

primaries were exposed. The following day they averaged 25.4 mm in length and were one-half exposed. A nestling that hatched on 2 August on the breeding ground had encased primaries about 6 mm long on 29 August.

The captive shearwater at death on 28 August was estimated as 42 days old; its primaries ranged from 25.4 mm to 50.8 mm in length and the primary and secondary wing converts had replaced most of the down. The white feathers of the ventral tract had developed although they were obscured by dense down. The black feathers of the humeral tract, the interscapular region and the upper dorsal region were exposed and free of down. There was little evidence of feather development in the capital tract or the cervical apterium. Pin feathers were just beginning to show in the pelvic region and in the caudal tract.

## FOWL POX IN CASSIN'S SPARROW, *AIMOPHILA CASSINII*

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Fowl pox, a disease caused by various members of the fowl pox virus complex, has been recorded as naturally occurring in an increasing number of native North American birds (Bleitz 1958; Kirmse 1966), since first reported by Gallagher (1916). The occurrence in another native species, Cassin's Sparrow (*Aimophila cassinii*), is reported herein.

An adult male Cassin's Sparrow (R.O.M. no. 97965) was observed exhibiting normal behavior in song and flight prior to its collection by J. A. Dick on 18 June 1966 in a sagebrush (*Artemisia* sp.)-covered pasture on the Conover Ranch in Seward County, Kansas. Subsequent examination showed the lores and base of the upper bill to be occupied by a large, brown, hard, irregular mass (fig. 1), 15 × 12 ×



FIGURE 1. Cassin's Sparrow, adult male R.O.M. no. 97965, showing fowl pox lesion of head ( $\times 1\frac{1}{2}$ ).

## LITERATURE CITED

- BRYAN, W. A. 1908. Some birds of Molokai. Bishop Mus. Occ. Papers 4(2):133-176.  
HENSHAW, H. W. 1902. Birds of the Hawaiian Islands. Thos. G. Thrum, Honolulu.  
KING, W. B., AND P. J. GOULD. 1967. The status of Newell's race of the Manx Shearwater. Living Bird 6:163-180.  
LOCKLEY, R. M. 1942. Shearwaters. J. M. Dent and Sons, Ltd., London.  
MUNRO, G. C. 1941. Birds of Hawaii and adventures in bird study. Elepaio 2:9-11.  
MUNRO, G. C. 1944. Birds of Hawaii. Tongg Pub. Co., Honolulu.

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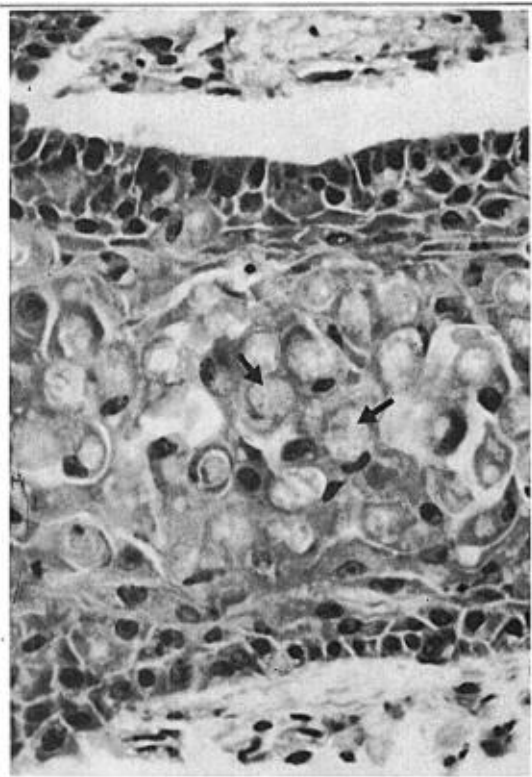


FIGURE 2. Portion of an epidermal rete peg of fowl pox lesion of Cassin's Sparrow. Arrows indicate Bollinger bodies. Hematoxylin and eosin stain ( $\times 460$ ).

9 mm, in size, appearing to arise from the loreal skin, and extending into and filling both nares. Sagittal section of the mass demonstrated it to be of solid consistency, with an outer, dark-brown, horny portion containing faint radiating darker brown lines, and a white basal portion. Adjacent eye, skull, and oral structures were unaffected, and no lesions were found in the viscera or on the legs or wings.

Histological examination of the lesion showed great epidermal hyperplasia, with many epithelial cells containing cytoplasmic granular inclusion bodies, identifiable as the Bollinger bodies of fowl pox (fig. 2).

A heavily inflamed surface crust and moderate sub-epithelial leucocyte infiltration were noted. Inoculation studies were not attempted because the bird had been preserved in 10 per cent formalin.

This specimen was one of nine Cassin's Sparrows collected in an area of one square mile over a period of 24 hours. None of the other specimens showed evidence of lesions on the head or extremities. Therefore, this was probably an isolated case. A review of published accounts suggests that the head lesions in outbreaks of fowl pox in passeriform birds are uncommon (Musselman 1923; Bleitz 1958; Stewart 1963), and that the feet and tarsi are the usual sites. In contrast, a high proportion of galliform birds with fowl pox showed head lesions (Syverson and Cowan 1944; Blankenship et al. 1961), while the columbiform species showed involvement of both sites (Kossack and Hanson 1954; Locke 1961; Blankenship et al. 1966).

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#### LITERATURE CITED

- BLANKENSHIP, L. H., R. E. REED, AND H. D. IRBY. 1966. Pox in Mourning Doves and Gambel's Quail in southern Arizona. *J. Wildl. Mgmt.* 30: 253-257.
- BLEITZ, D. 1958. Treatment of foot pox at a feeding and trapping station. *Auk* 75:474-475.
- GALLAGHER, B. 1916. Epithelioma contagiosa of quail. *J. Amer. Vet. Med. Assoc.* 3:366-369.
- KIRMSE, P. 1966. New wild bird hosts for pox viruses. *Bull. Wildl. Dis. Assoc.* 2:30-33.
- KOSSACK, G. W., AND H. C. HANSON. 1954. Fowl-pox in the Mourning Dove. *J. Amer. Vet. Med. Assoc.* 124:199-201.
- LOCKE, L. N. 1961. Pox in Mourning Doves in the United States. *J. Wildl. Mgmt.* 25:211-212.
- MUSSELMAN, T. E. 1928. Foot disease of Chipping Sparrow (*Spizella passerina*). *Auk* 45:137-147.
- STEWART, P. A. 1963. Abnormalities among Brown-headed Cowbirds trapped in Alabama. *Bird-Banding* 34:199-202.
- SYVERTON, J. T., AND I. M. COWAN. 1944. Birdpox in the Sooty Grouse, *Dendragapus fuliginosus fuliginosus* with recovery of the virus. *Amer. J. Vet. Res.* 5:215-222.

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## ALLOPREENING IN THE DOVE *GEOTRYGON MONTANA*

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Allopreening or mutual preening is a behavior pattern known for a large number of avian families (Harrison, *Behaviour* 24: 161, 1965), but its adaptive significance and evolution remain incompletely understood. It is thus pertinent to place on record all observations of allopreening, however fragmentary. Notable among previous observations of mutual preening in Columbidae are those of Goodwin (*Bird Study* 3: 25, 1956) on some species of *Columba* and *Streptopelia*. Harrison (op. cit.) has gone so far as to suggest that the phenomenon occurs in most, if not all, species of this family.

On 9 June 1967 I observed allopreening in a pair of Ruddy Quail-Doves (*Geotrygon montana*) in secondary forest in the northern mountain range of Trinidad. A male and a female had been observed foraging on the forest floor in the same area for several days. During one such foraging bout on the above date the female stopped and commenced autopreening. The male approached her and walked to and fro around her anterior end in an upright posture, his neck extended straight up, with the head held normally. The posture was apparently an allopreening-solicitation posture, for the female soon began to preen the feathers of the male's head and neck. When she did so the male lowered his head and slightly rotated it away from the female. Whenever the female ceased to preen the male he resumed soliciting, and the female would then resume preen-

ing him. The bout lasted for several minutes. The female's movements resembled normal autopreening motor patterns; the male nibbled the female's neck feathers a little during his solicitation, but no true reciprocation of allopreening was seen.

Immediately after the bout ended, the male mounted and copulated with the female. Both birds then autopreened side by side before resuming foraging.

This single brief observation clearly cannot form any substantial basis of serious speculation as to the motivation and functional significance of allopreening in this species, but a few important points are worth stressing. Allopreening was confined to the feathers of the head (mainly the crown) and neck, as is the case in most other observed allopreening species. It occurred between a pair of birds previously observed together for several days and probably with an established pair bond, but I make this point tentatively in view of the fact that these birds were not banded and identification was based on behavior. There was clear evidence that the sexual tendency was simultaneously activated, at least in the male, but no aggressive behavior was observed before, during, or after allopreening. The temporal association between auto- and allopreening known for other species of birds was also evident in this species. Finally, the present example is one of the less common ones in which it is the male and not the female that solicits allopreening and is preened. It seems probable that the solicitation/preening ritual facilitated the full expression of the sexual tendency by reducing the aggressive and (or) fleeing tendencies of the pair, but further observation is necessary to establish and clarify this point.

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