

DO CROWS USE AUTOMOBILES AS NUTCRACKERS?

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While driving through the University of California, Davis, campus one morning, I spotted a Common Crow (*Corvus brachyrhynchos*) hovering over the street ahead of me. The bird flew to the street and dropped a walnut. At the approach of several automobiles the crow flew up into the air. Four or five autos passed over the spot, while the crow circled some twenty-five feet above the street. After passing over the spot, I watched in my rearview mirror, noticing that the crow returned to the street (and, presumably, the walnut) after a final car had passed by. The walnut appeared to be intact, although I was by then a bit far-removed to tell if it had fragmented at the impact of the automobiles. I was, unfortunately, unable to return to the scene for a closer look.

The possibility exists that the crow deliberately dropped the walnut in the direct path of the automobiles. Could such opportunistic behavior have been learned by the crow? The literature of animal learning, particularly that concerning avian species, does not prevent such an interpretation (see Thorpe 1963 for material concerning the learning abilities of various birds). The following argument is offered to explain how such a crow might have learned to drop walnuts in the fashion described.

Given the frequent passage of autos on the Davis campus streets, a local crow population will roost and fly over areas where passing autos are a fixture of the environment. Should a crow drop it on asphalt, the walnut has a reasonable chance of breaking. But should the crow drop the walnut when cars are passing, the probability of a broken walnut is improved. One may hypothesize, then, that passing automobiles (for at least some crows) may become discriminative stimuli inducing walnut dropping onto the asphalt surface of campus streets. A bird is reinforced for such a motor act by the outcome—the exposition of the tasty insides of the walnut.

An alternative explanation may be offered, of course. The crow may have inadvertently dropped the walnut and simply waited for the autos to pass before retrieving it. Certainly this explanation is just as plausible, and the more parsimonious of the two. Only systematic and repeated observation of the event will confirm the existence of the habit, let alone my hypothesis regarding its acquisition. The incident does lend itself to experimental inquiry. For example, marking the bird in question would allow observers to follow it for further verification of the habit. One might also train a crow to emit such behaviors and observe its effect on a free-living group. These are only two of many possible ways to empirically investigate the phenomenon.

Additional observations I have made firmly establish a more conservative statement, one which complements but does not detract from the previous hypothesis. At least some crows in the Davis area make surface discriminations and intentionally drop walnuts on hard surfaces. I have picked up numerous walnut fragments in the middle of paved roads, after having disturbed crows in the midst of these fragments. On all of these occasions, no walnut trees were near the road, thus ruling out the possibility that they had fallen there. Two observations further corroborate this view. On the first occasion a crow flew over a parking lot and dropped a large walnut to the surface. The walnut broke in half and the crow flew directly to the pieces. However, I displaced the crow and retrieved the pieces for evidence. The second event was more conclusive and establishes the habit without a doubt. A crow I observed hovering over a campus parking lot dropped the walnut it was carrying four times, on each occasion returning to retrieve it,

NOTES

flying to a bit higher altitude and repeating the drop. On the third drop the walnut broke in two, but the crow retrieved both pieces and dropped them together. Again, I interrupted the crow to gather the evidence. Whether it would have dropped the fragments for a longer period, I cannot say.

The cleverness of crows is well documented. For example, Hertz (1926) describes how a Carrion Crow (*Corvus corone*) which was in the habit of hiding food by burial, would wait up to five hours before going directly to the spot and retrieving it. Furthermore, Porter (1910) described an American crow which in the course of a puzzle-box experiment learned a novel door-opening response by observing another, trained crow. Thus, crows appear to have good memories and are capable of imitation. Crows also perform well in operant conditioning situations. In a carefully controlled laboratory study, Powell (1972) found that the operant behavior of Common Crows was comparable to that of pigeons, rats and monkeys. Finally, the natural use of a twig as a probing tool has been reported for the New Caledonian Crow (*Corvus moneduloides*) by Orenstein (1972).

By trial-and-error, a crow learns to build a nest (Thorpe 1963). Walnut-dropping may be similarly acquired. If one crow learns such behavior, others are likely to imitate it. While the element of automobile use is (if proved) unique, the habit of dropping hard food onto hard surfaces is known to occur in several avian species. In her review of tool-use, van Lawick-Goodall (1970) states that the Pacific Gull (*Larus pacificus*), the Lammergeier (*Gypaetus barbatus*), the Common Raven (*Corvus corax*) and the Bald Eagle (*Haliaeetus leucocephalus*) drop hard food objects (such as bones, shellfish or turtles) onto rocky sites. Several other examples concerning other species have been documented.

As an anecdote, the observation noted herein may be of little use to the serious student of bird behavior, but should this behavior be observed by others, we are witness to an ingenious adaptation in response to the intrusion of man's technology.

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