OPERATION RECOVERY - APPALACHIAN MOUNTAIN STYLE

By George A. Hall

The members of EBBA who are familiar with the various coastal Operation Recovery Stations may be interested in a report of a quite different banding situation. Since 1958 Ralph K. Bell and the writer have been operating an OR station high in the Allegheny Mountains of northern West Virginia. The results of this study of montane migration have been most interesting and have raised some fundamental questions about the nature of inland migrations. A detailed listing of the species and numbers of each that have been banded has been published annually in The Redstart, and a comprehensive analysis of the results through 1963 has also been published there (Hall, 1964, The Redstart 31:30-53). This brief report will serve to acquaint EBBA News readers with this project.

Our banding station is located in Tucker County, West Virginia, on the high mountain ridge known as the Allegheny Front. This ridge, which is the boundary between the folded mountains of the Ridge and Valley physiographic province to the East and the Appalachian Plateau to the West, originates in central Pennsylvania and is nearly continuous south into Maryland and West Virginia, being interrupted only by the gap cut by the North Branch of the Potomac River. Travelers on the Pennsylvania Turnpike cross this ridge at the so-called Allegheny Mountain Tunnel. To the north the ridge is not very high but here in West Virginia it commonly reaches 3800 feet above sea-level and some knobs go to 4000 feet. Besides being a major physiographic boundary, the ridge also apparently represents a major migratory pathway for birds.

At the station the top of the mountain is a dissected plateau several miles broad. The general aspect is of a hilly country with rather gentle topography. The eastern face of the mountain is very steep, and the slope drops nearly 2000 feet in a very short distance. This steep slope is covered with a dense second growth forest of mixed oaks, which ends abruptly at the top of the mountain.

On top the floristic aspect is governed almost completely by the extreme rigor of the climatic situation. Strong west winds and low temperatures are the features of this climate. Frosts may occur in any month of the year, and snow commonly lingers in sheltered spots until late May. In 1961 our banding operations were interrupted by a blizzard in mid-October. It is a not uncommon experience, even in September, to awaken to find one's sleeping bag covered with frost, and on October 11, 1964, over an inch of ice froze in the waterbucket as the temperature plummeted to 17°.

Originally the mountain top was covered by a forest of Red Spruce. This was lumbered in the early days of this century and soon thereafter great forest fires swept through the area. The resulting destruction of

much of the organic matter in the soil, together with the rigorous climate, have prevented the reforestation of the area. Today the top is covered with a wide variety of plant associations. Small stands of Red Spruce, much of it gnarled and twisted and all of it wind-pruned; a few plantations of Red Pine; many acres of blueberry and huckleberry bushes; a few open grassy fields; and many boulder fields devoid of vegetation make up the scene. There are numerous streams, many of which are dammed by beaver. Along these streams aspens and alders occur, and the poorly drained places as well as the old beaver ponds form bogs of a marked boreal aspect. In flowering and fruiting season American Mountain Ash, Rose Azalea, and Chokeberry are conspicuous plants. The general aspect resembles some parts of New England and Canada even though it is south of the Mason-Dixon Line. The breeding birds of the area reflect this with Chestnut-side, Magnolia, and Black-throated Green Warblers together with Juncos and Hermit Thrushes dominating the summer list.

The banding station is located at a rather primitive U. S. Forest Service Campground reached by a good (gravel) Forest Service Road. It is difficult to describe the isolation of the area other than to say it is from 8 to 10 miles by road from the nearest human habitation, and to report that the writer once spent four days in midweek there without seeing another human being. On weekends, however, the campground attracts numbers of picnickers, hikers and would-be harvesters of the Blueberry and Mountain Cranberry crops. In October grouse and turkey hunters are ubiquitous.

The daily weather is highly variable and always subject to rapid change. Often in early September the bright sun causes cases of fierce sunburn, but on the next day the mountain top may be covered with fog. In 1963 we experienced a four-day siege of rain and fog which left our clothes soggy and moist. Needless to say banding was at a low ebb. Under these conditions the banders live, camping in such fashion as suits them. Island Beach personnel will note, however, that we have absolutely no mosquitos, although in 1964 Yellowjackets were abundant.

To add to the hazards of the weather the native residents of the mountain occasionally present some difficulties. Large numbers of beef cattle are grazed on the open range of the National Forest and after one of these sources of choice tenderloins and prime ribs has walked through a net, a bander can only wish he could set up an immediate butcher shop. The writer has lost at least one net in every year (except 1964) and one individual cow was responsible for two nets in two separate years. Deer are not plentiful on this part of the mountain, but occasionally one will go through a net. We have never been fortunate enough to see the most interesting resident of the area, the Black Bear which does inhabit the region in some numbers. Rattlesnakes are reputed to be common, but we have found only one, and that a half a mile away.

During the first five years of the study, several net lines were erected at the campground. An excellent spring supplies water for the

camp and generates a small stream which serves an an attraction for birds. During this time about 1800 birds were banded. Many more birds were to be seen flying over, however, and it was realized that we were tapping only a very small fraction of the total flight. In 1963 and 1964 we erected a line of nets on the very rim of the mountain, directly in what appears to be a major flyway. The results have been most spectacular. In 1963 1047 birds were banded and 1400 were added in 1964. On days when conditions are right for good flights, the number of birds to be seen is almost unbelievable. Perhaps the best day was September 17, 1964, when Bell banded 128 birds, essentially all caught in ONE net in two or three hours time. By actual count this net had 49 birds in it at one time. September 10, 1963, and September 24, 25, and 27, 1964, were almost as spectacular. But large as these totals are, they constitute only a few percent (certainly less than 5) of the total number of birds passing over.

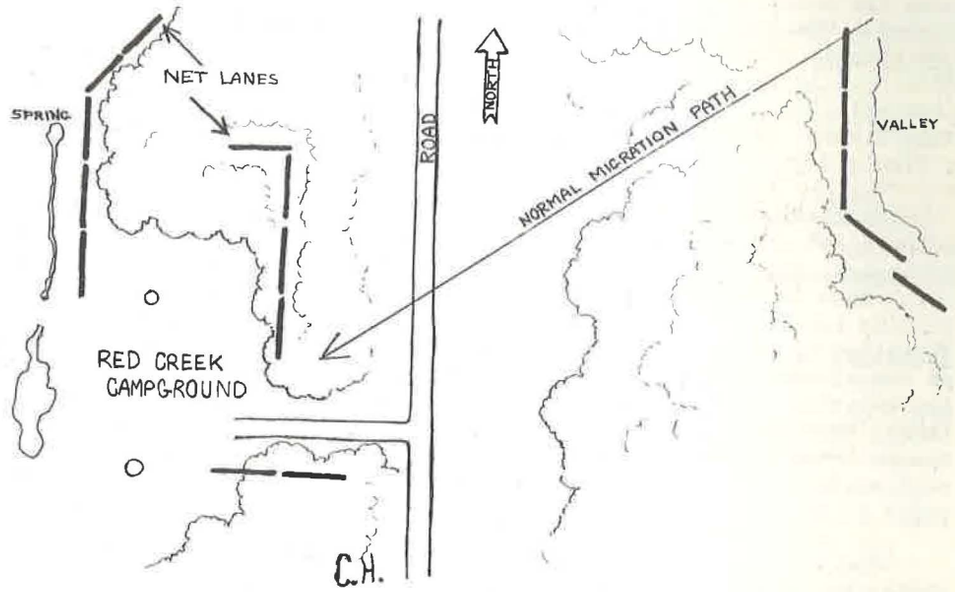

Figure 1. Sketch Map, not to scale of the Banding Station. The arrow actually points NNE. (Drawing by Carol Hand)

To the end of 1964 we have banded a total of 4273 birds of 90 species. We have had 26 station returns. None of our birds have been reported from elsewhere and we have had no foreign retraps. Up to 1964 our number of repeats was only 8.4% of the total and 3.1% in 1964. This indicates strongly that our station is located on a migratory lane and few birds remain in the vicinity long. At the Rim station there are almost no Repeats. Our totals may seem meager to the habituees of Island Beach or Ocean City, but our overall capture rate has been 306 birds per 1000

net-hours, and in 1964 it was 507 birds per 1000 net-hours. This great increase was obtained by reducing the number of nets but concentrating them in the major flight lane at the Rim station. At no time have there been more than two banders present and usually only one. We feel that if we could get continuous coverage in the later half of September and in October, our totals would properly reflect what must be the enormous migration along this ridge. Unfortunately, the exigencies of earning a living force us to operate the station as essentially a weekend proposition, and occasionally as only a Sunday morning affair.

The Wood Warblers are the most predominant species that we catch, and a total of 28 species have been banded. About 18 of these species are known to nest in the general area. The most common species over the years have been the Black-throated Blue and the Yellowthroat, but in 1963 and 1964 large numbers of Blackpolls were caught, and the feature of 1964 has been the outstanding flight of Tennessee Warblers of which 170 were banded. The Swainson's Thrush has been the most abundant species with 344 caught. One of the most spectacular results was the capture of 123 Blue Jays in one season, most of which were caught in one large mesh net strategically placed to tap the heavy flight of Jays along this mountain. This diurnal flight of Blue Jays sometimes numbers thousands of birds in a single day.

Examination of the list of species caught, together with the comparative numbers of each suggests that our flyway is apparently an ecological one. About 80% of the birds caught are either those species which nest in this habitat on this mountain or those that breed in similar habitats to the north, such as the Blackpoll, Wilson's and Tennessee Warblers. Species which do not nest in the habitat represented on top of the mountain, such as Indigo Buntings, certain sparrow species, Meadowlarks, Orioles, Tanagers have not been caught in any numbers, even though they may breed abundantly near by. The Indigo Bunting is a very common breeding bird of this part of West Virginia, although it does not nest on top of this mountain, and only 7 have been taken in the several years of operation.

One is tempted to speculate about the reasons for the heavy flight along this ridge. Since the Front follows a northeast to southwest direction, it would seem to provide a good flight path for fall migrants, and a reliable guide to diurnal migrants. This mountain has long been celebrated as a hawk flyway, and hawk watchers have in the past noted large numbers of small birds flying along the ridge during the fall. As these birds follow the general southwesterly course provided by the mountain, they come to a place where the ridge makes a long swing to the east and to continue following the ridge would require a detour involving a nearly 90 degree change in course. At this point a deep ravine cuts the east face of the mountain and at its head is formed a shallow gap in the mountain. It seems, then, that rather than take the detour many birds fly up this ravine, clear the top, and cross over the mountain into

another watershed to continue their southbound flight. Our banding station is located at the head of this ravine, and the campground is on the flightline to the new watershed.

Successful capture at this site depends upon the wind direction and the wind velocity. The birds apparently do not fly up the ravine when the wind is also blowing up the ravine. This will occur when the general wind direction is anywhere from South to Northeast. A southbound flight is not to be expected on a south or southeast wind, but one might be expected on a northeast wind. If the latter does produce a movement of migrants, they use some other flightpath. The birds do fly up the ravine, and in numbers as described above, when the wind is blowing down the ravine and they must fly into a headwind. This will occur when the general wind direction is from the North or Northwest. The classical ideas of fall migration would indicate that such winds ought to produce flights.

But capture success also depends very critically upon the wind velocity. If the velocity is too low, the birds easily fly up the ravine and clear the top at heights far above the nets. Few are captured, although large numbers will be seen passing over. If the wind is very strong, the birds become tired and relatively few fight their way to the top. Those that make it are low enough to be captured, but all too frequently under these circumstances the nets resemble a full rigged clipper ship rounding Cape Horn, and many birds bounce off the extremely taut nets. At intermediate velocities, however, the birds will clear the rim at elevations low enough to be caught and it is on these days that we have made our spectacular catches.

Once over the top of the rim, most of the birds continue to fly at moderately high elevations. A few will come down and hop through the bushes. It is from this small segment of the flight that all the captures at the campground are made.

The pronounced tendency for the birds using this flight path to fly into the wind, something that often requires a great physical effort, does not seem to fit into the picture usually held that migrating birds are being drifted by the winds.

In one other respect the results at this station seem to be at odds with the usually accepted beliefs. The movement along this ridge is in very large part diurnal. Hawks, Blue Jays, Chickadees, and several other species are normally considered to be diurnal migrants, and these are of course observed here. On the other hand, the biggest part of the September flight is made up of Warblers which are normally thought to be nocturnal migrants. During clear nights we hear good numbers of birds going over, it is true, but they do not stop at daybreak. A very substantial fraction continues to fly for several hours after daybreak.

On a good day the general picture of events at the station will be something like this. Large numbers of Ovenbirds and Thrushes will be found

in the nets shortly after the first light, but very few of these will be caught later in the morning. These then must be nocturnal migrants concluding a night's flight and settling down for rest or feeding. After these birds have been cared for there will be a decided lull for perhaps 30 minutes, followed by the appearance of the warbler flight. This will continue very heavily and will peak somewhere from one to two hours after sunrise. Even at noon small groups of birds will be flying, but captures are usually low after 10 o'clock. In part this is because the nets become visible to the birds. (One of the more amusing events is to watch a Blue Jay laboriously fight his way up the ravine against the wind, only to slow up and hover momentarily when he sees the net ahead with the disasterous result that the wind carries him out over the valley in the wrong direction.)

There is then a very heavy DIURNAL flight of warblers at this site. We have felt that this is truly a part of their migration. Some people (usually those who have not been on the site) have expressed the view that this is not a migration, but is rather a secondary flight, possibly to correct for faulty nocturnal navigation or possibly to arrive at a suitable daytime feeding ground. This matter cannot be settled at present, but I feel that the following arguments are cogent.

The flight is always in the same direction. This happens to be the direction taken by birds which are undisputable diurnal migrants, and the behavior of both groups is the same.

It must require a considerable expenditure of energy for a small bird like a Tennessee Warbler to fight its way up the ravine in the face of a stiff 20 or more mile per hour wind, and yet he does it. It would seem that he is being driven by some deepset urge to get up the ravine and get on with his flight. I would feel that this would most likely be the migratory urge and not a desire to correct a course or find a feeding ground.

As far as course correction is concerned, it appears to me that it should make little difference to a bird as to just which mountain ridge he follows. A coastal flying bird which finds himself blown out to sea when daylight arrives, may well want to correct his course to get back to land, but this reasoning is not pertinent at our site.

There is no way of proving or disproving the theory that the birds are merely seeking a suitable feeding ground. The ecological nature of the flight path, mentioned above, might suggest this, but on the other hand, we have never had a bird banded at the rim site recaught at the campground, a half a mile away. This might have been expected if the birds began to feed in the area. Our low percentage of Repeats also indicates that the birds do not stay with us long. Of the 344 Swainson Thrushes, for example, not a single repeat has been made.

In conclusion may I offer the following food for thought. Many of our ideas about migration and about migratory routes, and about the

weather situations that produce good migratory flights have come as a result of the work of those dedicated students, both in this country and abroad, who have watched the migration of birds along the boundary between the water and the land. Most of our significant studies have come from the Atlantic coastal stations (on both sides of the Ocean) or from stations on the shores of the Great Lakes. The inland birders have lagged behind in this respect. However, I feel that it is possible that all of the factors that are pertinent at the coastal stations are not necessarily pertinent in a strictly overland flight, such as we see along the Appalachian ridges. The factors that are important at Island Beach, for example, may not be the same factors that are important in the mountains of West Virginia, and likewise the factors that are important in the flat prairies of, for example, Illinois may be different from both the coast and the mountains.

The continued study of this montane migration can offer much, I feel, to the ultimate understanding of bird migration.

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CALL FOR PAPERS

Those who wish to present papers at the next EBBA Annual Meeting, which will be held in April 1965 at Ocean City, Maryland, should send particulars to Dr. Charles H. Blake, Box 613, Hillsboro, North Carolina.

CORRECTION Omitting the letter "m" changed a great deal of the sense of Mabel Gillespie's discussion of books on ecology in the previous issue. The first sentence of the second paragraph on page 216 should have read: "Jeff replied that there weren't <u>many</u> books available."

NEW ANNUAL BANDING REPORT

A form is enclosed with this issue to make it easy for EBBA members to send their 1964 banding figures to Betty Knorr. It is hoped that every member will fill in this report form in January (as they complete their schedules for the Banding Office) and mail it in.