

FIGURE 1. Characteristic pox lesions near the base of the bill and on the leg in two House Finches. Both lesions are moderate in size. Large tumors on the head can cause complete closure of the eyes.

so severely deformed that their rapid demise in the wild would have been assured. In a 3-week period the lesion on one bird progressed from a minor swelling and lesion near one eye to complete closure of both eyes with gross tumorous deformation of the head and blindness. No virus isolations were made and no intracellular inclusions were seen. Infections with a pox virus were presumed on the basis of gross pathology.

Although no attempts were made to capture birds in the winter of 1973-74, our observations were continued. A few isolated cases of House Finches with deformed heads or legs were reported, but there was no indication of an occurrence of lesions and tumors

as great as the previous winter. This may be evidence of decreased infection between years, or it may indicate only decreased severity. In some years infection may be mild and subclinical or simply not manifested as epizootic.

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## GROWTH AND FLEDGING AGE OF THE BROWN NODDY IN HAWAII

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Previous to this work, growth and fledging had not been studied in Pacific Ocean populations of the Brown Noddy (*Anous stolidus*). In 1972, I established two plots 20 ft × 20 ft (6.1 m × 6.1 m) just inside the rim of the central volcanic crater on Manana Island, Hawaii. I checked each plot every day, from before the first egg was laid until after the last chick had fledged. Each newly hatched chick was banded, weighed to the nearest 0.5 g with a Pesola scale, and measured to the nearest mm of culmen length with

vernier calipers. Every third day I entered the plots, weighed each chick, and measured the length of its culmen. Chicks from 50-100 g were weighed to the nearest 1 g, whereas chicks exceeding 100 g were weighed to the nearest 3 g.

I also determined fledging age, marking a chick as fledged if it could rise from the ground and fly 3 m or more, or if it could sustain level or ascending flight over a similar distance when tossed into the air.

Weight and culmen are plotted against age in figures 1 and 2. Twenty of the chicks fledged; the mean age was 42.5 days (SD = 4.03 days). One of the 20 chicks frequently escaped weighing, but for the other 19 I calculated the mean daily increase in weight during the first half of the nestling period, when weight increased rapidly. The mean growth rate was

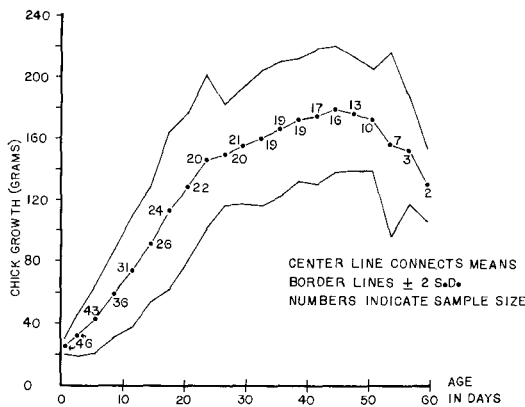


FIGURE 1. Weight against age of Brown Noddy chicks on Manana Island, Hawaii in 1972.

5.26 g/day (SD = 1.18 g/day), and chick growth rate and fledging age were negatively correlated ( $r = -0.490$ ,  $N = 19$ ,  $P < 0.05$ ).

Seventeen of the chicks were weighed both at the age of fledging and from 3 to 12 days later; there was no significant recession in weight after fledging ( $t = 1.17$ ,  $P > 0.2$ ), as suggested for certain terns (e.g., LeCroy and LeCroy 1974, *Bird-Banding* 45:326).

Dorward and Ashmole (1963, *Ibis* 103b:447) measured growth in weight and culmen length of Brown Noddies on Ascension Island in the Atlantic; scatter diagrams of their data indicate growth functions very similar to those plotted in figures 1 and 2. Gibson-Hill (1951, *J. Bombay Nat. Hist. Soc.* 48:214) found on Christmas Island in the Indian Ocean that "if left to itself" a Brown Noddy chick would begin to fly

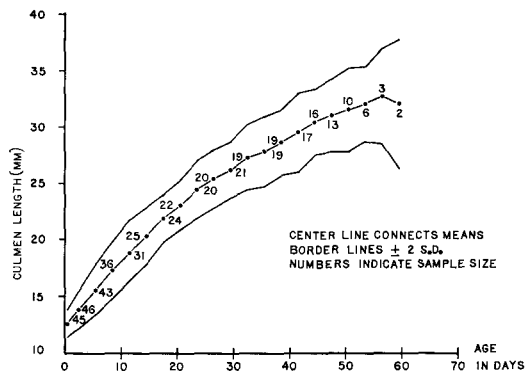


FIGURE 2. Culmen length against age of Brown Noddy chicks on Manana Island, Hawaii in 1972.

about the thirty-fifth day; apparently Brown Noddies on Christmas Island grow more rapidly than those on Manana. More data are required for a refined analysis of intraspecific variation in growth rates of Brown Noddy young.

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## RED-FOOTED BOOBY HELPER AT GREAT FRIGATEBIRD NESTS

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Skutch (*Condor* 63:198, 1961) defined a helper as "a bird which assists in the nesting of an individual other than its mate, or feeds or otherwise attends a bird of whatever age which is neither its mate nor its dependent offspring." Helpers may be intra- or interspecific, almost any age, breeding or nonbreeding, and may assist in various ways. A common means of assistance is feeding of young, but other means are nest building, incubation, and brooding. Although Skutch listed numerous species recorded as helpers, he did not record the Red-footed Booby (*Sula sula*) or the Great Frigatebird (*Fregata minor*). The following observations were made on Enderbury Island (3°08' S, 171°05' W) in the central Pacific Ocean during three surveys, totaling six days, conducted by the Pacific Ocean Biological Survey Program.

On the night of 1 October 1965, while banding Red-footed Boobies in a stand of *Tournefortia* on the western side of Enderbury Island, I captured an adult male booby, which had been banded as an immature on 19 November 1963, brooding a nestling Great Frigatebird. During the next two days this male was seen standing

next to the nestling and threatening intruders with "forward head waving, an aggressive territorial display" (Nelson, *Ibis* 111:363-365, 1969). The following year on 25 September and 9 October I found the same booby guarding another nestling Great Frigatebird, which was too large to be brooded, in another *Tournefortia* ca. 35 m from the 1965 nest. During the 3 to 4 hr of observation in 1965 and the 2 to 3 hr in 1966, I saw no adult frigatebirds at the nests, so the relationship between the parent frigatebirds and this booby is unknown.

Both species nest commonly in this stand of trees, sometimes in the same tree, so a frigatebird egg could have accidentally fallen into a booby nest. However, because the same booby was guarding a frigatebird nestling in two successive years and because these records are unique, this interpretation seems unlikely. For the same reasons, it is unlikely that a Great Frigatebird parasitized a Red-footed Booby nest. In addition, both nests appeared to be typical frigatebird nests rather than booby nests.

A reasonable explanation is that this booby was raised by frigatebirds, perhaps as a result of an accidental introduction of a booby egg into a frigatebird nest, and was imprinted on Great Frigatebirds rather than on Red-footed Boobies. Harris (*Ibis* 112:488-498, 1970) showed that such interspecific imprinting could occur in the wild by cross-fostering young of Herring Gulls (*Larus argentatus*) and Lesser Black-