloaca with its bill. If the process of copulation has been correctly observed and not confused with a phase of pre-nuptial display it is an unusual action. The two mated birds fly or move rapidly, half-hopping, half-running, towards each other; when almost touching, both in a flash reverse direction, the male apparently contacting the cloaca of the female, and apparently copulating in this swift action. In contrast, the males of **Erithacus rubecula** (vide Lack, op. cit.) and **Gymnorhina hypoleuca** (personal observations) merely mount the female in an unceremonious action.

REFERENCES.

Witherby, Tucker, Ticehurst, Jourdain, "Handbook of British Birds," Vol, 2; ;Witherby, London

Lack D., "Life of the Robin."

Fisher, J., "Watching Birds" (Pelican.).

* Notwithstanding this function of full song, the writer has heard migratory chiffchaffs (**Phylloscopus collybita**) delivering full song in tamarisk trees fringing the Suez Canal on January 6, 1946; and redstarts (**Phoenicurus phoenicurus**) on migration singing from olive trees in open croplands on April 6, 1945 (Faenza, Italy). These birds being on migration could not be holding territory.

BIRDS AT THE BROTHERS.

By J. H. Sutherland.

The previous bird notes from this island, published in Notornis, October, 1951, were for seven months ending February, 1951. I am now able to record further observations made by the keepers at the lighthouse from then till February, 1952. During this year, red-billed gulls, white-fronted terns and dove and diving petrels were ringed. Each night through the year it was recorded whether there were many, some, or few of both species of petrel. Owing to the craggy nature of this island it was not possible to make even a rough count, so it was considered better not to make an estimate of the actual numbers.

We were able to confirm the breeding times of the different birds. The small blue penguins hatched in mid-September, the diving petrels in late October, the gulls and terns about the beginning of December, and the dove petrels in mid-December. During November, starlings were noticed often flying from the same cranny in a cliff, but as it was in an inaccessible place we cannot be sure that they were nesting there. All that can be said is that it is quite likely.

From July to October numbers of goldfinches were seen regularly on the good days. They kept mainly to the shore groundsel which was flowering all through this period. They were often seen plucking the flower heads of this plant, and when it died off the goldfinches left and have not been seen since.

A kingfisher was seen occasionally from 2/4/51 to 12/9/51. We have no means of knowing whether it was the same one, but we never saw more than one at a time. We did not see it feeding at all, but we did notice it was here only on calm sunny days, that is, on days when most skinks would be out. It has not been seen since September.

White-eyes were sometimes seen from March to July, and during August, September and October they were here in numbers almost every day. They kept mainly to the shore koromiko where they appeared to be feeding on a small green insect; but they also visited other shrubs, and several times they were seen working on the ice-plant. We were not able to find out what they were feeding on there. None has been seen since the end of October.

Odd harriers were seen hovering over the island in most months but they appeared more often in September and October. An attempt was made to determine in what direction they were flying, but without any consistent result.

A few sparrows have been with us throughout the year. They are attracted by the scraps thrown out for the few domestic fowls we keep.

A fantail paid us a visit and stayed on the island on 14, 15 16/3/51.

A shining cuckoo was found on the night of 25/9/51 near the tower in a bedraggled and exhausted state, but apparently it was not hurt. There was a thick drizzle at the time. The bird was kept in a warm box overnight and released in the morning when it flew away strongly northwards.

On 22/12/51, during another night of drizzle and fog, a petrel was found dead in the tower court. I was not able to identify it confidently, but from my photograph and description the editor considers it almost certainly to have been a Cook's petrel.

Wandering albatrosses, mollymawks, giant petrels, Marlborough shags, black-backed gull and flocks of small black unidentified petrels have been seen occasionally, either flying past in the distance, or swimming on the sea in the vicinity.

Dove Petrel.—During January, few, and during February and early March, none, was seen. On 23/3/51 a few were seen, and from then until December they were with us in numbers almost every night. It was noticed that there were few, and sometimes none, on nights of bright moonlight, and on very stormy nights. The greatest numbers were present on calm, dark, wet nights. September, October and November were the months when they seemed most active. After 12/12/51 their numbers

declined until 20/1/52, after which none was seen. Over thirty were ringed but few repeated, except those ringed at the nests. The dove petrels had a very poor nesting season, probably because of the great numbers of gulls and terns nesting on the island at the same time. Many heavy falls of rain during the nesting months may have been a contributing cause. This year many chicks were found with their heads bitten off, a sign that the tuatara had been more vicious towards them than usual. In only one nest of the six under observation did a chick hatch, on 12/12/51, but this chick was killed by a tuatara a fortnight later.

Diving Petrel.—Few were seen during January except for the nights of the 17th to 22nd, when a number were noticed on the west side of the island. A few were seen on 4/2/51 and there were many here by 10/2/51. From then until 24/10/51 they were with us in numbers most nights, but like the "dovies" they were not so numerous on nights of bright moonlight. They were often here in numbers on stormy nights when the dove petrels were almost totally absent; but often on nights when there were great numbers of dove petrel here the "divers" would not be seen much in the open. Many of them returned to where they were first ringed. When the nesting season began few were found on the surface, and the numbers of repeats declined. A few returned to where ringed six months later. No doubt a careful search every night would have yielded even better results; but by the nature of our duties this is not possible.

Fifteen nests were chosen for observation. Many of these nests, however, were on the surface, partly concealed by the tussock. In these nests the birds sat on the eggs at night only, and none of the eggs hatched. Several nests were in burrows rather difficult to reach, and in these the parent birds were ringed to see if they return as a pair next season, but no further effort was made to observe the nesting for fear of disturbing the birds.

In the end there was only one nest from which we got results. The adults were first found with the egg on 20/9/51. On 25/10/51 the chick was found, a few days old. On 14/12/51 the chick left. The birds took turns at sitting, but not regularly night about as has been noticed elsewhere.

Several complete families of parents and chicks were ringed, but these nests were not under observation from the beginning of the season. By the end of December most of the chicks had left. Few divers were seen this January, but early in February they returned in considerable numbers.

Little Blue Penguin.—These were heard on odd nights all through the year, but from May to October they seemed to be here in greatest numbers. On 16/9/51 one was found on an egg. The bird was kept under observation and the chick hatched 20/9/51. The chick survived and left the nest during the first week in November.

Red-billed Gull and White-fronted Tern.—Odd gulls were seen all the year. They began gathering in September ond October, but did not arrive together. They gradually picked out nesting places and settled in. By the end of October the nesting colonies were well established, and at this time the white-fronted terns arrived. The terns set up their colonies much more quickly. Both gulls and terns began laying in the first week in November and the first chicks of both species were hatched at the end of the month. Laying and hatching continued till the end of the year. Both gulls and terns left during February. This year was a good season for both species; there were a great many more than last year; the terns were not molested much by the gulls and the gulls were not noticed attacking neighbouring gull chicks as often was the case last year. Many hundreds of gull and tern chicks survived and a few of each were ringed.

One of the 1950 gull chicks was recovered in Tory Channel, about seven miles away, through the bird becoming temporarily fouled in the ropes on the deck of a vessel.

I should like to thank my fellow-keepers for their assistance in keeping records; Mr. R. H. D. Stidolph, for his assistance in identifying doubtful birds; Mr. W. H. Dawbin, for his interest in the work on the petrels; and Mr. J. M. Cunningham, for help and encouragement in the ringing operations.

NOTES ON THE PRESENT STATUS OF SAMOAN BIRDS.

By J. C. Yaldwyn, Wellington.

The following are notes on the more obvious birds seen during a visit to Western Samoa from December, 1950, to January, 1951. These two months were spent mostly as the guest of Mr. A. R. Cobcroft, of Vaipoto Plantation, Upolu. Trips were made in the company of Mr. D. V. Cobcroft, who also supplied me with records from Vaipoto, to many parts of Upolu and to one coast of the island of Savai'i.

Bird observations were very difficult during this period as it was at the height of the rainy season with rain falling every day—just over 11 inches were recorded on Christmas Day at Vaipoto. Notes have been written only on those birds which were definitely identified and as I was unable to identify most of the passerine birds which were seen only for brief moments in the rain, I have made no mention of these.

The Samoan name of each bird is given after the scientific as in most cases this is the only name by which the bird is known in Samoa. The only book available on Samoan birds is Armstrong, J. S., 1932, "Handlist to the Birds of Samoa," London. As there seem to be very few copies of this essential work in New Zealand, I have repeated some of the observations recorded in the hope that they may be useful to future workers.

Other works used are:—Mayr, E., "Birds of the South-west Pacific," New York, 1945; Oliver, W. R. B., "New Zealand Birds," Wellington, 1930; Schultz, Dr. E., "Proverbial Expressions of the Samoans," J.P.S., Vol. 58 and following numbers.

White-tailed Tropic Bird (**Phaethon lepturus**), Tava'e.—About twenty seen flying about the tops of high trees on edge of a new clearing at Saleimoa, Upolu, on January 3, 1951. Whether these were nesting or not I cannot say. Armstrong mentions nesting in holes in trees high above the ground and gives as date October, at Vailima, Upolu, but Oliver gives for red-tailed tropic-bird, eggs between December and May in Kermadec Group. D.V.C. says they are often seen over Vaipoto and are more common than the red-tailed. The Samoans use the long tail feathers of both the white and red-tailed species for ornamental purposes and have two proverbs which show their interest in these feathers. (Schultz, 119, 120.)

Red-tailed Tropic-bird (**Phaethon rubricauda**), Tava'e'ula or Tava'-etoto.—None seen during my stay, but D.V.C. has seen them over Vaipoto but not often. Armstrong reports only one, so apparently they are not common. He also records the common tropic-bird (**P. aethereus**). Mayr, however, does not include it in his list of S.-W. Pacific birds, and it is one of those that he says do not occur in Samoa.

Brown Booby (**Sula leucogaster**).—Three seen at dusk flying over the ship the day before arrival at Suva, Fiji, 10/12/50.

Reef Heron (**Demigretta s. sacra**), Matu'u.—A pair seen on the beach at Mulifanua, Upolu, 26/12/50. Reported as generally distributed on both islands.

Grey Duck (**Anas superciliosa pelewensis**), Toloa.—They are reported as widespread but not common throughout Upolu, and are present on Vaipoto. Neither Armstrong nor Mayr record them on Savai'i, but I have seen them on the freshwater lagoon at Safune, on 7/1/51, and they are reported as occurring in other localities. They are highly prized as food by the Samoans, whose hunting of them keeps the numbers down locally. The shooting season is from July 1 to December 31.

Bush Fowl (**Gallus gallus**), Moa'aivao.—These were brought to Samoa by the Polynesians in a semidomesticated state and have since become wild and spread throughout both islands. They are constantly receiving new blood from domesticated birds of the Samoans; their plumage is very variable, a pure white bird being shot on Vaipoto while I was there. Though common, they are very secretive and seldom seen. (D.V.C.) An excellent account of the spread of the bush fowl by Polynesians is given in Ball, S. C.,

"Jungle Fowls from Pacific Islands," Bernice P. Bishop Museum Bulletin 108, 1933.

Banded Rail (**Rallus philippensis goodsoni**), Ve'a.—Very commonly seen between Vaipoto and Lepea; reported as common on both islands; when disturbed it is said to fly fast and low. (D.V.C.) Schultz records an old proverb which shows that this rail was formerly hunted on a large scale with bows and arrows.

Swamp Hen (**Porphyrio porphyrio samoensis**), Manuali'i or Manusa.—One seen, river bank, Vaipouli, Savai'i, 5/1/51. Generally distributed throughout both islands, especially in plantations, taro swamps and on river banks; does extensive damage to the young taro crop and is commonly shot for food by the Samoans. (D.V.C.) The shooting season is from July 1 to December 31.

Fairy Tern (**Gygis alba**), Manu Sina.—Many seen over reef and open sea between Upolu and Savai'i, 4/1/51.

Pacific Pigeon (**Ducula pacifica**), Lupe.—This and the following are the commonest pigeons in Samoa. Very often seen eating the fruit of the moso'oi tree. This is considered the best pigeon to eat by the Samoans, but all are shot for food, and as a protective measure a shooting season for all pigeons, except the tooth-billed, which is absolutely protected, has been introduced. The season is from July 1 to December 31. The large number of proverbs that deal with pigeon hunting given by Schultz tend to show the importance of these birds in the Samoan food supply.

White-throated Pigeon (**Columba vitiensis castaneiceps**), Fiaui.—Very common on Savai'i and Upolu, but not found in Eastern Samoa. Very difficult to distinguish from **D. pacifica** when seen in the tree tops against the sky.

Samoan Tooth-billed Pigeon (**Didunculus strigirostris**), Manumea.—This interesting pigeon is found only on Savai'i and Upolu, and is reported as not being as common as it was. Seen in bush on Vaipoto plantation (D.V.C.). This pigeon is now absolutely protected. Armstrong told the writer that a young one was being kept in Apia during January, 1951.

Crimson-crowned Fruit Dove (**Ptilinopus porphyraceus fasciatus**), Manutangi (young Manufili).—Very common all over the Samoan Islands. Often seen on Vaipoto. (D.V.C.)

Samoan Fruit Dove (**Ptilinopus perousii**), Manuma (female Manulua). Recorded from all the islands of the Samoan Group. Not very common on Vaipoto, where it seems to prefer the fruit of the moso'oi tree. (D.V.C.)

Samoan Ground Dove (**Gallicolumba stairii**), Tu (male, Tutautifa; female and young, Tu'aimeo).—Restricted to Savai'i and Upolu. This brown dove appears to be rare; occasionally seen on the ground at Vaipoto. (D.V.C.)

Samoan Blue Lory (**Vini australis**), Senga Samoa.—This is the only parrot native to Samoa; the Samoans, however, keep other species as pets. The blue lory is common on plantations especially among coconuts, on whose flowers they feed as well as on those of other trees. Seen on both Savai'i and Upolu. (D.V.C.)

Barn Owl (**Tyto alba lulu**), Lulu.—One seen several times on Vaipoto. Reported as often taking chickens and rats on plantations. (D.V.C.)

Swiftlet (**Collocalia s. spodiopygia**), Pe'ape'a.—Common on both Upolu and Savai'i, their flight is unmistakable. Reported to nest in caves and lava tunnels. The Tongan subspecies **C. s. townsendi** was seen in large numbers in caves in Vava'u Harbour, Tonga, 16/12/50.

Western Samoan Kingfisher (**Halcyon recurvirostris**), Ti'otala.—Often seen on road between Apia and Vaipoto. Reported to catch worms, insects and lizards (D.V.C.) This kingfisher is restricted to the islands of Upolu and Savai'i (Western Samoa), and is not found in Eastern or American Samoa which is only about 70 miles away. There, two subspecies of the widespread **H. chloris** are found. In fact, Eastern Samoa is the limit of its

range to the east. Why **H. chloris** does not occur in Western Samoa is not known.

Samoan Starling (**Aplonis atrifuscus**), Fuia—I saw many shot and eaten by Samoans at Vaipouli, Savai'i. Reported to be widespread in the plantations and bush throughout Upolu and Savai'i.

Samoan Fantail (**Rhipidura nebulosa**), Se'u.—These birds are very tame and are common in the bush on both islands. The Savai'i birds (**R. n. altera**) are said to differ from the Upolu birds (**R. n. nebulosa**) in being "somewhat lighter," but the difference does not appear noticeable in the field.

These notes have been written in the hope that they may act as a basis for a comprehensive account of Samoan birds under present conditions.

BREEDING HABITS OF SILVEREYE.

By W. H. Davidson, Dunedin.

On January 12, 1950, a silvereye's nest containing three eggs was found in a black currant bush, 3ft. from the ground. On January 14, at 2.30 p.m., the nest contained two chicks and an unhatched egg. The next day the third chick had hatched. The adult birds always approached the nest through the back of the currant bush, perched on a branch about a foot from the nest for a few seconds, then landed on the edge of the nest. It was always on the same place on the edge of the nest that the landing was made, with the result that there was a flat area on the far side of the nest from the camera.

The hen had a poor ring round her eyes. It was not white, but inclined to be dark and very ragged as if it were moulting. She had a smaller, finer beak than that of her mate, and she always sat on the nest facing the camera and looking with both eyes. The male was a little larger and he was well-groomed, with clean-cut features and with bright white eye rings. He sat with his head to the left and watched with one eye.

On January 19 pin feathers were developing on the wings of the young and their bodies were becoming covered with dark down. The nest was gradually canting to one side. When the hen was on the nest, at a given call from her mate, she flew off. Immediately her mate arrived with a beakful of insects, which were fed to one chick. He then settled down on the nest. The hen gave the signal "tweet," and he at once departed. She landed, fed a chick and settled on the nest. This procedure went on continuously. Each bird sat and waited for a signal "tweet," and flew off at once, the other bird landing within a second. At no time were two at the nest at once except on one occasion when a bird missed the signal, but it left the nest immediately the other arrived. Sometimes they cleaned the nest, larger droppings being dropped over the edge of the nest, smaller ones carried to a near branch which was covered with droppings. The interval spent in the nest was from half a minute to about two minutes. Insects and green caterpillars were the standard diet of the young.

On January 22, the eyes of the young were opening. They had green feathers on their backs but their heads were still bare. The two bigger youngsters seemed to be sitting on top of the third bird. The parents were now tame. By January 24 the eyes of the young were wide open and they were fully feathered except for a little bare patch on the top of the head and around the eye. They filled the nest and usually one of them had a wing over the side. On the rare occasions that an adult sat on the nest, it could not cover the young. On this date raspberries were given to the young. The adults seemed more timid about approaching the nest when the observer was near. One side of the nest was at least 2 inches lower than the other.

On January 25, a visit was made to the nest at 9.15 a.m. An accidental false movement was made by the observer and two chicks flew from the nest into the black currant bush, leaving one young in the nest. An unsuccessful search was made for the two that had flown. At 10.15 a.m. another visit was made to the nest and all chicks were back in the nest. Both adults arrived with food and there was a little excitement. The young were twittering and one of them climbed up a black currant branch to about 8 inches above the nest while another sat on the edge of the nest. Both parents flew away and the two chicks flew a moment later. One of them flew about 12 feet and one parent darted after it like a shot. The one in the nest was twittering and stretching up its head. Presently it began to wriggle and then it flapped its wings several times. Next it climbed up and sat on the edge of the nest. Later it dropped back into the nest and settled down. When the observer returned to the nest at 11.10 a.m., the last bird had gone.

During the day several visits were made to the nesting site, but no sign was seen of the family until 8 p.m. when they were noticed preparing to settle for the night in a macrocarpa hedge about 25 feet from the deserted nest.

On December 27, 1950, a silvereyes' nest containing three young was found among raspberry canes. The young appeared to be a day and a half old. On December 31 and January 3, while photographs were being taken of the nest, the adult birds brought the following food to the young: A large brown moth that covered most of the face of the hen bird; small bluish-green caterpillars, brown wrinkled caterpillars about one and one-eighth inch long and about a quarter of an inch in diameter, white butterfly grubs, daddy-long-legs and raspberries. On December 31, 1950, food fed to chicks about 4½ days old, eyes not opened: Dark green grub about an inch and a half long; long-legged insect, daddy-long-legs type but smaller; wire worm; bit of raspberry; two large and one small grub of white butterfly. (This last lot was thrust down one neck and the chick had to raise body and head, stretching its neck and swallowing three times before all was properly down.) January 4, 1951: Again watched young fed: Daddy-long-legs, cabbage butterfly grubs, moth, raspberry grub, dark green grub with lighter greenish-yellow horizontal stripes.

SURVEY OF DABCHICKS.—North Island: Most waters in the North Island have been visited in the last ten years and reports have been received from fourteen observers. South Island: Reports have been received from six observers. There is little information about the high-country lakes. Two North Islanders have reported on Westland. It is clear that dabchicks no longer occupy waters where they were not uncommon last century. There is also evidence that they have recently recolonised waters from which they were for many years absent. It is believed that dabchicks dislike waters in which eels abound. Observers are asked for their comments on this hypothesis.—R. B. Sibson, Auckland.

BREEDING OF GREY WARBLER.—When felling manuka in the Porangahau district, Hawke's Bay, on August 16, 1951, I found a grey warbler's nest, not quite half built. On September 2, the nest was completed but contained no eggs. On September 8 it had two eggs, and on Sept. 13, four. On August 27 a second nest was found in a "mingi" tree, 6ft. up, containing three eggs. A third nest was found on Sept. 1, also in a 'mingi," half-built. One of the eggs in the first nest appeared to be completely white, with none of the usual pinkish tinge, and the red spots were missing except when very closely examined, an odd, very pale speck was just visible.—R. L. Grant, Hastings.

AN EXCURSION TO THE HERMITAGE.

By Dunedin Naturalists' Field Club.

During a Dunedin Naturalists' Field Club excursion to the Hermitage on January 15 to 24, 1951, on the whole, native bird life was not recorded to the extent expected, but possibly this was partly due to the fact that a good deal of time was spent in travelling, and recording from a moving bus has its limitations. The Tasman Valley, miles long and miles wide, is quite impossible to explore in nine days. Altogether, about three dozen species of birds were recorded.

The crested grebe was found on a little lake in the Mackenzie Country, apparently a haunt of this bird for many years judging by its Maori name. When the water in Lake Tekapo is raised an additional 15 feet, it is possible it may also raise the water in this little lake and the grebe may lose its nesting haunts. Altogether, we saw 13 adult birds and two young ones. A black shag was recorded at Lake Ohau and two at Lake Pukaki. The paradise duck was in disappointingly small numbers. In the bush near the Hermitage we were shown a hollow in a tree about eight feet from the ground where a paradise duck had made its nest. After two eggs had been laid the nest was deserted, probably because too much interest had been taken in it by the finder. The duck made another nest nearby in the bush and reared a family. On our last day seven or eight paradise ducks were seen on the bank of the Tasman River. The grey duck was seen in numbers along the Tasman Valley. Counts on Lake Pukaki on different days varied from 2 to 32. One flight of 16 was counted. A few were present on Lake Alexandrina. On Lake McGregor two flocks of about 20 to 30 black teal were noted; on Lake Alexandrina five birds, and on Lake Pukaki, four. Counts of black swan at the head of Lake Pukaki varied on different days, the largest being 31 adults and young. On the day the party left the Hermitage a solitary Canadian goose was seen beside Lake Pukaki

The bush hawk was not noted by members, but a resident reported that it was present. From Dunedin to the Hermitage, via Kurow and Omarama, approximately 211 miles, a count of 31 harriers was made from a moving car. The day was very hot. On January 16, from Lake Ohau to Lake Pukaki there were six; from Pukaki to Hermitage, seven. The pukeko was present in swamy land at Lake Pukaki and in the lower Tasman Valley. The largest count was 13 plus. Two were noted near Lake Ohau. At the head of Lake Pukaki, where a stream ran through rush-grown ponds and gravel beds, there were numbers of banded dotterels. Their numbers varied up to about 12 or more. A pair of dotterels was present at Blue Stream, near the terminal moraine of the Tasman Glacier. On lagoons at the head of Lake Pukaki were five pied stilts; on a lagoon near the lower end of the lake, four; and near Lake Ohau, one. The black-fronted tern was seen as follows:—January 15, Kurow, 5; Jan. 16, Ohau River Bridge, 3; Jan. 14-24, counts from the Hermitage through the lower Tasman Valley and beside Lake Pukaki varied, the largest, 15, being on Jan. 16. On January 17, in the upper Tasman Valley from the Hooker River to Ball Hut, the count from a moving bus on the outward journey was 18, and on the return journey only 3. On January 17, when a stop was made at Blue Stream, at the terminal moraine of the Tasman Glacier, a small flock, 30 plus, was present on the shingle beside the stream. Among these were young birds. Adult birds were carrying billfuls of insects caught over the stream. A few black-backed gulls were seen in flight in the Tasman Valley. Near the Hooker Bridge, where the Hermitage pigs were fed on scraps from the hostel, a flock of 30 to 40 seemed to have taken up a more or less permanent abode. They were also about the Ball Hut. On the journey north on January 15, three dozen black-billed gulls were perched on the roof of the Oamaru Station. At the Waitaki Dam there were about 20. They were present in the Tasman Valley, at Lake Pukaki, Lake Ohau and Lake Alexandrina. At Lake Ohau a flock of about 50 frequented the camping grounds. When club members stopped for afternoon tea, they quickly transferred their attention to their party.

A resident of the Hermitage reported that there are a few native pigeons present, five being about the maximum seen. On January 15, about three dozen rock pigeons were counted at the limestone cliffs at Duntroon. The kea was not recorded by members, but other visitors to the Hermitage who did some climbing during our stay, reported six or seven on the mountains. Shining cuckoo calls were recorded early one morning and on another occasion a bird was seen. The morepork reported as once present in the neighbourhood of the Hermitage, had not been heard for some time. The little owl was not seen or heard at the Hermitage, but on the journey north, one was noticed perched on a post at Palmerston. About half a dozen riflemen might be seen in a walk through the bush about the Hermitage. Six were recorded in the beech forest on the shore of Lake Ohau. The rock wren was reported by a guide at the foot of Haast Ridge and in other alpine localities visited from the Hermitage. Six or seven pipits were noted on the road from Lake Pukaki to the Hermitage. At Ball Hut four were seen, and at the Blue Stream, four. The grey warbler was a fairly common bird where trees grew. On the walks to Kea Point, about 12 were counted. In Governor's Bush, when calls were made, five or six would respond. They were also present in beech forest at Lake Ohau. The yellow-breasted tit was another bird present in fairly satisfying numbers. A pair occupied the trees in front of the Hostel, and two more pairs had territory in the bush immediately at the back of the Hostel, and their songs were often heard. The nest of one pair was found about three feet from the ground, built in the angle formed by a branch with the trunk of a fuchsia tree where it rested against an overhanging rock. The nest contained four young ready to fly. Tits were also present in the beech forest at Lake Ohau. The count of fantails for the trip was 18 pied and five black. These lively little birds were sometimes seen indoor as well as out. The brown creeper was not definitely recorded. One or two birds seen near the Hermitage were possibly this species. The silvereye was frequently seen in small numbers, up to 10 or 12. The tui and bellbird were neither seen nor heard. Inquiries showed that one or two tuis were sometimes present, arriving before Christmas and departing at the first fall of snow, which was usually in May. These visits were not yearly events. Our informant, who was very interested in the bird life, took up his residence at Mt. Cook in 1924, and he had never seen or heard a bellbird there.

Sparrows, redpolls, goldfinches, chaffinches, greenfinches and yellowhammers were all seen repeatedly on the party's excursions around the Mackenzie Country. Sparrows were, as usual, common about farmlands, and some had nests, which were in occupation, under the eaves of the Hostel. One nest was found about five feet from the ground in a matagourie. It contained four eggs. Thrushes and blackbirds were exceedingly plentiful and were the commonest birds in the neighbourhood of the Hermitage. They were still in full song, though daytime song had almost ceased at Maori Hill, Dunedin, by January 15. In a patch of matagouri covering about an acre of ground beside a stream in the lower Tasman Valley, four empty nests of the thrush and three of the blackbird were found. In another area was a thrush's nest containing young. Numbers of hedge sparrows were seen, and this bird was also still in full song. The skylark was very common in the lower Tasman Valley. Always in the early morning there was a flock of 10 or 12 starlings feeding on the lawn. On all trips through the Mackenzie Country this bird was noted. Most flocks were small, but a few would number about 40 or 50. The white-backed magpie was not seen in the vicinity of the Hermitage, but about the lower end of Lake Pukaki a few were noted. On January 24, heavy rain was falling and visibility poor, but magpies were found to be much more plentiful between Lake Tekapo and Timaru than between Tekapo and Pukaki.

COURTSHIP DISPLAY OF MALLARD.—On August 11, 1951, while sitting overlooking a still pool between two small waterfalls, two mallard—a duck and a drake—were observed apparently feeding. Then it was noticed that, although both birds were bobbing their bills into the water they were doing so regularly, rapidly and with a contra movement —duck, drake; duck, drake, and so on—all the time circling slowly in counter-clockwise direction. As I watched the bobbing became more rapid and synchronised—circling continued. This went on for perhaps five minutes, then the drake swam to the edge of the nearer waterfall and flew over followed by the duck. The drake stood on a stone and preened under tail coverts; duck on edge of waterfall watching him. Then both returned to pool and resumed circling. Drake trod duck under water. Both swam over the waterfall into the adjacent pool. Here they stood on separate stones—after showering themselves well—and preened all over. Observer had to go away at this stage, but when observed ten or fifteen minutes later they were still standing on separate stones preening. From first observation of "bobbing" till treading took place would be about twenty minutes.—*Miss J. Gardner, Dunedin.*

SCIENTIFIC NAMES.

The scientific names of birds mentioned in this issue, where not given in the text, are:—

Albatross, Light-mantled Sooty **(Phoebetria palpebrata).**
Albatross, Royal **(Diomedia epomophora)**
Albatross, Wandering **(Diomedia exulans)**
Blackbird **(Turdus merula).**
Bellbird **(Anthornis melanura).**
Chaffinch **(Fringilla coelebs)**
Creeper, Brown **(Finschia novaeseelandiae).**
Cuckoo, Shining **(Chalcites lucidus)**
Dabchick **(Poliocephalus rufopectus).**
Dotterel, Banded **(Charadrius bicinctus)**
Dotterel, N.Z. **(Pluviorhynchus obscurus)**
Duck, Grey **(Anas poicilorhyncha)**
Duck, Mallard **(Anas platyrhynchos)**
Duck, Paradise **(Tadorna variegata).**
Fantail **(Rhipidura fuliginosa)**
Gannet **(Moris serrator)**
Godwit **(Limosa lapponica)**
Goldfinch **(Carduelis carduelis)**
Goose, Canadian **(Branta canadensis)**
Grebe, Crested **(Colymbus cristatus)**
Greenfinch **(Chloris chloris)**
Gull, Black-backed **(Larus dominicanus)**
Gull, Black-billed **(Larus bulleri)**
Gull, Red-billed **(L. hollandiae).**
Harrier **(Circus approximans)**
Hawk, Bush **(Falco novaeseelandiae)**
Hedge Sparrow **(Prunella modularis)**
Kea **(Nestor notabilis).**
Kingfisher **(Halcyon sanctus).**
Kakapo **(Strigops habroptilus)**
Kokako, Blue-wattled **(Calleas wilsoni)**
Magpie, White-backed **(Gymnorhina hypoleuca).**
Morepork **(Ninox novaeseelandiae).**
Oystercatcher, S.I., Pied **(Haematopus finschi)**
Owl, Little **(Athene noctua)**
Penguin, Little Blue **(Eudyptula minor)**
Petrel, Cook's **(Pterodroma cookii)**
Petrel, Diving **(Pelecanoides urinatrix).**
Petrel, Giant **(Macronectes giganteus).**
Petrel, Grey-faced **(Pterodroma macroptera)**
Pheasant **(Phasianus colchicus).**
Pigeon (Native or Wood) **(Hemiphaga novaeseelandiae).**
Pigeon, Rock **(Columba livia).**
Pipit **(Anthus novaeseelandiae).**
Prion, Fairy **(Pachyptila turtur)**
Pukeko **(Porphyrio poliocephalus).**
Quail, Californian **(Lophortyx californicus).**
Rail, Banded **(Hypotaendia philippensis)**
Redpoll **(Carduelis cabaret).**
Rifleman **(Acanthisitta chloris).**
Shag, Black **(Phalacrocorax carbo).**
Shag, King **(Leucocarbo carunculatus)**
Shearwater, Fluttering **(Puffinus bulleri)**
Shearwater, Sooty **(Puffinus griseus).**
Silver-eye **(Zosterops lateralis).**
Skua, Southern **(Catharacta lonnbergi)**
Skylark **(Alauda arvensis)**
Sparrow, House **(Passer domesticus).**
Starling **(Sturnus vulgaris)**
Stilt **(Himantopus himantopus).**
Storm Petrel, White-faced **(Pelagodroma marina)**
Swan, Black **(Cygnus atratus).**
Teal, Black **(Athya novaeseelandiae)**
Tern, Caspian **(Hydroprogne caspia)**
Tern, Fairy **(Sterna nereis)**
Tern, White-fronted **(Sterna striata).**
Thrush, Song **(Turdus ericetorum).**
Tit, Yellow-breasted **(Petroica macrocephala).**
Tui **(Prosthemadera novaeseelandiae).**
Yellowhammer **(Emberiza citrinella).**
Warbler, Grey **(Pseudogerygone igata).**
Wren, Rock **(Xenicus gilviventris)**

Group Adherence in the Common Tern, by Oliver L. Austin, Bird-Banding, xxii, 1: January, 1951.

This is an extremely important paper which should be read by all members studying and ringing colonial nesting birds in New Zealand, such as terns and gulls. It stresses that there are two kinds of attachments among common terns: that of "site tenacity" (see also "Site Tenacity, a Behaviour Trait of the Common Tern," Bird Banding, xx., 1; January, 1949) which brings birds back to where they were hatched year after year: and that of "group adherence" which tends to attach groups of birds together, even in wintering grounds. The Cape Cod tern colonies contain a number of rookeries which vary in size, but the whole group consistently contains approximately 25,000 terns. In the group there is some movement from rookery to rookery, but recoveries of tern ringed in other colonies are rare (c. 0.036%) and show that there is little interchange of populations. It is found that groups of terns ringed in one part of a rookery will be found in later years in the same part of the rookery. Site tenacity is not wholly responsible for this, as if environmental conditions force the birds to change their nesting site, the whole group will still nest together elsewhere, e.g., one group of 50 odd pairs nested together and were colour-ringed for three consecutive years. In the fourth, the site was destroyed, but the birds, easily recognised by their colour rings, did not scatter, but nested together again in a new site. Evidence is also given that young birds will remain together as a group through their first winter.—J.M.C.

On the Concept of "Incubation Period," by P. O. Swanberg.

A review by S. C. Kendeigh in Bird-Banding, xxii., 1; January, 1951, discusses two possible definitions. It is concluded that incubation should be defined according to Heinroth's rule "the time which elapses with regular uninterrupted incubation of a newly laid egg, until the young has left the egg." In nature, it is generally possible to ascertain the incubation period with satisfactory exactitude from the time of laying of the last egg to the hatching of the last young.—J.M.C.

Distraction-Display in the Kentish Plover, by K. E. L. Simmons. British Birds, xliv., 6; June, 1951.

Admirable descriptions, with lifelike drawings, which are useful for showing the resemblances and differences from the distraction display of the banded dotterel in New Zealand.—J.M.C.

Antarctic Isle, by Niall Rankin. 138 illustrations from photographs by the author. 383pp., Collins. 25/-. N.Z. price, 31/3.

Colonel Rankin and three companions arrived in Leith Harbour, South Georgia, in November, 1946, to study Antarctic animal life. As he cruised in his own 42-ft. motor yacht, The Albatross, for many months in and out of the bays and inlets, he photographed and studied the birds and animals wherever they were most concentrated. Excellent photographs of the life-cycle of the wandering albatross have already proved their value to me in helping to identify the adult male, female and young in Wellington Harbour. The author still clings to the fallacy that the adult albatrosses leave their young at the end of the breeding season, and states:—"If a nestling continued to be fed by its parents it would be content to remain indefinitely at the nest, happy and carefree, with no inducement to go out into the wide world. Drastic and cruel as it may seem, it is only by cutting off supplies and completely abandoning the young bird that it is compelled to fend for itself."

Dr. Falla, Richdale, Sorensen and others have recorded adult Tubinares returning to the nest after the young birds have flown, and I really think that if the author had patiently watched and waited a few days longer he would have seen the return of at least one of the adult birds.

Magnificent photographs of the penguins, sheath-bill, mollymawks, and sooty albatrosses and the photos of the nesting burrows of the whale-birds, Cape hen, Cape pigeon, South Georgian diving petrel, and the tiny Wilson's storm petrel form a collection of bird pictures that positively delights any keen ornithologist.

The chapters on the birds alone make the book one well worth reading, but there are in addition, chapters on the history of the island, the whaling industry, seals and ecology that make the picture of the island complete. Everyone interested in seabirds should have a copy of this book, which is a companion volume to this author's book on the land birds, "Haunts of British Divers," a poem of nature photographs.—R. V. Roberts.

Bird Recognition 2, Birds of Prey and Water-fowl, by James Fisher, with 85 illustrations by Fish-hawk and 32 maps compiled by W. B. Alexander. Penguin Books, Harmondsworth, Middlesex.

This eagerly-awaited little volume, like its predecessor, contains a mass of easily-accessible information about British birds. It is on the same lines as the first volume (reviewed in this publication) which deals with the sea birds and waders and has proved of considerable value to New Zealand bird observers as it contains many species found here. Volume two has nine species which occur or have been recorded in New Zealand, besides several others very closely related to species found here, and the information given about these birds, besides the details of recognition, habits, etc., of other species, make this book one that New Zealanders cannot afford to miss. How bird observers in this country would welcome a book on similar lines dealing with all the birds found here. Some day, perhaps, the publishers of this series may consider the production of such a book. At its modest price (3s. 6d. in Britain) volume two is within the reach of everyone interested in bird-life. Two further volumes are in preparation.—R.H.D.S.

Nestboxes, by Edwin Cohen and Bruce Campbell, British Trust for Ornithology, Field Guide Number Three, 1952. Price, 2s. 6d. (Address: 2 King Edward Street, Oxford, England.)

The enterprise of the British Trust for Ornithology in issuing field guides is a highly commendable one and this booklet, the third of the series, aims to describe the best and simplest form of nestboxes for attracting hole or ledge nesting birds. In New Zealand, the only widely distributed, common birds likely to adopt nestboxes are the introduced house sparrow and starling and it must be admitted that little attempt has been made in this country to invite birds to occupy these artificial sites for nests. For those wishing to conduct bird-watching of certain species in the garden or elsewhere on a scientific basis, the utilisation of nestboxes has manifest advantages. There are few native birds that could be attracted to these boxes, though in some of the more favoured localities it should be possible to cater for the needs of the rifleman (in Dunedin suburbs and Taranaki, for instance), the tomtit, morepork, kingfisher and possibly ducks. It seems that something could be done in New Zealand on these lines and if it is possible to provide breeding facilities for the species mentioned it would be worth while, though precautions against predators would be necessary and against house sparrows and starlings usurping the nest-boxes. Those who may contemplate activities of this kind will find this booklet, which is well illustrated with diagrams, invaluable for the purpose in view. —R.H.D.S.

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