

five test-tube feeders. Each test tube contained a differently colored sugar solution (red, blue, yellow, or green), except for one that contained colorless sugar solution. Both Anna's and Black-chinned Hummingbirds that had just arrived in their migration were involved in these tests. Each tube was emptied by them before the next one selected had been more than half emptied. This result demonstrated a tendency to persevere on a given color before shifting to another color. This whole experiment was repeated a second time, with similar results regarding tendency to persist on a given color, although the order of colors selected varied slightly with change in relative position of colors in the second experiment. In these two experiments, yellow and green were selected least often, while red and blue were selected most often.

Exploratory shifts to different colors were seen. Direct observation of the different feeders showed that a hummingbird would sometimes take a sip from more than one feeder before settling down to feed for a more prolonged time at another feeder. Such shifts were seen for both species of hummingbirds visiting the feeders at this period of our study.

A natural preference for red may sometimes be manifested. In the spring of 1967, five years after we had discontinued feeding the hummingbirds, the same series of test-tube feeders and colors as described above was put out in the garden. Presumably there were now no hummingbirds in the neighborhood trained to artificial feeders. A female Anna's that

came to the feeders was seen to select the red feeder over blue, yellow, green, and transparent feeders in 15 out of 15 different series of visits, over a period of a few days during which the position of the red feeder was shifted each day.

Discussion. Our results can be related to the feeding behavior of hummingbirds at flowers in nature. Flower nectar is little more than sugar water. Conditioning to position of a food source is related to learning the location of plants that have recently come into bloom and have a good nectar flow. It is quite possible that Anna's Hummingbird might be adapted to learning to feed at certain colors, perhaps such as red, faster than at other colors, perhaps such as green. However, the ability to learn to shift readily from one blossom color to another is adapted to the differences in color of favorite flowers of this species of hummingbird in nature, such as the red blossoms of the red-flowered gooseberry (*Ribes speciosum*) and the yellow blossoms of the tree tobacco (*Nicotiana glauca*). The tendency of hummingbirds to persist in coming to a given color that has proved rewarding assures that the birds will continue to exploit a given species of plant so long as it gives a good nectar flow. Such persistence is balanced against the exploratory tendencies of the hummers which increases the probability that flowers of different species of plants will be discovered to be profitable just as soon as they begin to have a good nectar flow.

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FIRST RECORD OF THE TURKEY *MELEAGRIS GALLOPAVO* FROM THE PLEISTOCENE OF MÉXICO

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While studying the bird collections of the Department of Vertebrate Paleontology, American Museum of Natural History, I found a proximal end of a right humerus (AMNH 6823) of the Wild Turkey (*Meleagris gallopavo*). The specimen was collected in 1928 by B. Brown, one mile east of Arizpe, 60 miles southeast of Cananea, Sonora, México; the age is recorded as "L. Pleistocene?" According to the accompanying label, the fossil humerus was associated with "*Bison* ref. *alleni*, *Equus* cf. *tau*, *Serridentinus*, & *Archidiskodon imperator*," thus indicating the age is very late Pleistocene (approximately Wisconsin).

No records for *M. gallopavo* are known from the Pleistocene of México (Brodkorb, Bull. Fla. State Mus. 8:335, 1964), although another species, *M. crassipes*, has been described from San Josecito Cave, Nuevo León (Miller, Condor 42:154-156, 1940). *Meleagris crassipes* was considerably smaller than *M. gallopavo* as was *M. richmondi* of the Pleistocene of California (Shufeldt, Trans. Conn. Acad. Arts Sci. 19: 67, 1915). *Meleagris leopoldi* (Miller and Bowman, Wilson Bull. 68:42-45, 1956) is based on the relative position of the tarsometatarsal spur cone and consequently cannot be compared with AMNH 6823. The collection of fossils united by Brodkorb (*op. cit.*, p. 325) under the name *M. alta* (= *M. superbus* and *M. celer*) has a size range encompassing AMNH 6823. Species limits in these turkeys are uncertain because of the large amount of variation in shape and

size (including sexual differences). It is highly unlikely that the specimen reported herein represents *M. alta*. The fossil is referred instead to *M. gallopavo* for the following reasons: (1) the fossil was compared with a series of 10 humeri of *M. gallopavo* from the Pleistocene of Florida and was found to fall within the range of variation of the series, (2) *M. gallopavo* had a broad Pleistocene distribution and is known to occur in Sonora today, and (3) the fossil is very late Pleistocene in age and therefore almost assuredly is *M. gallopavo*.

The Sonora locality for AMNH 6823 suggested the possibility of its being a new locality record for *Parapavo californicus*. Therefore, through the courtesy of Hildegard Howard, the Sonora specimen was compared with skeletons of *Parapavo*. Dr. Howard informed me (personal communication) that the pneumatic foramina within the pneumatic fossa "occupy a smaller space in AMNH 6823; in *Parapavo* they not only tend to extend farther beneath the tuberosity, but they occupy more space laterally. In my two *M. gallopavo* specimens the foramina seem to occupy the smaller area comparable to AMNH 6823." Howard also noted that AMNH 6823 differs from her specimens of *M. gallopavo* in the development of the prominence of the distal extension of the head on the anconal side, but great variation in this character was found in the Florida humeri I examined.

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