on the nest but because birds were not individually identified, I could not learn about possible role differences of the sexes.

Adult birds attended eggs from 5 to 180 min at a time (Table 2). Inattentive periods averaged 7.6 min ± 6.6 in the three nests with consistent incubation. Attentive and inattentive periods showed no significant relationship to time of day, burrow temperature and/or cliff face temperature (correlation coefficients, $P > 0.05$).

A burrow is a unique environment for a small bird to nest in as ambient temperatures are continuously below incubation temperatures. Perhaps if temperature data can be examined in light of other microclimatic conditions, a more complete picture can be drawn of the incubation habits of burrow nesting birds.

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BOTFLY (DIPTERA, MUSCIDAE) PARASITISM OF NESTLING APLOMADO FALCONS

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The genus *Philornis* contains flies whose larvae inhabit the nests and parasitize the nestlings of many Neotropical birds (Aldrich 1923, Hicks 1959, 1962). In 1977, I found a stick nest containing young Aplomado Falcons (*Falco femoralis*) all infested with *Philornis* larvae. The following description of this infestation is, to my knowledge, the first published report of *Philornis* in a falconiform nest and the first published description of a parasite of the Aplomado Falcon.

At least 17 species of *Philornis* flies have been described (H. R. Dodge, unpubl.). Most are nondescript, yellow-brown to black, slightly larger and stockier than the common housefly. The fourth wing vein bears a slight apical bend, which is the most obvious diagnostic feature of the genus (Aldrich 1923). *Philornis* has been collected in southern Texas, Mexico, Cuba, Jamaica, Trinidad, Puerto Rico, Florida, Panama, Costa Rica, Argentina, and Venezuela (Dodge 1955, 1968; Hicks 1959, 1962; Dodge and Aitken 1968). In nearly all cases, adult flies were first collected from nestling birds as larvae and then reared. Adult *Philornis* lay their eggs in birds' nests (Aldrich 1923). After hatching, larvae of most species burrow under the skin of the nestlings and feed on the hosts' blood (Aldrich 1923). Before pupating, larvae emerge through small apertures in the skin and fall to the floor of the nest. Pupation occurs within a cocoon formed from a salivary gland secretion and usually takes less than two weeks (Dodge, unpubl.). Known hosts are Neotropical landbirds, mostly passerines (listed in Dodge 1955, 1968; Hicks 1959, 1962; Dodge and Aitken 1968).

During March 1977, I began a study of the natural history of the Aplomado Falcon in eastern Mexico (Hector 1980). Seventeen falcon territories were located that year and the infested nest was the last one found (on 31 May). When I discovered this nest, only 6–12 larvae were apparent on each of the three nestlings, distributed mostly about the heads of the young birds (Fig. 1). A few larvae were embedded among the follicles of the growing remiges. On 7 June, larvae were evident at new locations on the nestlings, indicating that those initially seen had left their hosts to pupate, while others had now grown enough to be detectable.

The smallest falcon (250 g) was removed from the nest on 7 June and transported to a captive-breeding facility established by the Chihuahuan Desert Research Institute in Alpine, Texas. This nestling was raised in quarantine and all larvae were collected as they emerged. Of the 35 collected over a 14-day period, 15 were preserved as larvae and the remainder allowed to form pupae. Within hours after emerging from the falcon, the larvae quickly covered themselves with a whitish, foamy secretion that soon hardened to form a cocoon. Ten pupae were preserved. The surviving pupae were kept in small enclosures containing some local soil as a substrate. Approximately eight days later, adult flies appeared and were preserved. A sample of larvae, pupae and adult flies was then sent to the Systematic Entomology Laboratory (Beltsville, MD) for identification. The specimens could not be identified specifically because present keys for *Philornis* species are inadequate (Lloyd Knutson, pers. comm.).

This brood was the only one that appeared to be infested with larvae in 1977. Infestations, however, may not have been detected at other nests due to differences in degree of infestation and my failure to scrutinize the nestlings. Three three-to-four-week old falcons at a site examined in 1979 bore numerous scars, which I suspect were caused by *Philornis* larvae. As mentioned above, one of the infested nestlings bore 35 larvae although fewer than half this number were apparent when the nestlings were first inspected.

FIGURE 1. One- to two-week-old Aplomado Falcon bearing *Philornis* larvae (arrows) embedded subcutaneously.

Cursory visual inspections of nestlings may underestimate the true extent of infestations because small larvae do not create obvious bulges on the skin of young birds. In order to count accurately larvae carried by an infested brood, nestlings and the nest floor must be checked daily until several days pass without finding additional larvae or pupae.

It is likely that small downy young (less than two weeks old) are more susceptible to infestation than older, more active, nestlings. Older nestlings bite at flies and wasps flying around the nest; also, they are well-covered by down and growing contour feathers. According to Smith (1968), *Philornis* larvae are a significant cause of nestling mortality in colonies of Chesnut-headed Oropendolas (*Psarocolius wagleri*) and Yellow-rumped Caciques (*Cacicus cela*). He indicated that young oropendolas and caciques carrying more than seven larvae usually die. The adults of these species are only slightly smaller than adult Aplomado Falcons. Perhaps heavy infestations of *Philornis* can increase mortality rates of nestling Aplomado Falcons and similar-sized birds.

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COLOR PHASES IN THE DOWNY AND JUVENAL PLUMAGES OF TUFTED PUFFINS

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The downy plumage of Tufted Puffins (*Lunda cirrhata*) is usually described as being either uniformly black, or brownish above and grayish on the belly (Bent 1919, Dawson 1923, Dement'ev and Gladkov 1951, Kozlova 1957); however, Dement'ev and Gladkov (1951) also stated that as the chick grows the down becomes white. Belly feathers in the juvenal plumage have been described as pure white, whitish, or various shades of gray (Stejneger 1885, Bent 1919, Dawson 1923, Kozlova 1957). The variation in color of juvenal belly feathers has caused some confusion, leading some authors (e.g., Dybowski, *in* Stejneger 1885:46; Bent 1919) to infer that the belly feathers in juvenal plumage are lost and replaced before the first complete prebasic molt in spring. In a two-year study of the molts and plumages of 13 Tufted Puffins, collected as downy young and raised in captivity, Z. Eppley (unpubl. data) found no evidence of a partial molt among birds in juvenal plumage before the first prebasic molt. Eppley (unpubl. data) also noted polymorphism in the color of belly feathers among Tufted Puffins in first basic plumage. Polymorphism is not known to occur among Tufted Puffins in definitive basic or alternate plumages.

Although the existence of light (white-bellied birds) and dark (black or gray-bellied birds) color phases in the downy and juvenal plumages of Tufted Puffins has been known for some time, the frequency with which each color phase occurs in a population has not been reported. Are the frequencies of color phases in each plumage similar among populations? Is there selectivity for one color phase, or, as in the case of the Red-footed Booby (*Sula sula*; Nelson 1978), has selectively unpenalized polymorphism spread throughout the species? This paper documents the frequencies of color phases in young Tufted Puffins at two locations, thereby starting to compile the data needed before these questions can be answered.