

BANDING NOTES ON
THE NICKAJACK CLIFF SWALLOWS
(*Petrochelidon pyrrhonota*)
By Ralph T. Bullard, Jr.

A colony of Cliff Swallows that we can band easily? This garbled phrase started what has become known locally as the most banded Cliff Swallow colony in the Eastern United States. The site is Nickajack culvert named after the cave which is less than 1/8th mile away. About 2,000 feet directly in front of Nickajack Cave is a 25 x 12 x 69 foot culvert which carries the water from the cave under State Highway 156.

Since it is easy to lose direction in the mountains of this area, it was questionable as to whether the site was in Tennessee, Alabama, or Georgia when first discovered. A topographic map was needed to ascertain the exact location. Found to be approximately 3/8ths of a mile north of the Alabama State line and 1/2 mile northwest of the Georgia State Line, the culvert was well into Tennessee. The Nickajack culvert banding area is physiologically located within a broad valley formed by the Tennessee River as it meanders through the Cumberland Plateau.

The valley is located about 5 miles down stream from Hales Bar Dam where there is another colony of Cliff Swallows. The original idea of checking the swallows at Nickajack came about when the birds at the Dam mysteriously moved their nesting sites from the lock wall while it was being repaired. The location of the new site, noone seemed to know. After this thought, a search for Cliff Swallow nesting sites began which led to the discovery of the Nickajack Culvert. Previous Cliff Swallow sites in and around Chattanooga, Tennessee were in such a position that it was impossible to band the birds due to the location of their nests. Most frequently these were under high bridges or at the dams where banding operations were hampered for lack of a barge or similar craft to float the banding crew.

The culvert was first discovered to contain Cliff Swallows in 1961 when a small party of local Chattanooga Bird Study members were on their way to check the Cliff Swallow nesting activity at Nickajack Cave. Oddly enough, a Prothonotary Warbler was heard singing and as the party investigated its songs the swallows flushed from the culvert by the hundreds.

At this point we received the call saying that the location appeared to be an easy and convenient site to reach and one where banding would be easy. Two days later, on May 27, 1961 the culvert was inspected. To our amazement, the culvert was just what it had been described. Boots were donned and a quick trip through the farmer's sprouting cornfield brought us to the creek's edge where the swallows were flushed from their nests. Hundreds of screeching swallows flew above the entrance darting in and out of the culvert. A quick trip through the culvert revealed 522 completed nests. On a fragment of a Cliff Swallow nest, not over 1/4" wide, a Phoebe had constructed its nest and was flushed from four eggs.

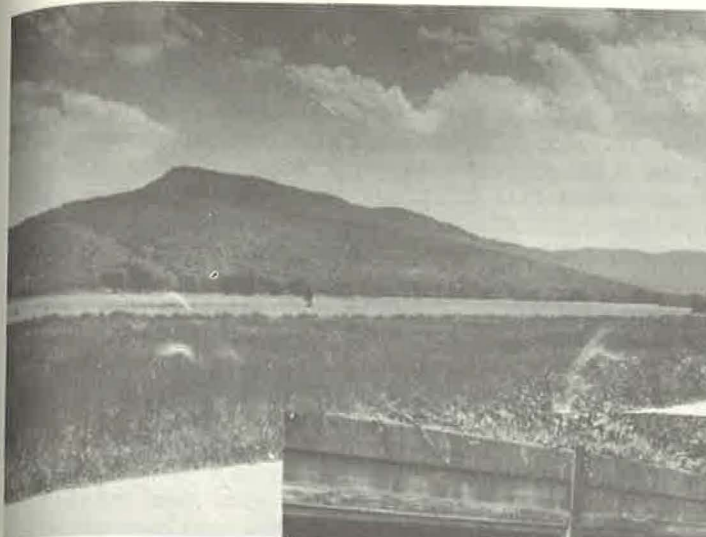
On examining a few (16) of the nests, using a small dental mirror and a flashlight, all examined showed eggs of varying numbers up to the standard clutch size. Below most of the nests, a white wash had already been given the walls by the birds. A count revealed that there were still 18 nests under construction.

One of the most unique facts about all the nests was the uniformity of the mud color. At other locations around Chattanooga, anything from a red clay to a very dark brown-black mud was used in varying combinations to give the nests a rather odd contrast with each other.

Technically, netting was difficult even under the best of conditions. One, there were more birds than anyone had ever before banded. Two, being late in the season everything had to be planned and executed as quickly as possible to trap as many birds as possible before the nesting season had ended. Three, what harm or damage would we be doing to the colony by banding? This last question was quickly answered by William K. Kirscher, noted Cliff Swallow bandler of San Jose, California, who reassured us that banding would prove without harm to the birds. On the surface this sounds easy, but the job later proved to be more than almost anyone could take and still live through the experience. In the MIGRANT, September 1961, Mrs. Eugene West states, "I will not go into detail here about the mud and rain of June 4, the banding of 310 swallows and handling of many repeats, except to say that 12 hours in the field on a banding operation of this type is not an experience that I am anxious to repeat."

The area immediately in front of the culvert had to be cleared of bushes and small trees so that the net could be rotated from the bank across the creek to cover the entrance of the culvert. Once the netting lane, or "netting swing lane", had been cleared two pipes two inches in diameter were to be driven into the soft mud and clay at the bottom of the culvert. Into these, the netting poles would be placed. This sounded easy as everyone was making plans to trap the swallows before the actual field work began. No one had taken into consideration that there would be a footing of concrete at the base of the culvert and that the pipe could not be driven into the mud and clay. This problem was solved by probing the area immediately in front of the culvert to ascertain where the footing actually existed. Upon probing, it was found that the concrete formed a pie shaped wedge with the point directed away from the culvert. This was relatively good because the culvert could still be sealed fairly effectively with the mist net even though the net had to be placed several feet in front of the position originally planned.

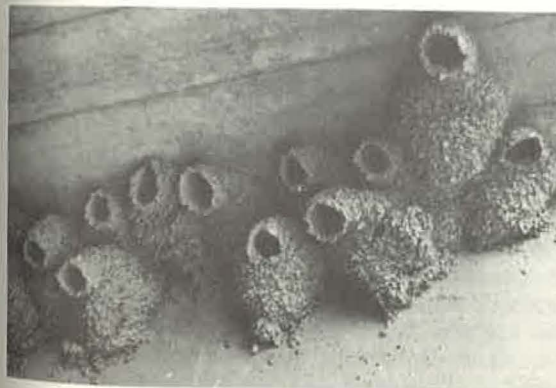
Once the pipes had been driven, the next step was to cut a mist net to fit the culvert opening. Again, more problems were encountered. Those people that have tried to cut a mist net under the hot sun with mosquitos buzzing around their heads will comfort us in saying it is no easy job. The most trying part of the entire operation was the retieing of the shelf strings and placing the vertical shelf spacer string along



Forage area on the Tennessee River flood plain



Note framework around entrance and hardware cloth at the bottom of the culvert



To photograph contents of nest a hole was made in the side of fourth from right. The hole was then dabbed with blue tempera paint. One week later the hole was sealed but the blue paint was still visible

the side of the net. At this time, someone suggested that where each shelf string was nailed to the pole, it should also be tied. This would keep the net from pulling loose if the net pole were rotated in crossing the stream. It seemed as though this might be a good plan so the strings were tied. The poles on many occasions were rotated and the birds might have been lost and the net tangled had the strings not been tied. After the strings were tied, the next step was to rotate one end of the net to the bank using the remaining pole to serve as a pivot point. The rotation of the net across the creek served literally to scribe an arc on the bank. At the intersection of the arc and the bank, another two inch pipe would be driven to hold the pole while the birds were being taken from the net. This rotation was necessary for several reasons but mainly to keep the birds from drowning after the nets became so full that they began to drag in the water. (As many as 50 birds were taken at a time.) Another very good reason for rotating the net was to keep the workers in a dry place so that their footing would be secure on dry ground rather than in the slimy mud of the creek bottom. The third most important reason was to clear the entrance so that the nesting birds could get back to their nests with the least possible disturbance. While all the erection was being made, the swallows were constantly boiling from under the culvert clouding the sky. When we moved away from the site, the swallows would instantly begin to filter back into the culvert. At this time, one of the more adventurous bird club members said that we could make catches both as the birds left and as they returned. This looked completely possible but we soon found that the birds were only caught from the inside of the culvert. Not over five birds were caught as they tried to enter it. As the birds flew back to the culvert, they would only stop before the net, flutter and rejoin the others circling above the entrance.

It is at this point that the humor began. Several local cars drove up and appeared to be very interested. We answered all questions in an effort to educate the people to the values of the Cliff Swallows. Why this sudden interest in stopping? No one had given us very much attention earlier in the day. Finally, a carload of teenagers pulled up along the highway and told us that the ladder, which we had used in erecting the nets, was a little early to harvest the corn. Then we realized that an open ladder in a cornfield is rather a strange sight, especially when the corn is only 8 - 10 inches high. We would go even further to say that a ladder in a cornfield is rather corny anyway!

Rotation of the net proved more difficult than would appear on the surface. As the net was rotated, the pole-carrier would almost certainly fall into one of the several holes while crossing the stream. These holes, formed from mud and sand deposits, varied from one to three feet in depth. After having crossed the stream, the next problem was to scramble up a two to three foot vertical bank that had long since gotten wet from other crossings. Again the person rotating the net would slip and slide almost losing the birds, thus forcing him to hand the pole to

someone on the bank. After the crossing had been accomplished, the pole was placed in the pre-spaced iron pipe that had been driven earlier in the day to keep the net taut. The birds could then be easily removed by the netting party. Ten to fifteen birds were placed into large paper bags for their short trip to banding headquarters which was 500 feet up the path.

This site was chosen because it was far enough away from the culvert so the birds would not be disturbed when returning to their nests. As this site was located near the cornfield, there were no trees to give cover. Therefore a tarpaulin, 12 x 14 feet, was erected to give the banders some protection from the hot June sun. The tarpaulin was used as a "lean-to" type of structure. The method of tarpaulin erection is the same as erecting the net poles. Two 2" pipe each two feet long were driven into the ground the width of the tarpaulin on one side. Two poles each ten feet long were placed into these pipes. While the tarpaulin was still on the ground, a pole the width of it was attached to one side with wire.. The obvious reason was to keep the two from pulling apart. Once attached, using two people, the horizontal tarpaulin pole was easily erected at head height, where it was wired to the two vertical poles. The loose end was then pulled taut and staked at 45 degree angles to the lay of the tent. It was then wired to the holding stakes. After the back stakes were driven, guy wires on the front side were placed to give maximum holding power to the tent even though the pipes were firmly secured. Several of the banders brought their own aluminum lawn chairs, but in most cases five gallon cans and wide board sufficed for almost everyone as a seat. An old card table served as a desk where the notes and banding records were kept.

After several hours of taking the nets back and forth across the stream most of the birds began to remain in their nests. At this point, someone had to wade through the culvert clapping their hands to flush the birds. The clapping hands, coupled with a tarpaulin and blanket waved from the opposite end of the culvert, flushed the birds easily into nets.

The ideal location for banding would have been the entrance to the cave where a cool breeze is constantly blowing. However, this was not possible due to the many factors involved, especially the distance from the culvert. However, to break the monotony of the hot banding, lunch time always saw us taking advantage of the cool breeze at the cave. This historical cave was on the route used by the Northern (Union) troops as they advanced into Chattanooga prior to the battle of Chickamauga, Georgia, during the Civil War. Many beautiful signatures and dates belonging to the men who stayed there during the war period of 1863 are found scratched into the soft limestone at the entrance to the cave. Having an unsupported entrance 175 feet wide and 60 feet high, one may see numerous nests of the Cliff Swallows clinging to the roof about 60 feet above the stream which runs through the cave. Cleverly concealed within the joints, where the rock has parted, the Rough-winged Swallows also make their nests.

During the period of June 3, 4, and 25, and July 2, 1961, 921 birds were trapped, banded and released at the culvert. Of these, 873 were adults and 39 flying immatures. This figure compares favorably with the largest number of birds taken in one season at one location in the West by William K. Kirsher et al. during 1952 when his party banded twice in one season for a total of 751 adults and 245 locals. Unless corrected, we will continue to claim the record for adult Cliff Swallows banded at one location in one season.

Incidental to the Cliff Swallows, one immature Barn Swallow was trapped among the flying Cliff Swallows. An immature Phoebe, possibly from the nest inside the culvert, was also caught on one of the "drives" through the culvert. The other bird, a female Orchard Oriole, was caught accidentally after we had gone to lunch. As luck would have it the Oriole was bagged.

During the summer of 1962, it was decided that a different method of trapping would be used to effect a greater capture of the swallows in a shorter period of time.

Western Cliff Swallow banders had proven that small mesh fish nets draped very loosely over the entrances of their culverts would seal the birds from escape. The fluttering birds, attracted to the light outside, would become wedged in the many folds of the fish net. They could then be extracted with a minimum of effort after their fluttering had been slowed by entanglement in the folds.

The method proposed for the Nickajack culvert was to erect a wooden frame around both ends of the culvert, then to drive a series of flat-headed tacks spaced about 6 to 8 inches apart completely around the frame whereby a Japanese mist net (our club could not afford to buy a fish net) could be fastened easily after the birds had gone to roost that night. Our mist net was to be pulled tight enough to prevent bagging, which is in contrast to most netting operations.

In theory, this again sounds easy but the effort was to prove more than a challenge. The erection of the framework had to be accomplished after a regular work day when everyone was tired. To make matters worse, the board lengths were too short to cover the entire entrance and had to be spliced, adding to the effort and time consumed in getting started on the project. By the time the framework was completed, the sun had already dipped well below the horizon. There was still enough daylight left to stretch hardware cloth across the bottom of the culvert, to let the water flow through easily without dragging the nets. The hardware cloth was also in uneven lengths and odd sizes.

By the time that the piecing operations were completed, the sun and daylight were gone altogether. The swallows returned to their nests as expected before dark, but our actions around the ends of the culvert



RALPH BULLARD WITH 31 NETTED SWALLOWS. COUNT THEM!



MAKING A CROSSING. WATER ESPECIALLY LOW.



(1-r) Eugene West, Ralph Bullard, and Mrs. Eugene West extracting birds from the net after rotation to bank.



(1-r) Mrs. West, Mr. West and Jim Tucker at banding headquarters, under the tarpaulin.

caused an estimated 50 to 100 to fly out into the night. The mist nets were erected in total darkness using only a flashlight held away from the entrance to disturb the birds as little as possible. After the nets were placed, the time now stood at 10:30 P.M. The last remaining banders, the Wests, now left for a 50 minute trip back to their home on the north side of Chattanooga some 40 miles away. Everyone had said earlier that they would be back at daylight the next day. This sounded good as we were all tired and more than ready for bed. The net still had to be stitched to the hardware cloth on both ends of the culvert. This operation consumed another hour of my time before I could go to bed under the tarpaulin "lean-to". After a few hours of very restless sleep constantly disturbed by the mosquito hordes, I awoke to find daylight fast approaching. It almost startled me to find some swallows flying through numerous holes that had been ripped in the net the night before when the light was nil. After a quick check for available cord and string, a few of the larger holes were repaired. By 4:45 A.M. the Wests had arrived looking like I felt, badly.

The job was apparent, the birds had already begun to bag themselves not in the shelves but in the bottom of the net where it was attached to the hardware cloth. The weight of the birds made this a natural bag and was catching better than a net shelf. This was not according to plan for we had expected to catch the birds fluttering against the nets.

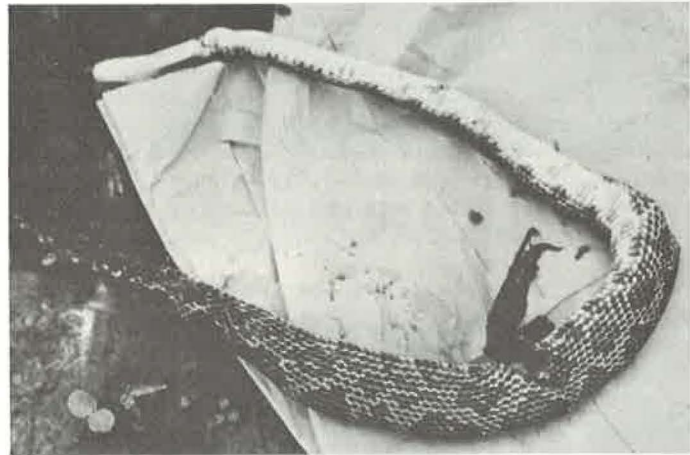
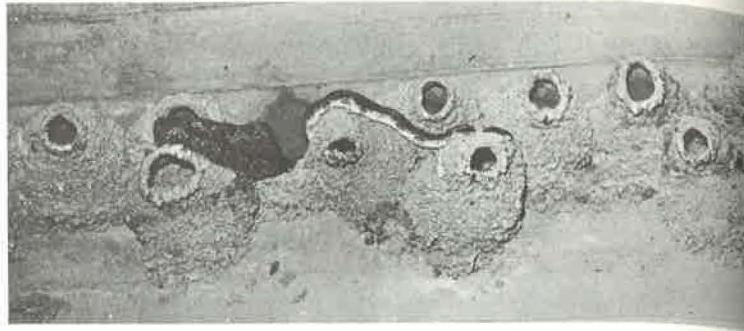
Where was the other help? The rescue had to be effected so Mr. West suggested that we take the birds from the nets and that his wife do the banding. After slipping behind the net into the culvert, we started to scoop the swallows up with our hands and drop them into the bags that were under our belts. As soon as a couple of bags were full, Mrs. West started to the banding shelter. No sooner had she reached the banding area than we had two other bags full for banding. We did not have a place to put the birds without the bags getting wet so removal operations had to cease for a quick trip to the banding station. By the time that we had returned to the culvert, the net was more than full again. This same operation was repeated over and over again until 8:30 when five other members of the club arrived.

Unknown to me at the time one of the late arrivals, a girl that I had met at one of our club's summer picnics, was to become my future wife.

Then the work started as planned in the several weeks preceding the actual banding; to illustrate: two men inside the culvert taking birds from the nets, another running the birds from the culvert to the banders, and yet another person recording "return" band numbers from the previous year; s banding and making notes on bird condition, etc.

By middle morning, the swallows remaining in the culvert had finally learned to avoid flying around inside and would just sit in the nests' entrances looking out at us passing. Here we started to walk abreast

Soon to wander
no more. . . .



A bird wing protruding
from snake's body
through shot hole.

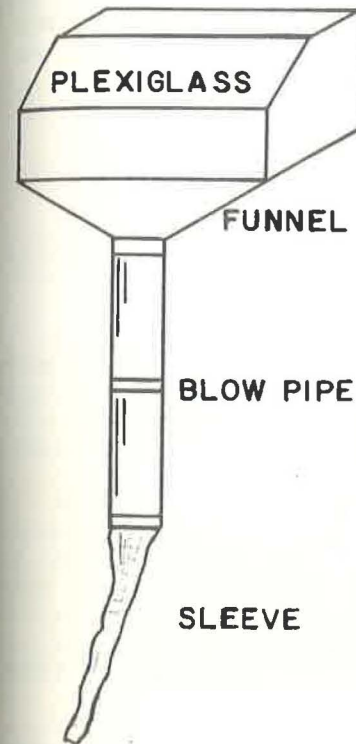
Carol Bullard
with revolver
and dead snake



clapping our hands and shouting. A few swallows darted out into the nets but the remainder only hovered near the top of the culvert flying in circles. After a few tries, a short piece of canvas was attached to two poles and taken inside the culvert. Once inside, the canvas was opened outward forming a moveable partition. At this point, two clappers would walk in front of the canvas flushing the birds from their nests as the partition moves closed the distance between the net forcing the birds into capture against the net. Even with such elaborate preparations as these, a good butterfly net held over the nests would have been useful in a quick trap of the more stubborn ones. At the close of the banding season, 395 birds had been banded with 200 returns recorded from 1961.

In view of the past banding operations, it has been decided that any further work on the banding of the swallows at the culvert will be done by erecting frames again (frames of 1962 destroyed by flooding during the winter) at each entrance, then stretching 1/2 inch hardware cloth at the

bottom. After this has been accomplished, a solid screen of burlap bags which had been pieced (sewn) together will be nailed at one end of the culvert. The bottom will then be tied to the pre-nailed hardware cloth which would hold the lower end in place. The other end of the culvert would then be covered in a like manner but appropriate holes for the attachment of a catching trap inserted into the burlap screen. The proposed trap design would resemble those used in the banding of Chimney Swifts.



A catching box (Fig. 1) approximately 1 1/2 x 2 ft. x 6 inches would be used. Across one corner, the box would be beveled. A glass pane or other transparent piece of material, for example plexiglass, inserted into the beveled portion of the box would serve as the window. This plexiglass would be favored because of the safety aspect. To take advantage of the dark screens on either end of the culvert and the attraction of the birds for the light through the plexiglass, a funnel fastened to the underside of the catching box would be attached to variable lengths of sheet metal pipe (blow pipe). Understandably, the length of the pipe would be proportional to the heights

Fig. 1. Proposed catching box.

of the culvert and the trapping box. The lower end of the metal pipe would be fitted with a sleeve preferably of transparent plastic. This is necessary for several reasons. The most obvious argument is to give the pipe on its lower end a certain amount of mobility in filling the catching bags. Another more important reason is to observe the birds so that none will suffocate or become crushed as would happen in a sleeve that was not transparent, for example of cloth. The reason for the sleeve should be obvious in that there would be no way to close off the opening to keep the birds from escaping from the sheet metal pipe.

Predation at the site takes several forms. During the summer of 1962, BB pellets and containers were found on the ground around the culvert entrance. The damage to the nests and birds is hard to ascertain. By making a special effort to educate the youngsters as to the value of the swallows, it appears that in 1963 there has been no destruction by humans. Reptiles accounted for the damage during 1963. On three visits to scout the area this year, there have been two four foot plus, unidentified snakes feasting on the young birds. Evidently both snakes, using overhanging vines, had managed to climb over sheer vertical walls which would appear to be impossible barriers. Both were shot (see Photos on page 200) and one was recovered and dissected. The thought of the number of birds that the snake had eaten down hearted those watching the dissection. As the snake was opened, five swallows were found inside it.



One of the flying immature Cliff Swallows
Note the white on forehead, chin and behind ear

Young swallows were not the only ones to suffer from the snake attacks. Of the five birds removed from the snake, one was an adult as evidenced by complete ossification of the skull. A random search in the first twenty feet of nests along the wall where the snake was found, revealed three adult swallows dead and desiccated. It can only be assumed that these adult birds, in trying to protect their nestlings, succumbed to the snake peril.

The culvert entrance was cleared of overhanging branches and vines to minimize the future chances of snakes crawling onto the nests. Short life appears to be the probable fate of this culvert. The Tennessee Valley Authority has eventual plans to build another dam below this area and flood the valley to a depth of 20 feet above the culvert. However, the Cliff Swallow appears to be one bird that favors the coming of man and his works, as is evidenced by the numerous structures both in the East and West that accomodate swallow nests. Maybe this group will move to the new dam and set up housekeeping there? The future remains to be seen on the actions that these Cliff Swallows will take.

3302 Navajo Drive, Chattanooga 11, Tennessee.



PEOPLE TO PEOPLE

Would you like to correspond with a Zanzabarian interested in zebras or an Ethiopian interested in eels. . . . or perhaps a man from Tierra del Fuego interested in penguins? One way to do it is through the People-to-People nature committee. George Miller, chairman of the nature committee, writes your Editor:

"We have people write in from countries all over the world who are interested in nature study and they want to write to people in the U.S.A. who are interested in nature. . . . People who want nature contacts in other countries should write to me and give their name and address, whether married or not, and what branch or branches of nature they are interested in. Also if they would care to volunteer to be the head of a People-to-People nature committee, they can write to me."

The basic purpose of People-to-People is to permit individuals personally to do something important about increasing understanding among people of all nations. EBBA members interested should write (it costs nothing) to George F. Miller, P.O.Box 916, Upper Montclair, New Jersey.