THE CONDOR

A Bi-Monthly Magazine of
Western Ornithology

Published by the
Cooper Ornithological Club

VOLUME XXVIII | MAY-JUNE, 1926 | NUMBER 3

THE HABITS OF THE SWIFTS IN YOSEMITE VALLEY

WITH THREE ILLUSTRATIONS

By ENID MICHAEL

THE RARE Cloud Swift (*Cypseloides niger borealis*) was noted more often in the Yosemite Valley the past year (1925) than ever before. On the morning of July 13, I happened to be on one of my weekly trips to the rim of the valley when, passing through the mist, I paused to watch the dancing rainbow colors in the veil of Vernal Fall. As I stood watching the play of color, and incidentally catching my breath after the hurried climb, a group of swifts dashed silently into my range of vision. At once I realized that they were Cloud Swifts and of course became all eyes, for I expected them to disappear as suddenly as they came.

The birds were coursing back and forth through the mist, occasionally rising above me and then swooping below me. At times a dozen were in the air at once. In the shadow of the cliffs they appeared dull, sooty black, but when they flashed into the sunlight they often appeared almost white. They looked much larger than White-throated Swifts, but it so happened that the only white-throats in the neighborhood at the time were sailing in the high skies, far above the Black Swifts, and so no true comparison could be had. However, it was noted that the Black Swifts had squarish tails which, as the birds turned and dodged about, were spread into broad fans, while the White-throated Swifts appeared to have keenly pointed tails. To me, the flight of the two swifts was similar. In the larger swift the wild, erratic dives and leaps were somewhat subdued, the tilting from side to side less violent; but there was not the slightest suggestion of leisure. The birds did not hurry away as I expected, but continued to sail back and forth across the canyon. Sailing through this heavy mist-filled atmosphere they could not have been feeding. Was this, then, their method of bathing?

At times, swifts were below me so that I could look down upon their backs, at other times they rose high so that I could view them in silhouette against the sky. The wing twinkle of these birds was very like that of the White-throated Swifts; but it was noted that while they flew in a general company they were also decidedly set apart in pairs. A group of sailing White-throated Swifts mingle more freely and more confusingly. These flying pairs of Cloud Swifts kept within a few feet of one another and often they almost touched wings. Only once, however, were birds actually seen to embrace in the air, and on this occasion they only clung together for an instant. White-throated Swifts we have seen cling together and pin-wheel down through the air for a distance of five hundred feet.

While I was visiting with the swifts I was joined by one of my party and together we watched the birds. With our eyes following two of these fleeting birds we were amazed to see them dash through the mist and come to perch on the perpendicular

face of the wall ten feet from the fall. While studying these two birds we discovered five more clinging to the wall. Some of these birds remained motionless for many minutes, others kept coming and going. Occasionally a pair of birds would hurtle out of the mist together and, coming to the perching wall, they would alight one above the other, perhaps several feet apart; then the lower bird would scurry up the wall to a point on a level with the higher bird, and here the pair would cling motionless and silent for many minutes. At one time there were four birds equidistant and on a perfect level. Occasionally birds coming to the wall would utterly disappear. At first we thought that they were diving into a crevice, but finally we came to the conclusion that they were simply coming to perch behind a projecting ledge. For thirty minutes we stood watching the birds, and in all these many minutes not an uttered sound was heard. This speechless racing through the air would alone set the Black Swifts apart from the white-throats, who are always very noisy in their games of aerial tag.

Climbing on, we came to the railing at the top of Vernal Fall. Down below us the swifts still sped their erratic way through the mist-filled atmosphere. Following with our eyes a pair of birds that dashed across the canyon on a level with us, we discovered a new perching wall. This wall was also sheer, moist and shaded. Across the face of this cliff was a narrow ledge from which ferns hung. The birds coming to perch usually alighted just above the fern ledge. Before leaving they would creep rapidly upward a few feet, fall backward into a sweeping turn, dropping several feet before their wings would twinkle into action. One by one we watched the birds drop off from the wall, and when the last bird was gone we looked off down the mist-filled canyon; then we realized that the Black Swifts had left the neighborhood, vanished as mysteriously as they had come.

A week later, after a great cloudburst in the back country, we again visited Vernal Fall. A mad, muddy torrent swept over the lip of granite, and the lower gorge was fairly choked with fleeting mist. We were much surprised to find the swifts present again, dashing through the heavy spray to perch on the wet wall. We learned nothing new this trip. The heavy mist discouraged any lengthy visit with the swifts, and besides, we wished to have a look at the plunging Nevada Fall.

Our next visit to Vernal Fall was on July 27. The swifts were still present, apparently no less in number. The water of the fall had receded much during our week's absence, and now the mist was thin and vapory. Birds were coming and going as on the occasions of the previous visits. They were perching on the same wet wall beside the fall, and a few were actually clinging to the wall directly behind the falling curtain of water. From the distance of fifty yards the birds appeared to stick as limpets do to the wet rocks of a sea shore. Mr. Hugh Jedell, who was with me on this occasion, produced a pair of powerful binoculars. With the aid of the glasses the swifts could be more clearly seen; they were not now sticking to the wall as limpets, but their bodies were held slightly away from the wall, with not even their tails touching. The position they held on the wall gave them the appearance of being slightly sway-backed. Today a few of the birds were perched well up on the wall and near where the waters of the Merced plunge over the lip. By climbing to the top of the fall we thought that we might, by leaning well out over the railing, get a close view of a bird. When we tried this, however, we found the wall slightly overhung and the birds hidden from view.

The great step over which Vernal Fall tumbles is broken in such a manner as to leave a dark cavern, or tunnel, through which one may crawl. Following the steep angle of this tunnel one drops about fifteen feet to come again into the light of day on a narrow ledge, but a few feet from the falling water. Taking advantage of this

tunnel we were able to approach within twenty feet of a perching swift. The fact was verified that the bird did not actually hug the wall. His strong toe nails were hooked to some tiny support and his entire tarsus rested firmly against the wall, thus holding his body and tail free. Silver-tipped feathers on the crown of this bird marked out rather obscure superciliary stripes; otherwise there were no apparent contrasting colors. The large dark eye of this bird was deep-set and had a look of keen intelligence. The beautifully rounded head set well on the body, and somehow there was something about the bird strangely remindful of a sea-lion.

From our perch on the narrow ledge we could see many swifts clinging to the wall. Some were below us, others were straight ahead and behind the curtain of falling water. When our near neighbor fell backward from the wall and took to twinkling wings we left our aerie and climbed back to safer footing.

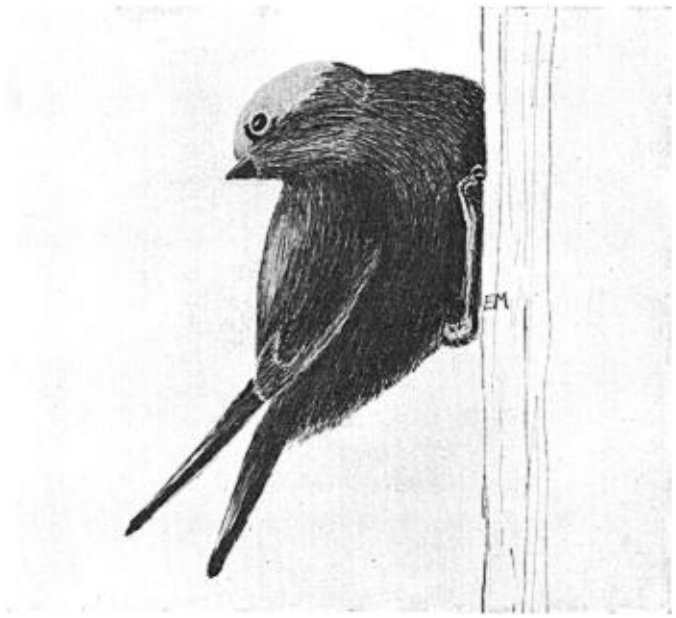

Fig. 32. CLOUD SWIFT CLINGING TO THE STEEP WALL BESIDE VERNAL FALL. DRAWN FROM LIFE.

Having had such close-up views of the Black Swift clinging to the wall, and after studying his pose and his peculiar manner of clinging to the wall—sway-backed, with his tail held free—the principle of his unusual mode of locomotion on steep surfaces began to dawn on me. My thoughts went back to White-throated Swifts that I had previously had opportunity to study, and it seemed to me that I now understood why it was that they could travel so well up a vertical wall, or across the under side of a horizontal surface, while they were helpless in going down a vertical wall and greatly handicapped on the level. The picture which I now had in my mind would also seemingly explain the swift's inability to rise from the ground. The diagram (fig. 34) accompanying this article is an attempt to picture graphically the idea that came to me that morning at Vernal Fall.

And now something of my experience with the White-throated Swift (*Aeronautes melanoleucus*): Twice have I had young of this species in my possession. The first one fell untimely from his crevice home and was too young to fly. The second one

was a mature bird but probably a young of the season. This second was found awkwardly scurrying about on the ground as though crippled. An examination, however, disclosed no injury, and so the bird was taken into a broad meadow and tossed into the air. Twinkling wings soon carried him out of sight and thus ended my experience with swift number two.

Swift number one I managed to keep alive for ten days, and it was from this bird that I got some notion as to how swifts behave terrestrially. This captive swift slept much of the time, but during his wakeful hours he was a very active bird: shoving and flopping along on his breast he could move rapidly. He was kept in a wooden box with a screened cover, where there were folded flannels into which he could snuggle away to sleep. When awakened he would set out at once to explore his box. He could crawl up the vertical wall of the box without the least difficulty, and one of his favorite stunts was to race about, back down, on the under side of the cover screen. This screen was ordinary mosquito-proof netting. When the screen cover was removed he would scurry up the wall of the box and topple headlong onto the floor.

Fig. 33. WHITE-THROATED SWIFT, SHOWING HEAVY, HOOKED CLAWS IN USE.

No sooner had he hit the floor than he would begin to skid about on his breast, using his feet as propellers. He had a fancy for dark cracks, and if he should find such a place he would surely disappear. Best of all, he loved to crawl up one's sleeve to snuggle warmly under one's arm. He had very strong feet and claws like a mammal. When attached to one's garments he clung tenaciously, and each hooked toe nail had to be pried loose before he could be removed.

From my observations of the captive swift, and of White-throated Swifts in general, I got the notion that: should the crevice selected by a colony of nesting birds be approximately level the birds on entering the crack would turn back downward to scurry across the ceiling, but should the crevice have a steep upward pitch the birds would be equally at ease on either ceiling or floor of the crack. Also, I am inclined to believe that where available the upward pitching crevice would always be selected, for such a site would give the departing birds added momentum as they plunged into the air.

The terrestrial locomotion of the swift, its position and movement on surfaces of different inclination poses a problem, a solution of which is here offered: The tarsus of the swift is assumed to be permanently bent at a right angle to the leg, without play, functionally if not anatomically, at the tibio-tarsal joint. The thigh joint is assumed

to be similarly fixed. The reasons for these assumptions will be set forth hereafter. These assumptions granted, the swift may be represented as a block of wood furnished with a hook (corresponding to the bird's claws) by which it may be attached to a surface. The behavior of such a block as shown in the diagram (fig. 34) should be the same as the behavior of the swift in analogous positions.

The greater weight of the swift's body is forward of the heel of the tarsus; therefore the weight of the body in relation to the toe hold is such that when the bird is in

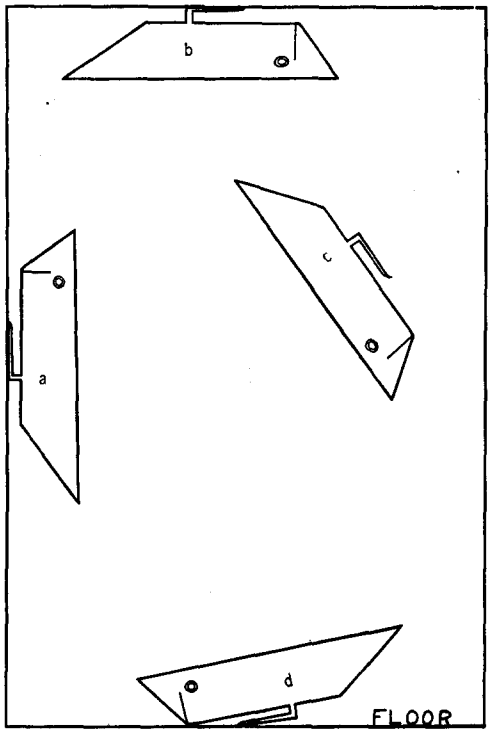

Fig. 34. DIAGRAM TO HELP IN ACCOUNTING FOR BEHAVIOR OF WHITE-THROATED SWIFTS IN DIFFERENT POSITIONS. SEE TEXT.

a natural position on a steep incline, or on the under surface of a horizontal plane, this weight brings the principle of leverage into play, causing the greatest pressure to bear on the heel of the tarsus. In the case of creepers and woodpeckers it is also the principle of leverage that makes it possible for them to tread up a vertical surface or to progress on the under surface of the horizontal; but here the pressure is not thrown on the heel of the tarsus, but rather on the third leg of the tripod in the form of stiff tail feathers.

In figure 34, *a* represents the swift walking upward on a perpendicular surface; *b* represents the swift traversing a ceiling surface. In both cases the weight of the swift's body is thrown on the ankle, or heel joint of the tarsus, the strong, rat-like claws are securely hooked, and the full length of the tarsus rests against the surface. The letter *c* represents a swift that has attempted to come down a vertical wall, and *d* represents a swift on a level surface. In both *c* and *d* the power of leverage in

favor of the swift's locomotion is nullified. Now, a claw on the heel of the tarsus, functioning as a toe, would enable the swift to maintain its balance in a downward course, or even on a level surface; but lacking such a handy attribute the swift must pitch forward when caught in such positions. The fact that the swift does pitch forward when on a level surface would seemingly account for this bird's inability to rise from the ground as do ordinary birds.

Yosemite, California, January 28, 1926.

AVIAN GONADS AND MIGRATION

By W. H. BERGTOLD

I HAVE VOICED my conviction, in a previous communication (Condor, XXIV, May, 1922, p. 82) that a large amount of valuable data is lost each year through the failure of collectors and preparators to utilize every mensural character of a freshly collected bird. The following contribution is based on an endeavor, made by myself during the recently past few years, to be consistent with this conviction. The data here published form a small but real addition to avian biology, and they have been gathered with ridiculous ease and with the aid of only a little extra equipment, paraphernalia which have served for both table and field purposes. This simple addition to a collector's outfit has been described in the above mentioned prior communication. Beginning in 1916, all male birds collected by me have been utilized to furnish the usual measurements of external characters, and have also contributed the body weight and the weights of the gonads.

The periodic hypertrophy and atrophy of birds' gonads has long been well known to collectors and to students of avian anatomy. Nevertheless the very remarkable increase in size of a bird's spermaries each spring does not cease to be a startling phenomenon; and yet, so far as I have been able to learn, nothing has ever been published which shows just how great this increase may be, when measured by some definite standard. A determination of the extent of this increase is not only of biological value *per se,* but it may shed light on other difficult problems in ornithology.

Table No. 1 gives the body weight and the combined gonads' weight of fifty-eight bird individuals, a series embracing forty-five different species; also the date of collection, the proportion of gonads' weight to body weight, and the "fold" increase (when possible to compute) in weight, of the active over the resting glands.

It is self evident that a considerable period of time is required for the change from complete atrophy (inactivity) to full hypertrophy (activity), and that the season of this period will vary somewhat, according to latitude, altitude and species. It is assumed that, for *most* of the species listed, and occurring in and about Denver during the nidification period, the active gland increase occurs from April to August (inclusive). However, it is more than probable that this does not hold true with such species as the Magpie, Clark Crow, Chickadee, Great Horned Owl, and Screech Owl, some of which may breed as early as February. This fact must be considered in the conclusions to be drawn from the data herein submitted.

The date of collection of a given specimen is recorded because it permits one to judge whether or not the bird had the maximum gonad weight attainable in the breeding period. It is obvious that one must judge, concerning this condition, largely by the date. Twenty-one of these fifty-eight birds exhibited spermaries so small that