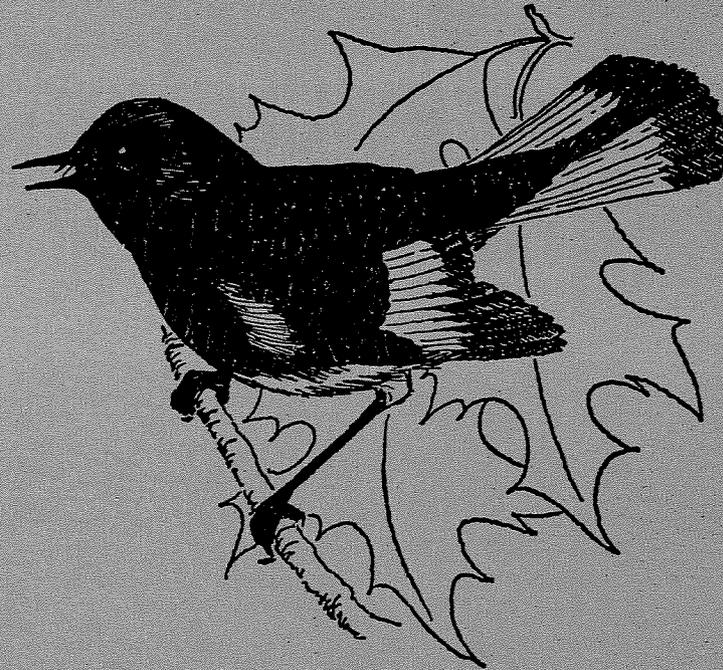


The **REDSTART**

Volume 31—Number 2

April, 1964



PUBLISHED BY THE BROOKS BIRD CLUB

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FOUNDED SEPTEMBER 1932

Named in honor of A. B. Brooks, Naturalist

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Volume 31, No. 2

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The Redstart, published quarterly in January, April, July and October, is the official organ of the Brooks Bird Club, Inc., with headquarters at 707 Warwood Avenue, Wheeling, W. Va. It is mailed to all members in good standing. Changes of address and inquiries concerning back issues should be mailed to club headquarters. All articles for publication and books for review should be addressed to the Editor.

FALL MIGRATION ON THE ALLEGHENY FRONT

by George A. Hall

In the late 1940's W. R. DeGarmo discovered that the rocky outcropping on Allegheny Front Mountain known as the Bear Rocks was an excellent station from which to observe the fall flights of hawks. For several years he carried out extensive counts from this point and after 1950 this effort was joined by other members of the Brooks Bird Club. A by-product of the hawk counting was the discovery that there was a heavy diurnal migration of passerine birds along this ridge, (Davis, 1952; Hall, 1955, 1958).

In 1958 it occurred to Ralph K. Bell and the writer independently that the migration along this mountain ridge would make a suitable project for study by the netting and banding techniques used at stations along the Atlantic Coast in what has been termed Operation Recovery. Accordingly a small-scale operation was conducted for several days in September of 1958 under Bell's direction. Despite bad weather the results were so encouraging that the scale of the operation was enlarged, and it has been continued for five subsequent years. In 1959 the project was led by Gordon A. Knight who joined the operation for that one year. Since that time Bell and the writer have jointly carried out the study.

The results of the previous seasons have been reported from time to time as tables of captures, (Bell, 1959; Knight, 1960; Hall, 1961, 1962, 1963a). This paper attempts to summarize the results of the six years of operation and to draw some conclusions from the data. The raw data for the 1963 season are included as an appendix.

Description of the Area—The Allegheny Front is a mountainous escarpment of variable height, arising in central Pennsylvania, and continuing south into West Virginia, interrupted only by the Potomac River. It forms the boundary between the highly folded mountains of the Ridge and Valley Province to the East and the mountainous region known as the Appalachian or Allegheny Plateau to the West. As a major physiographic boundary it forms a rather natural flight line for such bird migrations as typically follow such barriers. The prominence of the ridge as a hawk flyway arises from this fact. Typically the mountain consists of a steep eastern face overlooking a valley some 1500-2000 feet lower than the ridge, a broad nearly flat top of some extent, and a more gentle descent to the West.

The region discussed in this paper lies along the boundary between Tucker and Grant Counties, West Virginia at a latitude of 39° 00' and a longitude of 79° 20'. At this point the Front rises to above 4000 feet on some knobs and is typically above 3800 feet. The top is three or more miles broad, and is gently dissected by many streams into a series of low rolling hills. The east face is steep and drops off abruptly to the Jordan Run Valley at an elevation of 2000 feet.

The steep eastern face is heavily wooded with a mixed second growth oak forest which ends abruptly at the top of the mountain. On top the vegetational cover is highly varied, but is generally characterized by being sparse. Most of the area is a fairly flat plain covered with Blueberries (*Vaccinium* spp.) and Huckleberries (*Guy-Lussacia* spp.) (the so-called Blueberry plains). Here and there are small groves of wind-pruned Red Spruce (*Picea rubra*), and a few scattered Table Mountain Pines (*Pinus pungens*) are present. The Forest Service has planted stands of several other pine species with Red Pine (*P. resinosa*) dominating.

Some of the area is open grassland. These are the celebrated "Sods" of which the most noted, Dolly Sods lies about five miles to the south of the banding station. Along the many streams alders, aspens, and other deciduous trees form low, thick groves. Several species of azalea occur and the Rose Azalea (*Rhododendron roseum*) makes a spectacular show in the late spring. Most of the streams have been dammed by beaver and the resulting ponds introduce another habitat. There are extensive marshy areas carrying Cranberries (*Vaccinium* spp.) and other boreal marsh plants. The vegetation of the area has been described by Core (1939) and Baer (1954.)

Rocky outcrops occur at numerous places along the rim of the mountain, and one of these, Bear Rocks, is the principal hawk watching station. Vegetationless areas covered with jumbled small boulders are a common feature of the summit.

Climate and Weather—The winter climate of this broad mountaintop is probably best described by calling it rigorous. Temperatures are usually low, and much snowfall occurs. The dominant factor, however, seems to be the strong winds, predominantly westerly, sweeping uninterruptedly over the plains. The result is a vegetational aspect resembling somewhat the conditions near true timberline on higher mountains. The summers are usually hot, although, of course, temperatures will average lower than they do at lower elevations.

In the Fall season during which these studies were made weather conditions may be highly variable. In early September there will be many hot, humid days with very little air motion after the early morning. Such conditions are not conducive to heavy migrations. By the middle of September the hot weather will usually have ended and the weather will consist of an alternation of warm and cool periods. Often this alternation will be marked with heavy rainfalls, and even more frequently there will be periods of several days in which the mountaintop is covered endlessly with dense cloud. These conditions prevail into early October.

Frosts may occur in any month of the year, and snowfall has been recorded as late as late May. In the Fall the first snow may fall during the banding operation and on one notable weekend in 1961 a considerable blizzard interrupted operations. The first frosts of the fall will normally have occurred before the end of September.

October represents a time of transition from fall to winter which is quite rapid. Temperatures will fall and a continuous change will occur until by the end of the month the station will present every aspect of winter. The trees will have lost their leaves (usually in the first good October storm) and the other vegetation will have turned brown and sere. During this season the mountain top presents a very beautiful aspect, although one that is quiet and subdued in contrast with the more spectacular beauty of the autumnal foliage at lower elevations.

Description of the Banding Station—Netting and banding operations have been carried out at two different locations, within walking distance of each other. The original station was set up at the Red Creek Campground of the Monongahela National Forest. This rather primitive campground which offers only the bare necessities for camping, is located about a quarter of a mile from the eastern edge of the mountain. It consists of an approximately one-acre plot of grass and forbs surrounded by low spruce, alder, and aspen trees, as well as some of the Blueberry Plains. A spring which provides water for both the banders and the bandees is the source of a small stream which produces a swampy area and serves

to attract such birds as Swamp Sparrows, Yellowthroats, and Woodcock, as well as acting as a magnet for all species. Three net-lanes have been operated here. The principal one parallels the small stream and continues through a small patch of woods. A second has been hacked through a stand of low brush, and the third stands at the edge of another patch of woods.

In 1963 a second location was established when a line of nets was operated on the rim of the mountain, about a quarter of a mile from the campground (called hereinafter the Rim Station). At this point a small ravine cuts the eastern escarpment perpendicularly and the rim is about 150 feet lower than elsewhere. Westward from the Rim an almost imperceptible depression carries the watershed and this broadens out into a broad shallow valley ultimately connecting to Red Creek, the principal drainage of the mountains. The campground lies in this valley. At the Rim the vegetation consists of Blueberry bushes, a few spruce and some rocky fields. A line of five nets was established as close to the Rim as was feasible. Figure 1 is a sketch of the banding station.

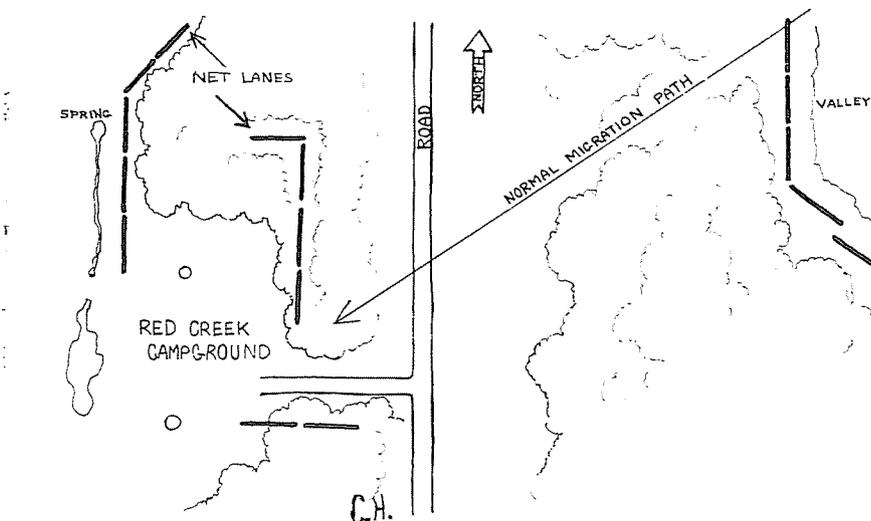


Fig. 1 Sketch Map of the Banding Station (not to scale) The pointer labelled North is actually pointing NNE.

The Banding Operation—In 1958 the banding station was operated for only one weekend in September, but in each of the subsequent five years it has been manned from late August or early September until sometime in October. A typical banding season has consisted of continuous operation for the first half of September, followed by weekend operation for the remainder of September and early October. In some years the coverage has extended until the last of October but in other years it has not, and in 1963 late October operation was prevented by the official closing of the forests lands due to fire danger. Table 1 summarizes the operation. From 5 to 17 mist nets have been used but 10-12 was the more common number. The number of nets in operation at one time depended principally upon the amount of manpower available for tending them. This has usually

Table I
Summary of the Banding Operation, 1958-63

	1958	1959	1960	1961	1962	1963	Total
Days Operated							
August	—	—	6	3	—	2	11
September	4	16	14	17	15	17	83
October	—	2	8	10	3	8	31
Total	4	18	28	30	18	27	125
Net-hours							
August	—	—	298	196	—	202	696
September	323	1897	923	1597	1674	2272	8686
October	—	126	277	597	168	654	1822
Total	323	2023	1498	2390	1842	3128	11204
Birds Banded							
August	—	—	36	27	—	26	89
September	54	390	133	360	351	517	1805
October	—	42	155	192	97	504	990
Total	54	432	324	579	448	1047	2884
Capture Success (birds/1000 net-hours)							
August	—	—	121	139	—	129	128
September	167	206	144	225	210	226	208
October	—	333	560	320	577	783	544
Total	167	214	216	242	242	335	257

been small and so the larger numbers of nets have seldom been used, and the maximum potential has never been approached.

As seen in Table I a total of 2884 birds have been banded in 11,204 net-hours, giving an overall capture success of 257 birds per 1000 net-hours.

Returns and Repeats—In bird-banding language a Return is a bird captured at the point of original banding at least 90 days subsequent to banding. At our station, which operates only in the Fall and for a period of less than 90 days, a Return is necessarily a bird recaptured in a year subsequent to banding. There has been a total of 21 Returns (See Table II). Of these, one bird was recaptured three years after its original banding, one bird was retaken two years later, and one bird was retaken in two successive years after banding (Hall, 1963b). All others were retaken only in the year immediately following banding.

Examination of Table II shows that only two of these birds represent species which do not nest on the banding site itself. These, the Purple Finch and the Ovenbird do, however, nest within a short distance of the site.

No birds banded at this station have been recovered elsewhere and no birds banded elsewhere have been captured here. While the Recovery percentage of all banded birds in the United States is in the neighborhood of 0.1% this figure is on the high side because of the large number of gamebirds and other conspicuous species which show high rates of recovery. The recovery rate of passerines is much smaller and in the case of this station must be less than 0.03%.

In banding parlance a Repeat is a bird recaptured at its banding site within 90 days of banding. At this station there have been 241 Repeats over the years. This constitutes 8.4% of the total banded. This figure is quite low for an Operation

Table II
Station Returns

Species	Date Banded	Date Retaken
Swamp Sparrow	September 21, 1958	September 13, 1959
Chestnut-sided Warbler	September ?, 1959	May 21, 1960
Catbird	September 6, 1959	May 21, 1960
		September 8, 1960
Catbird	September 7, 1959	May 21, 1960
Ovenbird	August 14, 1960	August 25, 1961
Purple Finch	August 13, 1960	September 2, 1961
Yellowthroat	September 3, 1960	September 12, 1961
Catbird	September 3, 1960	September 29, 1962
Yellowthroat	September 25, 1960	October 4, 1963
Yellowthroat	September 4, 1961	September 4, 1962
Rufous-sided Towhee	September 12, 1961	September 7, 1962
		September 29, 1963
Rufous-sided Towhee	October 7, 1961	September 10, 1962
Rufous-sided Towhee	September 2, 1962	September 8, 1963
Rufous-sided Towhee	September 4, 1962	September 21, 1963
Song Sparrow	September 23, 1962	August 30, 1963
		September 2, 1963
Catbird	September 30, 1962	September 8, 1963
Rufous-sided Towhee	September 30, 1962	September 6, 1963
Rufous-sided Towhee	September 30, 1962	September 22, 1963

Recovery Station. Ocean City, Maryland, for example, recaptured approximately 70% of the birds banded in 1961 (Robbins, 1961). The low figure at Allegheny Front indicates that the largest percentage of the birds taken are truly migrants who do not remain at the station for any length of time. The great disparity between Allegheny Front and Ocean City also reflects the considerably greater number of banders and greater number of nets at the latter station.

Of the 241 recaptures, detailed data are available for only 171. Twenty-four species are involved and Table III gives the data for the principal species.

Table III
The Number of Repeats

Species	Number of Repeats
Catbird	36
Swamp Sparrow	25
Rufous-sided Towhee	20
Slate-colored Junco	13
Yellowthroat	12
Song Sparrow	10
18 other species	55

Of particular interest is the fact that all of the species listed in Table III are resident at the station, and 4 of these are included in the 10 principal species banded. It is also noteworthy that the Swainson's Thrush which leads the list

in numbers banded has been retaken upon only two occasions. Of the other leading species 4 have been retaken only a total of 14 times, and one other, the Blue Jay, has never been retrapped.

Migration Times-Seasonal—The broad pattern of the seasonal migratory flow can be seen in the data of Table I. The results of the August bandings indicate that no appreciable influx of migrants appears until the end of the month. In the last few days of August or the first few of September the main fall migration initiates. The Common Nighthawk serves as a sort of advance guard and the hours before dusk are frequently enlivened with large flights of this species. The principal components of the September migration are the Wood Warblers of which 27 species have been captured. This family alone constitutes 42% of the total birds caught. The true indicator of the September migration, however, is the Swainson's Thrush which has constituted 8.5% of the total captures. Besides being numerous this species migrates steadily throughout the month of September and while a few individuals may be found even as late as the middle of October, the October captures amount to only 4% of the total number.

The Ruby-throated Hummingbird, Least Flycatcher, Veery, Canada Warbler, Hooded Warbler, Black and White Warbler and the American Redstart are species whose migration seems to be limited to the early part of September. None of these species, however, is an important component of the migration at this station. Such species as the Tennessee Warbler, Black-throated Blue Warbler, Blackpoll Warbler, Ovenbird, and Wilson's Warbler occur throughout September but in a given year there will usually be a period of two or three days in which a peak flight will be noted. On the other hand the Swainson's Thrush, Catbird, Yellowthroat, and Magnolia Warbler show no peak period and are caught in about the same numbers throughout the month. No species seems to be found only in the latter half of September.

While there will be days of very high success (e.g. September 10, 1963 with 1463 birds caught per 1000 net-hours), the overall capture success in September is not high. As the orderly changes in weather conditions occur there will be days of very poor capture success alternating with the successful ones. The number of species caught will be high.

September is also the time for the hawk migration which usually is at its peak during the third week of the month, although this varies from year to year.

In late September a few early strays of such species as White-throated Sparrow and Ruby-crowned Kinglet may be caught but the main migration of these species comes in the October wave which usually arrives in the first week of the month and frequently in the first few days. The October wave is markedly different from the September flight in several ways. Its arrival is usually presaged by the first really cold weather of the season but subsequently the capture success seems not to depend upon the weather unless this is so bad as to stop all movement. Although the number of species caught is much lower than in September the capture success is much higher (See Table I). The dominant birds are the Slate-colored Junco, White-throated Sparrow, both kinglets, Robin and Blue Jay. Several associated species constitute lesser fractions of the numbers caught. By the second half of October this heavy flight will have tapered off and the last quarter of the month will usually produce only large numbers of Juncos which spend the early winter winter roaming over the mountain, and permanent resident Chickadees.

Of the 20 dominant species (see *infra*) which make up 76% of the total captures,

3 are caught throughout the season; 3 from late August to early October; 4 in September only; 5 in September and early October; 3 in late September and October; and 2 in October only. As might be expected few of these 20 species show a marked peak in their flights.

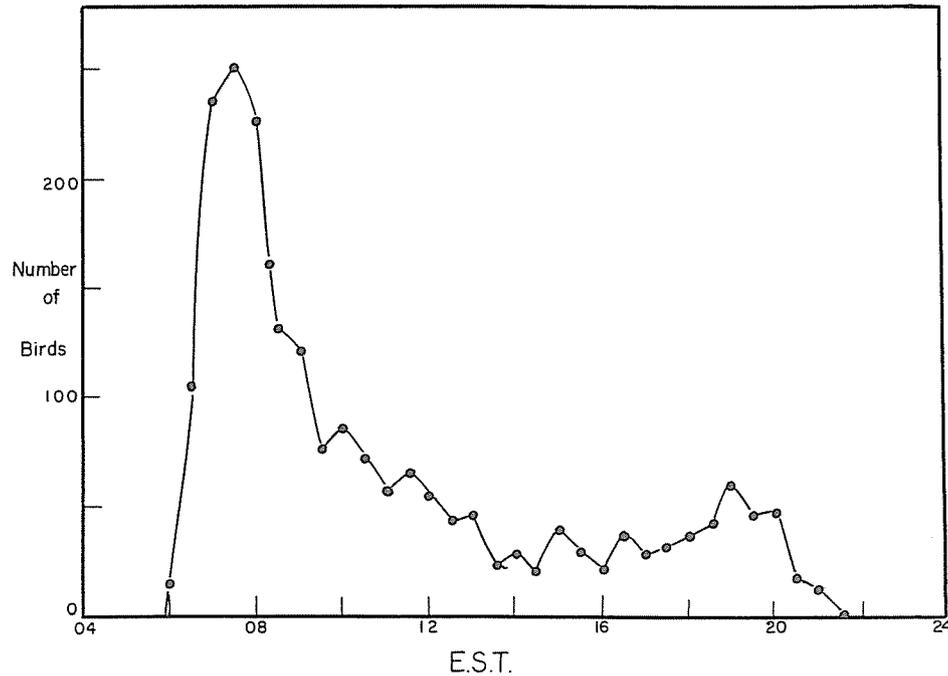


Fig. 2 Number of Birds caught in half-hour intervals.

Migration Times-Daily—Figure 2 shows the number of birds caught as a function of the time of day for the composite data of four years. In constructing this graph no correction was made for the changing time of sunrise, but it is obvious that a bird caught at 8 o'clock in October is biologically a different bird from one caught at 8 o'clock in early September. If such a correction were made it is possible that most of the sawteeth in the late morning hours might be removed.

A typical pattern on a good day would be somewhat as follows. In just a very few minutes after the first light fairly large numbers of Swainson's Thrushes and Ovenbirds will be caught. The number of birds caught then rises very abruptly to a maximum at about 6:30 EST. This maximum is very narrow and by 9:00 the numbers will be greatly reduced. Captures will continue through the morning at a reduced rate but very few birds will be caught in the afternoon. In most seasons there will be a minor peak at about 1800 EST or just before sunset. It is interesting to note that in 1963 these evening peaks seldom developed.

The weather may produce a marked alteration in this typical pattern. Warm days of little wind and high barometric pressures may result in the capture of only a dozen or less birds in the day. Days of rain or heavy fog, which is common,

may also be nearly total blanks. A foggy morning, followed by rapid clearing in mid-morning may produce a very good flight in the late morning hours. If this clearing comes much later than 0900, however, there is not likely to be a late flight. Of especial interest is the as yet unchecked possibility that on those days on which only the top of the mountain is fog covered there is a migratory flight occurring at lower elevations below the cloud cover.

Migratory Paths—The key physiographic feature that seems to be responsible for the success of this station is the ravine in the steep eastern face of the mountain which so nearly connects with the head of the gentle valley on the plateau. This apparently offers an easy path for the birds to cross the mountain. Any bird flying southwest along the edge of the ridge, would, when it arrives at this ravine, be faced with two possible routes for continuing its flight. It could continue to follow the ridge, which would necessitate a sharp swing to the east to round a promontory of the mountain; or it could follow the ravine, cross the lip of the mountain and continue its southwesterly course along the Red Creek Valley to the west of the station. It will be the birds who elect the second alternate that will be captured at the station. Visual observation would indicate that relatively few birds continue to follow the ridge and that most do, in fact, utilize the ravine. On some days the hawk migrations that have been observed from the campsite clearly follow the cross mountain route. On other days, when the weather is very warm, and the hawks are flying high on the thermals the route seems to be directly along the edge of the ridge. It is interesting to note that at Bear Rocks, to the north, hawks are frequently noted crossing from the edge of the Front to the Red Creek drainage. At this point they seem to follow the high divide between the Stony River and the Red Creek drainages.

If an observer is located on the Rim on a good flight day he will be impressed by the large number of small birds which work their way up the ravine by hopping from tree to tree until they make a rather short single flight which carries them over the top. Rather few birds seem to attempt the whole length of the ravine in one flight. Once on top the birds may then fly some distance at rather high elevations. A few continue to hedgehop however and it is from this minor segment that all of the banding captures at the campground proper are made.

From the campground on a good flight day an observer will see large flocks of birds flying over, and while he will be quite occupied in banding fair numbers of birds, he will be regretful that he is not catching more of the obvious flight. On the same day a bander at the Rim will probably have all he can do to handle the catches. The peak day of the six years was September 10, 1963 when 122 birds were banded in 4 hours. Of these 33 were caught at the campsite and 89 at the Rim.

While most of the birds, particularly warblers and Blue Jays, seemed to be hedgehopping up the ravine, Robins and a few other species have been seen approaching the ravine on long sustained flights from well out over the neighboring valley. It is not clear whether these birds originate in the valley or are crossing from the lower mountain range approximately four miles to the East. Of especial interest in this connection is the early fall migration of Nighthawks in which the birds seem to suddenly materialize out of thin air over the ravine and in circling flight rise up over the lip and then continue by the route followed by the other species.

In the small bird migration observed from the Bear Rocks, a point at which there is no inducement to cross the ridge, the birds have been observed to follow the

ridge closely but do utilize three distinct paths: (a) hedgehopping in the low vegetation on top—a difficult procedure in times of high winds; (b) hedgehopping in the trees just below the rim; or (c) flying in sustained flight over the valley (Hall, 1955).

Effect of Weather—I have not carried out a detailed correlation of the banding results with the weather data contained on the U.S. Weather Bureau maps but some rather broad generalizations are possible.

Heavy flight days for the passerine species will generally follow within two days of the passage of cold fronts, but very frequently the first day after the passage of the front will not be a good day. Usually there will be only one or two days of good flights following a given front. In 1963, however, after a three-day lull induced by very bad weather (which was not entirely local) there followed four successive days of very heavy flights. Indeed this wave may have continued longer, but observations were ended on the fourth day.

Days of prolonged rain or dense cloud at ground level will be almost totally unproductive, as will also those days which are hot and sunny and on which the barometric pressure is high and winds are low. Oddly these are just the days on which there may be large numbers of Broad-winged Hawks following the thermals. It has been a fairly general rule that a given day will not produce both a good hawk flight and good passerine flights. Indeed, the first good observations on the passerine flight, were made by a group of frustrated hawk counters on a poor hawk day (Davis, 1952).

Conditions which make it impossible for the birds to ascend the ravine and cross the Rim at low elevation will greatly reduce the capture success. On the basis of only one season's operation at the Rim station the following seems to be the trend. There will be no flights up this ravine unless the wind is blowing down ravine. That is, the birds will not use this flight on windless days nor on days when they have a tailwind. Captures will still vary on those days on which the birds fly into the wind. If the wind is exceedingly strong only a few birds will be able to fight their way against it all the way to the top. Indeed it is not uncommon to see birds blown back down the ravine. Under these conditions captures will be low. If the wind is rather light the birds may use the flight path in large numbers but they will usually clear the Rim at heights far above the nets. It seems then that it is only in a very critical range of wind velocities (which is unknown) that large numbers of birds will be captured as they clear the Rim at net heights.

Species Analysis—The annotated list that follows mentions a total of 120 species that have been recorded on the mountain during the fall migration. The discussion that follows will concern itself only with those 87 species which have been banded. These species represent 23 families (See Table IV) of which the Wood Warbler family, Parulidae, leads the list with 27 species and 1043 birds (36.2% of the total) which have been banded. The finches, Fringillidae, place second with 15 species and 616 birds (21.4%). Perhaps a more valid comparison would be the ratio of birds banded to species banded. Such a comparison shows the leader to be the Corvidae with 137 and the Mimidae with 105 birds per species banded respectively. Examination of Table IV shows that with the exception of the Corvidae, represented by a single species—the Blue Jay, the migratory flight consists essentially of four families, Turdidae, Mimidae, Parulidae, and Fringillidae (Thrushes, Mimic Thrushes, Warblers, and Finches).

Closer analysis reveals that only 10 species supply 55.6% of the total banded. Table V lists the 10 most common species. If the second 10 most abundant species

Table IV

Banded Birds Classified as to Families				
Family	No. Species	No. Birds	% Total	Banded/Species
Accipitridae	2	2	*	1
Scolopacidae	1	6	*	6
Strigidae	2	6	*	3
Cuculidae	1	2	*	2
Trochilidae	1	46	1.6	46
Caprimulgidae	1	2	*	2
Picidae	5	26	*	6.5
Tyrannidae	5	39	*	7.8
Corvidae	1	137	4.7	137
Paridae	2	80	2.8	40
Sittidae	2	17	*	9.5
Certhiidae	1	24	*	24
Troglodytidae	2	6	*	3
Mimidae	2	211	7.3	105
Turdidae	6	377	13.1	63
Sylviidae	2	95	3.3	42.5
Bombycillidae	1	15	*	15
Sturnidae	1	1	*	1
Vireonidae	4	57	2.0	14.3
Parulidae	27	1043	36.2	42.4
Icteridae	2	3	*	1.5
Thraupidae	1	3	*	3
Fringillidae	15	604	20.9	40.2

*Less than 1% of total

Table V

The Most Common Species

	Number banded	% of Total
Swainson's Thrush	243	8.4
Slate-colored Junco	184	6.3
Yellowthroat	176	6.1
Catbird	166	5.8
White-throated Sparrow	159	5.5
Magnolia Warbler	146	5.1
Rufous-sided Towhee	137	4.7
Blue Jay	137	4.7
Black-throated Blue Warbler	120	4.2
Ovenbird	103	3.6
	1570	52.6

are included it is found that 76% of the birds banded are represented in these 20 species. The second 10 are: Black-capped Chickadee, Ruby-crowned Kinglet, Cape May Warbler, Wilson's Warbler, Robin, Swamp Sparrow, Black-throated Green Warbler, and Tennessee Warbler. There is however a decided gap in the distribution of numbers as the Ovenbird (No. 10) shows 103 captures and the Chickadee (No. 11)

shows only 75. The twentieth bird, the Tennessee Warbler is represented by 48 captures.

Several of the species in the first 10, Catbird, Yellowthroat, Towhee, are seldom caught at the Rim station and with future operations at that location being intensified these 3 species may lose some of their present apparent importance.

On the basis of the data to date it appears that the species captured can be classified into categories as follows: 10 principal species; 23 minor species, and 54 casual species. 91% of the birds are embraced in the first two categories, which includes species having down to 24 captures.

A most profitable analysis results from classifying the species on the basis of the relation of the nesting range of the species to the banding station. Class A are those species known to nest on the mountain top itself. There are 22 of these of which 7 nest on the station site. Class B are the 11 species which probably nest on the mountain, but for which I do not have definite data. Class C consists of 22 species which nest (or probably do) on the wooded eastern slope or in the nearest valley. Class D are the 13 species which are known to nest somewhere

Table VI
Distribution of Banded Birds by Breeding Classes

Class	No. of Species	No. of Birds	Pct.
A. (Nest on Mountain Top)	22	1500	51.9
B. (Probably Nest on Mountain Top)	11	247	8.5
C. (Nest on East Slope or in Valley)	21	359	12.4
D. (Nest in Region)	13	169	5.9
E. (Migrants)	20	618	21.4

in this general region. Class E are the 20 species which are not known to nest within several hundred miles of the area, the truly migrant species. The classification of each species is given in the annotated list and Table VI gives a summary of number of birds banded in each class.

This assignment of species to the classes is based upon a rather broad element of personal judgment, and there may be many errors in it. This fact, as well as the large number of birds assigned to Class B, are good indicators of the great lack of knowledge of the breeding birds of this area. It should be understood that it is not implied that all 1513 birds in class A were local birds. The species is a local one, and many, if indeed not most, of the individuals are migrants from elsewhere.

I think that a careful examination of the species in each class shows clearly that this migration flight path is being utilized primarily by those species which do nest in this area, or in the case of migrants (Class E) species which nest in ecologically similar areas to the north (e.g. Wilson's Warbler and White-throated Sparrow). Further it seems apparent that many of the species which do nest in the wooded slopes and valleys to the East do not use this flight path at all. Notably absent are Meadowlarks, and many of the open country sparrows. Vesper Sparrows and Horned Larks have been found nesting on the grass covered summits of this mountain, only a few miles away but neither of these species has been caught. Indigo Buntings nest in abundance on the brushy slopes to the east, and are found on the summit itself some miles to the north, where the elevations are lower, but only 6 have been caught. Scarlet Tan-

agers and Wood Pewees must surely be common in the oak woods at lower elevations but they have been essentially absent from the flight. The Redstart is an abundant nester in the second growth woodland of the region but it has not been caught in very large numbers. There are numerous other examples.

No doubt some of these species do migrate over the region, but if they do they must use a purely aerial path and must seldom engage in tree-hopping as do the species which dominate the catch.

I am not aware of any reported ecological migrants, other than waterfowl and marsh birds, but the evidence at hand seems to indicate that only those species whose nesting grounds are ecologically similar to the mountain top use this flight lane in numbers. This idea would then suggest that the missing species mentioned in the last paragraph might be carrying out their migration in their ecological niche, which would have them migrating only a little above tree-top heights along the edge of the mountain in the valleys. No evidence of such a movement exists, but the possibility is intriguing.

Mobility of certain Species—Of the local species the Rufous-sided Towhee seems to have the largest mobility. All of the individuals of this species that have been captured have been in at least moderate molt and many were in heavy molt. This would seem to indicate that they were not migrants, but the large number caught (136) almost certainly cannot represent birds resident within a short distance of the station. Rather, it appears that there is a large floating population of this species roaming over the mountain-top feeding on the abundant blueberry crop. The large number of Catbirds caught probably represents the same phenomenon.

At the other extreme are the Slate-colored Junco and the Hermit Thrush which apparently are almost sedentary until the time arrives for their migration.

Considering the mountain top as a whole the Junco is an abundant breeder, but it does not nest at the station site itself. It probably does nest within a few yards, however, and it definitely nests at locations between the two net installations. Of the 184 birds caught only 14 have been taken before October 1, the usual earliest arrival date of the main Junco migration from the North. During the migration large numbers are caught, and so it would seem that the station is not unattractive to the species. It would appear then, that this species remains on its nesting territory until the migratory urge sends it on the move. The Hermit Thrush nests in the spruce groves within a short distance of the site but only 4 birds have been taken outside of the main migration period. In this case, it would also seem that the species does not use the migration path as extensively as do some other thrushes since the total captures are small.

Erratic Wanderers—Several species have been trapped in small numbers which apparently are out of place on this mountain. In most cases this has happened only once or twice. Such species include the Cardinal, Rusty Blackbird, Tufted Titmouse, Red-headed Woodpecker, Prairie and Worm-eating Warblers, and Whip-poor-will. No doubt they represent simple cases of wandering. The Rusty Blackbird was seen to alight in the trees near the Rim just at dusk. It was then caught at the campground in the early morning. It is possible that had darkness not interrupted its flight it would have passed over the station at high elevation, and if seen, would not have been identified.

Future Work—The major project for the future is the intensification of netting at the Rim site. This site has been in operation for only one year, and the

spectacular results there warrant much further work. The picture of migration presented above seems clear, but there is the decided possibility that further work at the Rim will necessitate a change in some of the opinions and conclusions presented here.

Current plans call for the operation of this station in the Fall for as many years as possible. There exists a decided possibility that the development of the proposed "scenic" highway along this mountain will eliminate the site as a banding station. It would be highly desirable if the station could be operated for the entire month of September. This would require the enlistment of more banders in the project, since the present two operators cannot devote much more time to the project than they do at present. Since only one October flight has been fully studied more attention should be paid to the late season flight also.

The analysis of the data on migrants through the area has pointed up the fact that practically nothing is known about the breeding birds of the mountain and the surroundings. Essentially the information on breeding birds rests in a few notes made on one day's observations by three observers (Hall, 1951). A detailed investigation of the breeding birds of the area should be made in the very near future.

ANNOTATED LIST

Those species which have been observed but have not been captured and banded at the station are enclosed in parentheses. The letter following each species name denotes the breeding bird class of the species (see Table VI).

(CANADA GOOSE) (E)—A large migratory flock was observed on October 22, 1961.

(BLACK DUCK) (A)—Black Ducks are occasionally seen on the nearby beaver ponds and have been seen flying over the banding station.

(TURKEY VULTURE) (D)—Small numbers are to be seen flying over the valley and occasionally over the campground throughout the fall season.

(GOSHAWK) (E)—This species has occasionally been reported by hawk watchers at the Bear Rocks, but since all of the records come from inexperienced observers, none can be considered fully acceptable. It is not beyond the realm of possibility that they should occur at this station but the September dates on which the reports have been made seem much too early for this species, in light of the records at Hawk Mountain (Broun, 1949).

SHARP-SHINNED HAWK (D)—Moderately common as a migrant along this Ridge.

The only banding record is of one caught on September 6, 1963. Birds of this species have been seen investigating the nets, apparently attracted by the struggling birds, and more than once a "Sharpy" has been seen perched on a tree near the Rim, apparently waiting for a weak flying migrant coming up the ravine. In 1948 DeGarmo (1953) found this to be the second most abundant species of hawk at this observation post.

COOPER'S HAWK (D)—Moderately common but less so than the last species. Both of these species probably nest nearby but definite evidence is lacking. One was banded on September 11, 1959.

(RED-TAILED HAWK) (D)—A common migrant and occasional breeder. Large flocks sometimes occur in October.

(RED-SHOULDERED HAWK) (D)—Uncommon migrant.

(BROAD-WINGED HAWK) (D)—An abundant migrant along this ridge with flocks of 100 occasionally listed, and daily counts of over 1000 made frequently. The peak

of this migration usually comes in the third week of September and only a few are to be seen after October 1.

(ROUGH-LEGGED HAWK) (E)—There are occasional reports for this species, but those reported in September may well be erroneous. At Hawk Mountain, Pa., where excellent records have been kept for many years no Rough-legs have been reported before October 6 (Broun, 1949).

(GOLDEN EAGLE) (D)—This species is rarely observed. Two reported records are October 16, 1948 (DeGarmo, 1953) and September 14, 1958 (Hall in Hurley, 1958). There have probably been a few other records but these have not been recorded in the literature.

(BALD EAGLE) (E)—One or two are reported in almost every year if the weather conditions are suitable for hawk flights at the time the observers are present.

(MARSH HAWK) (B)—Uncommon migrant along the ridge. (DeGarmo 1953) listed 20 in 1948. On several occasions these birds have been seen flying low over the campground and on one occasion one was seen flying along a net lane just above the net.

(OSPREY) (E)—Uncommon migrant along the ridge. A scattering of records each year.

(PEREGRINE FALCON) (D)—A rather rare migrant. Possibly no more than half a dozen records have been made in the time since hawk observations have been made.

(PIGEON HAWK) (E)—Uncommon migrant.

(SPARROW HAWK) (D)—Moderately common but as is the case with most falcons and accipiters it hugs the edge of the mountain and does not soar high. Consequently it is frequently missed.

(RUFFED GROUSE) (A)—Common permanent resident on the wooded mountain side but much less common on top. During some years it has been present in the woods surrounding the campsite, but in other years it has been absent.

(TURKEY) (B,C)—Uncommon resident on the mountain top. More common on the wooded east slope.

AMERICAN WOODCOCK (A)—A total of six have been banded; four of these in 1963. Throughout September the species is present in the open fields of the campsite and is often flushed at dusk. The captures represent only chance happenings. The population seems larger in October. It is not known for certain whether the species breeds in the vicinity or not.

(GREATER YELLOWLEGS) (E)—One was heard flying over on August 26, 1961.

(MOURNING DOVE) (D)—A very uncommon migrant. One or two seen in most every year.

BLACK-BILLED CUCKOO (C)—Five have been banded with the extreme dates ranging from August 25 to October 14 (this last bird was caught during a snow-storm). Four of the five were caught in 1961.

SCREECH OWL (B)—One was banded on September 10, 1963. One was captured but not banded due to lack of proper band size on October 8, 1961. Both of these were of the red phase.

(GREAT-HORNED OWL) (E)—Knight (1960) reported hearing this bird calling during September of 1959.

SAW-WHET OWL (B)—A total of five have been banded; two in 1959, September 10 and September 19; and three in 1963, September 5, October 6, and October 11. The September dates make it likely that these are local birds although there are no

known summer records for the species. Knight (1959) has summarized what was known of this species in West Virginia until 1959 and little new information has been added since.

WHIP-POOR-WILL (C)—Two have been banded: September 1 and September 7, 1963. Both were caught at the Rim location. This species may be a rare breeder in the wooded valleys to the east but its occurrence on the mountain top is probably purely fortuitous. One was heard calling in the valley in September of 1961.

(COMMON NIGHTHAWK) (D)—This species is a regular migrant and on some late August and early September evenings large numbers pass over. Two such large flights that have been recorded were on August 27, 1960 and on September 3, 1963. On this last date at least 200 were seen to come up over the rim at the net site.

(CHIMNEY SWIFT) (D)—Rather uncommon, but small groups are to be seen flying over from time to time.

RUBY-THROATED HUMMINGBIRD (D)—Over the years a total of 46 have been caught but only 10 have been banded. In 1963 a total of 25 were caught. The dates of capture range from August 12 to September 19 with the peak between August 31 and September 10.

YELLOW-SHAFTED FLICKER (C)—While large numbers have been seen flying over the valley in migration, only four have been banded, one in 1962 and three in 1963.

RED-HEADED WOODPECKER (D)—An immature was caught on September 11, 1962. Single birds and even small groups have been seen migrating parallel to the ridge but over the valley.

(PILEATED WOODPECKER) (C)—There are a few records of individuals seen flying across the valley from the wooded eastern slopes, where they probably breed.

YELLOW-BELLIED SAPSUCKER (E)—Six have been banded: two in 1960; two in 1961 and two in 1963 with the dates ranging from September 22 to October 7. The current breeding status of this bird throughout the West Virginia mountains is highly uncertain.

HAIRY WOODPECKER (A)—The only record was of one banded on October 5, 1963. They have been seen occasionally in the woods near the spring.

DOWNY WOODPECKER (A)—A total of 15 have been banded and there have been two repeats. That ten were taken in 1963 alone is typical of a number of species which showed a greatly increased capture in this very successful year.

EASTERN PHOEBE (C)—One was banded on September 23, 1962, the only record. One was seen at the station on October 14, 1962.

YELLOW-BELLIED FLYCATCHER (E)—A total of six birds of this species, which is infrequently reported in West Virginia, have been banded. The dates range from September 1 to September 12.

TRAILL'S FLYCATCHER (B)—Two birds have been banded; September 7, 1963 and September 30, 1962.

LEAST FLYCATCHER (C)—A total of 28 have been banded but the numbers vary widely from season to season; 1960-2; 1961-17; 1962-6; and 1963-4. The dates of capture range from August 13 to September 16. In 1961 the peak was on September 6 and the last seen date was September 16.

EASTERN WOOD PEWEE (C)—Only two have been banded: September 4, 1961 and September 5, 1959.

BLUE JAY (D)—This species is an abundant migrant along the mountain. Hall (1958) reported counts of 560 seen at the Bear Rocks in about three hours time.

On September 24, 1961 it was estimated that perhaps 3000 flew over the campground. Similar large flights were observed on September 22, September 29, and October 6, 1963. Despite this heavy movement only 4 birds had been captured prior to 1963 since usually the flights were too high for capture. The installation of nets on the Rim, and in particular the erection of a large mesh net suitable for holding this species resulted in some remarkable captures. Between September 29 and October 13 a total of 123 birds was captured, and many more escaped from the nets. The peak of captures came on October 4 with 48, October 5 with 33 and October 6 with 22. By October 13 the flight was essentially over and only one was caught.

(BARN SWALLOW) (D)—Occasionally seen flying over.

(CLIFF SWALLOW) (D)—Several seen in late August of 1963.

(COMMON RAVEN) (D)—This species most probably nests in the vicinity but definite records are lacking. One or two birds are to be seen in the vicinity on any day throughout the year, and occasionally flocks up to 10-20 are seen.

(COMMON CROW) (D)—Rather common as a vagrant bird over the area but probably not so much as the previous species.

BLACK-CAPPED CHICKADEE (A)—This is a common resident species throughout the region and a total of 75 have been banded, with 12 birds repeating later in the same season. The dates are scattered throughout the banding season. Small bands of Chickadees are to be seen moving through the area from time to time but the evidence points to these being a floating local population. In 1961, for example, one individual banded on September 8 repeated four times between that date and October 28. In 1963 some 19 birds were captured on October 11-12 and this probably represents an influx of wanderers from the North. Such a movement was a prominent feature of the fall season of 1963. It is likely that these birds should not be called migrants since careful studies in the northeast have shown that practically none of these wandering Chickadees ever return to their nesting areas (McCamey, 1963).

TUFTED TITMOUSE (D)—Five have been banded; one each on September 27, 1959 and October 12, 1963, and a party of three caught on October 16, 1960. This species is not known to nest on the upper part of the mountain, and these individuals must represent strays from nearby regions.

WHITE-BREASTED NUTHATCH (C)—Five have been banded from October 4 to October 12, 1963. While the species nests in the valley to the east, the behavior of these individuals, as well as the location of capture would indicate that they were migrating through the region. The species has not been observed otherwise on the mountain top.

RED-BREASTED NUTHATCH (B)—12 have been banded, all but one in 1963, and most of these at the Rim Station. The dates have ranged from September 16, to October 12. This species has sometimes been seen to move in good numbers (Hall, 1955) and prior to 1963 it had been seen and heard on numerous occasions at the banding station. It probably nests on the mountain top in the spruce groves but definite records are lacking.

BROWN CREEPER (B)—This species, also, probably nests within a short distance of the station but no records are available. A total of 24 have been banded with the dates ranging from September 15 to October 12. In 1963 the peak came on October 5-6 when 11 were banded. These dates suggest that the birds caught here are migrants rather than part of a local population.

HOUSE WREN (C)—The species very likely nests nearby but only three birds have

been banded. The dates were October 5 to 8, which suggests that they were migrants.

WINTER WREN (A)—This species nests nearby and in 1963 one was apparently resident in the rocks and trees just below the Rim nets. It was seen and heard singing on several occasions but never came high enough up the slope (a matter of only 20-30 feet) to be caught. Three have been banded, all in October, and in three different years. In September of 1963 one was found dead in the nets at the spring after a rainshower.

CATBIRD (A)—This species is a common nesting bird of the region, and is one of the principal species captured. A total of 166 have been banded and two birds have been caught in years previous to banding. There is no reason to doubt that there is a good migration of the species and that the banding total represents a portion of this as well as reflecting the local population. Only 12 birds have been captured in October and the latest date is October 7, 1961. August captures have totalled only 8 but because of the poor August coverage it is doubtful if this figure is significant. During September there seems to be no pronounced peak. The numbers caught each year have varied widely; 17 in 1963; 21 in 1961 and 23 in 1960 but 30 in 1959 and 47 in 1962.

BROWN THRASHER (A)—A common summer resident of the blueberry fields, and a total of 45 have been banded with about constant numbers from year to year. An extremely late date was October 5, 1963 but a more typical latest date is September 27 and only six birds have been taken after September 20. As with the Catbird no peak dates are evident but it is unlikely that all the birds were of local origin. There have been six repeats.

ROBIN (B)—A few Robins are to be seen flying over the area at all times but in early October large flocks sometimes pass by, with total possibly aggregating into the thousands. In the earlier years very few captures were made, except on the evening of October 21, 1961 when nine birds were caught and several more escaped when they pitched into the trees at the campsite to roost for the night. One of these birds had only one leg, although apparently healthy (Hall, 1962b). Before 1963 only 16 had been banded. The Rim nets and in particular the large mesh nets used in 1963 resulted in 40 being captured. On October 11, 28 were taken. Robins have been seen in winter on the lower slopes of the mountain. This is one of the species that has been observed to be flying towards the ridge from across the valley, possibly from the neighboring ridge.

WOOD THRUSH (C)—This species nests in the wooded valleys to the east but rather few are taken at the banding station. A total of only 14 have been banded with the dates ranging from September 4 to October 3.

HERMIT THRUSH (A)—The species nests in the spruce forest within perhaps a mile of the station, but of the 31 birds banded all but 4 have been taken in October when this species is migrating. Birds taken on October 13, 1960 and September 5, 1959 probably represent local birds, but the others are probably all migrants. The dates range from October 5 to 22. Eight birds were the most banded in any one year and the species does not represent an important part of the flight at this station.

SWAINSON'S THRUSH (A)—This is the species banded in the greatest numbers with a total of 243 captured. The species probably nests in small numbers nearby but undoubtedly most of the birds taken are migrants. One bird was taken in early August but otherwise the migration dates range from August 31 to October 14. Since only 10 birds have been taken in October this species may be considered

the "indicator" species of the September flight. There has been no consistency in the numbers of birds caught each year: 1959, 31 with a peak on September 18-20; 1960, 17 with a peak September 4 to 5; 1961, 52 with a peak on September 12-13; 1962, 26 with peaks on September 22-23 and September 29-30; and 1963, 105 with a heavy peak on September 9-10 and a lesser one on September 22. In all this large number of birds only two individuals have repeated at the station. The majority of the birds have been caught just after sunrise, and by 8 o'clock the days flight will have ceased. On some days there is an upsurge of captures just at dusk.

GRAY-CHEEKED THRUSH (E)—Twenty birds of this rather rare species have been banded. A few are taken every year and the largest catch has been 6 in one season. The dates range from September 4 to October 6 but the most common dates come in the last week of September.

VEERY (C)—Although this species probably nests nearby only 13 have been captured. The dates range from August 31 to September 12 indicating that this species completes its migration in our region early. There has been one Repeat.

(EASTERN BLUEBIRD) (G)—Three were seen flying over on October 12, 1963.

GOLDEN-CROWNED KINGLET (A)—This species is known to nest on the mountain but all 26 birds captured have been in October during the normal migration of the species. Capture dates range from October 4 to October 22. Except for 13 banded on October 22, 1960 the numbers have never been large.

RUBY-CROWNED KINGLET (E)—A total of 69 have been banded. There are two September dates accounting for 5 birds but since the species is not known to nest in the state these were presumably early migrants. Captures have been made as late as October 22 and in 1962 a pronounced peak was observed when 16 were banded on October 6.

CEDAR WAXWING (C)—Fifteen birds have been banded with dates ranging from August 13 to September 30. This small number, never more than 5 a year, is not truly representative of this bird. Flocks ranging in size from 5-10 to perhaps 50 are commonly seen flying over the area. In the early part of the season these are probably roaming birds and the same flocks are seen over and over again, but later in the season they may be truly migrants. On numerous occasions flocks have been seen following the usual migration lane up over the Rim. Waxwings were seen at the site in November of 1963.

STARLING (D)—This species is uncommonly seen flying over and the only banding record is of one caught on October 12, 1963.

(WATER PIPIT) (E)—The author has a recollection of being told by a hawk-watcher of the Brooks Bird Club of seeing this species along the mountain road, but the record is not to be found in the literature and the date and observer cannot now be recalled.

YELLOW-THROATED VIREO (D)—While this species may nest in the wooded valleys at low elevations it apparently does not use the mountain as a migration route since there is only one record, September 4, 1961.

SOLITARY VIREO (B)—While this species probably nests within a short distance of the banding station only 7 have been banded; two in 1959; and 5 in 1961. The dates ranged from September 4 to October 16.

RED-EYED VIREO (C)—This species was considered to be an uncommon migrant at the campsite and only 13 had been banded prior to 1963. However as with some other species the Rim nets were remarkably successful and 25 were banded in 1963. The dates range from August 28 to October 1. In 1963 the last one was

taken on September 14 and the peak was September 7-10.

PHILADELPHIA VIREO (E)—This species is uncommonly reported by West Virginia bird watchers but a total of 11 have been banded, some in every year, but never more than 4 a season. Most of the dates are in the early part of September although they range from September 4 to October 4.

BLACK & WHITE WARBLER (C)—This species has been listed as an uncommon summer resident (Hall, 1951). A total of 13 have been banded between September 1 and 15 with a concentration in the first week of September. A very late straggler was taken on October 5, 1963.

WORM-EATING WARBLER (D)—Two were banded on September 3 and 4, 1961. The species may nest in the valley to the East, but apparently its occurrence on the mountain top is purely accidental.

TENNESSEE WARBLER (E)—A total of 48 have been banded but 29 of these were in 1963. This species is quite capable of escaping from the net and it is likely that fairly large numbers have escaped. The species has been taken from August 31 to October 11. On September 10, 1963 12 were banded.

ORANGE-CROWNED WARBLER (E)—A total of three have been banded: one on October 15, 1960 and two on October 5, 1963.

NASHVILLE WARBLER (A)—This species has been reported from this mountain in the Summer (Hall, 1951) but only 17 have been banded. In 1962 and 1963 5 were handled and this is the largest number per season. The dates range from September 3 to October 12 with 6 captures made in October. It is an unimportant species at this location.

PARULA WARBLER (D)—There are only two records, one each on September 10, 1960 and September 3, 1963. The species nests in the general area but not on the mountain top.

MAGNOLIA WARBLER (A)—This species has been known to nest at the campsite itself and the 146 individuals banded show it to be an important part of the migratory flight. In 1959 44 were banded, with no pronounced peak; in 1960, 8; in 1961, 42 with a peak on September 6; in 1962, 27 with a peak on September 4; and in 1963, 21 with no peak. The extreme dates are August 28 to October 7 but only six birds have been taken in October. There have been only two Repeats.

CAPE MAY WARBLER (E)—A total of 69 have been banded with 26 in 1959 and 28 in 1963. There is no apparent explanation for the large numbers caught in these two years as compared with the small numbers in other years. The dates range from August 31 to October 8 with peaks on September 18-20 in 1959 and September 9-10 in 1963. In 1959 two birds repeated two weeks after banding, the longest stay on record at the station for a non-resident species.

BLACK-THROATED BLUE WARBLER (B)—The species undoubtedly nests nearby and it represents one of the most regular and steady components of the migratory flight. A total of 120 have been banded and except for the 37 taken in 1963 the yearly totals have ranged from 17 to 24. The extreme dates are August 26 to October 11 (1963), but only 6 have been taken in October. The principal migration seems to be from September 4-10 (72 birds taken). There are usually no peaks and a few birds are taken each day with 8 being the maximum daily capture. There has been one repeat.

MYRTLE WARBLER (E)—Only 14 of this species have been taken and this may represent, in part, the fact that operations may have ceased before the peak of the flight in most years. The dates are from October 2 to 15.

BLACK-THROATED GREEN WARBLER (C)—This species makes an interesting

contrast to the Black-throated Blue. While both species nest nearby and this is probably the more common of the two as a breeding bird only about half as many have been banded, a total of 53, with 17 captured in both 1961 and 1963. The capture dates range from August 26 to October 11, but only 5 birds have been taken in October. Thirty-three have been taken between September 4 and 12.

BLACKBURNIAN WARBLER (A)—Apparently this species does not use the mountain as a major flyway as only 24 have been banded, 15 in 1963. The dates range from August 28 to October 4, with the largest numbers in the second week of September.

CHESTNUT-SIDED WARBLER (A)—This is another species known to nest on the campsite. However most of the 37 birds captured appear to have been migrants. There have been 4 repeats, all in 1962. Dates have ranged from August 26 to September 24, but only three birds have been taken after September 10.

BAY-BREASTED WARBLER (E)—Only 17 of this migrant species have been banded with capture dates ranging from September 3 to October 12. There is some difficulty in distinguishing the immatures of this species from those of the next species and some identifications may have been wrong.

BLACKPOLL WARBLER (E)—65 have been banded, 51 of them in 1963 and 21 of these were taken on one day, September 9. The capture dates range from September 3 to October 11. Until 1963 this species was considered to be an unimportant element in the flight but the remarkable 1963 results have altered that view. More data are needed before any final conclusions can be drawn.

PRAIRIE WARBLER (D)—There is a summer record for the species on the mountain (Hall, 1961) but it is certainly not common. There is only one banding record, presumably of a stray, on September 3, 1962.

PALM WARBLER (E)—Two were banded on October 4, 1963, our only records.

OVENBIRD (C)—The species probably nests in the valley to the east. This is an important member of the flight with 103 banded. Most of these birds will have been caught in the very first hours of daylight. The dates have ranged from August 14 to October 1 (only one record) and the numbers have fluctuated from 34 in 1963 to 12 in 1960. The only migration peak was observed on September 9-10, 1963. There have been four Repeats and one Return.

NORTHERN WATERTHRUSH (A)—Only 8 of this species have been captured but it is likely that the main flight will have passed before operations have started in most years. Capture dates range from August 12 to September 10. There has been one repeat. In September, 1963 both eastern subspecies were taken (Hall, 1964).

CONNECTICUT WARBLER (E)—This is a rare bird to most West Virginia birders but at least one record has been made each year and a total of 8 have been banded. The dates range from September 8 to October 1.

MOURNING WARBLER (B)—One was banded on September 22, 1963, the only record. There are no definite breeding records for the area but it should occur.

YELLOWTHROAT (A)—This is a very important member of the migratory flight. A total of 176 have been banded and a large number have escaped from the nets. Many of these are local birds and there have been 12 Repeats and two Returns. One of the Returns was made three years after original banding, (Hall, 1963b). The dates of capture range from August 25 to October 8 but only 8 birds have been taken in October. The numbers have fluctuated widely over the years: 1959, 44; 1960, 11; 1961, 47; 1962, 55; and 1963, 17. In 1960 and 1963 the weather in late May was extremely cold and one is tempted to say that the low cap-

tures of these years was caused by a heavy die-off in the Spring. However the May weather of 1961 was also quite cold. This is one of the few species that has not been caught at the Rim station in any numbers.

YELLOW-BREASTED CHAT (B)—There have been only two banded in migration, September 7, 1960 and October 6, 1962 but an immature bird was captured here on August 4, 1962. This bird still had the very short tail of the extremely young bird and there were other indications that it had been born locally.

HOODED WARBLER (D)—Fifteen have been banded with 5 the most in any one year. The dates have ranged from August 25 to September 30. Most of these birds have been males. There was one Repeat.

WILSON'S WARBLER (E)—This species has been one of the more abundant birds of Class E, the true migrants with 63 banded between August 30 and October 1. By far the largest number of these birds have been males (31 out of 44 banded by the author). Only nine birds were taken in the first three years but 24 were taken in 1961; 11 in 1962 and 19 in 1963. In 1961 the peak of migration was on September 16 and in 1963 it was on September 7.

CANADA WARBLER (A)—Only 15 of these birds have been banded with six the most in one year. The dates range from August 26 to September 9, making this another species whose migration is completed early.

AMERICAN REDSTART (C)—This is a common breeding bird in much of the lower elevation woodlands but only 19 have been banded, 12 of these in 1963. This is an early migrant with the capture dates ranging from September 1 to September 12. No pronounced peaks are discernible in the data. As with some other species the majority of these birds have been males, although about equally divided among adults and immatures.

(HOUSE SPARROW (D))—Bell saw a flock of 12 at the campsite in 1962.

(RED-WINGED BLACKBIRD (D))—This species has been seen flying over on a very few occasions.

BALTIMORE ORIOLE (C)—Two were banded on September 6, 1963 and one was retaken on September 7.

RUSTY BLACKBIRD (E)—One was banded on October 6, 1963.

(BROWN-HEADED COWBIRD)—Rather rarely seen flying over.

SCARLET TANAGER (C)—Although this species must be a common breeding bird on the wooded eastern slopes only three have been taken at this station, September 12, 1961, September 8 and 9, 1962.

CARDINAL (C)—One was banded on October 21, 1960. The bird was most likely a stray from lower elevations.

ROSE-BREASTED GROSBEAK (C)—Only 8 have been banded and five of these were on September 12, 1961 (all caught at the same time in the same net). Banding dates have been from September 3 to October 13. There was one Repeat.

INDIGO BUNTING (C)—Although this bird is an abundant breeder in the region and is quite common on the top of this mountain some ten miles north of the station, where the crest is 1000 feet lower, it apparently does not use this mountain flyway for its migration. Only six birds, all immatures, have been taken with one on October 2 and all others in the first half of September.

(EVENING GROSBEAK (E))—Bell observed a flock on October 14, 1961, just prior to the snowstorm which was a feature of that weekend.

PURPLE FINCH (A)—Twenty-five of this species which breeds nearby have been banded. The largest number in any one year has been 10 in 1961. The dates

range from August 13 to October 22. There have been two Repeats and one Return. Four banded during the good migratory flight of October 1, 1961 would indicate a possible migratory movement, and Bell observed a migratory flight on October 12, 1963.

PINE SISKIN (E)—One was banded on October 11, 1963 and on October 12, 1963 large numbers were seen flying over. The bird has been found at this site in the Summer (Hall, 1951).

AMERICAN GOLDFINCH (C)—Large flocks are commonly seen moving over the campsite, although these may be wanderers rather than migrants. A total of 24 have been banded, but 17 of these were in 1963 and most of them were from the Rim station. The birds have been seen in the area throughout the period of the Operation and well into November.

RUFUS-SIDED TOWHEE (A)—This is a common bird of the blueberry flats and its "chewink" call is the most prominent bird sound in the early morning. A total of 137 have been banded, 20 have Repeated and 7 Returns have been made. One male banded in 1961 was retaken in both 1962 and 1963 (Hall, 1963b). The numbers taken from year to year have been: 4, 30, 21, 21, 47, 13. It is likely that the low 1963 capture was due to the elimination of the breeding population during the late May freeze of that year, although the almost total absence of a blueberry crop in 1963 undoubtedly had much to do with it. Most of the birds caught have been in heavy molt and are likely local birds. They wander widely during the season when the blueberries are ripe. The species has been taken as late as October 15 but most are gone by October 9.

SLATE-COLORED JUNCO (A)—A total of 184 have been banded but only 14 of these have been before October 1. The species is an abundant nester on the mountain top but does not nest on the campsite proper. Since the bird is seen commonly within 200 yards of the station, and is infrequently taken it seems apparent that until migration time it does not wander much. Once the main migration starts and the local population is augmented by newcomers from the North, large numbers may be taken, with up to 25 in one day being not unusual. Of the many banded on the mountain there have been only 8 Repeats and no Returns. Large numbers winter in the area.

FIELD SPARROW (A)—This species apparently does not migrate along the ridge in large numbers as only 33 have been taken. The dates range from September 2 to October 29. There has been one repeat.

WHITE-CROWNED SPARROW (E)—A total of 34 have been banded between October 2 and October 28. This species has never been as common as the next and 17 in one season is the maximum count. There have been 6 Repeats.

WHITE-THROATED SPARROW (E)—A total of 159 have been banded between September 28 and October 28. Annual numbers have varied from 11 in 1962 (poor October coverage) to 50 in 1960 and 54 in 1963. The peak in 1963 was October 11-13. There have been 7 repeats.

FOX SPARROW (E)—Only 5 have been banded with dates ranging from October 11 to October 28.

LINCOLN'S SPARROW (E)—This species is often considered to be rare by West Virginia students but 17 have been banded. The normal dates of occurrence are October 4 to 12, but there have been four September records including a very early one on September 10, 1963.

SWAMP SPARROW (A)—The bird nests on the nearby beaver ponds and many local birds are caught. A total of 54 have been banded and there have been 25

Repeats. One bird was recaptured a year after banding. The latest date has been October 16, but there has never been any indication of any concentrated migration. In 1959 a total of 22 were banded but the number has been as low as 5 in one year.

SONG SPARROW (A)—Fifty-two have been banded, 6 have repeated and there has been one Return. The annual numbers have ranged from 6 to 17 and the latest date has been October 21. While some of the birds may have been migrants most of them seem to have been local birds, and several repeats have been made several weeks after the original banding.

Acknowledgements—This project could certainly never have been carried out without the dedicated work of Ralph K. Bell. Somewhat more than half of the total birds have been banded by him, and his instruction in banding procedures as well as his companionship have been both welcome and invaluable. Carol Hand drew the sketch of the Banding Station that is Figure 1. Other members of the Brooks Bird Club and of the Audubon Society of Western Pennsylvania, too numerous to mention by name, have contributed time and help, and their aid and company has been most appreciated.

APPENDIX

In order that the full data be on record, Table VII records the day by day results of the 1963 season.

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ARTICLES OF INTEREST IN CURRENT ORNITHOLOGICAL JOURNALS

Clark Miller

An interesting and informative article on Goldfinch Behavior by Ellen L. Coutlee is in *The Wilson Bulletin* for December, 1963. The article is based on a one and one-half years study of the general behavior of the American Goldfinch in Michigan. Some of the observations and analyses were made with caged birds, supplemented by field work during the summer months. Various types of locomotion are discussed, and types of food and feeding behavior are described. The author uses common, everyday language in the descriptions, making the article easy to read and understand.

The Biology and Population Structure of Starlings at an Urban Roost, by William L. Thomson and Ellen L. Coutlee in the *Wilson Bulletin*, December, 1963 is a report of several years study of a large Starling Roost at Wayne State University, Detroit, Michigan. The article has various charts showing the percentage of males and females, annual bill color change in males and females, seasonal variations in weights of males and females and adults and sub-adults. The charts are arranged by months. Those of us who live in a heavily concentrated Starling area will find the article very interesting and no doubt will cause us to take a closer look at the Starling roosts in our neighborhood.

THE SPIRAL WOODPECKER

Earl Vanscoy

Last fall while walking through a wooded area near Elkins, West Virginia, Odin Taylor and I observed the following unusual behavior of a bird. It repeatedly flew into the air in a spiral manner much like a spinning top only to return almost immediately to the ground in the same manner. Sometimes it reached a height of 50 feet and other times from 3 to 25 feet. After observing these antics for awhile we were able to catch the bird and found it to be a male Redheaded Woodpecker. Its beak was imbedded in its body near the left wing. After freeing the impaled beak, which appeared to be uninjured, the bird was released and it flew away in a normal manner.



FIELD NOTES

Mrs. Nevada Laitsch, Editor
MC 21, East Liverpool, Ohio

Contributions Due

Spring Season (Mar. 1 to May 31) June 15

Summer Season (June 1 to Aug. 31) Sept. 15

Fall Season (Sept. 1 to Nov. 30) Dec. 15

Winter Season (Dec. 1 to Feb. 28) Mar. 15

The winter season, while not as severe as the last one, could still be considered a hard one. Early December experienced low temperatures which prevailed for a long period. Most of the lakes remained frozen. Snowfall was plentiful and remained on the ground throughout most of the winter. Freakish heavy snowfalls occurred in late February in the eastern panhandle, Morgantown and Charleston.

Stormy conditions and a cold front on December 14 were responsible for a concentration of waterfowl and gulls on the Ohio and Kanawha rivers. More than a hundred Horned Grebes on the Kanawha river at Charleston was unusual. Two Virginia Rails were found at Shepardstown on the Christmas count. A surprising number of Phoebes were reported and Rusty Blackbirds showed an increase as a wintering species. Evening Grosbeaks staged a fairly good flight and there were many reports of Pine Siskins. To most reporters the highlight of the season was the appearance of both species of Crossbills.

Loons, Grebes and Herons. **Common Loons** were on the Shenandoah River early in December and again the first week in February (CM). **Horned Grebe** was found at Elkins on December 9 (WLW). At least a hundred were on the Kanawha River at Charleston on December 14 (GFH) apparently results of a cold front as this is unusual for this area. **Pied-billed Grebes** were reported singly from Zanesville, Ohio (VTS) and were considered more common than usual on the Shenandoah River (CM). A **Great Blue Heron** was found on the Allegheny River in downtown Pittsburgh, Pennsylvania on December 29 (PG); three were seen near Inwood in January (CM); one on the Muskingum River on January 12 (VTS); on Magic Island, Charleston on December 2 (C&LC) and at Chesapeake, Ohio on February 9 (CV).

Waterfowl. A flock of 15 **Whistling Swans** were on the Potomac River near Shepardstown in Mid-January (CM). A flock of **Canada Geese** were seen flying down the Ohio River near Sistersville on December 15 (EG); a flock of twenty flew over Nitro on December 25 (JS) and twenty-one were on Dillon Dam near

Zanesville on January 19 (VTS). A **Snow Goose** was observed on the bank of the Ohio river at Glenwood on December 21 (L.K.SA). Ducks were practically non-existent in many areas due to frozen lakes and streams during most of the period. The cold front on December 14 resulted in a fair number on the Ohio and Kanawha Rivers. Many rafts of ducks were seen between Huntington and East Liverpool, Ohio. These consisted of **Mallards**, **Blacks** and some **Scaups** (NL). Seven **Redhead** were seen on the Kanawha (JS). Several **Scaup** and a hundred to hundred and fifty **Buffleheads** (GFH) at Charleston and one hundred **Ruddy Ducks** also on the Kanawha River (JS). Three hundred **Scaup** were present on the Tygart River at Elkins on December 1 (WLW). The Winter Waterfowl Survey (fide COH) from January 6 to 18 showed 6757 **Mallards** and 4116 **Blacks** present with the largest concentrations on the Potomac River. About half as many were on the Ohio River and few were on the New and Kanawha Rivers. **Redheads**, **Canvas-back** and **Ring-necked** were listed but **Common Goldeneye** and **Scaup** accounted for most of the diving ducks. An **Old-Squaw** on the Ohio River at Crown City on December 29 by H. C. Land (fide TI) was a noteworthy record. Both **Hooded** and **Common Merganser** were found at McClintic Wildlife Station the last week in December (TI) and both wintered in their usual numbers in the eastern panhandle area (CM).

Turkey Vultures were scarce around Inwood. Seven **Black Vultures** were seen near Shepardstown on December 30 (CM).

Hawks and Eagles. **Sharp-shinned Hawks** were recorded near Huntington on December 16 and February 23 (CV) and near Ripley on January 2 (JS). **Cooper's** appeared to be in normal numbers with several reports of individuals preying on birds at feeders. **Red-tailed** seemed to be the most common wintering hawk with reports coming from most observers. **Red-shouldered Hawks** were reported at Zanesville in December and February (VTS); Coonskin Park near Charleston (NG) and at East Liverpool (NL). A **Rough-legged Hawk** was seen at Zanesville on December 25 (VTS); Youngstown, Ohio on December 29 (ED); Ravenswood on January 2 (JS) and while they are not common in the Portsmouth, Ohio area, a number wintered there (MT). An adult **Bald Eagle** was seen near Zanesville on January 12 (VTS) and an immature was seen at Greenbottom along the Ohio River on February 2 (LW). A **Marsh Hawk** wintered near Zanesville and one was listed on the Youngstown and the Inwood Christmas counts. A **Pigeon Hawk** was observed at the Gallipolis Dam on the Ohio River on January 3 (TI). **Sparrow Hawks** seemed to be holding their own throughout the region.

Grouse, Bobwhite and Pheasants. **Ruffed Grouse** were reported at Berry Hills, Charleston on February 2 (CK); Coonskin Park on January 30 (NG); as being well established in Wayne County (CV); were raised on most every field trip in Columbiana County, Ohio (NL) and Hancock County (ERC). Coveys of **Bobwhite** were found at Comfort (C&LC); Lost Creek (WG); Zanesville (VTS); Greensburg, Pennsylvania (VO) and were considered to be in good numbers in the Eastern Panhandle (CM). Ninety-nine **Ring-necked Pheasants** were on the Youngstown Christmas count and from five to seven were seen daily near Greensburg (VO) throughout the winter.

Rails and Coots. Two **Virginia Rails** were found at Shepardstown on the Christmas count (CM). Eight **Coots** were on the Kanawha River on December 14 (GFH). **Killdeer** were reported sparingly, but the first flock was reported on February 28 at Middlebourne (EG). **Common Snipe** were present in the Eastern Panhandle area in the usual numbers (CM) and one was found at Clarksville, Pennsylvania on

the Christmas count (RKB).

Gulls. Thousands of gulls were seen on the Ohio River between Huntington and East Liverpool on December 14 (mostly **Ring-billed** with a few **Bonapartes**) (NL). About a hundred **Ring-billed Gulls** (GFH) and some **Bonaparte Gulls** occurred at Charleston on the same date (CK).

Doves and Owls. **Mourning Doves** appeared to maintain a good population with flocks reported afield and at feeders. A **Barn Owl** near Carmichels, Pennsylvania (RKB) was the only record of this species. **Screech Owls** were reported at North Park, Pittsburgh (JAG); Lost Creek (WG); and East Liverpool, Ohio (NL). **Great Horned** and **Barred Owls** were mentioned in several reports. A **Long-eared Owl** was found in a hemlock woods in north suburban Pittsburgh on January 16 (PG). **Short-eared Owls** were seen south of Columbus, Ohio on January 5 and eight were flushed from a small field in this area on another occasion (MT). A **Saw-whet Owl** was seen at close range in Wayne County on December 30 (CV).

Woodpeckers. The woodpecker population seemed to be about normal in all species. **Flickers** were recorded in several locations with regularity.

Kingfishers and Flycatchers. **Belted Kingfishers** were found in the Charleston area all winter (CK,NG) and were usually listed at Zanesville. **Phoebes** turned up in a variety of locations. One at Prichard on December 23 (CV); one just south of Beverly on January 6 (WLW); at Glenville on February 11 (JS); on Christmas count at Clarksville (RKB) and one was seen almost daily at Comfort during the period (C&LC).

Jays and Crows. **Blue Jays** continued to increase their wintering populations. One or two were found in Morgantown all winter which is an unusual occurrence (GAH). The **Common Crow** appeared in more reports as wintering in large numbers.

Chickadees, Titmice, Nuthatches and Creepers. **Black-capped Chickadees** were present in greater than usual numbers in many places. **Carolina Chickadees** were well distributed as were **Tufted Titmice**. **Red-breasted Nuthatches** appeared in fair numbers in many areas. 34 were found on the Christmas count at Charleston; 12 at Pittsburgh (JAG) and they were plentiful at Portsmouth (MT). Reports agree that the **Brown Creeper** was not common.

Wrens, Mimics and Thrushes. **Carolina Wrens** seemed to be having another difficult winter with low numbers in most areas. A **House Wren** was listed on the Charleston Christmas count. Two **Bewick's Wrens** were at Charleston on the Christmas count and one was seen at Ona on December 29 (SA). **Mockingbirds** continued to expand their wintering range. One wintered at Kingwood (LS); at Elkins (WLW) and three were found on Guyan River, Lincoln County, on December 14 (NL). A **Catbird** was seen near Zanesville on December 8 (VTS) and a **Brown Thrasher** was at McClintic Wildlife Station on December 21 (TI). **Hermit Thrushes** wintered in Wayne County in good numbers (CV) and the population was considered high at Charleston (GFH). The **Bluebird** picture continues to brighten. Charleston on Christmas counted 57; definitely on the increase at Middlebourne (EG); and quite a few wintered around Morgantown (GAH).

Kinglets, Waxwings and Starling. Reports on **Kinglets** were lacking for most part. Both species wintered in fair numbers in Wayne County (CV). A small flock of **Bohemian Waxwings** appeared in Maurice Brooks' yard in Morgantown on January 28 fide (GAH). While most of us are deploring the **Starling** population, Bell reports that they were scarce at his place.

Warblers. A **Cape May Warbler** was seen at Zanesville on January 18 (VTS).

Myrtle Warblers were reported wintering in fair to good numbers in several areas. Two **Pine Warblers** were seen at Greenbottom on January 26 (TI) and two near Prichard on January 18 (CV). Three **Palm Warblers** were found in the pine area at Coonskin Park on December 17 (NG) and Igou and Kiff recorded one each during December.

Blackbirds and Orioles. The Blackbird roost in Columbus which was estimated to peak at more than half a million birds broke up at the end of December. The **Red-wing** population which numbered about 5% left early in November; **Cowbirds** predominated through November; then were surpassed by **Starlings** peaking about mid-December. At the end of January the roost contained practically no birds (HB). Flocks of Red-wings, Grackles, Cowbirds and a few Rusty Blackbirds were observed on all field trips in the Huntington area and there was a sharp increase in late February (TI). **Rusty Blackbirds** continued to pop up all over. "First ever" was listed on the Christmas count at Pittsburgh (JAG); one at Cranesville Bog on January 24 (LS); eight on Youngstown Christmas count (ED); one at a feeder at Alpena, near Elkins (WLW); at Chester (ERC) and several in the eastern panhandle (CM). A **Baltimore Oriole** appeared at a feeder at Inwood on January 13 and remained in the vicinity until the end of February (CM).

Finches. **Evening Grosbeaks** staged a big, though erratic flight. They were reported to some degree by most reporters and the dates and numbers confirm them to be wanderers. Thousands moved into Elkins around mid-February. Wiley banded 719 and had as many as 300 in his yard on many occasions. Flocks arrived in Morgantown in December and some were still around at the end of February. Hall banded 390 at his home. Flocks were also reported in Columbus and Hallsville, Ohio (HB); Zanesville, Gibsonia, Greensburg, and Inwood. Only small numbers and stragglers were reported for the Ohio valley. The only report of **Pine Grosbeaks** was from Morgantown Brookside (GAH). **Purple Finches** were not common. **Pine Siskins** appeared widely distributed. Reported at feeders in Charleston, Huntington, Morgantown and East Liverpool. On December 17 a huge flock of five to six hundred were seen on Rt. 33 at Shaver's Fork bridge and another flock of more than a hundred at the Fish hatchery near Elkins (WLW). Goldfinches came to feeders in Youngstown (ED) and Charleston (BG) in large numbers. They were mentioned as being present by many reporters. No doubt the Crossbill invasion was the highlight of the winter for most observers. **White-winged** was the predominating species. Reports began about December 1 and continued with some regularity. They were reported all winter in Pittsburgh area (JAG); occurred fairly regularly at Columbus (HB); at Charleston in flocks of fifty to seventy five and other sizable flocks (NG); at Parkersburg (MLT), Huntington (TI), Clarksville (RKB), Lost Creek (WG), East Liverpool, and Oglebay Park, Wheeling (NL). **Red Crossbills** were somewhat more selective in their appearances. They were reported at St. Albans and Charleston (CK); North Park, Pittsburgh (JAG); Clarksville (RKB) and both Red and White-winged occurred at Willoughby (MS).

Sparrows. A **Green-tailed Towhee** appeared at a feeder in north Columbus during January and February. It was seen and verified by several members of the Columbus Audubon group (HB). Six **Vesper Sparrows** wintered at the disposal field near Inwood (CM) and one was seen at Glenwood on January 3 (TI). **Slate-colored Juncos** were considered abundant throughout most of the region. Two **Oregon Juncos** were listed on the Charleston Christmas count and Hall banded one

at his home in Morgantown on January 8. **Tree Sparrows** wintered in good numbers. Two **Chipping Sparrows** were coming to a feeder in Zanesville in mid-January (VTS). **White-crowned Sparrows** were scarce in Charleston area (NG); five immatures wintered at Clarksville (RKB). **White-throated Sparrows** attempted to winter at Willoughby (MS). Two appeared all winter at a feeder at East Liverpool (NL), and one at Morgantown (GAH). Seventeen **Fox Sparrows** were on Charleston's Christmas count which indicates a high wintering population (GFH). **Swamp Sparrows** were found on the Youngstown and Charleston Christmas counts. **Song Sparrows** were considered common throughout the region. A **Snow Bunting** was included on the Eastern Panhandle Christmas count (CM).

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YELLOW-THROATED (SYCAMORE) WARBLERS IN PRESTON COUNTY

Larry Schwab

In consideration of the recent range expansion of the Yellow-throated Warbler (*Dendroica dominica*) in West Virginia, it is noteworthy to report the finding of the Sycamore (*albilora*) race of this species out of its normal range and habitat, and at an elevation at which it has not previously been recorded.

At noon on May 29, 1963, I had under my observation for about three minutes a Yellow-throated Warbler, at a point two miles northwest of Kingwood, Preston County, West Virginia. The bird was seen at the edge of a deciduous woodland bordering a field at an elevation of 1900 feet. It was observed in good light, with 7X binoculars at a distance of forty feet, as it slowly worked about the spreading branches of a large oak. It did not sing.

Although I am advised by Professor Maurice Brooks that we are no longer sub-specifically concerned about this species as we once were because many intermediates between the nominate and Sycamore races have been found, this individual was apparently of the Sycamore race. Its eye-stripe was distinctly white, without yellow in its lores. However, as this is an inconstant characteristic, it may not be stated definitely that this bird was of the *albilora* race. No attempt was made to classify the sex of the bird because of the great degree of sexual similarity.

I was in the area frequently in June and July where the bird had been seen, but did not see it again. Thus it was not determined if it nested at this elevation.

There is, at the present time, a stable breeding population of the Yellow-throated Warbler in the Charleston area, and there have been nesting records for this race for the Huntington-Tug Fork region. East of the Allegheny Mountains, the birds have appeared recently along the Shenandoah River in Jefferson County, West Virginia. Presumably, the occurrence of this bird in Preston County, whether it was a stray or a nesting individual, has been from the west rather than from the southeast.

Table VII
DAILY BANDING RECORD
A. Bandings, August and September, 1963

	August										September										T	Grand Total	
	30	31	T	1	2	3	4	5	6	7	8	9	10	13	14	15	21	22	28	29			T
Sharp-shinned Hawk									1												1	1	
American Woodcock				1																		1	*
Screech Owl												1										1	1
Saw-whet Owl								1														1	*
Whip-poor-will				1						1												2	2
R-th. Hummingbird	2	7	9	5	2	2	3			4	3	4	2								25	34+	
Yellow-sh. Flicker														1						1		2	2
Yellow-bellied Sapsucker																	1		1		2	2	
Downy Woodpecker	1	1	1		1					1					1						4	*	
Yellow-bellied Flyc.										1		1									2	2	
Traill's Flycatcher										1											1	1	
Least Flycatcher		1	1	2										1							3	4	
Empidonax sp.	1		1	2																	2	3	
Blue Jay																			11		11	*	
B.C. Chickadee					1				1	3						1			1		7	*	
Brown Creeper															1						1	*	
Catbird	4	1	5	1			1		1	1	1	1	1	1	2	1	1				11	*	
Brown Thrasher				2										1	1	2					6	*	
Wood Thrush											1	2							1		4	4	
Swainson's Thrush	2	2	5	4	2				6	5	19	35	3	1	4	1	15				100	*	
Gray-cheeked Thrush																			1		1	*	
Veery	1	1	3				1		1												5	6	
Ruby-cr. Kinglet															1						1	*	
Red-eyed Vireo			1	1		1			6	7	8		1				1				25	25	
Philadelphia Vireo											2						1				3	*	
Black & White Warbler								1	2						1						4	*	
Tennessee Warbler	2	2	2	1						1	2	12	1	1		1					21	*	
Nashville Warbler							1				1										2	*	
Parula Warbler						1															1	1	
Magnolia Warbler			1		2	1	2	1		1	4	2	1	2		3					20	*	
Cape May Warbler	4	4	2		2		1		3	1	7	8									24	28	
Black-th. Blue Warbler	1	1	2	3	1	1	3	2	1	4	2	5	5	2	2	1					32	*	
Black-th. Green Warbler			3	1					1	1	4			1	2						12	*	
Blackburnian Warbler				2					2	3	7										14	*	
Chestnut-sided Warbler			3	1					1	1	1	1		1							9	9	
Bay-breasted Warbler										1	2										3	*	
Ovenbird				2	1				6	8	3	5			5	4					34	34	
Northern Waterthrush								3				1									4	4	
Connecticut Warbler														1							1	1	
Mourning Warbler																			1		1	1	
Yellowthroat	1		1	3						3	2	1	1	3	3						16	17	
Blackpoll Warbler						1				1	1	21	12		1		1	1			39	*	
Hooded Warbler		1	1							2		1									3	4	
Wilson's Warbler	2		2	2					1	9		1	3		1						17	19	
Canada Warbler							2	1		1	2										6	6	
Am. Redstart						1			2	3	2	3	1								12	12	
Baltimore Oriole				2																	2	2	
Rose-breasted Grosbeak						1								1							2	2	
Am. Goldfinch	1	1	2	1					7	2	1	1									14	*	
Rufous-sided Towhee			1	1		2		2		1	1					2					10	*	
Slate-colored Junco			2	1	1				1	2			1								8	*	
Field Sparrow				2						1			1								4	*	
Lincoln's Sparrow												1									1	*	
Swamp Sparrow	1		1	1	1							1									3	*	
Song Sparrow		1	1				1													1	2	*	
Total New	10	16	26	38	22	16	10	14	11	59	36	80	122	16	22	7	30				517	*	
Net hours	82	120	202	328	210	203	195	180	180	195	195	410	195	1468	83	67	16	72	51	98	2272	*	
Birds/1000 Net hours	1.22	1.33	1.29	1.28	0.91	0.79	0.51	0.78	0.72	0.303	0.105	0.410	0.1468	0.239	0.142	0.306	0.157	0.306	0.50	0.238	226	*	
Repeats		1	1	2	2		6	1	2	4	2	2		3	1	2		1	2	2	28	*	
Species	7	12	16	10	12	11	6	9	10	20	17	16	28	11	12	5	11	2	5		55	*	

* Grand Totals given after October banding Totals
+ No hummingbirds were banded because of lack of band of proper size.

Table VII

B. Bandings, October, 1963 and Season Grand Totals

	October								Total	Grand Total
	3	4	5	6	10	11	12	13		
American Woodcock			1			1		1	3	4
Saw-whet Owl				1		1			2	3
Yellow-shafted Flicker		1							1	3
Hairy Woodpecker		1							1	1
Downy Woodpecker		3		2					5	10
Blue Jay	48	33	22			2	6	1	112	123
Black-capped Chickadee	3	3				7	12	2	27	34
Tufted Titmouse							1		1	1
White-breasted Nuthatch		2		1		1	1		5	5
Red-breasted Nuthatch		5		4		1	1		11	11
Brown Creeper		2	4	7		2	6		21	22
House Wren			1						1	1
Catbird				1					1	17
Brown Thrasher			1						1	7
Robin	2	3	1	1	2	28	2	1	40	40
Hermit Thrush			1		1	1	2	3	8	8
Swainson's Thrush		1	1	1					3	105
Gray-cheeked Thrush				1					1	2
Golden-crowned Kinglet		1				4	2		7	7
Ruby-crowned Kinglet			3	3		2	1		9	10
Starling							1		1	1
Philadelphia Vireo		1							1	4
Black & White Warbler			1						1	5
Tennessee Warbler		5	1						6	29
Nashville Warbler		1	1				1		3	5
Orange-crowned Warbler			2						2	2
Magnolia Warbler		1							1	21
Black-throated Blue Warbler		1		1		1			3	37
Myrtle Warbler			6			1		1	8	8
Black-throated Green Warbler		3		1		1			5	17
Blackburnian Warbler		1							1	15
Bay-breasted Warbler						1			1	4
Blackpoll Warbler		4	5	5		2			16	55
Rusty Blackbird				1					1	1
Purple Finch		2				2	1		5	5
Pine Siskin						1			1	1
American Goldfinch						1	1		2	17
Rufous-sided Towhee			2				1		3	13
Slate-colored Junco		9	11	9	3	25	17	20	94	102
Field Sparrow						3	1		4	8
White-crowned Sparrow		2	2	1			3	5	13	13
White-throated Sparrow		5	5	8	1	7	21	7	54	54
Lincoln's Sparrow		3	4				1		8	9
Swamp Sparrow		1							1	5
Song Sparrow				1			5		6	9
New Bandings	2	116	85	71	7	95	87	41	504	1047
Net-hours	2	98	132	87	5	139	144	47	654	3128
Birds/1000 net-hours	1000	1183	645	816	1400	685		604	773	335
Repeats		2	3	2	1	5	3		16	45
Species	1	27	22	19	4	22	21	9	45	72

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DATA. The actual results of the investigation along with the methods used for collecting the information.

CONCLUSIONS. Interpretation of the data.

FUTURE WORK. As a result of the investigation, what work remains to be done.

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