

BIRDS OF THE WHATAROA MOUNTAIN VALLEY.

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Summary.—During five days at Easter, April, 1954, and six days in May, 1954, 700 birds were counted while covering 60 map miles over the 150 square miles of the Whataroa watershed. To obtain absolute numbers from the relative figures, sheep were counted and their total afterwards ascertained. On this basis, approximate bird populations can be calculated. The validity of the method can be assessed by examining the premises and by alternative methods of estimation which are suggested.

Habitat.—The Whataroa Valley of South Westland has a watershed among mountains up to 10,000ft. at Mt. Elie du Beaumont, and for purposes of this estimation covers an area of 150 square miles, roughly rectangular in shape with vertices Mt. Adams, 7,000ft.; Mt. Tyndall, 8,000ft.; Mt. Elie du Beaumont, and Mt. McFettrick, 7,000ft. The north-western side is along the Alpine Fault, and across the road bridge, 300ft. Geologically, the rock on the west is schist which gradually changes so that eight miles to the east in the Buller tributary it is greywacke. Schist soils are renowned for their high fertility and, indeed, the Whataroa Valley seemed an exceptionally fertile alpine valley. This may well be because of the flat floor of the glacial U-shape in the upper valley and the planar character of the lower valley formed from a fiord filled with eroded schist.

The hillside subjectively did not appear steep, though comparison of mean gradients with other neighbouring valleys shows no significant difference. The impression is confirmed by the fact that the Whataroa River has eroded down its bed as quickly as the land east of the Alpine Fault rose, so no sharp breaks in gradient occur, such as the frequent deep gorge just east of the Fault. The rivers run in vertical walled trenches between wide terraces, so the valley contains much flat and comparatively gentle sloping mountainside. This condition is conducive to fertility and a high animal population.

The vegetation on the river flats is rimu forest, or where cleared, exotic grasses, on the hillsides to 2,500ft. rimu forest, to 3,000ft. rata forest, to 4,000ft. on western faces nei nei (*Dracophyllum traversii*), and above alpine scrubs of nei nei (*D. longifolium*), five-finger, olearia, flax and tussock to 5,000ft, while beyond grasses and herbs to 7,000ft or more. The lowest snow in April was at 5,500ft., permanent ice in gullies at 6,500ft., and above 6,000ft. on southerly and easterly faces or 7,000ft. on northerly and westerly faces large neve regions. In May, during our expedition, snow settled to 3,000ft.

Accuracy.—To be counted a bird had to be seen and positively identified so perhaps as many birds were seen and not identified because of distance, light, a fleeting glimpse or lack of familiarity with the flight of each species. Later, fantails could be recognised by their flight, but all other birds were recognised by their colouring, usually on still specimens. All species were treated equally in the calculations but this introduces a bias as (1) birds and chamois of the tussock are more easily seen and identified at a distance so their numbers are inflated, possibly by two or three times; (2) in bad weather, especially above the bush, some species hide, though when passed near they could be heard. The pipit braved the weather while the rock wren hid almost at the disappearance of the sun; (3) some birds, especially the bell bird, had to be allowed to approach. On the second trip bellbird numbers are down, as in the bleak weather we had neither the time nor inclination to wait; (4) more generally the habits of birds differ: so to take extreme cases, the nocturnal animals, more-pork and opossum are ridiculously low.

Method of Calculation.—The relative density method was used, and as Mr. Nolan kindly gave the number of sheep, "210 breeding ewes," the efficiency 20% of the sweep was found. The total population could now be calculated if it be assumed (1) that a fair sample of the area had been traversed; and (2) that a two-chain wide path was swept and the distance traversed twice the map miles.

The premises of the method are open to criticism, namely: (1) That relative frequency of sights is proportional to relative population (see above, differing habits). (2) That different species are equally easily identified. In the calculation it has been assumed that sheep and bush wren are equally easily identified. This method would establish suburban bird populations by including humans in the count. (3) The method can be tested by calculating the acre per chamois, namely, five. Perhaps ten might be reasonable, comparing it with Canterbury high country stock-carrying capacity (see above, animals of the tussock).

Two other independent methods are possible and worthy of using to check the method: (a) By ringing and finding the density of ringed animals. Perhaps the kea would be a convenient species to ring; (b) by nest counts.

Notable Absentees.—

Weka.—A set of arrow-head footprints were found near the Gunn confluence and possibly a weka call heard at the Butler confluence.

Gull.—No gulls were seen, perhaps because little time was spent on snowfields.

Blackbird.—Common in other alpine valleys here; no sign seen.

Results:—

Species.	No. seen.	1st Trip.	2nd Trip	%	Population
Silvereye	202	109	93	27	50,000
Grey Warbler	100	47	53	13	25,000
Fantail	105	48	55	14	26,000
Bilack Fantail	11	2	9	1	3,000
Tom-tit	81	30	51	11	20,000
Bellbird	71	46	25	9	18,000
Kea	63	16	47	8	16,000
Pigeon	34	12	22	4	8,000
Pipit	23	9	14	3	6,000
Bush Wren	20	9	11	3	5,000
Rock Wren	16	13	3	2	4,000
Blue Duck	8	4	4	1	2,000
Tui	6	1	5	1	2,000
Owl	1	—	1	—	250
Chaffinch	1	1	—	—	250
TOTAL	742	347	395	97	
Chamois	86	32	54		20,000
Opossum	3	3	—	—	1,000
Sheep	43	43	—	—	210

Rank correlation of relative numbers $S=0.88$ plus/minus 0.04.

Comment.—

Silvereye.—Occurring in flocks as did the warbler at this season. The decrease on the second trip would be accounted for by movement to the coastal plain. Common in riverbeds and about the bushline.

Bellbird and Tui.—Often in pairs; sought to repel the intrusion on their territory.

Kea.—Few seen when moving, but one day when confined under rock we were visited by twenty-two. They had had time to find us and come from afar.

Pipit.—Seen on the river flats and on the tussock. It braved the most bleak weather.

Rock Wren.—Common among the alpine shrub and tussock above 4000ft. Among this scrub were many glacial erratics under which the birds shelter in bad weather.

Chaffinch.—The only introduced bird; seen by Barrowmans Hut at the Perth confluence.

Chamois.—Doubtlessly too high. See text.

Opossum.—As it is a nocturnal animal this figure indicates the high infestation.