

## GENERAL NOTES

**The effect of radar on birds.**—The publication of this war time observation was delayed pending the removal of security classification from the equipment used. Recently, the United States Air Force dropped this radar from the restricted list, permitting the publishing of the characteristics of the equipment, without which this report would be of little value to investigators in the field of avian orientation.

In the fall of 1943, I was in charge of a group of military personnel engaged in tracking aircraft over the ocean off the east coast of the United States. The radar set was emplaced in the dunes not far from the high tide line. During a lull in operation, a large flock of scaup (*Aythya* sp.) and scoters (species?) was seen flying parallel to the coastline a few hundred yards off shore and approaching our position. Having nothing better to do at the moment, we idly swung the parabolic antenna around and pointed it directly at the flock. The result was immediate and dramatic. The once orderly group of birds became a bewildered mass of individuals which flew in circles, missed wingbeats, and performed many unbirdlike gyrations. Some observers later insisted that a few birds accomplished loops and rolls although I never observed this. As the beam was diverted by elevating the antenna, the flock regrouped and proceeded down the coast in the original direction.

To verify this unusual behavior as being caused by radar, the experiment was repeated several times on subsequent occasions. In each case, the result was essentially the same, the response of the stimulated flock coinciding with the incidence of the beam upon the birds, the cessation of response coinciding with the diversion of the beam. The intensity of reaction appeared to vary inversely with the distance between the radar and the birds and some individuals were affected more than others. There also seemed to be some relationship between the angle of incidence and the intensity of response but this was not clear.

The electrical characteristics of this radar are quoted for those working in this field: wave length 10 centimeters (3,000 megacycles), crystal controlled; peak power 210 kilowatts; average input 540 watts; average output 280 watts; pulse recurrence frequency 586; pulse width 0.8 microseconds; beam width 1.4 degrees; maximum range 70,000 yards.

Although it is not the purpose of this report to speculate upon the nature of the mechanism involved in the detection of electromagnetic radiation by birds, one cannot help but wonder if the behavior described above does not support the theory that birds indeed perceive the earth's magnetic field. In flight, the crossing of these lines of force may result in the production of phosphenes, or perhaps the answer lies in the setting up of tiny oscillating currents somewhere in the animal's central nervous system.—O. A. KNORR, *Department of Biology, University of Colorado, Boulder, Colorado, April 20, 1954.*

**Evening flights of the Southern Everglade Kite and the Blue and Yellow Macaw in Surinam.**—The Southern Everglade Kite (*Rostrhamus s. sociabilis*) is, in the coastal area of Surinam, a common bird in freshwater marshes. It is often seen on poles or fences along rice fields, on the lookout for snails. This habitat it shares with the Southern Limpkin (*Aramus g. guarauna*), in Surinam called "Krau-krau," after its call note which is a characteristic sound at night or in the early morning in these places. The rice fields are only feeding areas where, owing to lack of cover, the birds are unable to breed.

The Everglade Kite is particularly numerous in the rice-growing district, Nickerie,

on the right bank of the Corentyne River. I never located a breeding colony, but the breeding season must be in the long rainy season as I observed birds assembling and carrying nest material on May 29 and 30, 1953, along Huntley Creek, in the same district where both kites and limpkins were numerous in the vast, surrounding marshes. As is well known, the Everglade Kite is a very social bird which spends the night in a communal roost. In Nieuw Nickerie I observed every afternoon a number of kites crossing the Nickerie River to its right bank on their way to their roost which itself remained unknown to me. At the end of July the numbers were particularly large, so I took the opportunity to count them on July 31, 1953.

The flight started at about 5:30 p. m. They passed over at low altitude, slowly flapping their wings, alternating with short glides. Many were in immature plumage, those in adult plumage often having the primaries in molt. It was interesting that several carried single snails, either in their claws or in their bills. The flight stopped towards darkness, or at about 6:45 p. m. I counted 712 birds which certainly were not all as the birds passed over a rather broad front which I could not oversee in its entirety. It was an impressive spectacle, as at the same time a large number, running into a few thousand, of egrets passed over in the same direction. These egrets have a long-used roost in the bushes on the right bank of the Nickerie River just opposite Nieuw Nickerie.

The Blue and Yellow Macaw (*Ara ararauna*) is in Surinam a bird of the lowland forests. Here it breeds in dead Moriche palms (*Mauritia flexuosa*). Kappler (1881. "Holländisch Guiana," Stuttgart, p. 94) reports the finding of a nest with two eggs (no date given) in such a situation, along the Wana Creek in the Maroni District. A favorite food is the seeds of the possentri or poison tree (*Hura crepitans*). On December 17 and 18, 1948, in the Coronie District, I watched a number of birds feeding in these trees and the stomach of a specimen collected at that time was full of the seeds.

Through the clearance of forests it has now entirely disappeared from the neighborhood of Paramaribo, but it is still rather common wherever primitive conditions remain. I have seen it regularly when travelling by launch along the upper Nickerie and Wayombo rivers and it is always a magnificent sight when some birds, always flying in pairs, cross the forest-fringed rivers, from time to time uttering their harsh note, rrrraaa.

The most impressive spectacle, however, I witnessed on August 23, 1947, when travelling by launch downstream on the Coppename River. In the late afternoon, beginning at about one hour before sunset, numbers of *Ara ararauna* started crossing the river towards its left bank at the point where the Tibiti River enters the Coppename.

As so often happens in such cases I realised the opportunity to count the passing birds only after the spectacle was already well under way. The birds were, as usual, in pairs, each pair flying with slow, synchronised wing strokes, the birds close to each other. Sometimes only single pairs went over, followed again by loose flocks split up in pairs.

The total counted was 342 birds. This number was certainly not all which crossed, as I started counting when the flight had been in progress for some time and, further, I counted from a rather fast-moving boat. In reality at least twice this number must have crossed the river at that time, en route to a sleeping place in the midst of the forest.—F. HAVERSCHMIDT, P.O. Box 644, Paramaribo, Surinam, August 26, 1953.

#### **Repeated territorial attacks of Pied-billed Grebe on Ring-necked Duck.—**

In the course of early morning observations on Pied-billed Grebes (*Podilymbus podiceps*) which began on February 27, 1954, one grebe, believed to be a male, established a territory in a marshy pond in Seneca, Maryland. By April 3, this bird had a mate, and