

## OCCURRENCE OF EASTERN ENCEPHALITIS VIRUS IN HOUSE SPARROWS

L. N. LOCKE, J. E. SCANLON, R. J. BYRNE, AND J. O. KNISLEY, JR.

DURING the late summer and fall of 1959 a die-off occurred among House Sparrows (*Passer domesticus*) in Prince George's County, Maryland, simultaneously with an epizootic of eastern equine encephalomyelitis (EEE) in horses on the Eastern Shore of Maryland (Byrne, et al., in press). This paper reports the results of our investigation of the sparrow die-off which may have been due to this viral disease and reports the first isolation of the EEE virus from House Sparrows collected in Maryland.

During the period 1950-1958 occasional reports of sick and dying House Sparrows were received at the Patuxent Wildlife Research Center, Laurel, Maryland. Some of the birds were subjected to extensive tests, but no diagnosis was made. Many of the others were received in too poor a condition for study. The reported symptoms of these birds were those characteristic of brain damage, chiefly circling or loss of coordination of movement and general malaise (personal communication from C. M. Herman, 1961).

On 15 July 1959, a sick adult male House Sparrow was received from John S. Frankenfeld, Glen Moore, Pennsylvania. The bird was extremely depressed, unable to fly or to hold its head erect. The vent was soiled with greenish feces. When the bird was placed on a hard surface it would tumble over onto its left side. It was placed in a cage for further observation. The bird became comatose and finally died on 17 July. Microscopic examination of sections taken from the cerebral cortex and from the cerebellum revealed no pathological changes. No diagnosis was made.

On 6 August 1959, sick and dying House Sparrows were reported from the vicinity of Laurel, Maryland. None of these sparrows was obtained for examination. During September, reports of sick or dead sparrows were received from Laurel, College Park, Oxon Hill, and the Agricultural Research Center, Beltsville, Maryland. A die-off among sparrows was reported in a rural area bordering the Patuxent Wildlife Research Center. The same general symptoms were reported. Upon investigation at the last site, three partially decomposed House Sparrows were found on a lawn. Two other carcasses, probably House Sparrows, were found beneath trees adjacent to the lawn. A neighbor reported that she had seen several sparrows behaving abnormally around her chicken yard. These sparrows exhibited incoordination, falling over when alighting, and flew with considerable difficulty. A few dead sparrows had been found.

On 15 September 1959, a sick male House Sparrow was received from Mrs. Fred Maxwell, Laurel, Maryland. This bird had been observed for two

days at a bird-feeding station and had shown incoordination, as evidenced by falling forward after alighting on the feeding tray. When feeding on the ground, the sparrow used its wings to help support its weight. Gross examination showed the bird to be depressed and very thin; the feathers were badly ruffled; the beak was fouled with keratinous material; and the vent area was stained with greenish feces. The same premises were searched on the day the sick bird was received and a sick female sparrow was found huddled in a clump of greenbrier. This bird did not flush when found; it was captured by simply picking it up. It was extremely thin, and the beak was fouled with food debris and keratinous flakes. Both sparrows were brought to the laboratory for diagnostic tests.

The male had an impaction of the esophagus, but no other gross lesions. The female was grossly normal. Fecal smears of both were negative for coccidial oocysts. Nutrient agar and brilliant green agar plates, inoculated with fecal material, failed to demonstrate any *Salmonella*.

The liver of the female was placed in sterile saline and ground into a suspension. Two canaries were inoculated intramuscularly with this liver suspension. The left legs of two additional canaries were scarified and liver-suspension material rubbed into the bleeding area. All four canaries remained normal until 5 November, when they were killed. Grossly, the canaries were normal except for the healing scars on the scarified areas.

Absorbent paper discs were soaked in the heart blood of the female sparrow. These discs were forwarded to Dr. Robert P. Hanson, University of Wisconsin, who tested for evidence of Newcastle disease virus. None was found.

The spleens were frozen and subsequently tested for virus isolation by inoculation into day-old chicks. No evidence of virus was uncovered.

During the period 15-25 September 1959, seven apparently normal sparrows were collected at the Agricultural Research Center, Beltsville, Maryland, where sick birds had been reported. The spleens were removed aseptically and tested by inoculation into day-old chicks. All the inoculated chicks were moribund in 24 hours; their plasma, inoculated intracerebrally in adult mice, produced death in 48 hours. The virus thus isolated was re-isolated several times from the sparrow spleens and the suspension was shown to be bacteria free. The agent was identified as EEE virus by serum-neutralization test (using adult white mice) and by hemagglutination-inhibition test.

#### DISCUSSION

Van Roekel and Clarke (1939) inoculated six House Sparrows intracerebrally with a brain-saline suspension of EEE virus prepared from a ninth-

serial-passage chick. The sparrows exhibited symptoms within 16 hours after injection. An initial period of reduced activity was followed by somnolence, inability to fly, marked weakness, prostration, coma, and death. Death occurred within 19 to 24 hours after inoculation. Davis (1940) found that the mosquito (*Aedes sollicitans*) was capable of infecting House Sparrows with EEE virus. Dardiri, et al. (1957), reported the isolation of eastern equine encephalitis from one of two dead sparrows collected on a game farm where several pheasants had died of the infection. These workers stated that several persons who raised game birds in Rhode Island had reported observing sick sparrows before and during an outbreak of encephalitis in pheasants.

In view of the known susceptibility of the House Sparrow to the virus of EEE, it seems likely that at least some of the sparrow deaths noted in Maryland in recent years were due to this virus. The isolation of EEE virus reported herein (the first from birds in Maryland) lends greater weight to this possibility. The isolation of virus from apparently healthy birds is in agreement with the findings of Stamm (1958) in Louisiana and Alabama and indicates the desirability of examining both apparently well and sick birds when an avian epizootic is suspected.

The Patuxent Wildlife Research Center has received several reports of birds exhibiting symptoms of incoordination, such as tumbling when alighting and flying abnormally. Although the "cataleptic fit" behavior of some kinds of birds, particularly chickadees (*Parus*), seems to be a response to nervous stress (Cade, 1953), such behavior by birds of other genera should prompt ornithologists to request virological assistance.

#### LITERATURE CITED

- BRYNE, R. J., F. M. HETRICK, J. E. SCANLON, J. W. HASTINGS, JR., AND L. N. LOCKE  
1961 Observations on Eastern Equine Encephalitis in Maryland in 1959. *J. Am. Vet. Med. Assoc.*, 139:661-664.
- CADE, T. J.  
1953 "Cataleptic" behavior in the Hudsonian chickadee. *Wilson Bull.*, 65:45.
- DARDIRI, A. H., V. J. YATES, P. W. CHANG, C. H. WHEATLY, AND D. E. FRY  
1957 The isolation of eastern encephalomyelitis virus from the brains of sparrows. *J. Am. Vet. Med. Assoc.*, 130:409-410.
- DAVIS, W. A.  
1940 A study of birds and mosquitoes as hosts for the virus of Eastern Equine Encephalomyelitis. *Am. J. Hyg.*, 32:45-59.
- STAMM, D. D.  
1958 Studies on the ecology of equine encephalomyelitis. *Am. J. Publ. Hlth.*, 48: 328-335.

VAN ROEKEL, H., AND M. K. CLARKE

1939 Equine encephalomyelitis virus (Eastern type) isolated from ring-necked pheasant. *J. Am. Vet. Med. Assoc.*, 94 (n.s. 47):466-468.

PATUXENT WILDLIFE RESEARCH CENTER, U.S. FISH AND WILDLIFE SERVICE, LAUREL, MARYLAND; DEPARTMENT OF ENTOMOLOGY, WALTER REED ARMY INSTITUTE OF RESEARCH, WASHINGTON, D.C.; DEPARTMENT OF VETERINARY SCIENCE, UNIVERSITY OF MARYLAND, COLLEGE PARK, MARYLAND; AND PATUXENT WILDLIFE RESEARCH CENTER, U.S. FISH AND WILDLIFE SERVICE, LAUREL, MARYLAND, 23 JUNE 1961

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### NEW LIFE MEMBER



William H. Drury, Jr., Director of Adult Education and Director of Research of the Massachusetts Audubon Society, is a new Life Member of the WOS, having been an active member since 1951. Dr. Drury is interested primarily in population problems and ecological aspects of behavior, chiefly of plovers. He has published numerous papers on these and related subjects. He studied in Haleybury College, England, one year and graduated from Harvard College with B.A. and Ph.D. degrees. His graduate research, following four years of service in the U.S. Navy, was in botany and his thesis was on the formation of bogs in the arctic. At present he is also a member of the AOU, BOU, Cooper Ornithological Society, Rhode Island, Massachusetts, and National Audubon Societies, Arctic Institute of North America, etc., and was secretary and later president of the Nuttall Club.