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THE NESTING OF THE WHITE-NAPED SWIFT

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Because swifts in general tend to nest in remote or inaccessible situations, we still know little or nothing of the reproductive behavior of a number of species. Those whose nesting habits are known exhibit certain interesting features which may be summarized briefly. The eggs are invariably white and rounded at both ends, and the clutch size varies from one in some species to six in others. Some swifts nest on ledges on cliffs, either next to the sea or in close proximity to waterfalls. Others nest in caves, hollow trees, chimneys, and even on the drooping leaves of tropical trees. Certain species construct their nests of mud, moss, fern fronds or sea weed, with saliva possibly being added to the ingredients either incidentally as a result of carrying materials in the bill or seemingly as a binding agent. Such nests are frequently kept moist by spray. Other swifts use saliva to glue together nesting materials of feathers or small twigs. The Gray-rumped Swiftlet (*Collocalia inexpectata*) may construct its nest entirely from salivary secretion.

These features of the reproductive habits of swifts are reviewed here for two reasons. First, the White-naped Swift (*Streptoprocne semicollaris*) differs, as far as known, from all the other members of the suborder Apodi in not constructing any sort of nest. It merely lays its eggs in a depression in dry sand. Second, Lack (1956), in his review of the classification of this group of birds, placed considerable emphasis on the character of the nest and the number of eggs laid. Although the nest of the White-naped Swift was unknown to him at that time, he included this species in the genus *Cypseloides*. Alleged similarities with regard to nesting habits were responsible in part for his inclusion also in the genus *Cypseloides* of species previously placed in the genera *Streptoprocne*, *Aërornis* and *Nephoecetes*.

Although the present paper is not taxonomic in character, the authors fail to concur with Lack (*op. cit.*) as regards his concept of the genus *Cypseloides* and prefer to consider the White-naped Swift as generically distinct. We have, therefore, retained the name *Streptoprocne semicollaris* as tentatively used in Part I of the Mexican Check-list (Pacific Coast Avifauna, 1950), pending more detailed anatomical studies of the Chaeturinae in general. We feel that the observations presented in this paper tend to support this action.

Lack (*op. cit.*: 6–7) states that "all species of *Cypseloides* for which the nest is reliably known agree in building on steep cliffs, usually in association with water, making a cone-shaped nest of mud and moss lined with fern-tips or twigs, and in laying a clutch of only one or two eggs." At the time of that writing, the nests of four of the nine species that he included in this genus were unknown. These were as follows (generic names in parentheses are those used by Peters, 1940): *Cypseloides cherrei, cryptus, (Streptoprocne) biscutatus* and *(Aërornis) semicollaris*. Those whose nests were known were *Cypseloides fumigatus, (Streptoprocne) zonaris, (Chaetura) rutilus, (Aërornis) senex* and *(Nephoecetes) niger*.

WHITE-NAPED SWIFT

STREPTOPROCNE SEMICOLLARIS

From a painting by Don R. Eckelberry

Actually there are marked differences as well as similarities in the nests of some of these species. Reboratti (1918), who describes and illustrates those of *C. fumigatus* and *C. zonaris*, asserts that both build a cone-shaped structure of mud, saliva, and moss, approximately 10 to 15 centimeters long, on a vertical cliff and lay but a single egg. This description of the nest of *C. zonaris*, however, does not agree with that observed by the senior author in Oaxaca, México, in the spring of 1962. While it is planned that these observations will be described in detail at a later date, it may be stated briefly here that the nests found in México were cup-shaped and situated on a very moist ledge in a cave behind a waterfall. Belcher and Smooker (1936) describe the nest of *C. rutilus* as similar to that of the previous two species but the usual number of eggs is two. Little is known of the nesting habits of *C. senex* apart from comments entered on the label of a specimen from Chapada, Matto Grosso, Brazil, in the American Museum of Natural History (♀34,042), by the collector H. H. Smith and quoted by J. A. Allen (1893:156) as follows: "Nest built of loose material, on a small rocky ledge, over which the water of a large stream fell. In the nest was one young bird and an egg."

Much more is known of the nesting habits of the Black Swift (*Nephoecetes niger*). All except the most recent records are summarized by Bent (1940). The nest is generally composed of moss or ferns and mud, when situated next to or behind a waterfall, or made of sea weed and/or mud, when on a ledge on a sea cliff or in a sea cave. A single egg is laid.

The supposed universal use of saliva (Lack, 1956:2) in the construction of the nest by all swifts has been questioned seriously by Marshall and Folly (1956) and by Johnson (1958). It can be stated with certainty that no saliva was used in the "nests" of the White-naped Swift described in this paper.

Our interest in the White-naped Swift began in the summer of 1958 when one of us (Rowley) observed a group of about 30 of these birds in a barranca near Cuernavaca, Morelos, México. Additional studies were made on this group in the same locality by Rowley during parts of the summers of 1959 and 1960 with the hope of discovering the nest of this species. In the course of these three summers a total of 16 specimens was collected.

The members of the Cuernavaca colony seemed to be resident in the area during the periods they were under observation. However, in the early morning and late evening hours White-naped Swifts believed to belong to this same colony were observed several miles away, both in the high pine-covered mountains at 9000 feet near Coajomulco and along various tributaries of the Río Salado at 3000 to 4000 feet elevation. Neither a roosting nor nesting site used by these birds was ever located. The testes of one male taken between May 28 and June 20, 1960 (exact date not recorded), were preserved in alcohol and later measured 12 mm. each in length. The testes of a male taken on May 24, 1961, and preserved in alcohol later measured 7 mm. each. None of the specimens collected appeared to be immature.

In the latter part of the 1960 season an intensive search of the Río Amacuzác drainage was instituted because White-naped Swifts were observed flying up and down the waterways. This drainage has many tributaries and eventually ends in the Río Balsas after winding through a great part of the State of Guerrero. One of these tributaries is the Río Chontalcoatlán and it was along this river at about 3000 feet elevation that a breeding colony of these swifts was finally found in 1961. The region in general is heavily forested with a thick undergrowth beneath the trees. There also are many miles of steep cliffs along the water course. The latter is impossible to ford on foot in most places even before the arrival of the rainy season.

BREEDING ACTIVITIES

While visiting the Río Chontalcoatlán in 1961, a group of White-naped Swifts was seen to enter one of the many caves along the side of a barranca on May 30. Fortunately, on this date the river was low enough to ford, although with some difficulty due to the strong current, and the cave was entered. After going about 150 feet inside the cave, mostly through water averaging three feet deep, a few side caves were seen. The formation, composed of limestone and sandstone, was a maze of small holes with some large-sized cavities up to three feet in depth. It was possible to penetrate into the recesses of this cave an additional 100 feet, because of the low water level, to a point

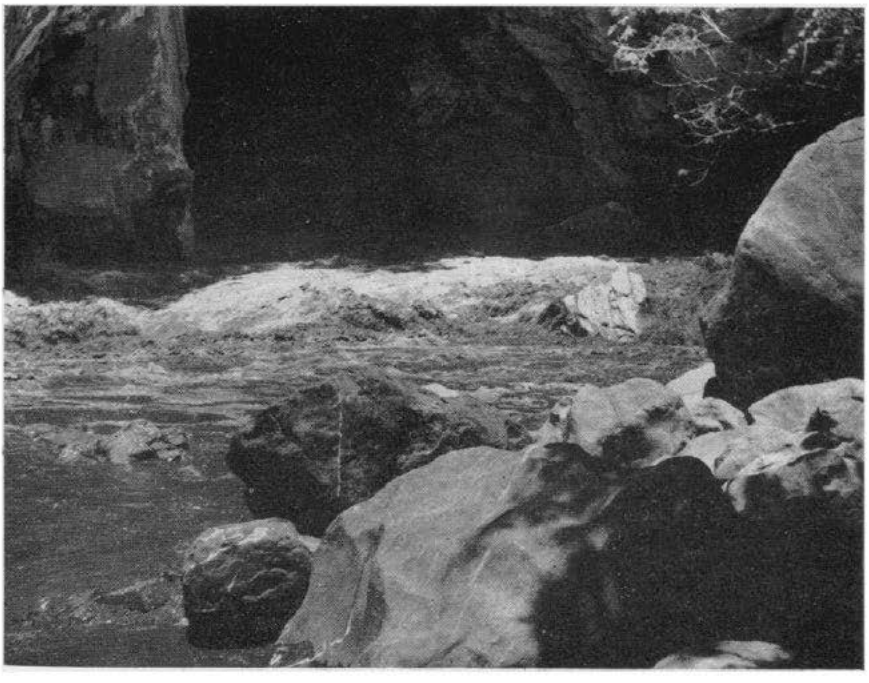

Fig. 1. Entrance to the nesting cave on June 18, 1961, after the start of the rainy season.

where practically no light was present. By directing a lantern toward the ceiling, which was about 30 feet above the water level, some 50 swifts were seen, all in a series of vertical rows, clinging to a rounded part of the wall. Six specimens were collected, four males and two females. When the gun report sounded, 108 birds were counted by another observer as they flew out of the mouth of the cave. Others were seen inside and more were heard deeper in the cave but it was impossible to penetrate farther because of deep water and intense darkness. It was conservatively estimated that this cave contained 200 individuals on this date. The testes of two of the males collected and preserved in alcohol later measured 18 mm. and 16 mm., respectively.

Twelve nests were discovered in a group of cavities about 25 feet above the floor of the cave. The nests were concentrated in an area about 15 feet long. It was possible to reach them by means of a sloping ledge. Each nesting cavity averaged six to eight feet in depth and was sufficiently wide to permit a person to climb in. Whenever an entry was made into one of these cavities, the adult bird flushed from the eggs and flew out into the main cave, calling. The vocal utterances, which were repeated rapidly

10 or 12 times, might be phonetically described as *cree-cree-cree*. These sounds were produced while the birds were clinging to the walls of the cave as well as when they were in flight. The disturbed birds flew deeper into the main cave rather than toward the entrance.

About 50 feet farther back in the cave from where these nests were situated another cavity about 15 feet above the floor was found. It was 15 feet deep and sufficiently wide to permit the passage of a human body. Here, in essentially total darkness, there were several rocky shelves and four more nests, within six feet of one another.

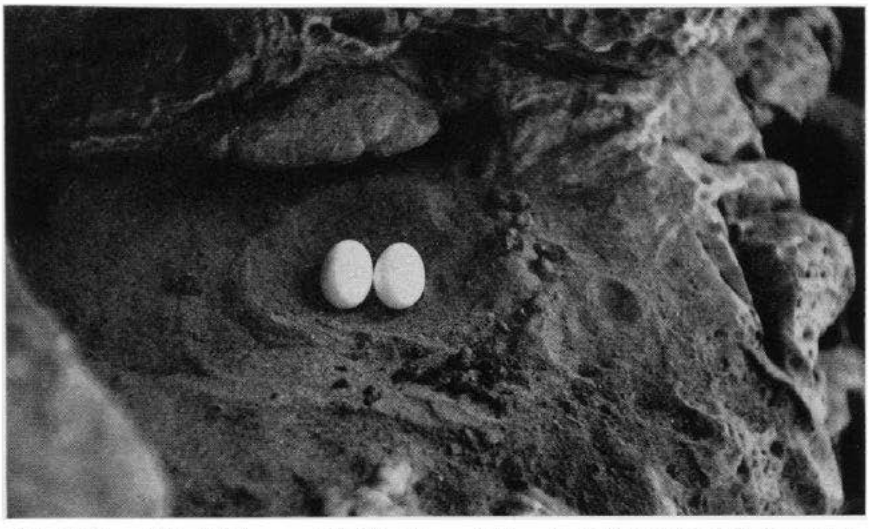

Fig. 2. Eggs of the White-naped Swift laid in a shallow depression in dry sand on a ledge in the cave. Some excrement can be seen around the margin of the depression.

All nest sites examined on this day held two eggs each. Two sets were slightly incubated; the rest were fresh. The eggs are pure white and unmarked. The smallest measures 30 × 21.5 mm. and the largest 43 × 28.5 mm. The eggs were situated in shallow depressions made by the birds in the dry, powdered sandstone on the ledges. Considerable excrement was mixed in with the sand surrounding the eggs. This seemed to be responsible for the dirty appearance of the latter. The only sign of outside material having been used was the presence of three fresh leaves partly covered with sand at one nest site.

The floor of the cave beneath the entrances to the nesting crevices consisted of sandbars and beds of rock and gravel which undoubtedly were covered with several feet of water during the rainy season. After examining the nest sites and securing representative sets of eggs, the observer sat quietly on one of the sandbars and watched the behavior of the swifts. About one dozen individuals were seen to fly, in what were believed to be pairs, to the upper part of one side of the cave. There they clung to the surface of the rock about 30 feet overhead. The wall was so slanted at that place that the main axis of the body of each resting bird was at an angle of about 40° from the vertical with the back facing downward. Several pairs were observed copulating at the roost. At such times the male clung to the female in a nearly upside down position and fluttered his wings. Chattering sounds were made by both members of a pair. Later, outside of the cave, it was believed that pairs were copulating while in flight. On occasions two individuals in flocks swirling several hundred feet in the air could

be seen to join together and descend rapidly toward the earth for several seconds. Following this they would separate and rejoin the group above.

On June 5, 1961, the nesting cave was again successfully entered and several nests which were left undisturbed on May 30 still contained two eggs each. One "nest" or depression from which a set of two eggs had been taken on the latter date contained one fresh egg.

A sandbar at one place on the floor of the cave was found to contain a layer of swift excrement covering an area approximately four by twenty feet, thus indicating a well-used roost above. Six broken eggs were found mixed in with the droppings. These eggs probably had been dropped by females very early in the nesting season. The position of the sandbar covered with excrement was such that it would be beneath several feet of flowing water as soon as the rainy season started. For this much excrement to accumulate since the previous October, which marks the beginning of the dry season in this region, the cave would have had to have been occupied by swifts for most, if not all, of the year. There was no indication that these large communal roosts are occupied during the nesting season when the birds are paired and, for the most part, scattered through different parts of the cave.

On June 18, 1961, an attempt was made to return to the nesting cave but the arrival of the rainy season made this impossible. The river in front of the cave that had been forded earlier in the month was a raging, muddy torrent running approximately 10 feet in depth. While watching the entrance to the cave on this date, a flock of about 25 White-naped Swifts flew silently through the entrance and disappeared. It was thought that they were probably returning with food for newly hatched young.

FOOD AND PARASITES

The upper portion of the digestive tract of a White-naped Swift (CAS ♀ 62271) collected near Cuernavaca on July 20, 1960, was preserved in alcohol because it was found to be full of insects. Examination later showed the entire esophagus, from a fringed valve situated immediately behind the glottis to the entrance to the proventriculus, to be distended with food. It measured 100 mm. long and throughout most of its length was 26 mm. in diameter. One thousand and seventy-two well-preserved insects, contained in this crop-like structure, were identified as follows:

Hymenoptera
- Fire ant (*Solenopsis geminata*), ♀ ♀ 392, ♂ ♂ 289
- Ichneumonidae, 2

Homoptera
- Sharpshooter leafhopper (*Draeculacephala minerva*), 391

Hemiptera
- Pentatomidae
  - Pentatominae, 4
- Cydnidae
  - Cydninae, 1
- Coreidae
  - Alydinae, 4
  - Coreinae, 3
- Pyrrhocoridae, 3
- Lygaeidae, 4
- Fam. undeterm., 1

Diptera
- Bibionidae, 3
- Dolichopodidae, 1
- Fam. undeterm. (part of specimen), 2

Coleoptera
- Chrysomelidae
  - Eumolpinae
    - *Nodonta* sp., 1
  - Cassidinae
    - *Chelymorpha* sp. 1

A number of lice secured from the feathers of this same swift were subsequently found to represent a new species, *Dennyus semicollaris*, described by Price and Beer (1962) of the University of Minnesota.

GENERAL BEHAVIOR

Since nothing has been written on the behavior of this species of swift, which was known from only eight specimens at the time that Part I of the Mexican Check-list (Pacific Coast Avifauna, 1950) was published, it seems worthwhile to present a few observations made during the summers from 1958 to 1961. In general these birds were seen most often in the early morning and evening at which times they flew in groups, composed of from six to ten individuals, up and down the various canyons or barrancas. As evening progressed the groups broke up and the birds flew separately. Such flight, presumably after insect food, continued until it was too dark for the observer to discern the birds in the air. Unless disturbed, no swifts were seen flying between about 10 a.m. and 3 p.m.

When flying in a flock, a group would frequently circle or swirl and then dive steeply in rather close formation toward the tree tops or the waterway beneath. At the bottom of the dive they turned and rose almost vertically to the cruising or circling level. The birds called quite loudly during these group flights whereas in the late evening when flying singly they were silent. The diving behavior was thought to have some sexual significance as occasionally after the dive was completed and horizontal flight was once again resumed, individuals would lock together in the air and appear to copulate.

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SUMMARY

The White-naped Swift differs from all other known members of the suborder Apodi in failing to construct a nest of any sort. It merely deposits the eggs in a depression in dry sand on ledges deep within a cave. Two white eggs are laid. The birds are colonial with the nests sometimes close together. The nesting cave described here was along the Río Chontalcoatlán in Guerrero, México, where fresh eggs were found on May 30, 1961.

These swifts forage in groups, generally composed of no more than about 10 individuals, in the early morning and late afternoon. In the evening, as darkness approaches, the groups break up and the birds fly separately.

Because of the distinctive nesting habits of the White-naped Swift the authors feel that it should not be included in the genus *Cypseloides*, as defined by Lack, until more detailed anatomical studies are made of its relationship to other members of the subfamily Chaeturinae.

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