

shining drops of pitch resembling eyes may frighten away predators, but these views have attracted little support (Rand, Audubon Mag., 61: 270, 1959). A disadvantage has been indicated, that the pitch may soil the bird's feathers. To lessen this the nuthatch may dive on the wing directly into the nest without so much as touching the feet to the edge of the hole (Bent, op. cit., p. 29). In the Pygmy and the Brown-headed Nuthatches, the nest cavity modification has been considered a protection against the weather (Norris, loc. cit.). It is also possible that it may simply add to the seclusion of the nest contents.

While behavior can be interpreted in terms of the immediate environment, as in the above, another appreciation is given by viewing the behavior from an evolutionary, physiogenetic point of view, in this case considering the related nuthatch behavior of the other 16 species in the genus, all of the Eurasian area. This I have done earlier for the Red-breasted nuthatch's pitch-plastering (Rand, op. cit.), and to which the White-breasted Nuthatch's behavior is comparable.

All nuthatches build nests in cavities in trees or among rocks. In addition some species variously caulk cracks, line the natural cavity extensively with mud, reduce the size of the entrance with masonry of mud, and may even stick feathers about the mud-covered entrance. Only a few species excavate their own nest cavity, and of these the Red-breasted Nuthatch adds pitch "decoration."

Presumably nuthatches are secondary hole nesters that originally occupied "natural" cavities. Unlike primary hole nesters such as woodpeckers, nuthatches construct a nest within the cavity, lay spotted eggs, and have natal down. Presumably early in the hole-nesting nuthatch ancestral line the modification of the entrance hole and caulking became established. The basic function may have been to add to the seclusion that many birds seek for the eggs and young. But so deeply entrenched in nuthatch phylogeny is the tendency to modify the cavity that it has been carried beyond the strictly utilitarian, and in the White-breasted and the Red-breasted Nuthatch we see nonfunctional, evolutionary relics or frills.—A. L. RAND, *Archbold Biological Station, Lake Placid, Florida 33852*. Accepted 18 Jun. 71.

Death of Red-breasted Nuthatch from pitch around nest hole.—Red-breasted Nuthatches (*Sitta canadensis*) dab pitch around entrances to their nest holes and continue to bring fresh globules throughout incubation and nestling periods until the pitch may become thick enough to stream downward (Bent, U. S. Natl. Mus., Bull. 195, 1948; personal observation). That the pitch can be a hazard to the nuthatches themselves has not been previously recorded so far as I am aware.

On 2 May 1965 I found a female Red-breasted Nuthatch carrying strips of inner bark from an oak into a nest hole 11 m above the ground in the dead stub of a paper birch (*Betula papyrifera*). I did not visit this nest again until 6 June, when I noticed the body of a nuthatch stuck to the entrance. When I pushed, the top of the stub broke off. The segment containing the nest remained intact as did the body of the adherent nuthatch. The nest was empty.

Pitch, as continually applied fresh from balsams (*Abies balsamea*) and other conifers, can become as sticky and tenacious as bird lime. It may be of importance in the present context that the female enters a nest more than her mate, for she not only spends the night there but also does all the incubating and early brooding, the male feeding her from the outside. Females are remarkably adept at entering their sticky entranceways. They may fly directly in like a bullet, or first hover, then pop in; a difficult feat in either case considering that the pitch often coats the bottom of the passage as well as forming a rim above. That females do brush against the pitch occa-

sionally is indicated by the increasingly disheveled appearance of their plumages as nesting progresses. Males can enter adroitly also, but do so mainly in the midnestling period. Once the young are large enough, both parents feed them from the outside. A remarkable adaptation for a hole-nesting bird, possibly related to the stickiness of the entrance, is that a nestling, once fed, may back around and deliver a fecal sac where the parent can reach in for it without entering the cavity.

When young are about to fledge, the floor of the passageway is covered with litter. I have noticed this both in the wild and with a breeding pair of captive hand-raised Red-breasted Nuthatches. The litter may protect the young from the pitch on leaving.

Nuthatches (*Sittidae*) as a group have a variety of stratagems for altering or protecting nest entrances as described by Löhr (Z. Tierpsychol., 15: 191, 1958) for the European species (*S. europaea*) and by Kilham (Auk, 85: 477, 1968; 88: 175, 1971) for the White-breasted Nuthatch (*S. carolinensis*) which sweeps with the bodies of crushed insects. The Red-breasted Nuthatch appears to be unique in bringing pitch from balsams and other conifers. That a female nuthatch could become fatally stuck to her own nest entrance suggests that the pitch makes an effective bird lime and hence might be protective against avian as well as small mammalian nest hole competitors. The White-footed Mouse (*Peromyscus* sp.), which nests in holes in stubs, might be among the latter.—LAWRENCE KILHAM, *Department of Microbiology, Dartmouth Medical School, Hanover, New Hampshire 03755*. Accepted 6 Jul. 71.

The juvenal plumage and relationships of *Lophostrix cristata*.—In September 1970 we received a young owl from William Huffman, a taxidermist in Pontiac, Michigan. He in turn had obtained it from an animal dealer in whose hands it had died. Its original source is unknown. The bird was thawed, washed, and prepared as a study skin (UMMZ 216,603) and proved to be *Lophostrix cristata*. So far as I can determine, the juvenal plumage of this little-known neotropical owl has not been previously described. The plumage of the head and body of this specimen consists of long, lax white feathers. The rufous and black face patch and black rictal bristles are fully developed like those of the adult, but the ear tufts are short and largely white. The remiges are nearly full grown and similar to those of an adult in the light phase, but the wing coverts are white distally and barred basally (Figure 1). The rectrices are very short and not erupted from their sheaths. A second specimen (UMMZ 101,968) collected at Escuintla, Chiapas, Mexico, December 1938, by G. Gomez, has nearly molted out of this plumage. Only a few white feathers remain on the crown, back, breast, and flanks; the rest of the plumage is that of an adult in the light phase. A male in the dark phase (UMMZ 97,557) collected at Obaldia, Panama, 20 June 1931, by H. Wedel had several white feathers on the breast but is otherwise very dark like a second specimen of *L. c. wedeli* from the same locality. Penard and Penard (1908: 461) described the young of this species as like the adult but more reddish in color and less beautifully marked. The specimens in the University of Michigan Museum of Zoology show that the color phase is evident at least before the last of the juvenal plumage is lost. Thus Penard and Penard apparently described a light-phase bird no longer in juvenal plumage.

In the dark face patch and rictal bristles, the white body plumage, and mixed pattern of the wing coverts, the young of *Lophostrix* resembles that of *Pulsatrix perspicillata* as represented by a specimen (UMMZ 74,908) from Paraguay and as described by Wetmore (1968: 163). In juvenal plumage the young of most, if not all, species of *Otus* and *Bubo*, between which *Lophostrix* is usually placed (e.g. Peters, 1940; Wetmore, 1968; Meyer de Schauensee, 1970) are barred and do not have dark