THE "DOWNY" NESTLING PLUMAGE OF SWIFTS OF THE GENUS CYPSELOIDES

By CHARLES T. COLLINS

Owing to the inaccessible or remote nest sites of most swifts, the early life history of many species of this group has been poorly studied. Our present information indicates that all swifts (Apodidae) are hatched without any traces of natal down (neossoptiles) and the first teleoptile plumage closely resembles that of the adults. There are two notable exceptions to this pattern, both in the genus *Cyseloides*. Dixon (1935: 267) stated that a recently hatched chick of the Black Swift (*Cypseloides niger*) was "bluish black in color" and that "there was not a bit of natal down on its body." He described an older nestling (p. 265) as being "covered with dark, slaty natal down, through which protruded the primaries and tail feathers." Legg (1956:183) in his study of a sea-cave nest of this same species made similar observations. The recently hatched young swift was "black-skinned, naked, [and] helpless . . . ." but "at an age of approximately two weeks, the nestling was completely covered with heavy down, and unopened feathers were present on the wings and tail." More recently Snow (in press: table 5) has recorded a similar sequence for the Chestnut-collared Swift (*Cypseloides rutilus*) found nesting in Trinidad. Snow observed that the skin of a newly hatched young of *rutilus* was "pink" and not black as in *niger*. Recently Wetherbee (1961:87) has stated that the "down" of these swifts is probably "*not* natal down, but emerging teleoptiles." While studying the development of nestlings of *rutilus* in Trinidad in the summer of 1962 I was able to obtain additional information on the plumage of this swift and the nature of the nestling "down."

DESCRIPTION

Although there is a complete gradation between plumaceous and pennaceous feathers, Van Tyne (Van Tyne and Berger, 1959:73) recognized the semiplume as a distinct feather type. These loose-webbed feathers have a definite rachis, barbs, and barbules, but lack hamuli (barbicels). Semiplumes are particularly numerous along the margins of the pterylae and are occasionally found in the apteria. Examination of skins and preserved material of adults and nestlings of *rutilus* indicates that the nestling "down" of this species consists entirely of the semiplume type of feather (fig. 1). Microscopic examination indicates that these feathers in fact lack barbicels. The proximal barbules often have an elongate strap-like base which imparts a pennaceous appearance to the medial portions of the vane (fig. 2). The distal barbules have a reduced base and lengthy pennulum (Chandler, 1916:253) which occasionally has prongs at the nodes. An aftershaft is present on the semiplumes as on most contour feathers in these swifts.

The most recent work on the pterylosis of swifts is that by Clark (1902, 1906) which was bitterly criticized by Shufeldt (1902). From an examination of preserved specimens I believe that the pterylosis of the Chimney Swift (*Chaetura pelagica*) drawn by Clark (1906:fig. 1), which was felt by him to be representative of all swifts, is very similar to what was observed in *niger* and *rutilus*. I do not however believe that it is representative of the family, as specimens of two species of *Chaetura* which I examined, including *C. pelagica*, show substantial variation from this figure as do those of Nitzsch (1867:3) for the European Swift (*Apus apus*) and Thompson (1901:315) for the White-rumped Swiftlet (*Collocalia spodiopygia*). In *rutilus* the semiplumes are found for the most part on the margins of the pterylae. They are on the lateral edges of the spinal tract and also the borders of the spinal apteria. Similarly, both lateral and medial

margins of the femoral and ventral tracts have these feathers. The humeral tract however has semiplumes only on the medial margin. In the anterior cervical, crown, and throat regions semiplumes are dense and in a few cases seem to be irregularly spaced between rows of contour feathers. There appear to be few, if any, of these semiplumes on the wings and they are absent from the crural tract and the coronal-frontal region. There are a few semiplumes in the dorsal apteria. Chandler (1916) and Nitzsch (1867) record the presence of down in the body apteria of *Cypseloides niger* and *Apus apus*, respectively. In the case of *niger* at least it is probable that semiplumes were observed.

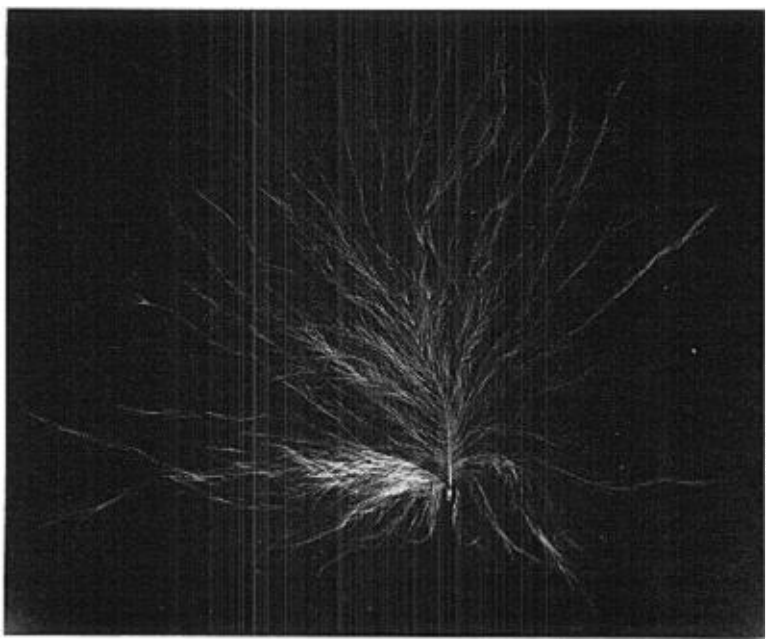

Fig. 1. Semiplume from twenty-six-day-old nestling of the Chestnut-collared Swift (*Cypseloides rutilus*).

Information on the growth of these semiplumes was obtained from eleven nestlings of *rutilus* in Trinidad, during the summer of 1962. The young are hatched naked but the incoming semiplumes may be observable as subcutaneous dark dots. By the second or third day after hatching all nestlings show these dots which by the fifth or sixth day are streaks 1 to 1½ mm. long. The semiplumes are freed of their sheaths for more than half their length shortly after they erupt from the skin, and thus the nestling soon takes on a downy appearance.

Erupting first on the eighth or ninth day the semiplumes reach full length of about 13 to 14 mm. by the nineteenth day after hatching and are entirely freed of their sheaths by the twenty-sixth day. A nineteen-day-old nestling is shown in figure 3. The semiplumes are covered by the emerging contour feathers at about the twenty-eighth day after hatching. The longest semiplumes are on the back and rump while the shortest ones are on the head and underparts. This agrees exactly with the description of the "down" on a nestling of *niger* (Bent, 1940:262). In addition to being shorter, the semiplumes bordering the ventral tract do not appear until several days after such feathers appear on the dorsal surfaces. The normal contour feathers begin to erupt through the

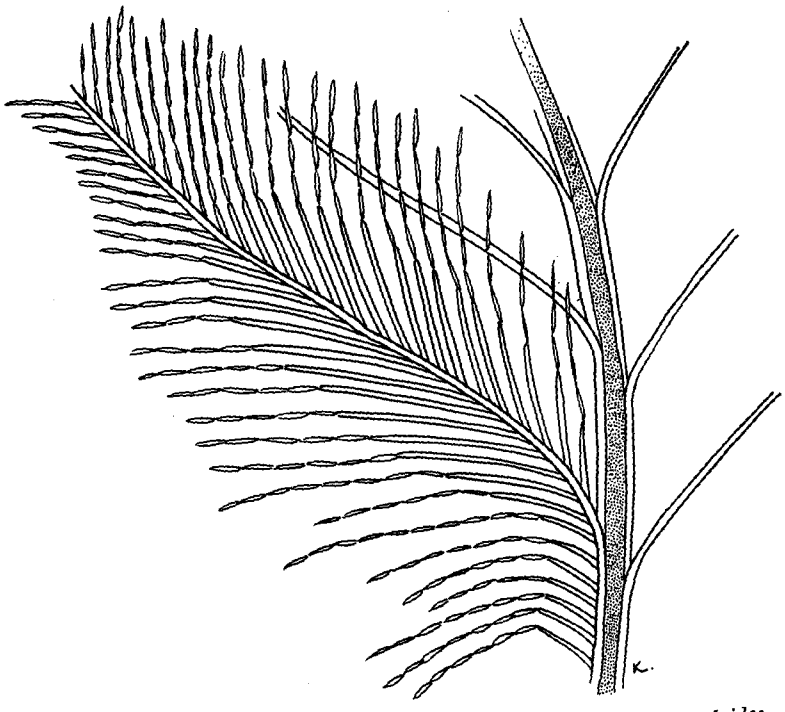

Fig. 2. The barb of a semiplume from a nestling of *Cypseloides rutilus* showing strap-like base of proximal barbules.

skin at about the tenth day and reach full size about the time of fledging, 35 to 40 days after hatching. The semiplumes are retained in the adult plumages although they are often badly abraded.

DISCUSSION

Legg (*fide* Wetherbee, 1961) speculated that down-like plumage is an adaptation to the moist and cool environment of the nest. My observations on *rutilus* support this view. The adults closely brood the nestlings for the first ten days by which time the semiplume covering is 3 to 4 mm. long. Thereafter the nestlings are infrequently, if at all, brooded during the daytime. Prior to the appearance of the semiplumes, nestling body temperatures quickly drop to nearly the environmental level (20° to 25° C.) if left unbrooded. As the nestlings grow older, the body temperature they maintain, when not being brooded, gradually increases. However it is not until about the time that the semiplume covering reaches maximum length that the nestling swifts maintain an adult level of body temperature.

Swifts of the genus *Cypseloides* utilize a nest site which is inaccessible to most predators. However in so doing they have encountered a very cool and damp environment in which to raise psilopaedic altricial young. Selection in accelerating the growth of the semiplume portion of the teleoptile plumage has compensated for the lack of natal down in these swifts. Very probably this aid to thermoregulation plays an important role in their ability to exploit this more inaccessible nest site with its rigorous environment.

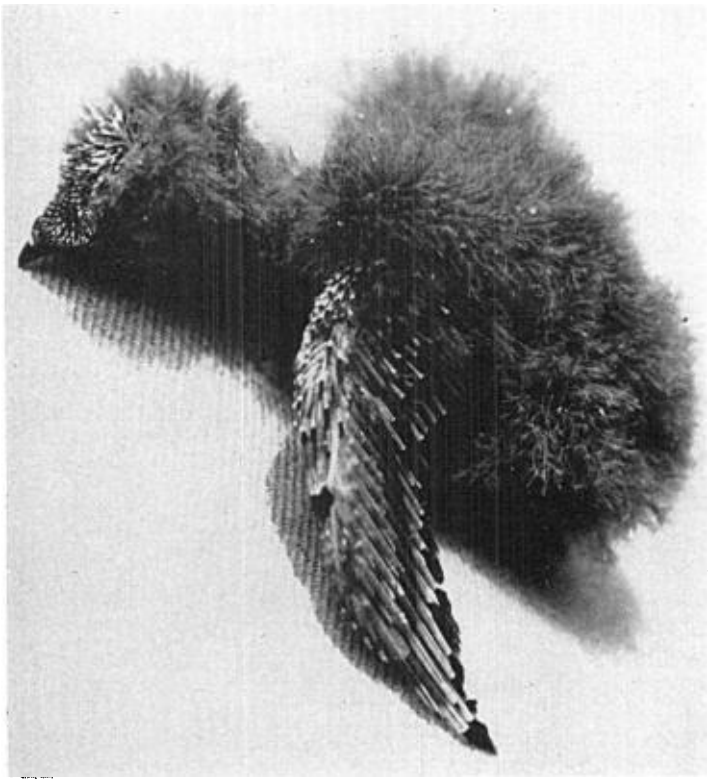

Fig. 3. A nineteen-day-old nestling of *Cypseloides rutilus*.

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SUMMARY

Swifts of the genus *Cypseloides* have been noted as having a covering of "down" although being hatched naked. In the nestlings of *C. rutilus* this "down" consists of the plumaceous semiplume portion of the first teleoptile plumage. The distribution, morphology, and growth of these semiplumes is discussed. Additional data obtained indicate that this semiplume covering may be a substantial aid to thermoregulation in nestlings of these swifts, enabling them to withstand the rigorous environment of the nest site.

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