FROM FIELD AND STUDY

Speed of the Allen Hummingbird While Diving.—To perform the power dive that is such a spectacular part of the display of Allen Hummingbirds (*Selasphorus sasin*), a male climbs 50 feet or more into the air and then under what appears to be full power swoops down toward the earth. The velocity during this dive must be close to maximum for the species.

Early in March of 1960, a male Allen Hummingbird displayed frequently to one or more females feeding and perching in some flowering quince bushes in Orinda, California. Next to these bushes I erected two 20-foot poles marked in 1-foot intervals and took motion pictures of the diving bird with a stationary camera fixed 33 feet from one of the poles and 40 feet from the other. The camera was aimed to record the part of the dive extending from about 25 feet above the ground down to about 15 feet. The bottom of each dive was at about 6 feet. When all went well I obtained a series of four to ten exposures of one of the poles and of the bird during that part of the dive when its speed would be expected to be greatest. The shutter opening was closed to one-quarter of the usual setting, to shorten the duration of each exposure, and the indicator on the camera was set at a speed of 64 frames per second. By photographing the face of an electric clock I found that this gave an actual speed of 69 exposures per second.

As each dive was photographed, I recorded in my notes the direction from which the bird approached one of the poles and, when the bird swooped in from one side, an estimate of how many feet from the pole it had passed. The developed strips of film were projected, exposure by exposure, in a photographic enlarger and a tracing made of the position of the bird in successive pictures. The distance between successive images of the bird was then measured, compared with the 1-foot marks on the pole in the same photograph, and corrected for being closer to or farther from the camera than the pole was. The pictures show that in the middle of its dive the bird was descending at an angle of about 45° from the horizontal. Consequently, the bird's distance from the camera was changing rapidly during all dives except those in which he approached the pole from either the right or the left; in the latter examples he provided a profile view of the arc of his dive. Using only the five dives that were recorded satisfactorily in profile and in which the bird was judged to have passed less than 4 feet from one of the poles, the speed was calculated to be 53, 53, 58, 63, and 64 miles per hour.

Some of the variation in these determinations arises from actual differences of speed in different dives, from inaccuracies in measurement of the projected images, from slight deviations from strictly profile views, and especially from errors in estimating how far away from the pole the bird passed. With the camera 33 feet from the pole and with the lens used (focal length 25 mm.), an error of 3 feet in estimating pole-to-bird distance would introduce an error of about 10 per cent in the answer.

A rough check on the accuracy of these measurements can be obtained by estimating the height of the dive and the elapsed time. The bird appeared to dive about 60 feet in slightly more than 1 second, which gives an average speed of 40 miles per hour, but this includes a period of acceleration at the beginning of the dive and a period of deceleration near the bottom.

Shortly before the bottom of many of the dives, the bird begins a long, clear, whistling note that arises from the vibration of certain tail feathers (Aldrich, Condor, 58, 1956:126). To determine the speed at this time, a few series of pictures were taken as the bird levelled off and passed over or through the top of the bush. From three such series of pictures, the speed at the bottom of the dive, as the bird moved horizontally, was calculated to be 34, 39, and 45 miles per hour.—OLIVER P. PEARSON, *Museum of Vertebrate Zoology, Berkeley, California, May 10, 1960.*

Thyroid Activity in Nestling Vesper Sparrows.—Although the importance of the thyroid glands to growth and development is widely appreciated, no analysis has been made of their functional state as it relates to the establishment of homeothermy in young altricial birds. It was therefore of interest to carry out a histological study of these endocrine glands in young Vesper Sparrows (*Pooecetes gramineus gramineus*) of known age, whose growth and temperature regulation have been analyzed (Dawson and Evans, Condor, 62, 1960:329–340). Height of the secretory epithelium has been used as an index of thyroid activity.

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The thyroid glands from 36 young Vesper Sparrows were removed within 12 hours of the time when the birds were captured. Prior to sacrifice these animals had been subjected to the maintenance and experimental procedures described by Dawson and Evans (*op. cit.*). Five adult Vesper Sparrows were collected on August 6, 1955, and their thyroids were used for comparative purposes.

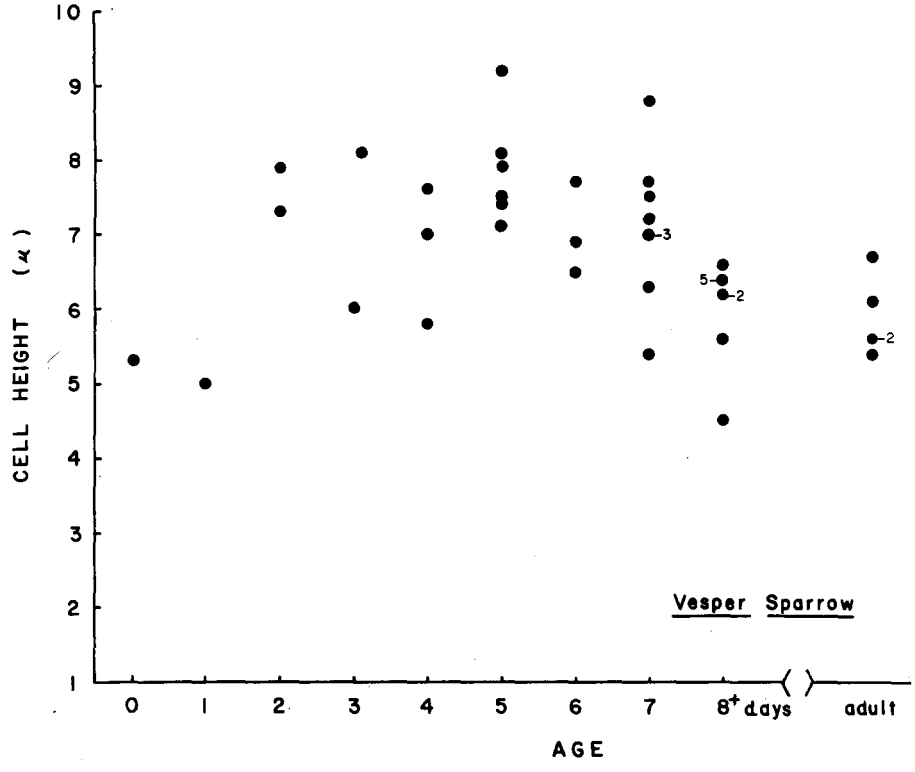

Fig. 1. Height of secretory epithelial cells in micra in the thyroids of Vesper Sparrows of various ages. The age category "8+ days" includes fledgling birds 8 to 12 days old. Numerals indicate the number of birds represented by the points which they accompany.

Thyroid tissue was fixed overnight in Bouin's solution. Ten-micra sections were cut and stained with hematoxylin. The heights of the secretory epithelial cells were determined with a compound microscope fitted with a suitably calibrated ocular micrometer. On each slide 50 fields were selected randomly. In each of these, two cells from opposite sides of a follicle were measured. Care was employed to select only round follicles to avoid possible errors arising from an oblique cutting plane. Each of the values presented in this report represents the mean for 50 pairs of observations.

The heights of thyroid secretory epithelium from Vesper Sparrows of various ages are summarized in figure 1. The data indicate thyroid activity to be at levels matching or exceeding that noted in adults throughout the nestling period. This activity appears to reach a peak on the fifth day after hatching, a day or two in advance of the time when homeothermy becomes well established in the Vesper Sparrow (Dawson and Evans, *op. cit.*). It declines at the end of the nestling period, and cell heights in fledglings 8 to 12 days old are significantly lower than those evident in nestlings 5 days old ($P<0.01$). The cell heights noted in the fledglings do not differ significantly from those noted in adult Vesper Sparrows collected in early August.

Thyroid activity of Vesper Sparrows appears highest in the period of most rapid post-hatching growth and of feather development. This activity should contribute to these processes in this species, for thyroid deficiency is known to result in plumage abnormalities and arrest of growth in young birds (Hohn, Ibis, 92, 1950:464–473). It is clear that the establishment of homeothermy in the Vesper Sparrow is not limited by the functional state of the thyroid glands. Indeed, the condition of these endocrine organs through most of the nestling period may be regarded as permissive to the development of temperature regulation, not only through the overall influence of their secretory products on growth and feather development, but also through the immediate action of these products in elevating heat production through stimulation of oxidative metabolism. The fact that thyroid activity in newly hatched Vesper Sparrows appears relatively high suggests that the anterior pituitary synthesizes and releases thyrotrophic hormone in effective amounts while the birds are still in the egg. —WILLIAM R. DAWSON and JOHN M. ALLEN, *Department of Zoology, The University of Michigan, Ann Arbor, Michigan, April 5, 1960.*

Black Rail in San Joaquin Valley of California.—On August 26, 1959, an adult male Black Rail (*Laterallus jamaicensis coturniculus*) was found dead near Fourteen Mile Slough, approximately four miles northwest of Stockton, San Joaquin County, California, by Mr. Paul Jorgensen. The bird was given to Dr. Kenneth Stocking of the College of the Pacific and the specimen was prepared as a skin by me (J. R. Arnold no. 881). Mr. Jorgensen reported to Dr. Stocking that a fence and other wires were present near where the bird was found. A broken wing was found at the time the skin was prepared. The only other record in this area known to me is that of Belding (Proc. U.S. Nat. Mus., 1, 1879:443).—JOHN R. ARNOLD, *Stockton College, Stockton, California, February 4, 1960.*

Insects Available for a Mockingbird Wing-flashing in February.—One of the prevalent theories concerning the enigmatic "wing-flashing" behavior of the Mockingbird (*Mimus polyglottos*) is that the wing motions flush insects to feed upon (see Hailman, Auk, 76, 1959:236–238 and references therein). It is known that wing-flashing occurs commonly in southern states but rarely in northern states during the winter (Sutton, Wilson Bull., 48, 1946:206–209; Tomkins, Wilson Bull., 62, 1950:41–42; Brackbill, Wilson Bull., 63, 1951:204–205; and Hailman, MS). It could be postulated that this is due to the unavailability of insects in the north during winter.

On February 28, 1960, my wife and I watched a Mockingbird wing-flashing on a grass roadway ten miles southeast of Norfolk, Virginia. Usually, wing-flashing is not seen in the Norfolk area until June. Many times after wing-flashing this bird pecked into the grass. It is of considerable interest to know whether or not moving insects were present where the bird was foraging and wing-flashing. A cursory search of a small area (six inches square) produced a small flea-like insect, an unidentified larva, a small burrowing insect, and a beetle. Thus, the association of wing-flashing with availability of potential prey is upheld.—JACK P. HAILMAN, *Bethesda, Maryland, February 29, 1960.*

Additional Data on the Establishment of the Chestnut-backed Chickadee at Berkeley, California.—A matter of interest concerned with the extension of geographic range of any species is the pattern of establishment after the initial invasion. The colonization of the Berkeley Hills of Alameda County, California, by the Chestnut-backed Chickadee (*Parus rufescens*) provides some information bearing on this point. In an earlier report (Condor, 56, 1954:113–124) I brought together available records outlining the progress of the colonization from 1938 through 1952. It appears that vegetational discontinuity in the area southeast of San Francisco Bay, acting as a barrier to the dispersal of an arboreal species, was bridged by the planting of orchards and shade trees, and, presumably following population build-up, the chickadees spread to occupy an area of favorable climate opposite the Golden Gate in the early 1940's. A number of reports indicate that the area occupied by this chickadee in the East Bay region has continued to expand: for example, Cogswell (Gull, 37, 1955:22) reported nesting at Mills College in Oakland in April, 1955, and Stallcup (Gull, 39, 1957: 10–13) listed the species from Alameda in December, 1956.

In the spring of 1959 I took advantage of limited opportunities to assess the current population levels of this chickadee along Strawberry Creek on the campus of the University of California in Berkeley, a locality at which this species was not known to nest prior to 1950. An equally important