RATS AND MOA EXTINCTION

By C. A. FLEMING

A number of hypotheses have been put forward to explain the extinction of some 27 species (7 genera) of moa *(Dinornithiformes)* and a number of carinate birds during the late Holocene. The writer has emphasized (1951, 1962) that these extinctions must be attributed to the great ecological changes brought about by the coming of man with fire, rats and dogs within the last two thousand years. But the problem remains mysterious because the early Polynesian colonists were apparently neither populous nor sophisticated, their fires were not universal, their dogs reputedly were not feral, and the Polynesian Rat *(Rattus exulans)* seemed unlikely to have been effective as a predator on large birds with strong eggs. So in 1951 I suggested that dogs, contrary to tradition, might have become wild and hunted in packs. Recently, however, observations at Kure Atoll (Hawaiian Islands) have revealed an unsuspected behaviour trait in at least some populations of Polynesian Rats that is relevant to our speculations on moa extinction.

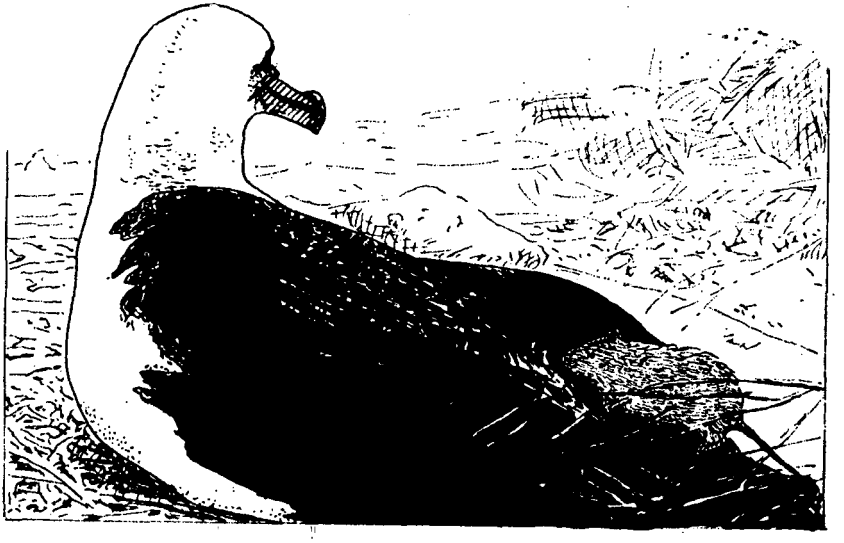

FIGURE 1 — Polynesian Rat approaching an open wound on the back of a Laysan Albatross. The bird's bill is blood-stained from his probing into the wound. Traced from photograph reproduced by Kepler (1967, Fig. 2).

C. B. Kepler (1967) has recorded rat predation on nesting Laysan Albatrosses at Kure Atoll, the only place where Polynesian Rats and albatrosses are sympatric. Injured, dying and dead adult albatrosses found with large gaping wounds in their backs led to observation at night. Rats approach sitting albatrosses, climb up over the tail and up their backs, first clipping off rump feathers, and then opening a hole in the skin to feed on exposed flesh and subcutaneous fat (Fig. 1). Many rats scampered off an albatross back when disturbed by torchlight, and over 20 fed on one bird. The albatross may turn and seize a rat, throwing it aside, but others take its place. The wounds are enlarged to 5 or 7 inches diameter, often exposing the thoracic cavity, ribs or lungs, and may become fly-blown. The bird probes in its wound, staining its bill with blood. Immobilisation and death follow in a day or so. 50 adults so killed were found in a population of about 5000, of which about 1000 pairs breed. Thus, the annual mortality from rat predation is of the order of 1% to 2½%.

The rats' behaviour described at Kure Atoll may have been recently and locally acquired, like the habit of opening milk bottles by British tits, but if so it could have happened at other times and places. Obviously Polynesian Rats are potential predators on large sluggish birds nesting on the ground, and cannot be neglected as factors in the reduction or extermination of moas and ground-nesting carinates such as *Aptornis, Notornis* and *Cnemiornis.*

REFERENCES

FLEMING, C. A., 1951: **Notornis** 5: 7-10.
———— 1962: **Notornis** 10: 113-7.
KEPLER, C. B., 1967: **Auk** 84: 427-30

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SHORT NOTE

BANDING RECOVERY — RED-TAILED TROPIC BIRD

Whilst J.J. was on passage from Trincomali to Penang on 7/5/65, a Red-tailed Tropic Bird *(Phaethon rubricauda)* landed aboard the M.V. Wairimu. The bird was immature when caught, having a dark bill and with the rachis and tip of the primaries black. The tail streamers were only 1½ inches longer than the other tail feathers, and wholly white, showing none of the adult red colouration. During a stay on board of 4½ hours the bird regurgitated a partially digested flying fish about 3 inches long.

Following banding the bird was released offshore in a South force 5 wind some 24 miles N.E. of Sumatra (6° 19'N; 94° 40'E).

This bird was subsequently recovered at Gunners Quoin Island (19° 57'S; 57° 37'E) North of Mauritius on 20/9/68. This is a distance of 2,700 miles and an elapsed time of 3 years 4 months 13 days.

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