A POPULATION STUDY OF THE WRY-BILLED PLOVER (Anarhynchus frontalis)

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INTRODUCTION

Ever since the French naturalists Quoy and Gaimard, during the voyage of the corvette *Astrolabe*, 1827-1829, discovered the Wry-billed Plover "in small flocks on mud-flats in the saltwater estuaries which surround the Hauraki Gulf ('Baie Chouraki')" this small plover has rightly been considered a rare bird, although it has sometimes been reported as locally plentiful. Now in the middle of the twentieth century when there is widespread and growing interest in the rare animals of the world, it seems fitting to try to assess the numbers of Wrybills — for this is one of the truly unique bird-species of New Zealand — and to see how they have stood up to the impact of pakeha civilisation.

The Wrybill has a very restricted breeding range in the South Island, where it is known as a nesting-bird from only some half-dozen of the larger rivers of Canterbury. There are, indeed, very large portions of the South Island where the Wrybill is quite unknown. I have not been able to find any evidence of wintering in the South Island; and it may be safely assumed that when the breeding season is over, virtually the whole population moves northwards* In the New Year Wrybills return with almost predictable regularity to certain favoured localities in the province of Auckland, where it appears that rather more than 95% of the total population spend the winter. This estimate of the Wrybill population is based on counts made over twenty years in the main winter-quarters which are, in order of importance, in the Firth of Thames, Manukau Harbour and Kaipara Harbour.

EVIDENCE FOR NINETEENTH CENTURY

Buller's great volumes provide the only substantial evidence for the status of the Wrybill in the latter part of the nineteenth century. When the first edition of his History of the Birds of N.Z. was published in 1872, little was known of the migrations of the Wrybill to the northern coast of the country; but when the second edition came out in 1888, he was able to write:— "In the North Island the Wrybilled Plover is particularly plentiful during the spring and winter months on the extensive sandbanks at the mouth of the Kaipara, on the mud-flats of the Manukau basin, in the Bay of Plenty and on the ocean beach between Waikanae and Wanganui." Then in a footnote, a quotation from a letter which Cheeseman wrote to Buller, gives the first hint of actual numbers of Wrybills visiting the tidal flats near Puketutu Island in Manukau about 1880. "I have on some occasions seen as many as 200 or 300 together; but this is quite unusual, the flocks in that locality generally numbering from 10 to 20 birds." Cheeseman's botanical excursions probably took him quite frequently into that corner of Manukau and his use of the word 'unusual' implies

* Seven were found on Farewell Spit during May, 1962, by the members of a Field Study Course (Notornis X, 58).

that he knew it well, though it must have been much less accessible and 'workable' than it is to-day.

When Buller published his supplement in 1905, more information had come to hand. By 1895 Captain Mair had located Wrybills at the mouth of the Piako River along the southern shore of the Firth of Thames. "Here they are to be seen in thousands, and are so tame that you may knock them over with a stick." In those days, as now, the Firth of Thames was evidently the main wintering round. About the same time Mr. A. T. Pycroft was able to report that he had found Wrybills 'plentiful' on the Kaipara mudflats. To sum up, by the end of the nineteenth century Wrybills had been discovered in considerable numbers in three localities where their biggest winter concentrations are known to occur to-day.

THE QUEST SINCE 1940

During the next forty years little was added to our knowledge of the migrations of the Wrybill, though valuable studies on its breeding in Canterbury were made by Stead (8) and Guthrie-Smith (9). North of Auckland, Wrybills were occasionally reported from the long oceanic beach of Muriwai; and in 1936 Dr. C. A. Fleming noted small flocks at Cheeseman's old locality in Manukau. More intensive study of this area began in 1940, since when few months have elapsed without visits from one local ornithologist or another, with whom the checking of the Wrybill flock has been one of their first duties. In 1941, Mr. H. R. McKenzie joined me in an attempt to visit the Miranda coast of the Firth of Thames at least once a month and the results have been richly rewarding. In 1946 Mr. D. A. Urquhart discovered a second wintering ground of Wrybills in Manukau, namely the south shore at Karaka, where the extensive sand-cum-mud flats and the muddy estuaries of several creeks provide an eminently suitable feeding ground, with shelter, if necessary, from the south and a choice of high-tide roosts. Kaipara is still far from satisfactorily known. The central area of this huge harbour beyond Okahukura and Tapora is now much more accessible by road and is being more frequently visited by ornithologists, who seldom come away without having something worthwhile to report.

METHOD

This study of the present Wrybill population is based on counts made preferably between April and July when the numbers resorting to roosts are fairly stable. These roosts are shellbanks and bare patches of mud or sand among saltings which are above the level of the normal full tide. A harbour which has no full-tide roosts, however rich the feeding grounds which are exposed by the falling tide, will not attract many Wrybills as a permanent winter habitat. Though Wrybills prefer to roost close to the lapping water, they now readily fly over the sea-wall at Karaka into reclaimed marshland where the vegetation is still thin; and near Waitakaruru in the Firth of Thames they have often been found in ploughed paddocks; but not more than a few hundred yards from the tideline.

Because resting Wrybills are tame and easily approached, counting is seldom difficult. With patience, flocks containing some hundreds of birds can be counted exactly and flocks of up to a thousand birds can be checked, so that the percentage of error is very small. When

a large flock, estimated finally to contain 2600 birds, was examined independently by several experienced counters, their tallies were all remarkably close to the same figure. If a hasty estimate is made of a flock at a distance just in case it suddenly flies right away — which it seldom does — and the number can later be checked, experience shows that a first, rough, hasty assessment is usually well below the true figure.

As a result of the quest for the Wrybill in these three vital localities, the following figures have been obtained.

TABLE 1

WINTER COUNTS OF WRYBILLS

	Manukau				Firth of Thames	Kaipara (a) Muriwai (b) Tapora
	Puketutu		Karaka			
1940	16	(18)	?		?	(a) 82 on 9 June
1941	33	(36)	?		c. 1000	(a) 213 on 27 April
1942	60	(62)	?		1000+	?
1943	63	(64)	?		x 100	?
1944	72	(77)	?		x 100	?
1945	92	(94)	?		1500+	?
1946	136	(142)	67		c. 1500	?
1947	c. 160	(192)	59		x 100	?
1948	c. 210		73		2000+	(a) 33 on 18 July (b) 28 on 23 Aug.
1949	c. 225		65		1800+	(b) 45 on 20 May
1950	c. 240	(283)	c. 190	(205+)	900+	?
1951	346		250	(320)	1430+	?
1952	c. 405		279		1400+	?
1953	450+		c. 330	(339)	c. 1150	?
1954	600+	(800)	440+		2400+	?
1955	c. 660	(672)	c. 720		c. 2500	(b) c. 30 on 3 Sept.
1956	500+		850+	(1500)	c. 2600	?
1957	c. 700		800+	(1200)	2350+	?
1958	c. 530		650+	(1100)	2500+ (?3000)	?
1959	c. 650	(700)	1050+		2500+	(b) c. 220 on 3 May
1960	500+		950+		2500+	(b) 215+ on 1 May

NOTE.—Under Manukau, figures in brackets give a maximum count, which may represent either a short-lived peak, or perhaps for Karaka a temporary merging or partial merging of the two main Manukau flocks.

With the Kaipara figures, dates are added because of their significance. Thus 30 Wrybills in early September would be only the remnant of a much bigger wintering flock, most of which had already left for the South Island.

The locality where it has been possible to study the wintering flock of Wrybills most closely year by year is the expanse of tidal flats which lie between Mangere, Ihumatao and Puketutu Island in Manukau.* One of the most interesting and perhaps puzzling aspects of

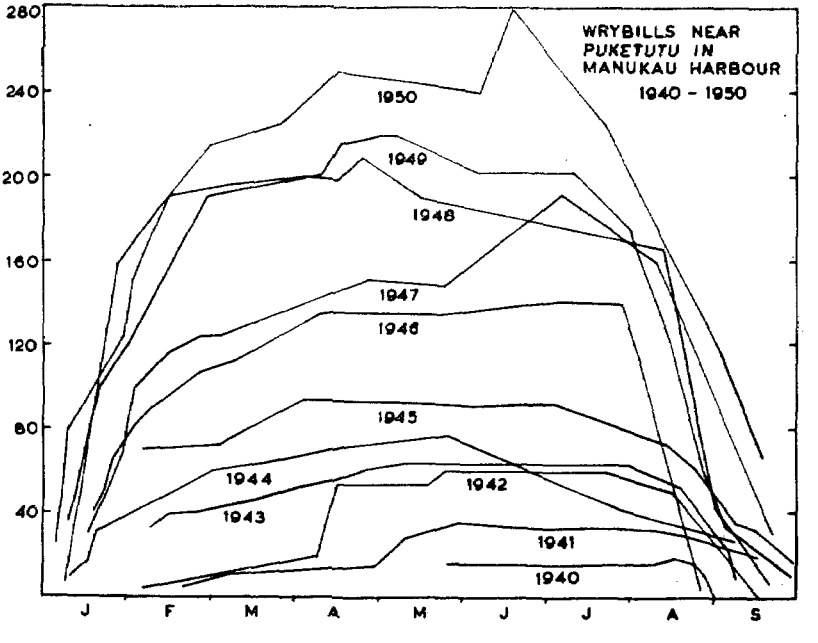
* Now submerged beneath the oxidation ponds of the A.M.D.B.

this study has been the remarkable increase in the number of wintering Wrybills between 1940 when regular observations began (11-12) and 1954 when the size of the wintering flock tended to level out and become stabilised at about 600 birds.

Various suggestions have been put forward to account for this spectacular increase, which is confirmed by figures from Karaka and perhaps also from the Firth of Thames. The first suggestion is that the Wrybill population by 1940 had sunk very low and that since then conditions have become much more favourable, so that the figures represent the natural annual increase of an essentially virile species which had been through a lean period of decline. Possible reasons for such a decline were the growth of alien weeds and the spread of introduced predators, such as stoats and Australian Magpies, on the Canterbury riverbeds where the Wrybills breed, and the indiscriminate shooting of shorebirds.

It has also been suggested that the total Wrybill population had not actually declined, but that up to 1940 the tidal flats around Puketutu were popular with shooters whose continual harassing of the godwits when they were in good condition and in their greatest numbers locally, coincided with the return of the Wrybills from the South Island, and drove them to remoter haunts where they were less likely to be disturbed by urbanised 'sportsmen.' If this is so, the figures therefore simply indicate that the Wrybills were returning to a favoured area from which they had been driven before the shooting of shorebirds was prohibited by law. In short the protection of the Bar-tailed Godwit directly benefited the Wrybill.

A third suggestion is that conditions in Manukau have become



more favourable for the wintering of Wrybills and that the increase here implies a draw-off from some other wintering-place or places. In the large shallow harbours of the north, tidal currents and gales are continually building, reshaping and re-siting sandbanks and shellbanks. Possible high-tide roosts appear and disappear. Some, for instance, are left high and dry and become choked with weeds. In 1940 and for some years afterwards there were near Puketutu three clean shellbanks which only the highest tides covered, and the Wrybills were rarely forced to leave this corner of Manukau to seek a roosting-place elsewhere. It is likely also that Manukau is a much richer feeding ground than it was before a great city was established around its upper shores. Much is heard about the 'pollution' of Manukau from sewage and the waste of meat-works and tanneries. But judged by the tens of thousands of birds of several species which feed and forage on the mudflats of upper Manukau (14, especially Annual Locality Reports), this waste has richly fertilised the mud-flats and stimulated the organic life of the shallow waters. Although there has been no direct pollution of the Puketutu mudflats, it may be significant that sandbanks in mid-harbour which once appeared bare at low tide, are now seen to be vividly green with plant life (algae sp.) when exposed. If plants some miles downstream from the source of pollution have been thus stimulated, it is reasonable to suppose that the small animals of the mudflats upon which the Wrybills feed have also increased and multiplied. It remains to be seen how the local flock of wintering Wrybills responds to the radical changes which are being brought about as the Manukau Sewage Scheme nears completion. It is understood that some two square miles, over which the Wrybills have been accustomed to disperse for feeding, will soon be submerged under four feet of water.*

At Karaka, on the southern shore of Manukau, there has been an even more spectacular increase in the numbers of Wrybills counted, since Mr. D. A. Urquhart first found a few at the muddy estuary of the Whangamaire Creek in 1946 (12). During four successive winters the numbers were fairly stable at about 60-70; then in 1950 they suddenly leapt up to about 200; and now in 1960 about a thousand may be expected. On 8/7/56 when a winter census of shorebirds in Manukau was taken by Auckland bird-watchers, a flock of at least 1500 Wrybills, which was counted here, probably included the flock from Puketutu, where none could be found. Flocks of a thousand or more Wrybills at Karaka are not now regarded with surprise.

Since 1955 the number of Wrybills wintering annually in Manukau in the two known flocks, which usually keep separate, has been not less than 1350 and may have reached 1700. On the other side of the narrow Auckland isthmus small flocks of Wrybills are sometimes reported from the estuaries of the Tamaki, Turanga (Whitford) and Wairoa (Clevedon); but, because of a lack of clean banks suitable as permanent high-tide roosts, these Wrybills appear to be only passing migrants or temporary visitors from Manukau.

After nearly half a century of ornithological neglect it was Buller's mention of "thousands" which led the search for the Wrybill to the southern shore of the Firth of Thames. Since the visit of Captain Mair, great changes have taken place. Saltmarshes have been

* This has now happened. The Wrybills have moved elsewhere.

reclaimed, sea-walls have been pushed out, and the water-level of the Hauraki Plains has been controlled by a network of embankments and wide drains. Fortunately the falling tide still exposes many square miles of rich ooze between Kaiaua on the west and Thames on the east. These tidal flats without a doubt are the main winter-quarters of the Wrybill. In my second exploratory trip to the Firth of Thames coast near Miranda, I was joined on 3/8/41 by Mr. H. R. McKenzie, without whose assistance over the years this study would have lacked many important details. In view of the supposed rarity of the Wrybill at that time, we were astonished to locate a flock of about a thousand birds, although we did not know the likeliest places where to look and by that date some Wrybills should have left for their breeding grounds. Experience has shown that during average tides Wrybills gather at several roosts in the Firth of Thames, near creek-mouths at Parawai, Piako, Waitakaruru, Kairito, and Miranda; and only at the biggest tides do the various flocks unite. During some censuses watchers have been posted at all these gathering places. Even so small groups of Wrybills can easily escape notice, so that the figures given are, if anything, conservative. Only once in the 1940's, namely in 1948, was a flock of more than 2000 Wrybills encountered;but since 1954 the average winter count has been about 2500. In the Firth of Thames as in Manukau there appears to have been an increase since 1940; possibly as much as a doubling of the number of Wrybills wintering. It is satisfactory to know that Captain Mair's 'thousands' was not an exaggeration; and that sixty-five years later the painstaking ornithologist has a fair chance of seeing together along the same shore more than 2000 of what must be considered one of the world's rarer waders.

So vast is Kaipara Harbour and so extensive its sands that the Wrybills which winter there are never faced with the problem of where to go at the big spring tides and it is doubtful if they ever form a single flock as they sometimes appear to do elsewhere. In recent years, though ornithologists have been visiting Kaipara more often at critical seasons, the largest flock of Wrybills so far found there contained about 220 birds. This was near Tapora in mid-Kaipara, which appears to be a regular winter haunt (13). Wrybills are also known from the long west coast beaches to the south and north of Kaipara Heads, whence a flock of more than 200 has once been reported (11). Mr. A. T. Pycroft has recently informed me that the locality where he found the Wrybills which he reported to Buller sixty years ago, was Shelly Beach. Godwits from this area are sometimes forced by big tides to roost near Wainui Inlet on the sands below South Kaipara Heads where Muriwai Beach swings eastward in a great curve; and Wrybills from the southern (Helensville) arm of Kaipara are likely to follow the same route. In the light of present knowledge therefore, the winter population of Wrybills for Kaipara cannot be assessed at more than 500. It might be expected that the numbers would be comparable with those of the First of Thames and Manukau. However, I am inclined to think that there are two main groups of rather more than 200 birds each, based somewhat loosely on Tapora in mid-Kaipara and on South Kaipara Heads.

North of Kaipara Harbour small numbers of Wrybills have been recorded from several estuaries and harbours, such as Ruakaka, Whangarei (up to 12), Doubtless Bay, Rangaunu Bay (c. 70 on

22/8/53), Houhora (8 on 3/2/55), and it appears that some regularly travel as far north as Parengarenga to pass the winter. Here on 5/4/53 a group of Auckland naturalists discovered about 80. It seems not unreasonable therefore to assume that the winter population of the far north beyond Kaipara may be about 100.

To the south of the main area, it is doubtful if the number of wintering Wrybills exceeds 100; and they may well be fewer than 50. Though Buller (5) mentions the Bay of Plenty in an early list of northern localities where Wrybills were 'tolerably common,' observers in the last two decades have been able to report only stragglers or very small flocks from the many estuaries and beaches which they have visited. As it is, the biggest flock for the Bay of Plenty, containing a mere eight birds, was found on 30/3/58 by H. R. McKenzie at Tairua, on the east coast of the Coromandel Peninsula. It is perhaps surprising that neither Ohiwa nor Tauranga, which are frequented by big flocks of other waders, has yet disclosed Wrybills in quantity. However, since Tauranga Harbour is large and some parts are still rather inaccessible, a hightide roost on Matakana Island could easily escape notice.

On the south-west coast of the Auckland province the harbours of Raglan, Kawhia and Aotea appear to be only casual halting-places, unsuitable for permanent wintering. In the Wellington province Wrybills regularly appear on passage in spring and autumn, but only in small numbers. A few could pass the winter at such estuaries as those of the Manawatu and Rangitikei.

From this study of the Wrybill in the North Island in winter, it is now possible to make the following assessment of the population between 1956 and 1960 when counts in the main areas seem to show that the population has been fairly stable.

North of Kaipara (Whangarei-Parengarenga)	100 - 100
Kaipara Harbour	400 - 500
Manukau Harbour	1500 - 1700
Firth of Thames	2500 - 2600
Bay of Plenty, Raglan, Wellington Coast, Hawke's Bay, etc.	50 - 100
	4550 - 5000*

If this estimate is incorrect, the most likely upset would come from the discovery of a sizable wintering flock in Tauranga Harbour.

This study, therefore, shows that the population of this unique New Zealand bird is rather more than 4000 and may indeed be about 5000. I am inclined to believe that the figures for Manukau reflect a steady increase in the population after a serious decline; although, even when the numbers were at their lowest, the Wrybill was much more numerous than was suspected, because the Firth of Thames was not known. One important fact of which we can be certain is that over the last twenty years breeding conditions on the Canterbury riverbeds must have been favourable. Losses in winter-quarters, too, have been small. Very few obviously sick or ailing birds have been seen; and of the few that have been found dead, the majority have died prematurely by striking telephone wires or electric power cables.

* Further counts made in 1961 and 1962 indicate that the figure of 5000 is the more accurate.

ACKNOWLEDGEMENTS

The counting of Wrybills over twenty years has been possible only through the co-operation of many willing helpers, who have provided transport or braved the wintry mud to reach keypoints at a significant season. More than one census has been taken on a mid-winter's day. I am especially grateful to Messrs. H. R. McKenzie, D. A. Urquhart, P. C. Bull, J. C. Davenport, B. D. Heather, F. M. Brookfield; Miss N. Macdonald; Mr. and Mrs. J. Prickett.

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BIRDS OF THE MERCURY ISLANDS GROUP

By P. D. G. SKEGG

The Mercury and Ohena Islands were visited from 27th August until 7th September, 1962. The intention was to study some of the islands not visited by a similar expedition twelve months earlier, and to spend a night on others previously visited only by day. The party was once again led by B. D. Bell (Senior Field Officer, Department of Internal Affairs), and included A. Blackburn, R. B. Sibson, I. A. E. Atkinson (Botanist, D.S.I.R.), J. L. Kendrick, J. F. O'Brien (Wildlife Branch), Miss Lois J. Bishop, Miss Joan Robb (Zoologist, University of Auckland), and C. G. Cathie, M. J. Hogg, N. J. Ledgard, R. H. Sibson, P. D. G. Skegg of the King's College Bird Club. Eleven of the party were members of the O.S.N.Z.

In late November, 1962, C. A. Dickie and P.D.G.S. spent four days at the islands.

Strictly speaking, all the islands listed below comprise the one group, but for the sake of convenience they have here been divided into two sub-groups. The Mercury sub-group is taken to comprise Great Mercury (Ahuahu), Red Mercury (Whakahau), Kawhitihu (Atiu I., Stanley I.), Double Island (Ngaumangamanga, Fisherman's I.), Korapuki (Rabbit I.), Middle Island (Flax I.), and Green Island. The Ohena sub-group, to the south, includes the islands of Ohena (Ohinau), Little Ohena, and Koruenga (The Maori Woman) and the rocks or stacks of Black Rocks, Flat Island, Old Man Rock, and Needle Island (The Hole in the Wall).

On 27/8/62 we left Hobson Wharf, Auckland, in R.N.Z.A.F. "Arataki" and proceeded direct to Great Mercury. We arrived at our