Cardrona, Kyeburn and other small rivers are now useless for those birds requiring broad reaches of uncluttered shingle.

A third factor is the aggressive competition from the Spur-winged Plover *(Vanellus miles novaehollandiae)*, which has steadily increased in distribution and density since the first ones arrived in 1964 and is still doing so. Breeding Spurwings will attack anything in their vicinity, and the more timid Pied Stilts are often forced away from potential nesting-sites.

The 1982/83 season has been especially disastrous for many of the riverbed species; they have had to contend not only with the problems I have mentioned but also with periodic floods and high river levels over the main part of the breeding cycle (November/December). An exceptionally high and unseasonal flood in mid-January took a heavy toll of renesters and late nesters.

Some idea of the lack of breeding success of the Pied Stilt this season can be judged from the following figures of groups in well-frequented localities:

6/12/82: 12 nests in one colony on Manuherikia River, Galloway: all predated
18/1/83: Lindis River: Only 5 adults in a stretch of 5 km
21/1/83: Manuherikia River, Galloway: 26 ad., 2 juv.
23/1/83: At the confluence of the Manuherikia and Clutha Rivers, Alexandra, after a major flood: 18 adults only
30/1/83: Matukituki River mouth, W. Wanaka: 26 ad., 2 juv.
31/1/83: Makarora River mouth, head of Lake Wanaka: 25 ad., 2 juv.
13/2/83: 'Taieri Lake', near Kokonga: 67 ad., 5 juv.

The proportion of juveniles to adults above is 11:167, that is 6.6%.

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FERTILISATION OF WANDERING ALBATROSS EGGS ON MACQUARIE ISLAND

Several authors (e.g. Murphy 1936, Matthews 1951, Rankin 1951) have provided narratives on parts of Wandering Albatross *(Diomedea exulans)* life history, but as these authors have usually studied large colonies for a short time, and as the birds were usually unbanded, they could not describe courtship displays, copulations and other behaviour in the light of a most important factor — the birds' breeding status. Thus it is not known at what stage of egg development Wanderer eggs are fertilised. This paper records the copulation frequency of breeding pairs on Macquarie Island and infers when the egg is fertilised. Richdale (1950) suggested that fertilisation in *D. epomophera sanfordi* may occur 9-13 days before egg laying, and Tickell & Pinder (1975) suggested that it occurs about 14 days before egg laying in *D. m. melanophrys* and *D. chrysostoma* on Bird Island.

I often visited the small colony at Caroline Cove on Macquarie Island in the austral summers of 1974/75 and 1975/76 and made almost daily observations on attendance and behaviour of all birds in the colony between 25 November 1976 and 7 March 1977. During the 1976/77 summer I watched birds for a daily average of 8.5 hours, and to be able to identify individuals on the ground and in the air, I colour banded and colour painted all birds in the colony and recorded their plumage characteristics.

The shaded areas in Figure 1 show the two *minimum* spans of time in which *all* females were seen to copulate or were suspected by their attendance to have copulated — shown as closed circles. Pairs almost certainly copulated on every day they were seen together at their nest (Tomkins, in prep.). Rape, which is the forceful copulation by a male other than the female's partner, is indicated as 'R' in Figure 1. Because of the intensity of my observations, especially in 1976/77, I am confident that I recorded all days on which breeding pairs copulated at the colony, and as far as I know, these birds do not copulate away from the colony. A pair can copulate on the first day the female arrives at the colony (in one case 25 days before egg laying), and copulation occurs at irregular intervals until the day before the egg is laid.

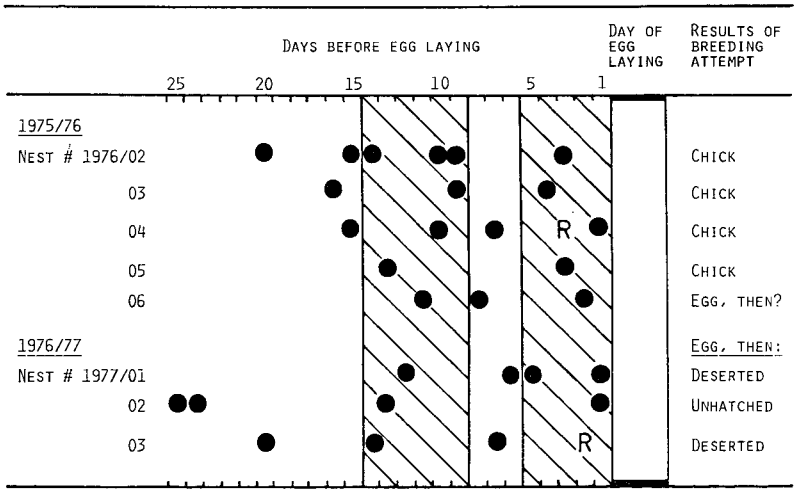

FIGURE 1 — Frequency of copulation of breeding pairs of Wandering Albatross on Macquarie Island. Shaded areas show the two minimum periods in which all females were inseminated. Copulation, seen or presumed, is shown as closed circles, and rape is shown as R.

Discussion

Presumably, egg fertilisation occurs at a definite stage of egg development. If females store sperm, fertilisation could take place at any time after copulation, but if they do not store sperm and fertilisation occurs only after copulation, we should be able to use Figure 1 to predict the approximate time of fertilisation.

Two aspects are worthy of note: (i) both females which were raped had last copulated seven days before egg laying, and (ii) the male partners of both the raped females were absent at the beginning of the females' final stay at the nest immediately before laying. If copulation does have to occur less than five days before egg laying (rather than in the period of 9-14 days, also on Figure 1) to allow fertilisation, both females may have allowed cloacal contact during rape because normal fertilisation was not possible in the absence of their mates. In fact, each female did not resist the advances of the rapist very strongly, but immediately after copulation with it, they savagely rejected the advances of it and all other males. If the female does not store sperm and fertilisation occurs soon after copulation, I suggest that fertilisation occurs 1-5 days before egg laying.

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MARSH CRAKE AT LAKE WAIRARAPA

On 19 March 1983, while studying habitat use by wetland birds at Lake Wairarapa, I came across a Marsh Crake *(Porzana pusilla)* in the western margin of Boggy Pond, 1 km inland from the south-eastern shore of the lake. This was an exciting find because on three previous occasions in March, between 2000 and 2200 hours, I had not found Marsh Crake in other parts of Boggy Pond and the adjacent Matthews Lagoon, although using tape-recorded calls made at Lake Alexandrina in 1979. There have been four other reports of Marsh Crake around Lake Wairarapa. Two birds were seen at the lagoon