We are indebted to the N.Z. Forest Service who provided a camp site, some of our transport, and were most co-operative.

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KIWI EGGS LAID AT WELLINGTON ZOO

A blind female North Island Brown Kiwi *(Apteryx australis mantelli)* of unknown age arrived at Wellington Zoo in 1960. In mid-1969 she was shifted to an enclosure measuring 32 by 21 feet (670 sq. ft; 62.5 sq. m) and, since then, has laid eight eggs — the first in November 1969 and the eighth on 15 November 1971. These eggs were irregularly spaced, the intervals between them being 92, 207, 57, 26, 67, 99 and 188 days respectively.

The bird maintains good health, but she is exceptionally small. She weighed 1701 g six days after laying a 374 g egg in 1970; and a series of five weights taken during 1971 and early 1972, which ranged from 1612 to 1719 (mean 1665) g, show her to be about two-thirds the weight of wild females in good condition. Measurements and fresh weights are known for six eggs and these weights average about 22% of her mean body weight (Table 1). The mean weight of 363.5 g for this series of eggs is about 8 g or 2.2% heavier than the mean weight obtained from the calculation $.565ab^2$ (Reid 1971: 246) which, it seems, may understate the weight of fresh kiwi eggs.

When the female laid in February 1970 she was alone in the enclosure — the male had been shifted to a neighbouring pen some time earlier. The other seven eggs, which were laid while she had a male companion, were also infertile.

The egg laid on 15 November 1971 had an internal volume of 342.5 ml. Its fresh weight of 374.7 g decreased by 36.1 g to 338.6 g after 31 days of incubation. This egg was deep-frozen and the shell, albumen and yolk separated. The shell, which weighed 22.3 g, had a volume of 10.5 ml. The albumen weighed 95.1 g and the yolk 221.2 g or 62.8% of the weight of the contents at the time of laying. Romanoff & Romanoff (1949) have shown that during the early period of weight-loss in stored eggs the albumen, as well as losing water by evaporation through the shell, also loses it by diffusion to the yolk which, as a consequence, increases in size. To be meaningful, comparisons of the contents of eggs which differ widely in age should be based on the dry weights of these contents. In a fresh egg, described elsewhere (Reid 1971), yolk comprised 61.1% and albumen 38.9% by weight of the contents. Data in Table 2 compare this egg with the one laid at Wellington Zoo and show that,

while the contents of the latter egg include proportionately more yolk, this yolk contains fewer solids — and that on a dry weight basis the yolk content of both eggs is almost identical.

In the eggs of other species of birds the yolk comprises from 13.2 to 44.6% of the contents (Romanoff & Romanoff 1949) but in two eggs of the North Island Kiwi the yolk represented between 61 and 62% by weight of their contents when fresh. The large quantity of yolk in the kiwi egg permits this species to meet the demands of an exceptionally long incubation period (74 to 84 days) and still hatch with ample food reserves to nourish it during its first five or more days of life when it is confined to the nesting burrow.

I thank Nubar Dakessian for providing weights of fresh eggs and other information.

Table 1 MEASUREMENTS AND FRESH WEIGHTS OF EGGS : WELLINGTON ZOO

Date Laid	Measurements (mm)	Shell Weight	Total Weight	Egg Wt. as % of Mean Body Wt.
10.11.69	112.2 x 75.3	21.7	360.0	21.6
10. 2.70	119.6 x 69.4	19.7	374.0	22.5
5. 9.70	121.0 x 71.7	21.7	354.6	21.3
1.11.70	111.5 x 78.1	23.2	368.0	22.1
27.11.70	110.4 x 73.9	20.6	352.5	21.2
15.11.71	116.5 x 75.0	22.3	374.7	22.3
Mean	115.2 x 73.9	21.5	363.5	21.8

Table 2 YOLK CONTENT OF A FRESH EGG FROM A WILD BIRD, AND OF A 31-DAY OLD EGG LAID AT WELLINGTON ZOO.

Egg	Weight of		Yolk			
	Fresh Contents (g)	Yolk (g)	As a % of Contents	Dry Weight (g)	Dry Wt. as % of Wet Wt.	Dry Wt. as % of Contents
Wild	411.7	251.4	61.1	142.5	56.7	34.6
Zoo	352.4	221.2	62.8	122.7	55.5	34.8

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