

MORTALITY OF BIRDS AT THE CEILOMETER OF THE NASHVILLE AIRPORT

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THE purpose of the following account is to record the apparently singular circumstances surrounding an accident to a migratory flight of birds at the ceilometer at the Nashville Airport. During the second week of September, 1948, numerous reports appeared in the press of substantial numbers of birds killed at various locations from New York to Texas. In at least several of the instances, the accidents were typical in that the wave of birds collided with an obstacle, as at the Empire State Building in New York. In an account of the Empire State occurrence, Pough ('48) attributes the accident to the fact that the bird flight was riding a southward moving mass of cold air, and that the latter was continuously being pressed to a lower altitude by an overlying northward moving mass of warmer air. At New York City the flight was sufficiently low to strike the shaft of the world's tallest building.

Presumably, similar conditions may have been operative at a number of eastern seaboard locations, such as at the 491 foot Philadelphia Savings Fund Building and the 450 foot WBAL television tower in Baltimore, on the same evening (Sept. 10-11, 1948). At Nashville, however, on the preceding night, Sept. 9-10, the birds fell to the ground while flying across the vertical beam of light sent up from the ceilometer and apparently death was due to impact with the ground or runways. Although it may be reasonable to assume that the birds crossing the beam of light were temporarily blinded and hence fell to their deaths hundreds of feet below, the actual combination of circumstances responsible for the accident is a mystery, because the ceilometer has been in use at Nashville for years with no previous known effect on migrating birds, and furthermore such ceilometers are in use at other airports.

The instrument in question, made by the Crouse-Hinds Company of Syracuse, New York, sends a vertical beam from a mercury-vapor lamp of great intensity high into the sky, recording cloud levels up to 15,000 feet, and is said to be visible from 30,000 ft. At Nashville it is set in a low, brick housing on the airfield close to the runways. The beam of the light may be seen at night as a narrow, blueish column, and on cloudy nights the light spot it makes on the clouds can be seen from several miles away. The caretaker of the light, Mr. Charles Linville, stated that at close range the light is so intense as to blind for several hours anyone so unfortunate as to look directly into it, and that it can cause third degree burns. However, if the intensity falls off as the inverse square, it is doubtful that such effects can be considered important factors in arresting a bird flight hundreds of feet in the air overhead. Pre-

sumably in a period of several years birds must have passed over the ceilometer on numerous occasions and apparently without effect. On the morning of Sept. 10, however, between midnight and 4:30 A.M., some 300 birds fell down the column of light, to be picked up dead (for the greater part) or variously incapacitated on the ground.

The accident was reported to the Nashville Children's Museum by Mr. Skinner of the airport staff, and the actual observation was made by Mr. Linville. On the night in question, at 6:30 P.M. of Sept. 9, the weather record shows that the cloud ceiling was at 2400 ft., the ground visibility 6 miles, a 4 mph NW wind, and a temperature of 67°F. At 11:30 P.M. the ceiling had lifted to 4200 ft., and visibility increased to 10 miles, with wind and temperature about the same. At this time birds were first noted going overhead (reported as various calls, including a "honking" sound (Green Heron?)). An hour later when the first birds began to fall, the ceiling was at 5000 ft., gradually lifting to 9700 ft. at 4:30 A.M., when the last birds fell. Most of the birds fell in the first hour. Mr. Linville stated that as he looked up the shaft of light, as far up as he could see, birds were tumbling down to land on the ground and adjacent runway, mostly dead. He watched for over an hour, but when Pied-billed Grebes and an American Bittern appeared overhead he took shelter. In the morning he gathered 248 birds which were taken to the Nashville Children's Museum for study by Mrs. Amelia Laskey and the writer. Mr. Albert Ganier later prepared a few of the specimens for his private collection. Before the main group of birds was taken to the museum, however, some dozens of badly damaged birds were swept off the runways, and not recorded.

It is clear that with the atmospheric conditions reported, there can hardly have been any considerable factor of poor visibility, and in fact it would seem none at all. There had been cloudy and unsettled weather with small amounts of precipitation from Sept. 3 through the 9th, but the morning of the accident brought clearing. Since the beam of light was not directed at any object except the clouds thousands of feet overhead, there can have been no appreciable factor of flying toward the beam. Rather, only those birds actually crossing the beam were intercepted. It is not impossible that, becoming aware of the light below, birds started downward towards it, and becoming incapacitated, fell to their death. It is noteworthy that most fell within 50 to 100 ft. of the instrument, but some were found at somewhat greater distances. The slight N to NW wind tended to carry birds to the south side of the impact area, but a considerable number was on the north side as well. This might suggest that they fell from no great height, but Mr. Linville stated that he thought that he could see them at least a 'thousand' feet up. Since it is doubtful just how far the smaller birds at least could be seen under such conditions, 500 ft. may be a more reasonable estimate, and of course birds may have entered the column of light at various altitudes. This is low, however, in terms of the heights recorded

Record of Birds Killed at Nashville on the Night of Sept. 9-10 and at the Empire State Building on the Following Night

SPECIES		NASH- VILLE	NEW YORK
Pied-billed Grebe	(<i>Podilymbus podiceps</i>)	6	0
American Bittern	(<i>Botaurus lentiginosus</i>)	1	0
Sora Rail	(<i>Porzana carolina</i>)	2	0
Empidonax Flycatchers		20	0
Yellow-bellied	(<i>Empidonax flaviventris</i>)	19*	
Acadian	(<i>Empidonax virescens</i>)	1*	
Wood Pewee	(<i>Contopus virens</i>)	5	0
Olive-backed Thrush	(<i>Hylocichla ustulata</i>)	2	0
Veery Thrush	(<i>Hylocichla fuscescens</i>)	2	1
Yellow-throated Vireo	(<i>Vireo flavifrons</i>)	1	0
Red-eyed Vireo	(<i>Vireo olivaceus</i>)	95	8
Black and White Warbler	(<i>Mniotilta varia</i>)	9	7
Prothonotary Warbler	(<i>Protonotaria citrea</i>)	2	0
Worm-eating Warbler	(<i>Helmitheros vermivorus</i>)	0	1
Blue-winged Warbler	(<i>Vermivora pinus</i>)	0	1
Tennessee Warbler	(<i>Vermivora peregrina</i>)	7	3
Nashville Warbler	(<i>Vermivora ruficapilla</i>)	1	1
Yellow Warbler	(<i>Dendroica petechia</i>)	4	0
Magnolia Warbler	(<i>Dendroica magnolia</i>)	5	7
Cape May Warbler	(<i>Dendroica tigrina</i>)	0	3
Black-throated Blue Warbler	(<i>Dendroica caerulescens</i>)	0	6
Cerulean Warbler	(<i>Dendroica cerulea</i>)	1	0
Blackburnian Warbler	(<i>Dendroica fusca</i>)	1	0
Chestnut-sided Warbler	(<i>Dendroica pensylvanica</i>)	3	3
Bay-breasted Warbler	(<i>Dendroica castanea</i>)	0	5
Black-poll Warbler	(<i>Dendroica striata</i>)	0	4
Prairie Warbler	(<i>Dendroica discolor</i>)	1	1
Oven-bird	(<i>Seiurus aurocapillus</i>)	6	16
Northern Water-thrush	(<i>Seiurus noveboracensis</i>)	7	5
Louisiana Water-thrush	(<i>Seiurus motacilla</i>)	2	0
Kentucky Warbler	(<i>Oporornis formosus</i>)	9	0
Connecticut Warbler	(<i>Oporornis agilis</i>)	0*	10
Mourning Warbler	(<i>Oporornis philadelphia</i>)	4*	0
Yellow-throat	(<i>Geothlypis trichas</i>)	4	4
Yellow-breasted Chat	(<i>Icteria virens</i>)	20	5
Wilson's Warbler	(<i>Wilsonia pusilla</i>)	1	0
Canada Warbler	(<i>Wilsonia canadensis</i>)	20	1
Redstart Warbler	(<i>Setophaga ruticilla</i>)	4	6
Bobolink	(<i>Dolichonyx oryzivorus</i>)	1	1
Baltimore Oriole	(<i>Icterus galbula</i>)	1	3
Rose-breasted Grosbeak	(<i>Pheucticus ludovicianus</i>)	0	1
Savannah Sparrow	(<i>Passerculus sandwichensis</i>)	1	0
		248	103

* Tentative identification.

by the ingenious method of Carpenter (1906); but the observation of Stone (1906) recorded a flight passing quite low over the lumber yard fire he described.

On the other hand, the observation showed that the birds did not fly either into the light or into the ground, but were arrested high in the air, to fall to the ground with death by impact. It is interesting that both legs of the bittern were broken by the fall, but the heavy-bodied grebes were not badly damaged. Overing (1936) mentions that during one night flight at the Washington Monument, many sparrows appeared at the ground, flying down and apparently resting from the flight, but no such factor was apparent at the Nashville flight. Although it is clear that a major role was played by the ceilometer light, it is equally clear that other and unknown factors were operative, because of the fact mentioned that similar occurrences have not been noted at Nashville before, and that similar instruments are in operation at many or most other airports.

In the accompanying table are recorded the birds of the Nashville group and also the birds from the Empire State Building in New York, supplied through the kindness of Mr. Pough. In each case the list is incomplete, and while the Nashville list probably contains by far the greater percentage of the total killed, there is no such assurance for the New York group, where it may be supposed that a much larger proportion was lost.

The imposing group of warblers is not a complete representation of the flight, as a short field trip later in the day revealed 2 Golden-winged Warblers as well as several Yellow-throated Vireos. It does not seem possible to allocate the Nashville birds to any one origin, as both 'Canadian' and 'Carolinian' forms are represented. Wilson's Warbler, Canada Warbler and Northern Waterthrush are matched by Yellow-breasted Chat, Cerulean, and Kentucky Warblers. It is interesting that the Empire State group contains 5 Yellow-breasted Chats. Overing (1936, 1937, 1938a, b) has provided a well worthwhile record of birds killed at the Washington Monument. Of 874 warblers of 22 species picked up in three seasons, 347 (39%) were Yellow throats, 181 (21%) were Magnolias and 94 (11%) Black-throated Green. Not a single Canada Warbler appeared in that list, while at Nashville 18% were of this species. Since the Nashville group is from a single flight it is not as significant as the substantial sample published by Overing, but the considerable differences in the proportions of various species are worth noting. The presence of rails, grebes, and a bittern at Nashville indicates a wider representation of families, but whether this is due to differences in the collection of the sample, to real differences in fly-way cross-section, or merely to fortuitous factors, is not apparent.

SUMMARY

On the morning of September 10, 1948, approximately 300 birds were killed or incapacitated at the ceilometer of the Nashville Airport, and 248 of these were studied at the Nashville Children's Museum. The occurrence appears

to be unique in that the birds did not collide with some object while in flight, but were intercepted upon crossing the vertical beam of the ceilometer light, down the long narrow column of which they fell, to be picked up dead, presumably from impact with the ground. The light itself is not a sufficient cause of the accident, as it has been in use for years without incident, and other such instruments are in use at other airports. Furthermore, visibility was high and the cloud level was at 5000 ft. or above during the accident. The actual combination of factors responsible remains a mystery.

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