ber of breeding birds can be reasonably predicted, but this is not easily done. On the other hand, in interpreting spot-maps it is useful to know territory size. However, for many birds territory size is not well-known and varies with many circumstances such as habitat, breeding bird density, and individual differences in aggressiveness (Schoener 1968). This is not usually a problem for species with low densities since territories may be more widely spaced. With high density species, however, such as the Yellow-rumped Warbler and Ruby-crowned Kinglet in Willow Creek, it was difficult to delimit one territory from all adjacent ones. If territory size is underestimated, population density will be too high. This may account, in part, for the discrepancy in density estimates for some species when comparing the variable strip transect to spot-map results.

Kendeigh (1944) criticized the use of singing males to indicate number of breeding pairs since a considerable proportion of them may be unmated. For example, he found that 9% of the singing male House Wrens were unpaired. Variation in degree and strength of vocalizations occurs among species. The spot-map method does not distingush between paired and unpaired birds and does not consider variation in adults or territories during the raising of second broods (Kendeigh 1944).

Mapping territories is time consuming and requires at least three readings through the study area per month; Kendeigh (1944) indicated that five per breeding season were necessary. In addition, certain members of the population are not counted, such as the non-breeding adults and the fledglings. Toward the end of the breeding season territories begin to break down and accuracy of spot-mapping declines rapidly. One big drawback to spot-mapping is that it is applicable only when birds are reproducing. For most species, this is the only time that singing occurs and territories are maintained.

The method used should depend upon the circumstances. In situations where dense vegetation may hamper detectability, resulting in underestimation of population size, the spot-map method may be more accurate. Availability of personnel may be a consideration because the transect method requires less time and fewer observers to census a given amount of habitat. I thank John T. Emlen and Robert D. Ohmart for helpful suggestions on improving the manuscript. I am grateful to the U. S. Forest Service for supplying the funds for the field research (16-382-CA).

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A LOCAL OCCURRENCE OF AVIAN POX IN THE HOUSE FINCH

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Avian Pox is a viral infection of birds characterized outwardly by proliferative, warty lesions commonly on legs, feet, eyelids, and at the base of the bill (Karstad, *in* Davis et al., Infections and parasitic diseases of wild birds, Iowa State Univ. Press, 1971). Infections of the mouth and upper respiratory tract are also known but less easy to identify, at least in wild birds. Although firm figures on mortality rates in nature are unknown, Karstad maintained that pox in wild birds is a mild disease where lesions eventually heal and abnormally proliferated epithelium sloughs off. Large lesions that completely occlude the eyes or are subject to injury, bacterial infection, and hemorrhage are more conducive to death in the host.

Although pox has been reported in 24 species of Fringillidae (Kirmse, Div. Zoonoses and Wildl. Dis., Ontario Vet. College, Publ. No. 49, 1967; Savage and Dick, Condor 71:71, 1969), the only record we know of for occurrence in the House Finch (*Carpodacus mexicanus*) is that of Warner (Condor 70:101, 1969) for introduced populations on Kauai in the Hawaiian Archipelago.

House Finches are commonly observed at garden feeders in and around the Santa Barbara area, and occasional birds with tumors or suspected lesions on the head or legs have been seen from time to time in past years (W. Abbott, pers. comm. and others). However, in the winter of 1972–73 a particularly heavy outbreak occurred and an unusually high number of sight records of deformed birds was received. In response to inquiries by one of us (GH), approximately 40 cases were reported by bird watchers from Atascadero to Huntington Park, California. It is impossible to compare this figure to what might take place in a "normal" year as no systematic attempts to record the occurrence of suspected pox-induced lesions and tumors have been made. However, through personal communication, we obtained a clear impression that there was a great increase in the occurrence of deformed birds seen in the wild.

During December 1972 and January 1973, mist nets and traps were set up near the Santa Barbara Museum of Natural History to capture live House Finches. Of 24 males captured and maintained in captivity, 5 had observable pox lesions (fig. 1) and died within a few weeks of being kept in captivity; 2 died from unknown causes. Of 18 females captured, 2 died with observable lesions and 5 died from unknown causes. Thus, of the total number of House Finches captured, 17% died with pox lesions. No birds with observable lesions recovered. The high incidence of mortality may have been due in part to the added stress of being in captivity. However, some birds were

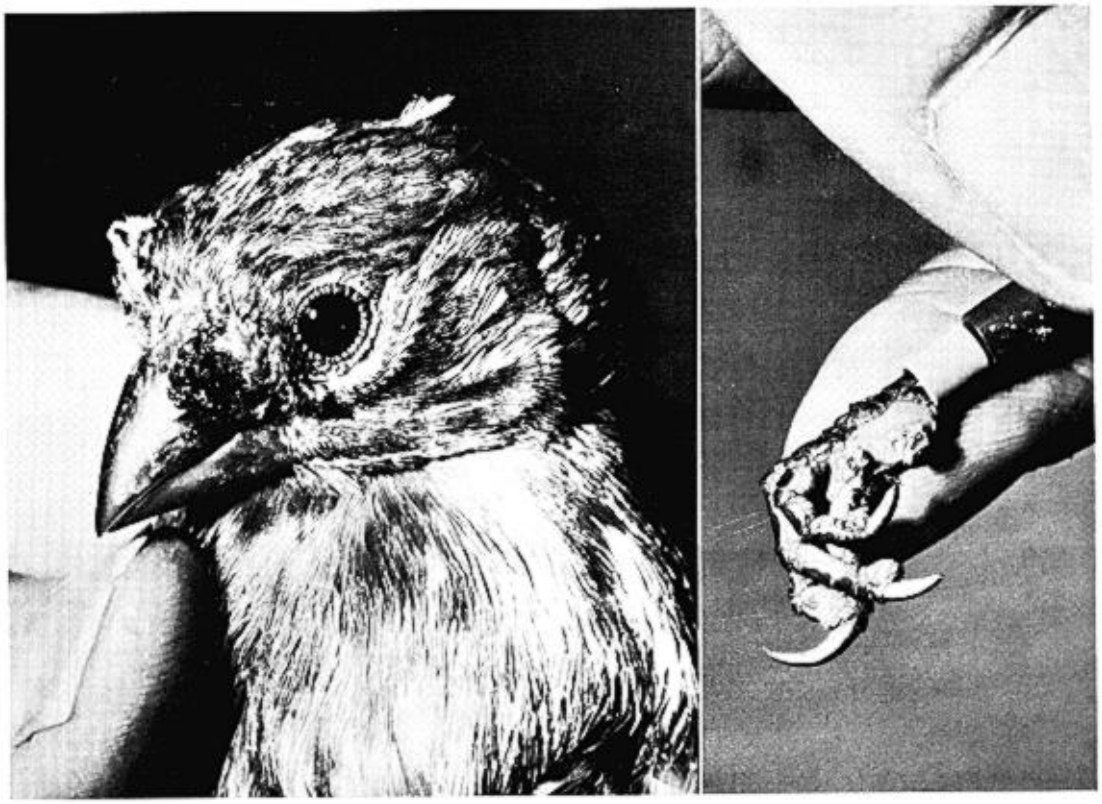

FIGURE 1. Characteristic pox lesions near the base of the bill and on the leg in two House Finches. Both lesions are moderate in size. Large tumors on the head can cause complete closure of the eyes.

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