

THE HAWK MIGRATIONS AT CAPE MAY POINT, NEW JERSEY.

BY ROBERT P. ALLEN AND ROGER T. PETERSON.

Physical Features.—The village of Cape May Point, at the southernmost tip of the Cape May peninsula, New Jersey, lies at the very junction of Delaware Bay and the Atlantic Ocean. The peninsula itself, a protruding finger of land less than ten miles in average width, separates the waters of the bay from the ocean for a distance of some eighteen miles. The country immediately to the north of this peninsula is readily likened to a triangle, with the ocean as one boundary and the broad bay and river mouth as the other. This triangle may be compared further to a giant funnel, the mouth of the funnel being the Cape May peninsula.

From the southwest tip of the peninsula one may take a compass bearing on due north, and, moving off to the west and south, reach due east without sighting land, except perhaps at one distant point, if the visibility is good. That one point is a high line of dunes in the vicinity of Cape Henlopen, Delaware, slightly less than thirteen miles distant. Thus the three quadrants from north to west, west to south and south to east are open water within a circle thirteen miles in radius from Cape May Point. Furthermore, the quadrant south to east faces the open Atlantic, a fact of distinct importance in relation to bird movements.

The vicinity of Cape May Point consists of flat coastal plain, with narrow sand beaches bordering both ocean and bay, and low dunes lining the bay side for several miles. Northward from the Point the bay side is lined with salt marsh, intersected by frequent tidal creeks. The sand dunes near the Point, while seldom large, continue to occur well in from the bay where they lose their identity as small hills covered with vegetation.

The plant life has a decided Carolinian flavor, the dominant tree growth being Spanish oak and pine with holly and prickly pear (*Opuntia*) generally distributed. Bayberry and beach plum are also typical. Directly north of the village, and lying close to the bay, is a grove of Spanish oaks, with post oaks, pond pines, red cedars, holly and a profusion of other plant life represented to a lesser degree. This entire Cape May Point woods covers an area less than one quarter mile square.

There are no springs in the Point woods, but fresh water is found nearby in Lake Lily and Lighthouse Pond immediately adjacent, and in Pond Creek to the north.

The Flights.—From late August until the middle of November there occurs at Cape May Point a series of migratory flights of outstanding interest; especially because of the large numbers of birds concerned both

as to species and individuals. During the 1935 season, the Audubon Association warden, Mr. William Rusling, recorded 188 species and estimated a total of 124,000 individuals, either passing through or found within the vicinity of the Point (August 4 to November 16). This total estimate of individuals is probably far under the actual figure as the observer was concentrating on the raptorial species. The raptors were represented by thirteen species, slightly more than 10% of the total number of individuals of all species recorded, or approximately 13,500 birds. This estimate is fairly accurate; that of the passerine birds, probably only a fraction of the number that actually passed through.

Detailed records of the Hawk flights were kept in 1931, 1932 and 1935 by representatives of the Audubon Association¹ engaged primarily in furthering law enforcement during the flights. A comparison of these records indicates that the Sharp-shinned Hawk (*Accipiter velox*) is the most abundant raptor, with immature birds of the species predominant. Table I shows the relative abundance of this and other raptorial species.

TABLE NO. 1.

<i>Species</i>	<i>Abundance</i>		
	<i>1935</i>	<i>1932</i>	<i>1931</i>
<i>In order of abundance in 1935 at Cape May Point</i>			
1. Sharp-shinned Hawk.....	8,206	5,765	10,000
2. Cooper's Hawk.....	840	1,222	500
3. Sparrow Hawk.....	777	322	200
4. Osprey.....	706	102	common
5. Pigeon Hawk.....	402	1,707	1,200
6. Broad-winged Hawk.....	367	400	2,000
7. Marsh Hawk.....	274	264	100
8. Bald Eagle.....	60	10	40
9. Duck Hawk.....	56	42	20
10. Red-tailed Hawk.....	50	177	
11. Red-shouldered Hawk.....	12	600	
12. Rough-legged Hawk.....	2		
Unidentified Buteos.....	22		
Total.....	11,774	10,611	14,060
13. Turkey Vulture.....	1,678		
Total.....	13,452		

Other migrating birds that particularly characterize the Cape May flights because of their great numbers, include the Black-crowned Night Heron, Woodcock, Flicker, Kingbird, Tree Swallow, Barn Swallow, Robin, Cedar Waxwing, Bobolink, and Red-wing.

¹ Geo. B. Saunders, 1931; Robt. P. Allen, 1932; Roger T. Peterson and William J. Rusling, 1935.

The flights are often very spectacular. On a favorable morning the Point woods may be literally alive with migrants. Over the meadows to the north animated clouds of Swallows, sometimes in thousands, move gradually towards the tip of the peninsula; or species after species pass overhead, flying very high on a southerly course or *northward* at a low altitude. Eagles, Vultures and Buteos circle on soaring wings, gaining altitude. Woodcock spring up on every hand, whirring away in all directions and disappearing into the thickets. One hears the call notes of Warblers, Sparrows, Black-birds and Flickers. Rails sometimes crowd the nearby marshes, and when disturbed add their protesting tones.

Even dragonflies and monarch butterflies join the migrating hosts on occasion, and when vast numbers of the latter reach the Point, the Spanish oaks, are sometimes more orange than green, and constitute a local feature to which the natives point with pride.

The woods area offers natural foods and abundant cover and it is here that the principal concentrations of migrant birds are observed. Barn Owls, occurring in flocks that may number upwards of one hundred birds, prefer a grove of half-grown pines in the vicinity.

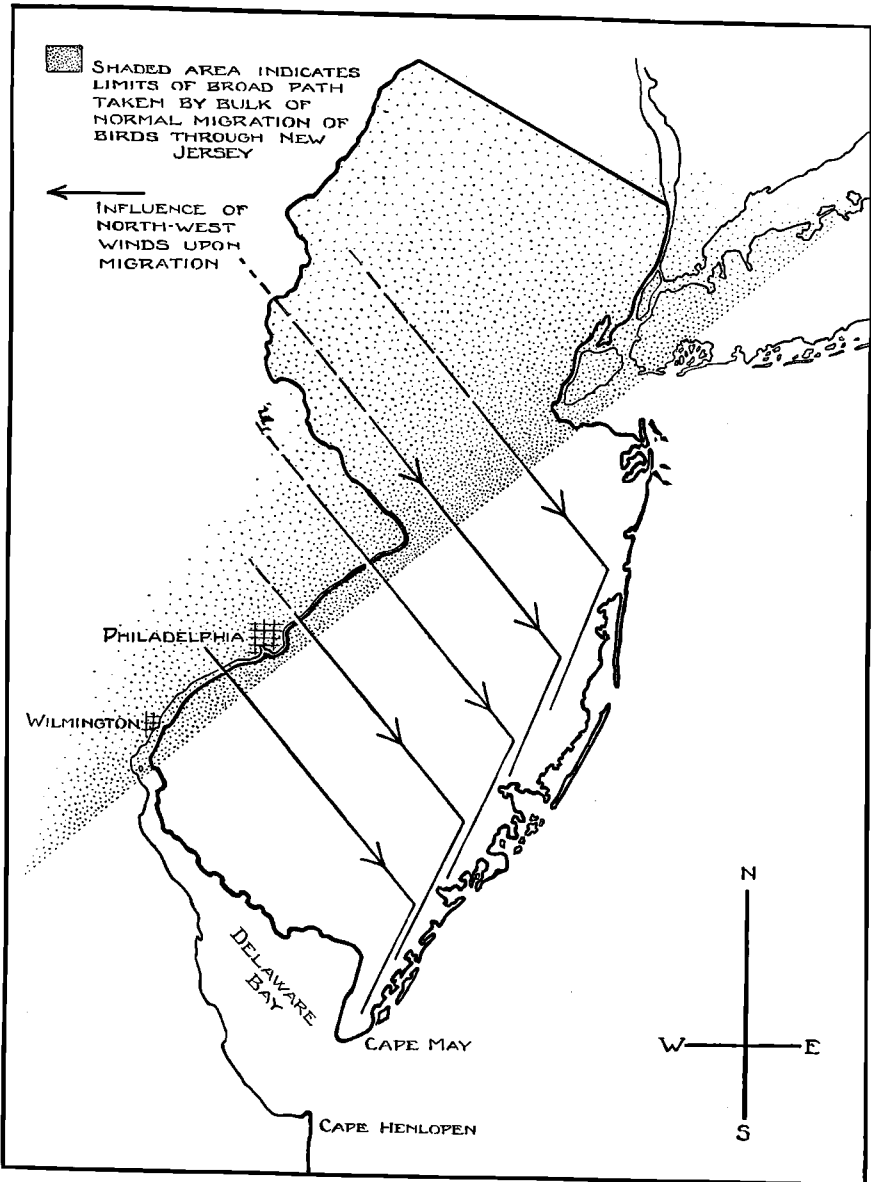
At night, when a heavy flight is under way, the calls of the arriving migrants may be heard indoors by residents of the village, and the uncertain calling of Night Herons, and flock notes of passerine birds are almost as incessant as the rumble of the surf. These bird sounds, coming with the first cold drafts from the north and northwest, are as stirring as the roll of drums, and eloquent of the whole magnificent pageantry of bird migration.

Normal Path of Migrants.—It is generally conceded that the migration of birds proceeds regardless of wind. As Eagle Clarke (1912) concludes, the weather at the place of origin of a movement has an important influence in stimulating migration, but the migrants are *affected* as they go along by whatever other conditions they meet.

For example, they keep on going whether they encounter winds from the north, south, east or west, but the direction of the wind and its intensity has its *effect* on the birds by *deflecting* their path. They are influenced to a greater or lesser extent by the cyclonic movement of the air bodies.

The notes of numerous field observers indicate that the normal lane of migration of the bulk of land birds across the state of New Jersey, passerine birds and Hawks, is a diagonal one, which lies north of a line corresponding roughly to the edge of the Newark lowlands and the Piedmont Plateau. This seems to conform to the old coastline and extends from northeast to southwest.

Cutting across the upper corner of the state are the Appalachian ridges which extend in the same diagonal direction and down which many of the Hawks, especially the Buteos and the Accipiters, normally pass.



As any bird student who has worked the area knows, the Pine Barrens and much of the rest of the present coastal plain are rather poor for land birds, other than the breeding species, much of the time during migration.

Effect of Wind on Migrants.—The concentrations of a variety of migrants at Cape May seem to be very largely the result of a wind condition—a northwest wind blowing across the lane of travel. The birds lose ground against this wind and gradually slip into the southern New Jersey peninsula. These birds eventually jam into the narrow confines of Cape May Point. A north wind will bring birds, and even a north-northeast wind will bring a few, but a northwest wind almost invariably brings a great many more.

The importance of the degree of wind force is illustrated by the observation that clear skies and light northwest winds bring only moderate flights while a northwest wind of fairly strong, or strong force is almost certain to be accompanied by a large influx of migrant Hawks besides many smaller land birds.

Arrival of Migrants at Point.—The Hawks arrive rather high, are confronted by the broad waters of Delaware Bay and the smaller species, the Accipiters and the Falcons, that fly with much beating of the wings, drop to a lower level near the lighthouse.

The lighthouse is not at the tip of Cape May Point and is set back a bit from the edge of the ocean. It is in this general neighborhood that the Hawks seem to arrive.

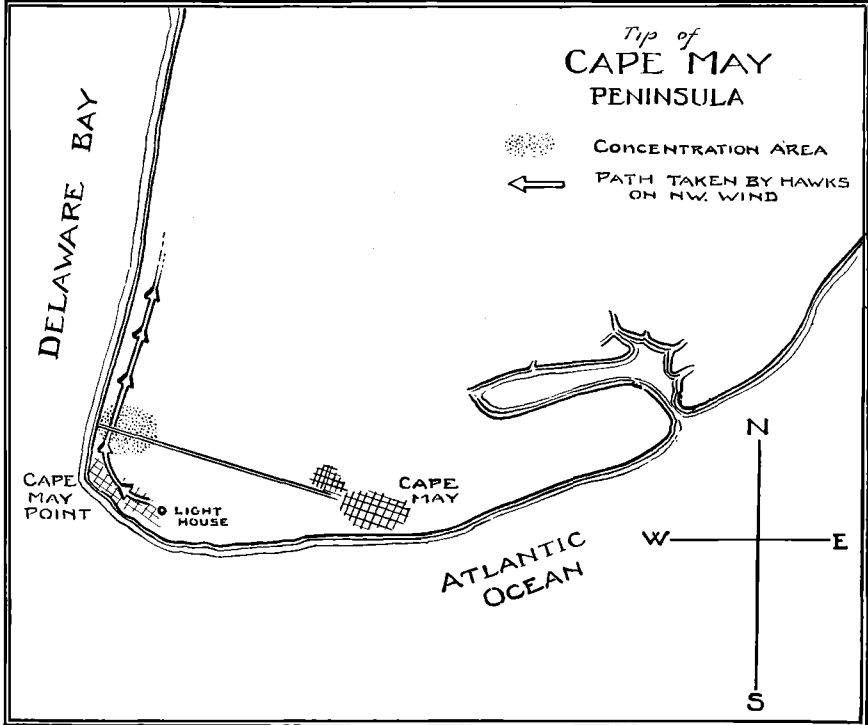
The Falcons, the Sparrow, Pigeon and Duck Hawks, wander over the salt meadows on migration, but the Accipiters, the Sharp-shin and the Cooper's, shy away from the broad open stretches and follow the wooded areas. They both arrive in this vicinity, circle down, and start beating their way through the town of Cape May Point and *north* along the bay.

On a clear day one can see the tremendous sand dune at Cape Henlopen in Delaware. The Hawks then, can see Delaware from their point of vantage in the sky, but will not attempt the crossing on the northwest wind that has forced them to Cape May. It is a long flight and if they lost too much ground against the wind they would be taken out to sea. It would be a long fight into the wind to regain the shore in Delaware.

Northward Flight into Northwest Wind.—On a northwest wind the King-birds and Flickers, as well as the Warblers and Thrushes that arrive at the Point at dawn, all follow the bay shore line northward. Even the monarch butterflies and the dragonflies have a tendency to go in that direction. In the early hours of the morning small birds that had overcast the mark and gone out to sea in the dark can sometimes be seen winging their way in from the open ocean against the wind. These waifs join the general movement of the other migrants.

This narrow path up the shore takes the Hawks low over the wooded

section just north of the town of Cape May Point. A concrete highway running almost east to west cuts across the woodland and here the local gunners formerly lined the road and waited for the Hawks to come over. Until recently shooting was permitted from the highways in New Jersey so the slaughter of Sharp-shins, an unprotected species, was considerable. As the road through the woods commands a considerable vista of open sky



it is the best vantage point from which to check the numbers and the actions of passing Hawks.

Shooting from sandhills in the woods has been largely eliminated through the creation of the Witmer Stone Wildlife Sanctuary by the Audubon Association. This embraces much of the woodland where the concentrations occur.

The northward flight continues as long as the northwest wind persists. If the wind is very strong the birds sometimes find difficulty in tacking back and forth against it. We have followed the birds for seventeen miles north along Delaware Bay. It is to be supposed that they continue on until they reach a point where the river is narrow enough for them to cross. When a

salt water creek, with broad marshes, intersects the lane of travel, the Sparrow Hawks cross without hesitation. The Sharp-shins follow the edges of the woods until the creek narrows. For this reason the lane of travel becomes diffused and difficult to follow farther north.

A careful search on the Delaware side revealed no concentrated crossing point, although Mr. Richard H. Pough of Philadelphia has seen considerable numbers of birds cross in the neighborhood of Wilmington.

"Follow-up" Flight.—Often for a day or so after the wind has lulled or shifted into another quarter, fair numbers of Hawks will drift through. These birds, instead of swinging north along the shore, will attempt to fly south across the bay from the tip of Cape May Point. We believe these to be birds that had been brought onto the coastal plain by the wind of the day before, but that had not reached Cape May by nightfall. However, we cannot be certain of this.

The Sharp-shins often fly very high when crossing, usually from five hundred feet to the limit of vision. It is a neck-breaking and eye-blinding job to obtain an accurate count. Although they seem to head in the direction of Cape Henlopen, Delaware, there is no corresponding concentration on the other side. Neither the lookout men at the coast guard station or the wireless station had noticed any unusual numbers of Hawks. It is probable that the birds are still flying very high when they reach Delaware and spread out over the country-side before dropping down.

Lulls.—For a day or so after the "follow-up" flight there will be scarcely a Hawk. This scarcity might last several days. Small land migrants are also largely absent, and seem to evaporate into thin air on days when the wind is in a southerly or easterly quarter. Dr. Witmer Stone tells of working the woodlands along the bay for five miles during one of these lulls. He recorded only ten species of birds. That night a northwester set in. The following day, over the same ground he listed eighty-three species.

TABLE NO. 2.

Relation of wind direction to the numbers of the Sharp-shinned Hawk (*Accipiter velox velox*) at Cape May Point during the fall of 1935.

Date	Prevailing Wind	Numbers of Sharp-shins	Direction of Flight After Reaching Point
Sept. 16.....	N	803	N along Bay
17.....	NW	281	N along Bay
18.....	SW	5	
19.....	S	3	
20.....	NW	228	N along Bay
21.....	S	340	S across Bay
22.....	NNW	325	N along Bay
23.....	NNW	566	N along Bay
24.....	E	52	S across Bay

TABLE NO. 2 (Continued).

	<i>Date</i>	<i>Prevailing Wind</i>	<i>Numbers of Sharp-shins</i>	<i>Direction of Flight After Reaching Point</i>
Sept.	25.....	SW	1	
	26.....	SW	0	
	27.....	S	7	
	28.....	E	1	
	29.....	W	11	
	30.....	NW	168	N along Bay
Oct.	1.....	S	591	S across Bay
	2.....	NW	251	N along Bay
	3.....	S	295	S across Bay
	4.....	NW	531	N along Bay
	5.....	NE	79	N along Bay
	6.....	Rain	12	
	7.....	NW	242	N along Bay
	8.....	N	63	N along Bay
	9.....	ENE	49	S across Bay
	10.....	E	47	S across Bay
	11.....	SW	30	S across Bay
	12.....	N	83	N along Bay
	13.....	SE	91	S across Bay
	14.....	SW	22	S across Bay
	15.....	NW	1057	N along Bay
	16.....	N	224	N along Bay
	17.....	SW	18	
	18.....	SW	1	
	19.....	NW to SW	70	N along Bay
	20.....	SW	27	
	21.....	S	4	
	22.....	SW	3	
	23.....	SW	4	
	24.....	NNW	149	N along Bay
	25.....	N	163	N along Bay
	26.....	W	8	
	27.....	W to NW	28	
	28.....	S	4	
	29.....	SE	2	
	30.....	SE	0	
	31.....	ENE	0	
Nov.	1.....	NNE	22	N along Bay
	2.....	NNE	52	N along Bay
	3.....	N	226	N along Bay
	4.....	E	8	
	5.....	SSW	0	
	6.....	NW	166	N along Bay (last flight of season)
	7.....	ENE	1	
	8.....	E to N	5	
	9.....	NE	7	

TABLE NO. 2 (Continued).

<i>Date</i>	<i>Prevailing Wind</i>	<i>Numbers of Sharp-shins</i>	<i>Direction of Flight After Reaching Point</i>
10.....	SE	0	
11.....	S	0	
12.....	SSW	0	
13.....	S	1	
14.....	N	4	
15.....	N	2	

Mutual Reactions of Hawks.—The migrating Hawks were almost entirely silent, making sounds only when one bird would plunge at another. This parrying and diving is apparently in mock combat, as none of them seems to suffer damage.

Sharp-shins were seen to plunge at other Sharp-shins, at Cooper's Hawks, Broad-wings, Vultures and Eagles. Eagles were seen to tumble about in the air together. Pigeon Hawks chased Sparrow Hawks, Sharp-shins and other Pigeon Hawks. One immature Duck Hawk seemed to have great sport annoying any bird that came near. First, it would charge at a Vulture and then, folding its wings it would swoop at one Sharp-shin and then another.

FOOD HABITS DURING MIGRATION.

As would be expected with the great concentration of small migrants at Cape May Point, approximately 100% of the food of the Sharp-shinned Hawk and the Cooper's Hawk is birds. A large number of stomachs were examined during 1931 and 1932 and a few during 1935. These were birds that had been shot by local gunners.

Accipiter velox. SHARP-SHINNED HAWK. 189 stomachs of the Sharp-shinned Hawk contained 208 birds of 44 species.

Although one of the commonest sights during the Hawk flights is a screaming Flicker with a little Sharp-shin in hot pursuit, there was not a trace of a Flicker in any of the stomachs examined. It seems as if they just enjoy hearing the Flickers squeal.

Warblers and other small birds are not so fortunate. Cuckoos are the largest birds normally killed by the Sharp-shin. No game birds were found.

Accipiter cooperi. COOPER'S HAWK. 22 stomachs of the Cooper's Hawk contained 30 birds of 17 species. One stomach contained a trace of a beetle.

Falco c. columbarius. PIGEON HAWK. A number of stomachs of the Pigeon Hawk were examined during 1931 and 1932. These contained more dragonflies than anything else. It is interesting to note that good Pigeon Hawk days are often good dragonfly days. The food supply seems to arrive with the Hawks, influenced by the same wind conditions.

Forty-one (41) stomachs of the Pigeon Hawk contained:

115 Dragonflies, 2 Crickets, 2 Grasshoppers, 34 Birds, 2 Red Bats, 1 Field Mouse.

On one occasion a Pigeon Hawk was seen to perch on a pine branch and eat a dragonfly while a Mourning Dove looked on less than five feet away.

A Pigeon Hawk was seen to harrass a flock of a hundred Yellow-legs feeding in a flooded cornfield. It would swoop at the flock and send the birds to another part of the pond. It frightened them up repeatedly, but never struck down a bird. Eventually, the Yellow-legs lost most of their fear of the Hawk and fed within a short distance, while it preened itself on a fence post. As the play of many animals is closely akin to food-getting, it is probable that this chasing might be interpreted as such.

ANNOTATED LIST OF HAWKS.

Cathartes aura septentrionalis. TURKEY VULTURE. In Cape May County the Turkey Vulture is much commoner during the winter months than in the summer. Those breeding in northern New Jersey move out of that section of the State during the colder months, and probably help to swell the numbers that linger further south. The Vultures evidence some difficulty in attempting to traverse the waters of the bay. They arrive at the Point in their rocking and wheeling manner and on reaching the water the loose groups assume a single-file formation,— as if each bird were tied to a string, and proceed in a straight line across the water.

If the wind is a quartering one, from the northwest, then attempts at crossing are futile. They lose ground rapidly and drift toward the ocean. One flock of Vultures was seen to make three such attempts. Each time the flock returned to resume its intricate wheeling and make a fresh start at a different air-level. When finally seen the number had nearly doubled, and the birds were so high they could scarcely be discerned without a glass.

Accipiter velox velox. SHARP-SHINNED HAWK. The first Sharp-shinned Hawks put in their appearance on August 23, 1935, but the species did not become common until the second week in September.

Of the 8206 Sharp-shins recorded during the 1935 season only 26 were positively identified as adults. In 1931 only two adults were recorded. Normally, the Cape May flight is made up almost entirely of immature birds. Perhaps the immature birds are less inclined to hold their course along the Alleghany ridges, and when the wind is strong, to take the course of least resistance and drift over the low country toward the coast. They perhaps ride the ridge drafts until they reach one of the frequent breaks or gaps and then make the departure. At Hawk Mountain in Pennsylvania, the flight is composed of a large percentage of adults, ranging from 20% to nearly 100% on different days.

On October 21, 1932, a very strong northwest wind brought an exceptionally great flight of Hawks to Cape May—4562 birds—this included a good percentage of adult Sharp-shins, the only adult flight of which we have any record. This indicates that it probably takes a much stronger wind to induce the adults to leave the usual path.

The bulk of the Sharp-shins fly in the morning from 7:30 to noon. They feed along the way,—at least after turning north at the Point. Very frequently a Hawk would veer suddenly in its course and dive at a small bird near the ground.

By the middle of the afternoon most of them are resting.

Accipiter cooperi. COOPER'S HAWK. The Cooper's Hawk flight starts a little later in the season than that of the Sharp-shin. The numbers are much smaller—in the neighborhood of 10%. This 10% figure seems to hold quite consistently in the daily flights.

Immature birds predominate in this species also.

BUTEOS.—The Buteos seem to require quite a sustained blow to bring them to Cape May in numbers. They arrive in long strings high in the air and circle around

in groups when they reach the Point. There they wheel, gaining altitude. This makes it difficult to determine exactly how these birds make their departure.

Their numbers vary greatly from year to year.

Haliaeetus l. leucocephalus. BALD EAGLE. The bulk of the Bald Eagles during the fall migration of 1935 passed through during the first and second weeks in September. Of the sixty Bald Eagles that were observed, nearly fifty were immature birds. A few pairs of Bald Eagles breed in southern New Jersey, but these birds tend to remain in the vicinity of the nest throughout the year.

Circus hudsonius. MARSH HAWK. The Marsh Hawk occurs in scattered groups, seldom arriving in the concentrated numbers of the other Hawks. October is its month.

Pandion haliaetus carolinensis. OSPREY. Ospreys nest abundantly in lower Cape May County so the count of 706 Ospreys in 1935 may mean a great deal of duplication. The greatest numbers of those obviously on migration passed through during the second and third weeks of September.

Falco peregrinus anatum. DUCK HAWK. The few Peregrines that were noticed seemed to be more independent of the influence of wind than almost any other species.

Falco columbarius columbarius. PIGEON HAWK. Pigeon Hawks seem to fly more in the afternoon than do the other Hawks at Cape May.

On the 16th of September, 1935, late in the afternoon, a small Falcon which was identified at the time as an immature Pigeon Hawk (Peterson) came over the town of Cape May Point accoutred with falconry trappings. The jesses were trailing from its legs and its bell was ringing. It was found later that Captain Meredith, a falconer of Boonton, N. J.—140 miles to the north, lost one of two young Richardson's Merlins (*F. c. richardsoni*) two days before. Very likely it was the same bird!

Falco sparverius sparverius. SPARROW HAWK. During the 1935 season large numbers of Sparrow Hawks went through between the 15th and 20th of September.

Along the ridges, Hawk Mountain, for example, the Sparrow Hawks are very few in number. It is possible that many of them take the Piedmont. In this connection it is interesting to note that on a change of wind into the proper quarter the Sparrow Hawks very frequently arrive first—then the Sharp-shins. In short, if the Sparrow Hawks take the Piedmont Lane they do not have to drift so far to reach Cape May.

BRIEF COMPARISON WITH OTHER CONCENTRATION POINTS.

Concentrations of Hawks similar to those at Cape May occur at several other points along the Atlantic Coast. Trowbridge in 'The Auk' in 1895 has shown that the Connecticut shore flights are composed largely of Sharp-shins which are brought by the northwest winds. The Fergusons in 'The Auk' in 1922 have shown that the Fishers Island flights are made up largely of immature Sharp-shins which arrive on northwest winds.

We have been informed that there is a great concentration of Hawks at Cape Charles, Va., which is quite identical to that at Cape May. These birds double back and fly north along the Chesapeake. Mr. Richard Pough has definite data on this same flight flying north along the Hooper Island district in Maryland. The birds are mostly Sharpshins and fly north during northwest winds. They apparently cross the

Chesapeake below the Choptank—which is about 100 miles north of Cape Charles. The authors hope to make a detailed check of the Cape Charles flight at some later date.

The Hawk Mountain flight in Pennsylvania is of a more normal nature; made up of birds that ride the air currents that are generated and forced upwards by the wind striking against the steep slopes. Buteos predominate but there are also a great number of Accipiters. Hawks migrate along various ridges in the neighborhood on almost any wind but there is a tendency for the largest flights at Hawk Mountain to occur on a northwest wind perhaps because it is the easternmost of a series of parallel Appalachian ridges and the birds are loath to leave it for the low country. In short, it is probably not quite a normal ridge flight.

At Point Pelee on the northern shore of Lake Erie the concentration of Sharp-shins is made up largely of immature birds which arrive via the lake shore and cross at this narrow point.

*Nat. Asso. Audubon Societies,
New York City.*

[In connection with the excellent account of the Cape May Point Hawk flight which Messrs. Allen and Peterson have presented it may be interesting to state that our attention was first called to the *northward* flights of birds along the Bay shore by the late Henry Walker Hand, of Cape May, who had given them a life long study and the information regarding them that the writer has presented at several meetings of the A. O. U. was largely furnished by him. Mr. Hand was of opinion that the birds were not searching for a narrow crossing of the River or Bay, but simply spread out over the wooded areas to feed, and passed on southward from the Point after the northwest wind had abated.—Ed.]