

- BANNERMAN, D. A. 1955. The birds of the British Isles, vol. 4. Edinburgh, Oliver and Boyd.
- BENT, A. C. 1940. Life histories of North American cuckoos, goatsuckers, hummingbirds and their allies. U. S. Natl. Mus., Bull. 176.
- BRAUNER, J. 1952. Reactions of Poor-wills to light and temperature. Condor, 54: 152-159.
- COLLINS, C. T. 1968. Notes on the biology of Chapman's Swift *Chaetura chapmani* (Aves, Apodidae). Amer. Mus. Novitates, No. 2320: 1-15.
- COWARD, T. A. 1928. The "wing-clapping" of the nightjar. Brit. Birds, 22: 134-136.
- GUGGISBERG, C. A. W. 1941. Wie entsteht das Flugelklatschen der Nachtschwalbe? Ornithol. Beob., 38: 121-122.
- HARPER, F. 1938. The Chuck-will's-widow in the Okefinokee region. Oriole, 3: 9-14.
- HOYT, S. F. 1953. Incubation and nesting behavior of the Chuck-will's-widow. Wilson Bull., 65: 204-205.
- KELLOGG, P. P. 1969. Florida Bird Songs. Recording, Cornell Univ. Lab. Ornithol.
- MENGEL, R. M. AND M. A. JENKINSON. 1971. Vocalizations of the Chuck-will's-widow and some related behavior. Living Bird, 10: 171-184.
- ORR, R. T. 1948. Nesting behavior of the Poor-will. Auk, 65: 46-54.
- SUTTON, G. M. 1967. Oklahoma birds. Norman, Univ. Oklahoma Press.
- TYLER, W. M. 1940. Eastern Whippoorwill. Pp. 163-183 in Life histories of North American cuckoos, goatsuckers, hummingbirds and their allies (A. C. Bent). U. S. Natl. Mus., Bull. 176.
- WHITTAKER, I. 1928. Note by Mr. I. Whittaker. Brit. Birds, 22: 136.
- WITHERBY, H. F., F. C. R. JOURDAIN, N. F. TICEHURST, AND B. W. TUCKER. 1938. The handbook of British birds, vol. 2. London, Witherby.

ROBERT M. MENGEL, *Museum of Natural History, The University of Kansas, Lawrence, Kansas 66044*, ROGER S. SHARPE, *Department of Biology, University of Nebraska at Omaha, Omaha, Nebraska 68101*, and GLEN E. WOOLFENDEN, *Department of Zoology, University of South Florida, Tampa, Florida 33620*. Accepted 10 May 71.

Copulation by California Condors.--Koford (Res. Rept. No. 3, Natl. Audubon Soc., 1953) observed sexual display among California Condors (*Gymnogyps californianus*) on more than 30 occasions, yet only once did he see what he thought was copulation. Some of the displays he watched were quite intricate, with considerable posturing and "male" aggression, but no such activity preceded this copulation. The birds sat several feet apart for over 1 hour, then one climbed onto the other's back, staying there $\frac{1}{2}$ minute and flapping gently at the apparent moment of coition. Afterward they sat quietly $\frac{1}{2}$ hour before flying away. This led Koford to state (p. 79) that "possibly in *Gymnogyps* copulation is not immediately preceded by display."

We have records of 8 California Condor copulations, 5 of which are similar to that described above. The three other occasions began similarly, with the birds sitting quietly, but then the "male" displayed briefly before the "female" with wings half spread and head drooping forward. This elicited no apparent response, but the male immediately walked behind and mounted the female. The apparent moment of coition was accompanied by gentle wing flapping in all instances.

Thus, obvious display may or may not occur at the time of copulation. The

posturing we saw was rather brief and passive compared to that observed on some other occasions, and very well-described by Koford (op. cit., 77-79). Also copulation was in all cases performed in seclusion, whereas display sometimes occurs when groups of Condors are together at food, at a roost, or elsewhere.

The sexual display of most New World Vultures (Cathartidae) has been described, but apparently actual copulation has seldom been seen. Poulsen (Z. Tierpsychol., 20: 468, 1963) watched captive South American Condors (*Vultur gryphus*) display actively just prior to copulation, and Koford (op. cit., 79-80) records display by this species both before and after mating. On the one occasion on which we saw Turkey Vultures (*Cathartes aura*) copulating, there was no display. The birds were first noted at 07:45 on 11 March 1970 sitting side by side on a rocky promontory. They sat quietly for another 15 minutes, then one climbed onto the other's back and stayed there 45 seconds, flapping occasionally as coition occurred. The "female" preened actively for the next 7 minutes, while the "male" sat motionless at her side. Then both alternately preened and sunned (spread wings) until 09:21 when they flew away.—SANFORD R. WILBUR, *Bureau of Sport Fisheries and Wildlife, Patuxent Wildlife Research Center, Ojai, California 93023*, and JOHN C. BORNEMAN, *National Audubon Society, 1973 S. Victoria Ave., Ventura, California 93003*. Accepted 11 May 71.

Food and feeding behavior of the Jamaican Crow, *Corvus jamaicensis*.—

Virtually nothing is known about the life histories of West Indian crows, as evidenced by Johnston (The biosystematics of American crows, Seattle, Univ. Washington Press, 1961, pp. 81-99). On Jamaica specifically the 19 species of endemic land birds are poorly known from the standpoint of feeding and other aspects of niche utilization, competition, and resource partitioning. The following information of food and feeding behavior of the Jamaican Crow should be helpful in future analyses of the ecology of this species. To my knowledge the only reference to its food habits is that of Gosse (The birds of Jamaica, London, Van Voorst Press, 1847, pp. 209-217), who states that it is principally a vegetarian, feeds on the fruits of bitterwood (*Picrasma excelsia*), pimento (*Pimenta pimenta*), soursop (*Annona muricata*), banana (*Mus sapientum*), and plantain (*M. paradisiaca*), and also eats the eggs and nestlings of wild pigeons.

This study was carried out in the Lluidas Vale (Worthy Park) region, St. Catherine Parish, Jamaica during the spring and summer of 1970. Lluidas Vale (1,250 feet) is in an interior valley or polje. Its vegetation is classified as wet limestone forest (Asprey and Robbins, Ecol. Monogr., 23: 359, 1953). This type of forest grows in areas of limestone rocks where annual precipitation exceeds 75 inches. Many of the trees in this region have epiphytes, lianes, and bromeliads growing in profusion.

The Jamaican Crow is a fairly common resident in the wet limestone forest and mountain pastures, usually encountered in small flocks of three to four individuals. Primarily arboreal, it feeds on fruits and may be seen probing into bromeliads, underneath bark, and into rotten limbs, as the following excerpts from my field journal show:

20 April.—Watched two individuals feeding on the reddish berries ($\frac{1}{2}$ inch) of the wild fig (*Ficus trigonata*) in the upper inner branches, approximately 35 feet from the ground.

23 April.—One bird seen feeding on the fruits of the wattle-wood tree (*Laetia thamnia*), approximately 20 feet high on the outer lower branches.

27 April.—Watched Jamaican Crow probing into a medium-sized bromeliad (base