isthmus just south of Auckland we were careful to make sure that the pigeon which was lured into trying to behave as a shag was indeed *Hemiphaga* and not a Carrier or Feral Pigeon *(Columba livia)*.

J. A. F. JENKINS

14 Lochiel Road,
Remuera,
Auckland

R. B. SIBSON

26 Entrican Avenue,
Remuera,
Auckland, 5

★

UNREPORTED METHOD OF STONE-COLLECTING BY THE ADELIE PENGUIN

The use of stones for nest construction by the Adelie Penguin *(Pygoscelis adeliae)* is well known. Sladen (1958) determined that both sexes are active in the collection of nest material. Two methods of collection have been reported. Most commonly, birds procure nesting stones from neutral areas away from the territories of breeding birds, or from vacant or abandoned nests (personal observation). A second method described by Levick (1915) is that of stealing from occupied nests. Collecting birds may steal from neighbouring nests or travel considerable distances to adjacent colonies.

In 1971, while studying the incubation behaviour of the Adelie Penguin at Cape Hallett, Antarctica (72° 19′ S, 170° 13′ E), I observed an unusual method of the collection of nest material. At 1420 local time on 8 November while observing a small colony that contained several banded birds, I noted the approach of a mated female (509-73535) to the perimeter of the colony under observation. A banded unmated male (519-35803) with a nest near the periphery of the colony exhibited an oblique stare bow (Sladen 1958) at the female's approach. The ritualized sequence of events that followed is typical of pair formation in the Adelie Penguin (Penney 1968). The unmated male (519-35803) assumed a prone position on the nest and proceeded to scrape the bowl with his feet. The female remained in close proximity to the nest, but did not initiate a mutual display (Sladen 1958) when the male returned to an upright posture in the nest. Following an abbreviated scraping bout, the male relinquished the nest to the mated female. The female stepped into the nest-bowl and, instead of taking a prone position, picked up a stone from the nest and retreated to her own colony and deposited the stone in the nest occupied by her mate (509-73469). Interestingly, the unmated male (519-35803) discontinued the ritualized sequence of (1) oblique start bow (2) scraping the nest-bowl and (3) relinquishing the nest to the female, after she had made several trips to his nest for stones. Each time she retrieved a stone from the unmated male's nest she deposited it in her own. At no time did the unmated male show aggression toward the stone-stealing

female. The mated female continued to steal stones in this manner from the nest of the unmated male for 40 minutes, when I discontinued the observation.

I observed the same colony on 9 November and recorded a second banded female (519-35834) and another unbanded bird stealing stones from the nest of the same unmated male (519-35803) at 1120-1130 in the manner described above. At 1340 I again observed two birds (female 519-35834 and an unbanded bird) using the same technique. Although I had observed this previously unreported method of stone-collecting in other areas of the Hallett rookery, I had never been able to substantiate the sexes of the birds involved.

Sladen (1958) suggested that stone stealing allowed a higher reproductive success among birds with larger, better formed nests, and Tenaza (1971) demonstrated that Adelie Penguins nesting in the central part of a colony were more successful than peripheral nesting birds. The first mated female (509-73535) I observed stealing stones was a central nesting bird and the second (519-35834) occupied a peripheral nest. The unmated male (519-35803), as stated, had a peripheral nest of poor quality. Tenaza (1971) suggested that the poorer quality of peripheral nests is due to loss of stones to other Adelie Penguins. Whether unmated male Adelie Penguins that allow the theft of nest stones by females during pair formation are always peripheral nesters is not known, nor is the frequency of such activity. It is possible that such birds are younger, inexperienced breeding individuals. Unfortunately, I had to leave Cape Hallet on 12 November, so I was not able to follow the progress of the unmated male. Analysis of continuous time-lapse photographs of one of the mated females (509-73535) during the incubation period revealed successful hatching of two chicks.

ACKNOWLEDGEMENTS

This study was supported by National Science Foundation Antarctic Research Program Grants (numbers GA13827 and GA23744) awarded to Dr John R. Baker of Iowa State University. I thank Richard D. Crawford and Thomas C. Rothe for critically reviewing various drafts of this paper.

LITERATURE CITED

LEVICK, G. M. 1915. Natural history of the Adelie Penguin. British Antarctic ("Terra Nova") Expedition, 1910. Natural History Report, Zoology I (2): 55-84, pls I-XXI, tables A-B.

PENNEY, R. L. 1968. Territorial and social behaviour in the Adelie Penguin. p. 83-131. **In:** O. L. AUSTIN, Jr. (ed.) Antarctic bird studies. Washington, D.C.: American Geographical Union.

SLADEN, W. J. L. 1958. The pygoscelid penguins. I. Methods of study. II. The Adelie Penguin **Pygoscelis adeliae** (Hombron & Jacquinot). Falkland Islands Dependencies Survey. Scientific Reports 17: 1-97, text-figs 1-19, pls I-XII, tables I-XX.

TENAZA, R. 1971. Behaviour and nesting success relative to nest location in Adelie Penguins **(Pygoscelis adeliae).** Condor 73 (1): 81-92.

DIRK V. DERKSEN

Department of Zoology & Entomology,
Iowa State University,
Ames, Iowa 50010, USA