NOTES ON BARN AND CLIFF SWALLOWS

By David E. Samuel*

Anyone who has done research on one species knows the intimate rapport you can develop with that species. I've reached the point where the sight of a Barn or Cliff Swallow in West Virginia is like renewing acquaintance with an old friend. Yunick (1970) spoke of swallows as "romantic travelers", as they are indeed, and while watching swallows each spring I can only wonder where each has been in those travels.

My swallow studies began in April 1967, in the many old barns and sheds located in Preston County, West Virginia, plus one Ohio farm (Fig. 1). Almost every building visited (Figure 2) contained old Cliff Swallow nest marks, as well as Barn Swallow nests. A few farmers in the areas were aware of this and commented on the occasional presence of "square-tailed" swallows nesting in their buildings. Many knew when each species arrived, how they constructed nests, etc. I was impressed with how much the land owners knew about, and their interest in, both of these swallows. One farmer indicated that the first Barn Swallow was the sign of the last snow in spring. Thus, with fine cooperation from landowners, I decided to study both the Barn and Cliff Swallow.

Barn Swallows arrive earlier than Cliff Swallows in the Eastern states (Table I). There can be many reasons for this difference, but any change in the weather can cause trouble for the early arrivals. For example, I noted, as has Ralph Bell (1962) some mortality of early arriving Barn Swallows during cold weather. One such occasion was a May 1st snowfall in 1967. As I reported (Samuel, 1971a) at least one bird died and all 10 birds in one particular barn left the area (or died) in the next 3 days. No such mortality occured for Cliff Swallows. In this same paper, I suggested that insect availability was the reason many swallows feed over ponds on colder days during migration. Since that time I've kept some "informal" data on where swallows feed during migration. From these scattered observations I find that on colder days swallows feed over water, rather than over land.

Banding was a problem at first. I foolishly attempted to use 9 meter nets placed outside the barns, but quickly learned that the swallows could see the nets. So, I went inside the barns, using 5 meter nets to capture adult Barn Swallows. Placing the net 5-10 feet inside the small barn or shed openings (Figure 2) worked quite well, and handling did not cause nest desertion (Samuel, 1970a). Cliff Swallows were a problem, as they nested right inside shed openings. Thus, I placed the nets outside the entrance and manually pulled it over the opening. Once one bird hit the net the whole colony would leave. Here again, handling had little effect on desertion (Samuel, 1970a). Banding Barn Swallows was not a problem as birds could be removed as captured. I'd open the net upon arrival, then check each nest in the barn for stage of construction, eggs or nestlings.

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Periodically I'd check the net and remove the birds, thus I seldom had more than 4 birds in the net at one time. Of course, each barn provided a different situation in banding. The cow milking schedule in one barn (late morning and late evening) altered my activities and the activities of the birds as well. This rare farmer was the only one I've ever known who "slept in" every morning.

Sexing birds was difficult, except when brood patches were evident in May, but certain techniques were successful (Samuel, 1971b). Problems were almost identical to those experienced by Yunick (1970) in his study of Bank Swallows. Other data were collected in an effort to sex birds during banding (Table II), but these simply reflect the different morphology of the two swallows.

Once many birds were banded and paint marked, the summer observation periods began. In many respects these days were relaxing, especially the evenings. When one is sitting on a green hillside, watching marked birds flitting in and out of the old abandoned barn, you can't help but relax. Thus, even though I had my tape recorder running as I hastely recorded data during this very active period, the evenings were serene. No cars, no people, no buildings, just the things which make this part of research so palatable, Occasionally a landowner would join me, asking thoughtful and most interesting questions about the birds residing in his barn. Why do you paint mark birds? Why do Cliff Swallows feed higher than Barn Swallows? Why do Cliff Swallows nest in different parts of the barns than Barn Swallows? What do all the different calls mean? Some of these I could answer, others I could not. One fact which the farmers usually enjoyed was in knowing the number of birds raised in their barn per year. For some the figures were over 100, and these farmers were proud of this fact. Economic loss did not bother the farmer if his swallows were threatened. One dairy inspector insisted that 20-30 Cliff Swallow nests would have to be removed from the barn if his milk was to be sold. The farmer resisted; the inspector agreed; the swallows remained. The amazing thing was the lack of aggression the Cliff Swallows exhibited. Rarely did they so much as give an alarm call. No such interactions took place between Barn Swallows and House Sparrows.

Most of the data on breeding biology has been discussed elsewhere, but one aspect of Barn Swallow reproduction is most interesting. We note from Table III that in the majority of all 1967 nests, first eggs were laid in the weeks of May 21 to June 10 (65.5 percent of the total). However, in 1968 nesting was more evenly distributed. Many factors, perhaps weather, could be responsible for these differences. I did not have sufficient numbers to tabulate Cliff Swallow data in a similar manner.

When two similar and sympatric (occupying the same area but not interbreeding. Editor) species nest in close proximity, mechanisms

which prevent competition have evolved. I was interested in determining how competition was kept minimal and so I spent time observing the two species of swallow feeding. It had already been shown (Moody, 1968) that differences in insect diet occurred. One indirect measure of diets may be obtained by measuring bill size, and differences have been shown for other sympatric species. However, bill sizes of museum study skins were not significantly different (Table IV). I did observe, however, a difference in feeding height; Barn Swallows feeding lower than Cliff Swallows, but neither this vertical stratification nor the reported diet differences were reflected in bill size differences.

No group of birds has benefitted more from man than swallows. Boxes, barns, cut hillsides and even saw dust piles have provided nesting areas for all eastern swallows. How did use of such sites evolve? One can only surmise. But the nesting sites of Cliff Swallows in West Virginia raise many unanswered questions on the use of man-made structures for nests. Forbush and May (1939) stated - "the belief was quite general at one time that the Cliff Swallow, finding both shelter and strong points of attachment for their nests under the eaves of the rough buildings of the early settlers, gradually moved eastward from the Rocky Mountains and so settled in the Northeastern states and the Southeastern provinces. Probably, however, they were already established in this area on some of the rather infrequent cliffs of the eastern country, which they forsook later to take up their residence under the protection afforded them about dwellings of mankind, wherever clay or mud could be found sufficiently adhesive to answer their purposes." Such an explanation seems reasonable, but why these birds nest inside barns in our area and under eaves of buildings in many other areas of the East and Midwest is a mystery. Not only the 90 nests, but also many hundreds of old Cliff Swallow nest marks were found inside barns and sheds on my area. I guess it's true of most research, in that more questions are raised than are answered. And yet all the research in the world is not needed to appreciate the beautiful and graceful swallows.

Many EBBA readers and banders provided data, ideas, and encouragement during my work. These include Ralph Bell, Fred Schaeffer, George Hall, Merrill Wood, and Mary Clench, with many others also helping. My thanks to all.

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TABLE I. Average arrival dates for Barn Swallows and Cliff Swallows in eastern United States.

	Barn Swallow		Cliff Swallow	
Area	No. Yrs. Avg.	Arrival Date	No. Yrs. Avg.	Arrival Date
State College, Pa.(1)	12	10 April	11	21 April
Waynesburg, Pa.(2)	19	5 April	5	7 May
Davis, W. Va.(3)	3	22 April	0	- - -
Morgantown, W. Va.(4)	14	20 April	?	6 May
Connecticut (Saunders, 1959)	40	18 April	?	1 May
Ohio (Trautman and Trautman, 1968)	?	2 April	?	2 May

(1) Data supplied by Merrill Wood
(2) Data supplied by Ralph Bell
(3) Data supplied by Ben Thompson
(4) Data supplied by George Hall and David Samuel

Figure 1. Study Areas.

TABLE II. Wing and Tail lengths (outer feather) (MM) for Barn Swallows and Cliff Swallows banded and released on the study area. N = Sample Size, $\bar{X}$ = Mean, s = Standard Deviation, $s_{\bar{X}}$ = Standard Error of Mean.

Birds	N	$\bar{X}$ ± s	$s_{\bar{X}}$
Wing			
Barn Swallow, adult*	91	119.5 ± 1.74	± 0.182
Cliff Swallow, adult	31	108.9 ± 4.05	± 0.727
Barn Swallow, juvenile	5	107.8 --	---
Cliff Swallow, juvenile	7	107.2 --	---
Tail			
Barn Swallow, adult*	89	83.1 ± 0.82	± 0.086
Cliff Swallow, adult	31	55.4 ± 2.25	± 0.405
Barn Swallow, juvenile	5	59.8 --	---
Cliff Swallow, juvenile	7	49.1 --	---

* From Samuel (1971b)

TABLE III. The number of Barn Swallow nests in which the first egg was laid in each ten day period for 1967 and 1968.

	1967	% of total	1968	% of total
May 1-10	0	0	5	7.5
11-20	2	3.4	18	26.9
21-31	24	41.4	9	13.4
June 1-10	14	24.1	8	11.9
11-20	4	6.9	3	4.5
21-30	2	3.4	10	14.9
July 1-10	5	8.6	9	13.4
11-20	7	12.0	5	7.5
	58	100.0	67	100.0

TABLE IV. Bill measurements (MM) obtained from Barn and Cliff Swallow study skins at the Carnegie Museum, Pittsburgh, Pa. Birds were captured all over the United States. N = Sample Size. Measurements are followed by one Standard Deviation.

	Length(Culmen)	Width	Height	N
Barn Swallow, ad.	9.9 ± .58	11.1 ± .08	3.3 ± .04	40
Cliff Swallow, ad.	8.9 ± .24	11.1 ± .02	4.2 ± .21	76
Barn Swallow, juv.	10.5 ± .47	11.5 ± .11	3.2 ± .12	11
Cliff Swallow, juv.	8.8 --	11.1 --	3.5 --	4

Figure 2

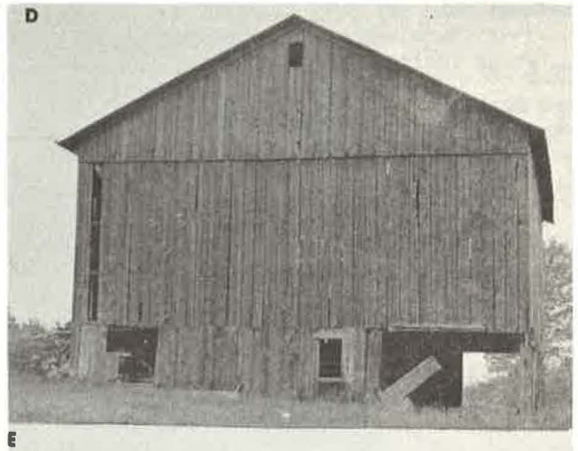
A. Barn Swallow used the door and window entrances.

B. Barn Swallows used seven entrances.

C. Barn Swallows nested here.

Figure 3

D. Barn at Area B, used for Barn Swallows.



E. Barn Swallows nested here.

F. Cliff Swallows nested here, gathering mud from puddle in foreground.

Figure 3

A. Adherent Barn Swallow nest, built on Cliff Swallow nest mark- string held nest in place

B. Cliff Swallow nest built on top of a Barn Swallow nest-debris indicates that House Sparrow has taken over nest.

C. A typical Cliff Swallow nest with a bird inside (right)

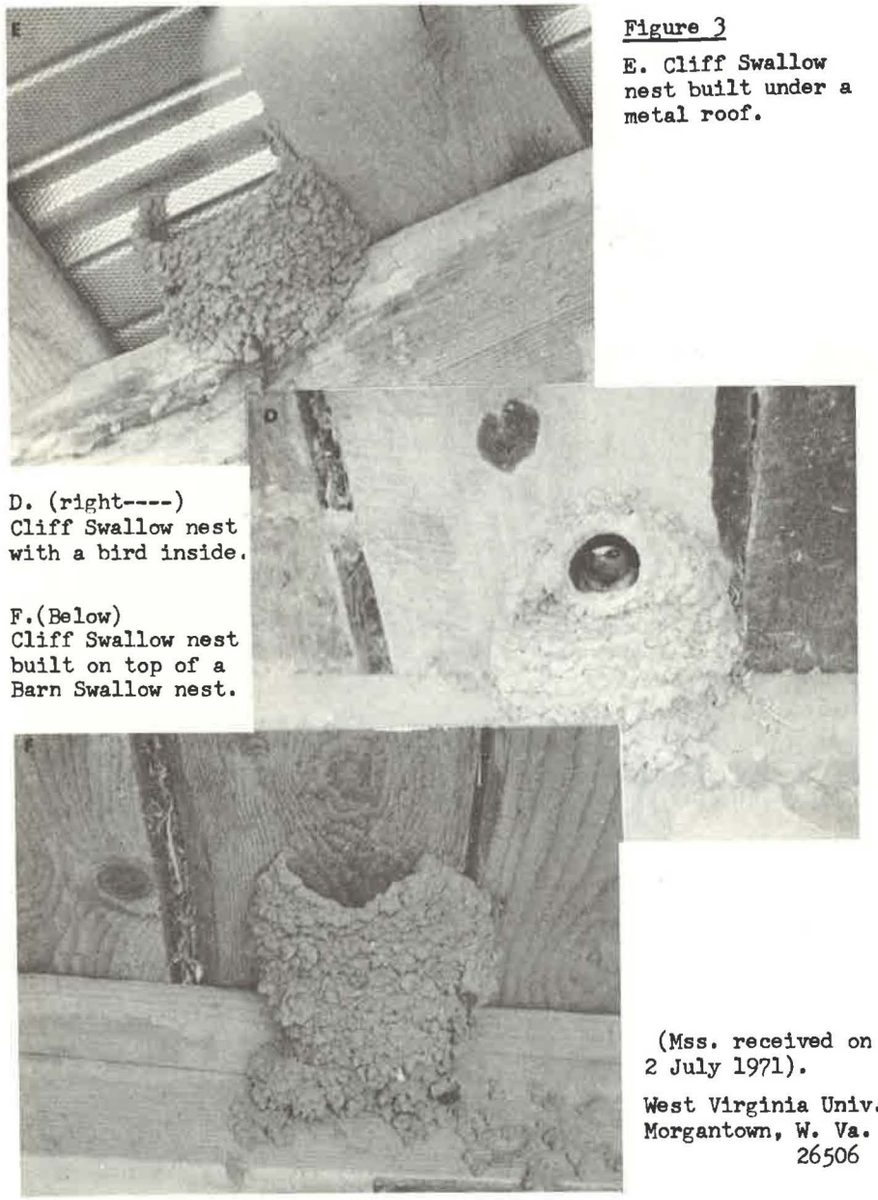


Figure 3

E. Cliff Swallow nest built under a metal roof.

D. (right----) Cliff Swallow nest with a bird inside.

F.(Below) Cliff Swallow nest built on top of a Barn Swallow nest.

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AN EMPIDONAX DATA FORM

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Two recent papers by Phillips, Howe and Lanyon (1966) and Phillips and Lanyon (1970) have created a new pastime for banders who handle Empidonax flycatchers. To those banders who take seriously the confirmation of identity of the species they handle, there is probably no group of passerine species with as extensive a check-list of identifying criteria as the Empidonax group.

If one takes the time to key out each and every one of these birds as one should do, it seems a shame not to keep a permanent record of the characteristics and measurements. There are two compelling reasons for making a permanent record of the identification data on the Empidonax group: 1) To enable one to confirm the identity at any subsequent time; and 2) To offer some measure to an individual bander's variability and agreement with the key.

The value of #1 can be illustrated by a situation that occured much to my chagrin in the fall of 1970. During a morning of peak activity at Vischer Ferry while Will Merritt and I were banding before a bird club group, Will asked me to identify an Empidonax that had him and several observers puzzled. In my haste I identified the bird as a Traill's flycatcher, but was not completely convinced because of the bird's greenish appearance. I rationalized this identification decision at the time on the basis that while I had not previously seen a Traill's flycatcher quite so green, I had seen them show varying greenish tendencies that differed from the usual olive-brown. Later at home I was transferring the banding field notes to various record files when I came upon the bird on Will's carbon copy. I mentally recalled the bird in the hand, and was suddenly stricken with the realization that I had misidentified what probably had been a rare Acadian flycatcher - our first ever at Vischer Ferry.

Because Will had recorded various criteria referred to by Phillips et al., we were able to review these, and confirm throat coloration with others who had seen the bird, thus allowing us to correct this error on my part and confirm the identity as that of an Acadian flycatcher.

The value of #2 becomes apparent when one considers how all measurements are subject to variability due to the individual and his methods of taking data. There are times when all the criteria of Phillips et al., do not agree perfectly and one must make a value judgement on an identity. At such times it is handy to know what the variability in a particular measurement is, so that one may ascribe some degree of reliability to that identifying characteristic. At times when a key indicates that a measurement of 5.5 mm. or less differentiates A from B, a bander who has kept such records may be aware that in his experience a value of 6.0 or less has typically been the line of differentiation. Only with permanently recorded facts and an analysis of these can one benefit from them.