

GENERAL NOTES

Cavity "excavation" by Cliff Swallows.—It is not unusual to find Cliff Swallows (*Petrochelidon pyrrhonota*) associating with Bank Swallows (*Riparia riparia*). At the onset of the nesting season, large numbers of Cliff Swallows may be found in or near Bank Swallow colonies, especially if the colony is in a high bank. There they flutter back and forth in front of burrow entrances, cling to the bank near burrows, and sometimes enter burrows. In view of the fact that Cliff Swallows are known to modify the nests of other birds for their own purposes, it is not surprising to find them building their jugs among or even in the burrows themselves. Indeed, this phenomenon has been reported by a number of authors. (For a review of Cliff Swallow nesting associations, see W. M. Mayhew, 1958. *Condor*, 60:21.) Usually, Cliff Swallows either use the burrow as found or modify the entrance more or less extensively by partially sealing it with mud or adding the entrance tube of a jug. It should be noted that reported modifications have always been additive, and we know of no previous report of Cliff Swallows excavating.

East of Lawrence, Kansas, the southern bank of the Kansas River is a steep, sandy cliff about three-fourths km long and three to five m high (depending on the river level) during most of the breeding season. Certain of the exposed strata are subject to intensive colonization by Bank Swallows (perhaps 1500 pairs in 1962 and at least 2000 pairs in 1964, when the colony split into two distinct portions). Cliff Swallows frequent this site both in the spring and in mid-summer following the breeding season and prior to fall migration. In years when Bank Swallows nest late and are still actively breeding in mid-summer, the Cliff Swallows display the same interest in the holes that is normal in spring. However, no attempts at nesting by Cliff Swallows were noted until 1962. On 1 June, one of us found a partially formed cup that was not in association with a burrow. Unfortunately, a few days later that portion of the bank slumped, destroying the cup. No attempt was made to renew construction. The colony was not observed in 1963.

In 1964, we observed the colony from 23 June to 10 August. At the time of first observation, the river was receding after a period of heavy rain. Bank Swallows began digging on 24 and 25 June. This was evidently a second effort, as later examination revealed abandoned burrows of the year, crushed eggs and nests, and one crushed adult. On 29 June, nine Cliff Swallow nests were found within five meters of each other. Most of them were partial jugs extending from or surrounding burrow entrances. One was simply a partially walled off burrow. Subsequently, two more Cliff Swallow nests were found about 10 m from the first. One of these was in an eroded slit in the bank and had required considerable vertical construction to seal the opening. In addition, a nest probably belonging to a Cliff Swallow, was found at the end of an enlarged, but otherwise unmodified, 0.5 m tunnel. The ceiling and walls of many Bank Swallow burrows near the jugs had been rubbed smooth, indicating entrance by the larger birds. Bank Swallows seldom, if ever, rub against the walls of their tunnels, and marks left from digging are clearly evident even after the breeding season.

More interesting than these nests were a number of large, semispherical chambers in the vicinity of the first nine jugs (Figs. 1 & 2). These ranged from 14 to 19 cm wide by 15 cm high at the opening. Entrances to nearby Bank Swallow burrows ranged from 7–9 cm by 5–9 cm. The walls of the large cavities were covered with numerous, fine, horizontal lines. On the ceilings, these lines were completed to form a pattern of concentric circles. Some of the cavities were surrounded by partially completed jugs.

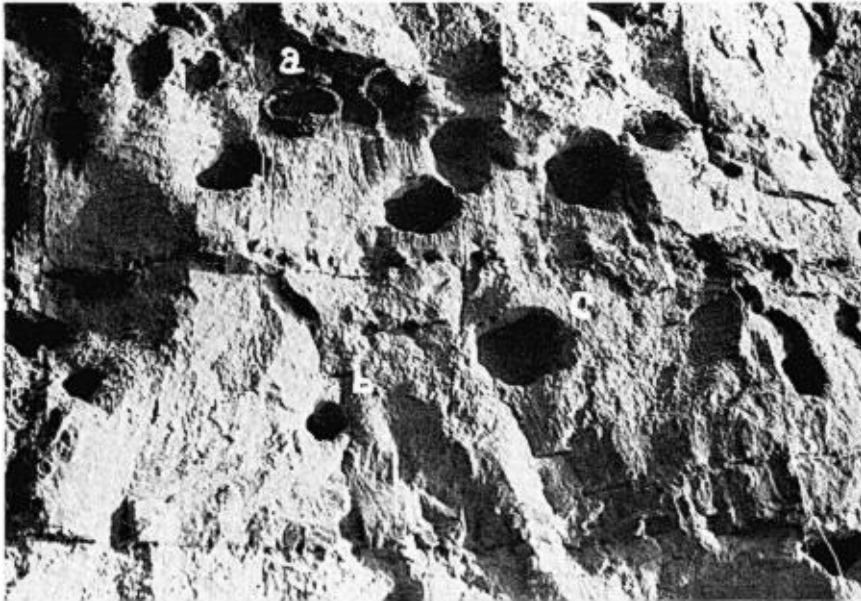


FIG. 1. A portion of the Bank Swallow colony showing: (a) a partially completed Cliff Swallow jug; (b) entrance to Bank Swallow burrow; (c) Cliff Swallow chamber.

Most, however, had no added mud. We learned later that some of the completed jugs were built around similar cavities. During the next few days, jug construction continued. Even though mud was abundant within a few meters of the nests, there were frequent attempts to steal pellets from other jugs.

Although we did not witness the initial stages of construction, we did observe Cliff Swallows behaving in a manner that would explain the structure of the spherical cavities. Several cavities were never closed off, and a few of these were occupied by birds that appeared to be unmated. At various times, these birds were observed to peck and, rarely, scratch at the walls and floors of their chambers. These motions did not appear to be very effective. On several occasions, a bird was seen to go to the center of the chamber and rotate rapidly while beating its wings, the primaries sweeping sand from the walls and ceiling. This "dancing" action would explain the fine, circular markings previously mentioned. At the time of our observations, the ceilings of the chambers were several centimeters above the birds' heads when they were standing erect and could be reached only with the tips of the primaries. More frequently, rotation was not accompanied by wing flapping. Rather, the breast was pressed and rubbed against the wall. One bird was observed pressing its breast against the wall near the entrance as if it were trying to push an irregular portion of wall out of the cavity. At no time was an attempt made to remove any portion of the wall by forming pellets and carrying them off. It is probable that both the sandiness and dryness of the substrate would have made any attempt to do so futile. Nor was there any good evidence of such slashing motions as are used by Bank Swallows.

We can be confident, to the point of certainty, that Cliff Swallows were not responsible

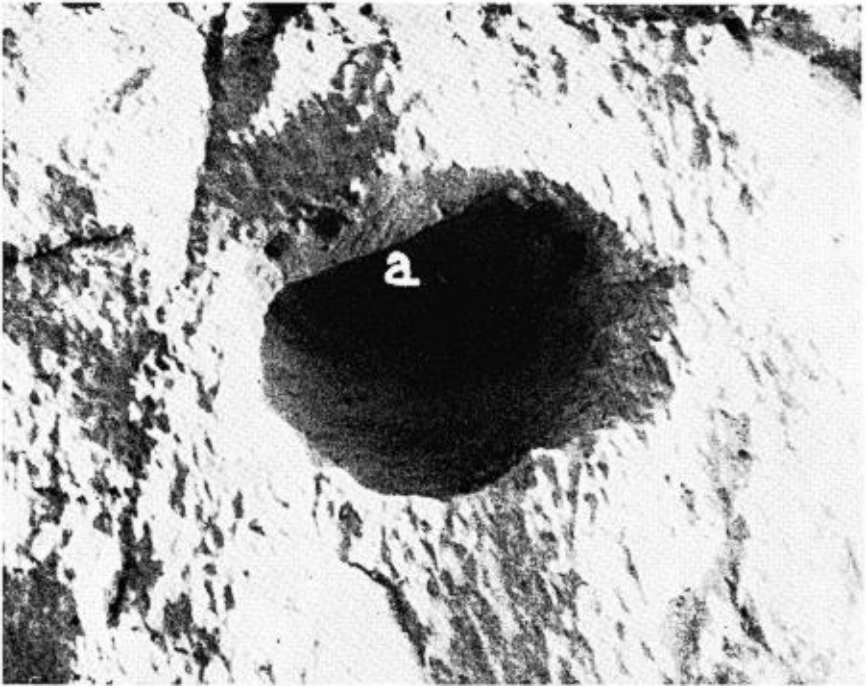


FIG. 2. An enlargement of "c" in Figure 1. Although the print is somewhat grainy, some of the fine lines left by beating wings are visible above "a."

for the initial stages of excavation. Neither in our observations nor in the literature is there anything to indicate that Cliff Swallows can, or will, attempt to begin a tunnel. As none of the large cavities had tunnels extending from the rear, they probably were not modified entrances to Bank Swallow burrows. Two possibilities remain: starts abandoned by Bank Swallows, and Bank Swallow nesting chambers exposed by slumping.

Bank Swallows make many false starts that are later abandoned. These may penetrate the bank a few millimeters or several centimeters. If these were used by Cliff Swallows, modification would have been extensive. Indeed, it is difficult to understand how so much enlargement could have been made by the techniques described without severe damage to wing and breast feathers. Of course, in the early stages the birds could have used the more rigid basal portion of the primaries and perhaps even the bony structure of the wing.

Exposed nesting chambers would require far less lateral modification. These chambers are sometimes exposed when a bank slumps in precisely the right plane. We have mentioned evidence for such slumping. The fact that all spherical cavities and jugs built around them were in close proximity strongly suggests such an origin. However, Bank Swallow nest chambers are never very high, being limited by the height to which the bird can slash with its bill. Thus, although these cavities would approximate the lateral dimensions of the spherical cavities, the vertical dimensions would be only half those described. Furthermore, exposed, unmodified nest chambers do not show the

described pattern of fine lines, but rather the heavier slash marks of the Bank Swallow's bill.

In either case, it is evident that Cliff Swallows modified the pre-existing structure. More important, the initial modification was subtractive, requiring some form of earth removal. Jugs were completed for only those cavities occupied by mated pairs.

Breeding success for the two types of nests was distinct. Whereas most of the sealed tunnels fledged young, several of the partial jugs and jugs sealing large cavities were destroyed by heavy rains on 11 and 12 July. Although none of the destroyed nests was found to contain nesting material, a smashed egg was found beneath one. The presence of eggshells beneath sealed tunnels with nests indicated hatching took place in these on 13 and 14 July.

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An instance of "white wing-barring" in the Common Crow.—On 2 October 1965, near Rockville, Montgomery County, Maryland, two Common Crows (*Corvus brachyrhynchos*) with white wing markings were seen flying together by Mr. James F. Dawe, who secured one of them. The specimen (USNM No. 481596) was prepared as a study skin; one wing was removed, spread, and prepared separately. Unfortunately, determination of its sex was impossible because the carcass was eviscerated by the collector.

The specimen is a bird of the year as indicated by its worn primaries and rounded, rather than truncate outer rectrices (Emlen, 1936. *Condor*, 38:99-102). Except for white in the remiges of both its wings, it is normal in color throughout. White occurs mainly on the inner vane of primaries 1 to 9 and secondaries 1 to 8; the outer vane of primaries 5 to 8 exhibits some white toward the base of the feathers along the rachis (Fig. 1). There is little relative difference in the size of the white area of the various remiges, although the streak of the inner primaries (1 to 3) and outer secondaries (1 to 4) is proportionally longer than in other remiges. The overall pattern of white in the wing is that of an interrupted broad bar or patch, which is visible only when the wing is spread (Fig. 1). This would have rendered the patch conspicuous in flight, but not when the bird was at rest.

The occurrence of white bars or patches on the wings of various European corvids (especially *Corvus corone* and *C. monedula*) has been abundantly reported by British authors (see literature cited by J. M. Harrison, 1957. *Bull. British Ornith. Club*, 77:84-85, and *ibid.*, 131-133). Although albino or partly albino Common Crows (*Corvus brachyrhynchos*) are not rare (see Cross, in Bent, 1946. *U.S. Natl. Mus. Bull.*, 191:235-236), we have found only one record (Warne, 1926. *Bird-Lore*, 28:110-116) of a crow with the white restricted to broad wing-bars or patches. Harrison (*loc. cit.*, 131-133) suggested that this phenomenon is of evolutionary significance, and stated (*loc. cit.*, p. 85) that the pattern "must of course be genetic and pied patterned genes must have come from somewhere in the long evolutionary ancestral history of the corvine forms." He further suggested that study of variant corvids "may well one day disclose important contributory evidence of their evolutionary history." As he noted, patterns involving white wing markings occur in a number of corvid genera, although only *Cyanopica*, *Dendrocitta*, *Podoces* and, especially, *Pica*, exhibit patterns very similar to that of the aberrant *Corvus brachyrhynchos* discussed herein. It seems logical that if these effects are indeed genetic, then recurrent mutation (possibly enhanced by inbreeding in local