

AGE GROUPS AND SEX RATIO OF THE CALIFORNIAN QUAIL IN CENTRAL OTAGO IN THE 1948-49-50 SHOOTING SEASONS.

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The Californian quail (*Lophortyx californicus*) was first introduced into Otago in 1868 when the Otago Acclimatisation Society liberated 18 birds at Inch Clutha, Thomson (1922). They increased rapidly and spread throughout the province, reaching their greatest numbers in the late '80's of last century. Due to a combination of ecological factors they received a severe check in the early '90's, disappearing altogether from some localities, especially on the coast. They managed to survive, however, in Central Otago, where their numbers have remained fairly static to the present day except for season to season fluctuations. It was in an endeavour to measure the extent of these seasonal fluctuations that this work was undertaken.

Sumner (1935) conducted a life history study of the Californian quail in its native habitat in the Santa Cruz Mountains, California, and was able to work out a life equation for the quail in that area. He also indicated a simple method of distinguishing young of the year from fully adult birds. He states, "The innermost six primary coverts of the juvenile plumage are 'clay colour' barred and striped with buffy white, in which respect they differ from the fully adult plumage." (See Fig.) A cyclostyled questionnaire with a drawing of a wing of an adult and a juvenile bird illustrating the diagnostic features of the age groups was distributed to local shooters asking for the number of each sex and age group in their daily bag.

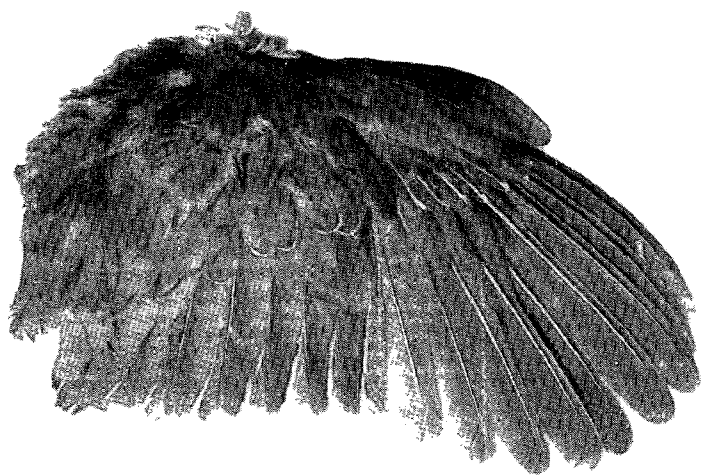
The number of questionnaires returned was disappointing—only three were returned in 1948, five in 1949 and one in 1950. In addition to these, questionnaires were supplied to the Internal Affairs Department, Wildlife Branch, at Queenstown, for distribution and they kindly supplied me with the results of several returned in 1949. In all, 896 birds were reported on, and all of these were taken in the shooting season (May, June, July of each year) in Central Otago.

TABLE I.—AGE GROUPS.

Shooting Season.	No. in Sample.	% of Totals.	
		Juveniles.	Adults.
1948	379	63	37
1949	310	54	46
1950	62	34	66

Table I. shows the percentage of the bags that were juveniles and comparison of the 1948 and 1949 shooting season indicate that a greater number of young birds were raised in the 1947-48 breeding season than in the 1948-49 season. The number in the 1950 shooting season sample is too small to be of any value in comparison with the previous seasons. It is, however, of interest as a special case. It consists of the bags from two adjacent coveys only. The first covey had been shot over regularly from season to season and yielded a bag of 27 birds, 52% juveniles to 48% adults, whilst the second covey had not been shot over in recent years and yielded a bag of 35 birds, 20% juveniles and 80% adults. Sumner (1935) in discussing permanency of covey states: "Although certain individuals of a given covey may fail to return in the following autumn the covey usually receives a sufficient number of new birds, most of which are young of the year, that its size remains fairly constant. In reality the numbers of a covey and its location are governed largely by the available food and shelter. . . ."

It would appear then that annual shooting had reduced the number in the first covey below the carrying capacity of that covey's range and thus room was made for young of the year to join in the following autumn. In the case of the unshot covey, natural mortality had made room for only a few birds of the year to join it in the autumn and the surplus young of the year were crowded out and had to join or form



Wing of Adult Quail (above) and of Immature Quail, less than one year old (below). Note the buffy white tips and barring of the primary wing coverts of the immature and the complete absence of this colouring on the primary wing coverts of the adult.

other coveys; hence the high percentage of adults in the unshot covey. This then indicates that shooting exerts a pressure on the numbers of quail in Central Otago. Sumner (1935) has shown from population fluctuations during one year among quail residing in a 60-acre territory that juveniles constituted approximately 70% of the population throughout the year. From this he concludes, "... it can be seen that if the percentage of young birds taken is consistently less than about 71% of the total bag, it is an indication that the breeding season was not successful." In several individual coveys reported on, more than 70% were juveniles, but the overall percentage in both 1948 and 1949 fell short of this. (See Table I.) Until more is known of local conditions and replacement rates of quail in Central Otago it cannot be said that overshooting is taking place, but when the percentage of juveniles is in the low 50's caution is indicated.

TABLE II.

	Percentage of Totals.		No. Birds in Sample.
	Males.	Females.	
1948	55	45	331
1949	58	42	503
1950	53	47	62

The sex ratios for the three years (see Table II.) were consistently in favour of the males, and for the three seasons combined, 896 birds, the ratio was 57% males to 43% females. Sumner (1935) obtained a ratio of 53.2% males to 46.8% females.

I wish to acknowledge my indebtedness to the Otago Acclimatisation Society for printing and distributing the questionnaires and especially to Mr. L. Miller and Mr. W. N. Manson, the secretary and ranger respectively, for their ready assistance throughout. To the shooters who returned completed questionnaires, to Mr. E. S. Gourlay, who obtained the quail wings for me, and to Mr. R. Blick, who photographed them, I am grateful.

REFERENCES.

- Sumner, Jr., E. Lowell (1935)—A Life History Study of the California Quail, with Recommendations for Conservation and Management. California Fish and Game, vol. 21, Nos. 3 and 4, pp. 168-256 and 277-342.
- Thomson, G. M. (1922).—The Naturalisation of Animals and Plants in New Zealand. Cambridge, 1922.

FEEDING OF SILVER-EYE CHICKS.—When young silver-eyes were under observation the parent bird always brought three insects and fed one to each of the three chicks. Thus they all received an equal share every time the parent bird returned to the nest with food.—Noelle Macdonald, Howick.

FLIPPER PATTERN OF LITTLE BLUE PENGUIN IN COOK STRAIT.—According to reference works, the flipper of the little blue penguin is banded behind with one row of white feathers. This character appears in photographs taken of little blue penguins on Otago Peninsula, on the Five Islands, New South Wales, and in Western Australia. In Cook Strait it is usual for adult blue penguins to have anterior as well as posterior bands of white feathers on the flippers. The anterior band often becomes more extensive on the carpal flexure. Of 15 adult penguins collected as derelicts at Oharui Bay and Lyall Bay, Wellington, between 1946 and 1950, two only had a single band of white feathers on the posterior edge of the flippers. The culmens of single banded birds averaged 38mm. length, of double banded birds 36mm. length. Wing lengths of both varieties averaged 65mm. As regards juvenile birds, which are cast ashore in great numbers following the summer solstice, these have no anterior band to the flippers. Future work may serve to show whether the characters described have any taxonomic significance.—H. L. Secker, Wellington.