

internal side of the lamina, the external surface of which remains smooth. In one specimen, the lamina appears to be made up of two separate, thin layers, only the inner of which takes part in core development. With the continued growth of the core, core and lamina attach to the metatarsal shaft, evidently aided by a proliferation of cells from the rough area on the shaft of the metatarsals (Plate 25, lower figure, *d* and *e*).

Although the breadth of the shaft in the adult bones may be partially affected by this activity in the area of the developing spur core, the shaft as a whole maintains a slight porosity in both male and female bones until the ridges and grooves formed by the tendons are fully etched on its surface. As long, therefore, as roughness or graininess in texture of bone exists, slight increase in breadth of shaft may be expected, though the linear dimension is apparently not altered once the tarsal and metatarsal elements are well united.

This concept of the proportions of the bones of immature individuals is of importance in paleontological studies. Lacking true epiphyses, the time of cessation of growth in avian specimens is not clearly marked as in mammalian bones. It appears, however, that in the tarsometatarsus, in which the tarsal element acts as an epiphysis, it is safe to consider linear measurements on a par with those of adult individuals when the fusion of the two parts is complete, though the proportion of breadth of shaft would be unreliable as long as roughness exists.

Los Angeles County Museum
May 1, 1945

BEHAVIOR OF BIRDS DURING A FLORIDA HURRICANE

BY GEORGE MIKSCH SUTTON

ON October 19, 1944, a much publicized hurricane, which moved northward from Cuba by way of Tampa, struck the vicinity of Orlando, Orange County, Florida. Hundreds of large trees were blown down in Orlando and in the neighboring town of Winter Park, just to the north, but destruction of houses was not great on the whole; damage to the citrus crop appeared to many eye-witnesses to be considerably overstated in the newspapers, and very few lives were lost. At the 'New Area' of the Army Air Forces Tactical Center, at which base I was stationed at the time, scores of large pine trees were broken off or uprooted, several wooden barracks were shoved from their cement-block foundations, and roofing paper, tin chimneys, and wooden ventilators were blown off right and left.

We had received numerous warnings concerning the approaching storm, so were not taken by surprise. An east wind was blowing hard when I wakened at 7 o'clock on the morning of the 19th, and it was raining. I rose and dressed, made my way to the office building at which I regularly reported, found the door to be not only locked but boarded shut, and returned to my barracks, wringing wet. The telephone was in order, so I called the officers' cafeteria to inquire about meals. A tense voice answered that no food was being served, that the building there was expected 'to go' at any moment. My own barrack was of solid, cement-block construction, so I did not expect it to blow down; but the thrashing of the pines, the wild gusts and screeching wires, the whirling, tumbling clouds, and the great batlike sheets of roofing paper which whipped off and blew about were so exciting that I chose to stay outdoors in the lee of the building, watching the storm.

By 9 o'clock the wind had shifted to the southeast. Lake Suzanne, a small body of water whose north shore was only a few rods south of my barracks, I now could see but dimly through the rain and spray from the lashing waves. The trees along the open shore bent in the fierce blast, some snapping off noisily, others sinking slowly to the ground as their roots gave way. Some of the worst gusts came at about this time, so most of the trees which I saw go down fell toward the northwest. By 10 o'clock the wind had swung round to the south. The storm's fury abated somewhat toward noon, at which hour some of my fellow officers and I went in search of food. A strong west wind rose between 2 and 2:30 P. M., continuing to blow for about two hours. By 5 o'clock the storm had passed, the sun had come out, and we looked upon a thoroughly drenched and rather battered world. The wind's velocity, as recorded by the local weather stations, had been about 78 miles per hour, with gusts up to 108 miles per hour. The strongest gusts had occurred between 8 and 9:30 A. M., and in mid-afternoon.

What of the bird-life during all this? As for the several Mockingbirds (*Mimus polyglottos*), Blue Jays (*Cyanocitta cristata*), and Shrikes (*Lanius ludovicianus*) which lived near the barracks, I saw many of them during the height of the storm. One mocker dived from thrashing shrubbery under a low porch close by and ran for shelter behind one of the supports. A shrike which had found a comfortable perch in a small oak—a nook behind a clump of Spanish moss—whipped back and forth with the treetop until the slender trunk snapped, then flew to the lee of an outhouse where it stayed on the ground close to the foundation for an hour. Three Blue Jays moved about among

the swinging pine boughs almost as if they were enjoying it all, but I noticed that they sought the shelter afforded by the trunk now and then, and that when they flew from tree to tree they invariably made their way by diving into the wind from the upper part of one to the lower branches of the next.

For a time I failed to discover the Palm Warblers (*Dendroica palmarum*), which usually were so much in evidence all over the Area. Eventually I found them—under porches and thick shrubbery, behind and under ventilators on the buildings' roofs, and in the grass a short way back from the lake-shore. They did not fly about while the wind was high, and those which I was able to observe did not seem to be in the least interested in feeding. The only bird which I found dead directly after the storm was of this species. I found it along the southwest shore of Lake Corinne, another body of water within the 'New Area.'

At about 9 o'clock I saw an Osprey (*Pandion haliaetus*) high in air directly overhead, moving swiftly northward, apparently quite unable to control its course. It was headed east, southeast and south as long as I could see it, and it seemed to be trying to fly into or across the wind. When it finally disappeared into the cloudy sky it was still headed southward, but moving rapidly northward. I could not help wondering how far it might be carried thus and, remembering the species' well nigh cosmopolitan distribution, wondered how often wind might have been the means of carrying it from one land-mass to another.

An Egret (*Casmerodius albus*) which flew across Lake Suzanne at about 11 A. M., just after some of the fiercest gusts, had a very difficult time. Twice I thought the bird was going to give up and fall into the waves. A Little Blue Heron (*Florida caerulea*) which found shelter back of some weeds along the north shore of Lake Suzanne, stood there hunched up, with bill pointed into the wind, for more than three hours—perhaps longer. Three Killdeers (*Charadrius vociferus*) stayed back of the same clump of weeds during most of the storm.

A Flicker (*Colaptes auratus*) which flew out from a falling pine, started off down-wind, struck the ground, righted itself, about-faced, and started again upwind, finally reaching the shelter of another pine trunk. Here it remained virtually motionless, as if dazed, for an hour, then climbed to a better shelter under a bough.

A Red-headed Woodpecker (*Melanerpes erythrocephalus*) which had been roosting regularly in an old woodpecker hole in a dead stub not far from my office window, probably did not emerge at all during the storm. At noon, when I passed its stub for the second time, it was looking forth dubiously.

Species which lived about the barracks but which I did not see until late afternoon after the passing of the storm, were the Cardinal (*Richmondena cardinalis*), Ground Dove (*Columigallina passerina*), and Red-bellied Woodpecker (*Centurus carolinus*). A species which we had been seeing daily as it passed over, but which was nowhere to be seen on the 19th, was the Fish Crow (*Corvus ossifragus*).

Several Ring-billed Gulls (*Larus delawarensis*) and about 15 Common Terns (*Sterna hirundo*) were blown in by the storm. The latter lingered about Lake Corinne for three days. On the day after the hurricane I almost captured one of these terns which probably had been badly buffeted by the wind. The gulls stayed about for some time.

Word reached us that a Caracara (*Polyborus cheriway*) had been picked up dazed in the streets of Titusville, Brevard County, Florida, thirty some miles to the east of Orlando.

In general, I was surprised at the birds' ability to adjust themselves so quickly to the conditions imposed by the storm. A good many birds might even have remained in their roosting places (as did the Red-headed Woodpecker) during most of the day. Certainly not many birds attempted to feed, though the Blue Jays appeared to be doing so. The one dead bird which I found on October 20 (Palm Warbler) may or may not have been a victim of the storm.

Army Air Forces Tactical Center
Orlando, Florida

A COMPARISON OF THE SUMMER RESIDENT BIRDS TODAY AND FORTY YEARS AGO IN A SMALL AREA IN MASSACHUSETTS

BY STANLEY COBB, M.D.

In the winter of 1943 I chanced to glance over some of my old ornithological notebooks and realized that perhaps I had something of value. Here, for the years 1903 and 1904, were very full notes on the birds seen in Milton, Massachusetts. I still live on the same land, so I planned to make a survey in the spring and see how the avifauna compared in 1943 with 1903. The week of May 30 to June 6 was chosen as the best time to study resident birds, and the survey was repeated in 1944. Birds that were seen three or more times on the land chosen during those weeks were counted as resident; in a few instances nests were found. The scoring was done in pairs, a male and a female counting as one unit, so on the chart the number in parentheses after the bird's name means the number of pairs, not number of