abrasion of tail-feathers: it must have spent its growing-up period on fairly soft ground. It was just a little younger than the Muriwai bird. This makes the task of reconciling its dates with those of known colonies still more difficult.

On October 7th a third item was added to the series. Mr. F. C. Kinsky was passing to the east of D'Urville Island in Cook Strait when he saw a mixed flock of birds working over a shoal of fish. Of 98 Gannets counted, at least 30 showed plumage phases which were different from the adult. A few of these were still very close to the speckled appearance seen at the age of six months.

Was the 1959-60 season such a late one that some gannet chicks failed to attempt the Tasman crossing, or is it possible that some of the southern Gannets do not go to Australia at all?

[Mr. P. A. S. Stein, whose address is 9 Cameron Street, Auckland, W.1, would be grateful if any winter sightings of Gannets in brown juvenile plumage, especially in the south, or the finding of such birds ashore, could be reported to him promptly.—Ed.]

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OBSERVATIONS ON ROCKWRENS NEAR THE HOMER TUNNEL

By M. F. SOPER

In November, 1960, I photographed Rockwrens at Homer Tunnel. In all, six pairs of birds were located and three nests. The habitat was scree, rockfalls, snowgrass, and low scrub. Of the nests, one was in a man-made rock wall in a general habitat of snow tussock and boulders; one was in an extensive bouldery rockfall virtually free of scrub; and one at the foot of a rock and scree slope over-grown with low dense scrub, the nest being situated under a big scrub-surrounded boulder. The remaining three pairs of birds were found respectively in a big rockfall; in a scrub-covered scree slope; and in an area of rock, veronica scrub, and snow tussock near an isolated patch of bush.

All six pairs of birds showed a marked difference in plumage. One, the presumed male, had a bright green back — more olive on the forehead; a pronounced creamy-white eyestripe above the eye, which, when viewed from the front projected outwards like eyebrows and ended in a little tuft; lower eyelid pale buff bordered below by a thin black line; a rich yellow patch on the flanks; the alula black and forming a most attractive dividing line between the yellow flank and the green back; the under-surface buffy; the legs flesh-coloured. All markings were neat, distinct, and clear-cut. (v. Plate XXXIV).

The female was generally an olive brown, "greenish"-brown above; eyestripe fawn; lower eyelid pale buff with the dark line below present but not noticeable; alula dark brown; flanks yellow; under-surface buffy-white a lighter patch on the secondary wing feathers forming a distinct V pattern when the wings were closed and the bird viewed from above. This pattern was not noticed in the male in the field though it can be seen in the photographs as a dark brownish patch. In general the colour areas merged into one another with none of the

clean-cut lines of the male. They also had that rather scruffy nest-worn look that one comes to recognise (v. Plates XXXIII and XXXV).

Only one nest was followed to any extent, a total of sixteen hours being spent at it over three days (November 19, 20 and 28). When first found the chicks were naked except for a few tufts of dark down. It was impossible to see into the nest properly without wrecking it, but there appeared to be two chicks only. (The other nest which could be reached also appeared to have only two chicks.)

The nest was built into a cavity between the rocks and was a substantial igloo-shaped structure comprising a long woven entrance-tunnel of snow tussock leading to a bulbous nest cavity of woven snow tussock packed with feathers. Both birds fed the young and at considerably longer intervals than I had expected. Instead of something like the 3 - 5 minute visits of Riflemen, I found half-, three-quarter, one hour visits: and once from 1 p.m. to 3.30 p.m. no visit was made for 2½ hours. Not all visits to the nest were with food. Sometimes after an absence of, say, an hour an adult would return, look into the nest, stay inside perhaps five minutes and then come out with a worn feather shaft. Food on these first few days was mostly a flat squat beetle that lives in the crevices in the rocks. These beetles were taken in whole and obviously broken up inside, as after a few minutes the bird would reappear with all the prickly bits — the legs, wing-cases, etc. No faecal sacs were brought out during these two days.

On four occasions the adults were seen to eat feathers. Also, soft downy feathers were taken into the nest about every third or fourth trip. After an interval in the nest the bird would come out with a dilapidated feather shaft. This occurred so frequently that it must be of some signficance.

On my visit of 28th November — 8 days later — the chicks were quite downy, the down being of a creamy-buff colour. Feeding was still at long intervals, never less than half-hourly. No feathers were taken in all day and no feather shafts were brought out, though the birds would still sometimes visit the nest without food and after a few minutes reappear and fly off. Food comprised green caterpillars, moths, black hard-cased shiny grubs, small grasshoppers, and insects that on my photographs look like small wetas. The faecal sacs were carried away and eaten.

All birds bobbed up and down in typical Rockwren manner. Perhaps I should add that my experience of Rockwrens is not limited to these few birds. I have known Rockwrens for many years in widely separated parts of the South Island. They also had a bowing movement — in which they would lean forward with their legs set so far back on their body that they appeared to be about to topple forward off balance — and then, after a pause, straighten up to an almost vertical position. This is more a swing of the body on the "hips"; the "bob" is an up-and-down movement with the body kept more or less at the same angle to the ground.

Average flight distance was five or six yards, though they could travel a chain without apparent difficulty. In general, as they were continually on the search for insects, they did not fly further than from one rock to the next.

DISCUSSION:

The descriptions of the typical Rockwren *(Xenicus g. gilviventris)* and the Fiordland Rockwren *(Xenicus gilviventris rineyi)* in Oliver (1955 pp. 455 - 457) do not indicate any plumage differences between the sexes though Buller remarked on it in northern specimens (pers. comm. Mr. E. G. Turbott). The very marked difference observed at Homer is therefore either a true sex difference previously unrecorded for southern birds or the result of cross-breeding between subspecies on the edge of their respective areas of distribution.

It is my opinion that all the green birds were males and all the "brown" ones females. I do not think that this can be seriously questioned. If one has six pairs of Rockwrens all showing plumage differences it is logical to assume that all the green birds are of one sex and all the brown ones of the other and, since they are passerines, that the brighter bird is the male. This accords with the nest-worn look which one learns to recognise in nesting females, particularly cavity nesters, and which the brown birds showed; and falls in line with the plumage difference found in the related Rifleman (green male; patterned female). Were this breeding on the edge of subspecific distributions one would expect at least one pair to be both green, or both brown; or "reversed," i.e. green female, brown male, which, as argued above, is illogical. Taking this argument a stage further, it is also unlikely that all the females were *gilviventris* wrens and all the males *rineyi* wrens, so the problem is to which subspecies to ascribe the Homer Rockwrens. I compared my field observations and my colour photographs with three specimens belonging to the Canterbury Museum (a Nelson female; an Arthurs Pass female; and an Arthurs Pass juvenile male). The Homer females were very similar to the Nelson female; slightly richer in colour than the Arthurs Pass female; but not as green as the Arthurs Pass juvenile male. Homer males were very much brighter and greener and more distinctly marked than any of these specimens.

I also saw the paratype of *X. rineyi* kindly lent by Dr. Falla. Homer females were decidedly browner than this. Homer males were for all practical purposes the same (I thought, if anything, slightly brighter). Along with the rineyi paratype; to quote Dr. Falla: "I am sending a fragment of what I take to be the typical green phase in a male rockwren. The difference from typical *rineyi* is admittedly rather slight but in this specimen at least the green is not quite so bright and there is a strong predominance of brown in the crown and forehead which is not at all marked in the *rineyi* wren." The Homer males were greener than this fragment and did not have the brown head. Homer males had a very definitely olive-green head shading to brownish on the forehead only.

Thus there is at Homer a population of Rockwrens the males of which look like *rineyi* while the females look like *gilviventris*. If these wrens are to be called *rineyi* then we immediately come up against behaviour difficulties. The Homer wrens freely left the scrub; bobbed; and flew as well as any *gilviventris* wren — three things Riney was insistent the Fiordland wren did not do. However, these behaviour differences could well be seasonal rather than subspecific. Bobbing, for example, appeared to me to be a display against an intruder into its territory; or possibly a displacement activity — a cross between the desire to hold its ground and a desire to fly.

On the other hand if these wrens are to be called *gilviventris,* then we weaken the status of *rineyi* because *rineyi* can no longer be separated off on the basis of the male's plumage, but only on the difference of behaviour (if valid) and/or possible green female in a true *rineyi* (there being no type specimen for a *rineyi* female as yet).

The only conclusion possible therefore in the present state of our knowledge is that the subspecific state of the Homer wrens must be left open — though with a strong bias towards their being *rineyi* wrens. Dr. Falla sums up the position in his letter to me and I am grateful for his permission to quote —

"It does seem as if the plumage characters given for *rineyi* do not hold good as a distinguishing feature unless the female of this southern form is also green. This clearly does not apply to your Homer birds but there still remains a possibility that all the specimens with the bright green males should be called *rineyi.* Haast's type of *gilviventris* was from the Canterbury mountains and the description indicates a very dull green bird, a fact supported by the plumage of specimens taken more recently there or seen about. The fragment I sent you would represent an extreme of the brightest plumage found in *gilviventris.* I should say, therefore, that your birds are Fiordland Wrens and it is likely that Riney's colony further south was in fact no different.

"I entirely agree with you that no great weight can be placed on such a doubtful behaviour character as the so-called bobbing. It must arise from some kind of tenseness even when there is no cause for agitation."

The eating of feathers by the adults was interesting, as also was the frequency with which they took soft downy feathers into the nest, reappearing a short while later with the shafts only. This was probably simply replacement of normal wear and tear, but I did wonder if the young were offered feathers as are young Grebes, because usually (as for example with Riflemen and Grey Warbler) feather replacement only occurs after rain (it had been fine at Homer for some days) and as a rule, unless the nest is very wet, the feathers are simply taken in and not exchanged for old shafts.

SUMMARY:

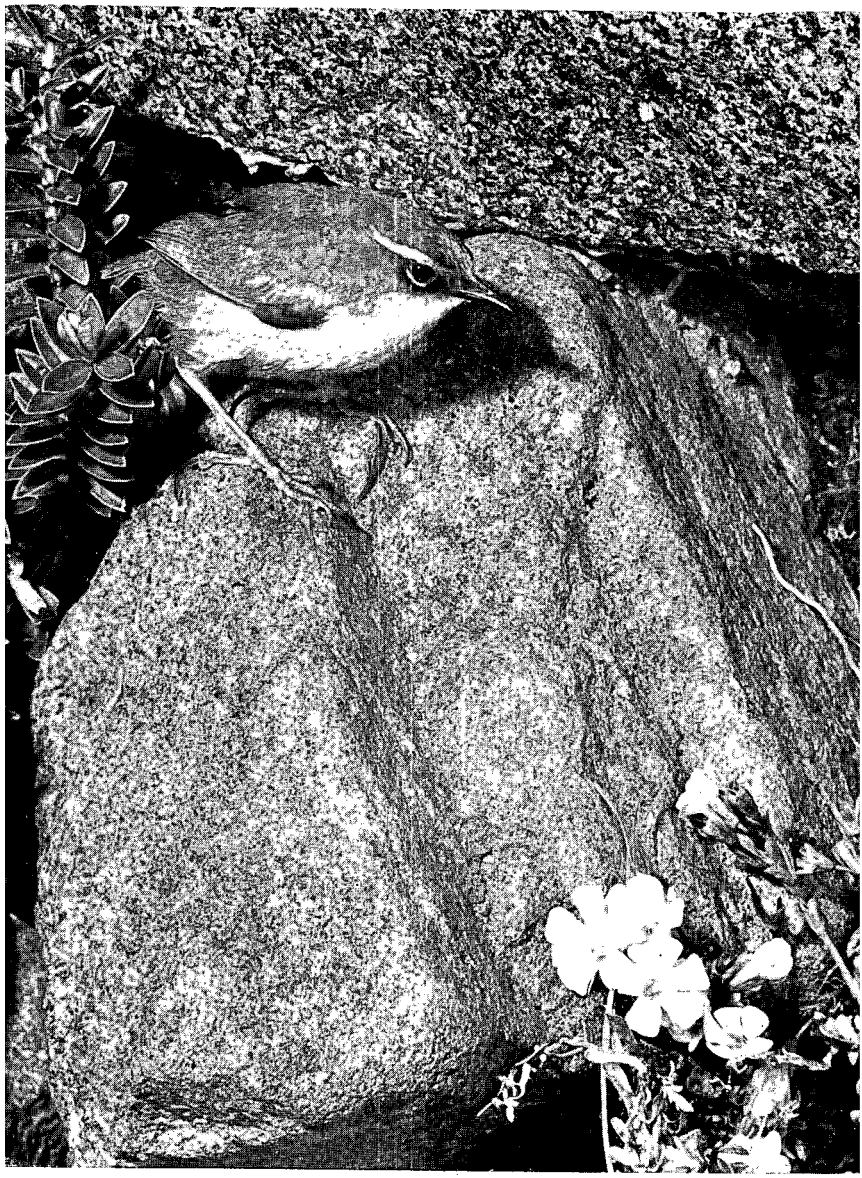
Distinct plumage differences between males and females of nesting Rockwrens is described.

A brief note is made of habitat and nesting behaviour including the fact that feathers are eaten.

I wish to thank Mr. E. G. Turbott of the Canterbury Museum and Dr. R. A. Falla of the Dominion Museum for their help and their loan of specimens; and Dr. Falla for permission to quote from his letters.

[M. F. Soper

XXXIII — Female Rock Wren **(Xenicus gilviventris)** returning to nest among boulders with a beakful of insects.



[M. F. Soper

XXXIV — Male Rock Wren, November, 1960, near the Homer Tunnel. Males are greener than females and more distinctly marked.

[M. F. Soper

XXXV — Female Rock Wren approaching nest. Note the huge feet and the nest-worn look of the plumage.