

(*Dendroica cærulea*). Also several specimens of Swainson's Warbler, and a large series of Bachman's Warbler, as already recorded by Mr. Galbraith in the present number of 'The Auk.' Of special interest also is a pair of Crossbills (*Loxia curvirostra minor*), taken March 27, 1888; they are much smaller than northern birds of the same species, and the male is of a darker red. They were probably bred in the mountains or tablelands of Kentucky or Tennessee.

Mr. Galbraith informs me that Pine Finches and Juncos were rather common winter residents at the locality in question.

His collection contained also a Brown Thrush with a malformed bill, in which the bill is slender, lengthened, and curved to the right, with the upper mandible twisted partially beneath the lower, which is considerably longer than the upper. A Yellow-bellied Woodpecker presents a somewhat similar malformation, the mandibles being crossed near the base, and the lower one attenuated and greatly lengthened.

A beautiful albino Prothonotary Warbler (*Protonotaria citrea*) is also worthy of mention. The yellow is of normal extent and intensity, but the gray is entirely replaced by pure white. The wings and tail are thus pure white and the body deep intense yellow, the olive of the back being replaced with yellow. The specimen thus looks very much like a white-winged yellow Canary with a Prothonotary's bill.

All the birds above-mentioned, except the greater part of the Bachman's Warblers, have been purchased for the American Museum of Natural History.—J. A. ALLEN, *Am. Mus. Nat. Hist., New York City*.

**Observations on Bird Migration at Milwaukee.**—The Milwaukee Exposition Building occupies one square, between 5th and 6th Streets east and west, and State and Cedar Streets north and south. The building is located about one mile west from the Lake shore, and nearly in the centre of the city north and south. The main tower of the building is nearly in the centre of the structure, and rises over 200 feet above the street. During the Exposition this tower is illuminated by four electric lights of 2000 candle power each. They are lighted from 6 to 6.30 P. M. and turned out at 11 to 11.30 P. M., according to the condition of the atmosphere.

The weather previous to September 20-21 was exceptionally mild and pleasant, and but few birds were noticed migrating, *i. e.*, during the day time. I had not yet discovered that the electric lights on the tower attracted the birds to any extent. September 21-22 it grew suddenly cooler with raw cold north wind. On the morning of the 22d some of the employes of the Exposition climbed to the tower and found "lots of birds" dead. I procured a few of them, the rest becoming scattered before I had found it out. Of this lot there were no species of those I saw, not represented in my list of the next day except *Colaptes auratus* which I identified from some feathers a young lady had saved from the specimen.

The night of September 22-23 was raw and cold, with fresh north wind, and was very dark. The next morning I found the following species around the lights and on the accessible roofs.



|   | Adult. | Juv. |
|---|--------|------|
| <i>Setophaga ruticilla</i>              | 1 ♀    | 4    |
| <i>Geothlypis trichas</i>               | 1 ♀    | 3    |
| <i>Geothlypis agilis</i>                |        | 6    |
| <i>Mniotilta varia</i>                  |        | 1 ♂  |
| <i>Compsothlypis americana</i>          |        | 1 ♀  |
| <i>Helminthophila peregrina</i>         | 1      | 5    |
| <i>Helminthophila ruficapilla</i>       |        | 1    |
| <i>Dendroica castanea</i>               |        | 4    |
| <i>Dendroica blackburniæ</i>            |        | 1 ♂  |
| <i>Dendroica coronata</i>               |        | 2    |
| <i>Dendroica vigorsii</i>               |        | 1 ♂  |
| <i>Dendroica palmarum</i>               |        | 5    |
| <i>Dendroica maculosa</i>               |        | 3    |
| <i>Dendroica cærulescens</i>            |        | 1    |
| <i>Dendroica virens</i>                 |        | 2    |
| <i>Seiurus aurocapillus</i>             |        | 4    |
| <i>Seiurus noveboracensis</i>           |        | 3    |
| <i>Troglodytes ædon</i> *               |        | 1    |
| <i>Regulus satrapa</i>                  |        | 1    |
| <i>Melospiza fasciata</i>               |        | 1    |
| <i>Ammodramus sandwichensis savanna</i> |        | 1    |

This list comprises only such species as were procured and examined. I estimate that fully double this number of birds was scattered about on the different roofs in sight from the dome but not accessible without considerable risk and much trouble in procuring ladders, etc. They were too far away to identify with certainty, and most of them rolled down the roofs into the troughs, or to the ground, and were lost.

The night of September 23-24 was much like the preceding, but somewhat colder and less windy. On the morning of the 24th I procured the following species. These were not all killed on the night of September 23-24, however, as some of them that were found in the eave troughs had probably been killed one or two days previous.

|                                 |     |      |
|---------------------------------|-----|------|
| <i>Geothlypis agilis</i>        | 3   | juv. |
| <i>Geothlypis trichas</i>       | 3   | "    |
| <i>Setophaga ruticilla</i>      | 2   | "    |
| <i>Dendroica palmarum</i>       | 1   | "    |
| <i>Dendroica castanea</i>       | 4   | "    |
| <i>Dendroica maculosa</i>       | 2   | "    |
| <i>Dendroica pennsylvanica</i>  | 1   | "    |
| <i>Dendroica vigorsii</i>       | 1 ♂ | "    |
| <i>Dendroica cærulescens</i>    | 1 ♀ | ad.  |
| <i>Dendroica striata</i>        | 3   | juv. |
| <i>Helminthophila peregrina</i> | 4   | "    |

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\*Flew in at main entrance to Exposition building about 9.30 P. M. and was caught. It is said there were others with it.



|                                    |             |      |
|------------------------------------|-------------|------|
| <i>Vireo olivaceus</i> *           | 4           | juv. |
| <i>Vireo gilvus</i>                | 1           | "    |
| <i>Seiurus auricapillus</i>        | 1           | "    |
| <i>Seiurus noveboracensis</i>      | 1           | "    |
| <i>Melospiza georgiana</i>         | 1           | "    |
| <i>Habia ludoviciana</i> †         | 2 (♂ and ♀) | "    |
| <i>Piranga erythromelas</i>        | 2 (♂ and ♀) | "    |
| <i>Turdus aonalaschkæ pallasii</i> | 2           | "    |

September 24 was a very pleasant day with light northwest wind. The wind freshened in the evening, and many birds were noticed about the dome from 7 P. M. until 10.30 P. M. I did not go up during the evening but some of the small boys employed about the building did, and as I was afterwards informed secured a "market-basket full of birds." I did not see any of these. I climbed the tower early the next morning and was surprised not to find any birds until I found out the boys had preceded me.

The 26th being Sunday, no lights were lighted. Weather mild and fair with light southerly winds. On the evening of the 27th I went up on the tower, but the weather was too boisterous. There was a cold rain with high wind. Very few birds were seen, mostly Thrushes and one small flock of *Tringæ*. The birds merely circled around the tower once or twice, and passed on. I heard Gallinules, Rails, and Night Herons, but they did not approach the lights. The 28th it rained very hard, and as I could see no birds from below I did not go up. None were found dead next morning.

The 29th was rainy with high north wind. I went up on the tower about 8 P. M. The weather was unfavorable; I saw a few Thrushes, one Robin, and some small Sparrows, but they merely flew near the lights, sheered off, and passed on. None were found dead next morning.

On account of the exposure to wind and rain for two nights on the tower I got an attack of rheumatism and was unable to make any further observations until the birds had passed south.

Besides the species enumerated in the above lists I saw and heard the following, some from the street and some on the tower:

*Totanus*, either *melanoleucus* or *flavipes*, straggling flocks, quite noisy. Noticed several evenings, but did not approach very close to the lights.

Two or three loose flocks of small *Tringæ* circled rapidly around the lights a few times, and disappeared in the darkness. A flock of small Plovers, probably *Æ. semipalmata*, acted much the same way, but appeared to be lost and would wander away out of sight, soon return, pass close by the lights and after a few minutes return and go through the same manœuvre.

Thrushes were noticed frequently, especially on the 27th and 28th. At times there were eight or ten flying aimlessly around the lights, but never

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\* One of these was minus both wings.

† Female was minus both wings and tail.



going very close, nor flying directly at the lights as most of the Warblers did. I could not identify the species, but think most of them were *pallasii*. I saw one young Robin, but he soon bent his course downwards to some shade tree where I have no doubt he found a roosting place.

Carolina (?) Rails were frequently heard, especially on the 21st, 22d, and 23d; they seemed to be flying on a lower level than the dome, barely above the housetops. None were seen around the tower. The same remarks apply to the Florida Gallinule. Night Herons (*N. nycticorax naxius*) and some other Herons that I think were *Botaurus lentiginosus* passed frequently from the 22d to the 26th. They did not seem to be attracted by the lights and appeared to be flying considerably higher than the dome, I should think at least 100 feet or more. English Snipe were noticed a few times, but only flew rapidly by. This was one of the few species I observed that were flying in the normal manner.

Small Sparrows that looked like *Melospiza georgiana* were frequently noticed, but the species could not be determined with certainty. They arrived singly, and came from a lower level than the lights on the tower, and in passing by always directed their course downwards, as far as I was able to see them in the darkness.

One feature that especially interested me was that nearly all the birds I observed had a peculiar dragging flight like a bird wounded through the intestines; it reminded me forcibly of the peculiar flight of the male *Icteria virens* during nesting time. Any ornithologist who has observed this will recall the unnatural flight, the wings are raised high, tail dropped low and head raised, so that the body instead of being carried nearly horizontally is at a considerable slope. The first impression suggested was of extreme fatigue, but it is probable the birds are better able to sustain continued flight by flying in this manner with the wind.

Another interesting fact is that among the forty odd species and many times that number of specimens I only detected four adult birds.

Apparently most of the birds were killed by coming into contact with the electric wires, as there was not a bruise nor hardly a ruffled feather on them. Some had flown against the lights and broken or bruised their bills, others had torn the skin or feathers from the side of the head or throat, and in two instances the wings were gone. Two or three had their necks broken.

I estimate the number procured at about fifty per cent of those killed. A large number fell on inaccessible roofs, or were blown into the eave troughs during the high winds and lost.—LUDWIG KUMLIEN, *Milwaukee, Wisconsin*.

**Osteological Notes upon Puffins and Ravens.**—In examining some skeletons of adult specimens of *Lunda cirrhata*, kindly loaned me by the Smithsonian Institution, I find, occupying the usual site of the bone, but completely enveloped by the tarsal theca, a rudimentary accessory metatarsal, or the hallux metatarsal, which is freely articulated, but all evidence of a basal phalanx of the toe is absent. Such a rudimentary element in



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