

an exponential equation in which $\log f_s$ is linearly proportional to $s-1$ (and hence also to s), with slope $\log p$ and intercept $\log B$. Since the logarithm of a fraction (p) is always negative, the slope is negative. In short, if the probability of adding another scratch to a bout is constant and independent of the number of scratches already performed, then the logarithm of the frequency of bouts having at least s scratches is inversely proportional to s , the number of scratches/bout.

It may help intuitively to point out that this simple model is related to the survivorship curves of banded birds of a single year-class where mortality is constant through time, and to the decay of radioactive materials—except that scratching is a discrete variable (number of scratches per bout), whereas time is a continuous one. The model may thus be termed a “geometric decay function” in parallel with the exponential decay functions of demography and radioactive disintegration.

Figure 1 shows the graphic analysis for both species. The fit of the data to a straight line (geometric decay function) is close: negative correlation coefficients exceeding 0.999 were found for both species. The lines fitted to the data in Figure 1 are lines of least-squares regression, and it will be noted that the slope of the junco line is slightly steeper than that of the Whitethroat. Since slope expresses the probability of adding another scratching motion in a bout according to equation (2), the difference in slopes shows that Whitethroats do in fact have a slightly higher probability of multiple scratching than do juncos.

My conclusion from these results is that both species possess fundamentally the same kind of scratching behavior. The most parsimonious interpretation of the geometric decay functions is that the effectiveness of a scratch in a bout is assessed visually during scratching; the decision as to whether to scratch again before pausing to inspect for seeds is made very rapidly so that no break in the scratching motions is necessary. Indeed, birds often appeared to be looking down while scratching. Finally, the small quantitative difference between the two species might be due to several factors, such as differences in visual criterion of a “successful” scratch or differences in preferred foraging habitat.

It is my impression that the last factor may be operating, for the Whitethroats appear to pick scratching sites more heavily leaved than sites picked by juncos. Therefore, a Whitethroat scratch will have a slightly lower chance of successfully clearing the ground of leaves, and consequently performance of a successive scratch will be slightly more probable.

I thank B. Dennis Sustare and Edward H. Burt for very helpfully criticizing the manuscript despite their sharing my bias that quantitative explanations of even “simple” behavioral patterns can yield interesting results.—JACK P. HAILMAN, *Department of Zoology, University of Wisconsin, Madison, Wisconsin 53706. Accepted 28 February 1974.*

Breeding range extensions of certain birds in New Mexico.—During field work in 1971–1973 at Tucumcari and in the Rio Grande Valley, New Mexico, I obtained the following notable extensions in the ranges of breeding birds in the state.

White-faced Ibis (*Plegadis chihi*).—On 16 June 1973, Ms. Barbara Escher and I flushed an adult White-faced Ibis from its nest at Tucumcari Lake, just east of Tucumcari, Quay County. The nest was built among cattails (*Typha* sp.) in the midst of a Black-crowned Night Heron (*Nycticorax nycticorax*) heronry. The night heron

nests were empty or contained young about to fledge. The ibis nest, made primarily of cattails, was built up about 18 inches above the water. It contained four blue or blue-green eggs, of which I obtained several photographs.

Plegadis chihi is a statewide migrant and occasional in summer and winter in New Mexico, but it has not been previously reported nesting in the state (Hubbard, checklist of the birds of New Mexico, New Mexico Ornithol. Soc. Publ., 3:13, 1970). Its breeding at Tucumcari Lake is somewhat unexpected, although this site supports an interesting breeding array of aquatic species in a region otherwise dominated by plains and other arid habitats. The lake itself, occupying a depression between U.S. Highways 66 and 54, is a generally shallow sheet of water of several hundred acres extent. Marshes of cattail and rushes (*Scirpus* sp.) are widespread, interspersed with open water and bordered by varied shoreline habitats.

Black Hawk (*Buteogallus anthracinus*).—On 25 July 1971, I found three of these hawks at the nest in woodland along the Rio Grande, near Alameda, Bernalillo County. The overstory was cottonwood (*Populus wislizenii*), with an understory of salt cedar (*Tamarix* sp.) and Russian olive (*Elaeagnus angustifolia*). One adult bird was clearly seen, and an immature flew from the nest to a nearby cottonwood. A third bird was calling but could not be clearly seen. The nest was about 35 to 40 feet above ground in the branches of a cottonwood.

In 1972, a pair built a new nest near the old site. The hawks were seen by Charles L. Hyder on 21 April 1972 near the new nest, and Brother Edwin Mattingly and I found an adult at the nest feeding young on 3 June. The second adult was nearby. Dr. Hyder obtained photographs of one of the adult birds and of the nest in April. The nesting area was checked frequently during 1973, and a single adult was seen 20 June, but no evidence of nesting was found. A Great Horned Owl (*Bubo virginianus*) did successfully raise its brood in the abandoned 1971 nest.

The known breeding range of the Black Hawk in New Mexico is generally confined to the southwestern part of the state, with reliable records as far north as the Gila Cliff Dwellings (Hubbard, op. cit.:23). There are earlier, undetailed reports of nesting along the nearby San Francisco and Mimbres rivers, plus a vague indication of occurrence in the lowermost Rio Grande Valley (Ligon, New Mexico birds and where to find them, Univ. New Mexico Press, Albuquerque, 1961:72). The breeding of this species at Alameda represents a northward extension of some 160 miles in New Mexico, notable in a hawk that is generally considered of lowland, neotropical affinity.

Tree Swallow (*Iridoprocne bicolor*).—At Elephant Butte Marsh, Sierra County, about 55 miles south of Socorro, New Mexico, I saw a pair of Tree Swallows entering and leaving a nest hole in a willow snag about seven feet above water 17 June 1972. The nest site had been used earlier in the season by a pair of Ladder-backed Woodpeckers (*Dendrocopos scalaris*). On 24 May 1973, a pair of Tree Swallows again used the nest hole. The nest, well-lined with feathers, contained one egg. Rising water, however, apparently caused failure.

This is among the southernmost breeding records for this species in New Mexico and apparently in North America. The species has been recorded previously nesting 45 miles to the north in the state, at Bosque del Apache National Wildlife Refuge, Socorro County (Ligon, op. cit.:191). The Tree Swallow also appears to have extended its range southward in the westernmost part of the state. Hubbard (Nemouria, No. 2, 1971) found a pair nesting near Cliff on 27 June 1968 and obtained photographs of the nest and eggs.

Black-capped Chickadee (*Parus atricapillus*).—On 14 June 1973, I found a family of two adults and at least three young in woodland along the Rio Grande near Alameda

(see above). The adults were feeding the young out of the nest in low brush. The young also appeared to be gleaning food on their own, although they were very recently fledged. I observed the family group for about 10 to 15 minutes from a distance of 15 feet or less.

The Black-capped Chickadee has previously been reported breeding in three northern counties of New Mexico (Hubbard, 1970:60). The southernmost breeding record to date is for the Santa Fe area, Santa Fe County (Ligon, op. cit.:207), some 45 miles northeast of Alameda. The species winters irregularly in Bernalillo County, but has not previously been known to breed so far south in the Rio Grande Valley. This appears to be the southernmost breeding record of the species in North America.

Catbird (*Dumetella carolinensis*).—I found an adult Catbird incubating four eggs in a nest in a Russian olive tree near Alameda (see above) on 30 May 1973. There were at least four additional territorial males singing in the area. The nest was about six feet above ground in an area of dense vegetation. Three young were in the nest on 10 June, along with one unhatched egg. By 14 June, the three young had well-developed feather sheathes, and on 20 June only the unhatched egg remained in the nest.

Dumetella carolinensis has been previously recorded breeding in four northern counties of the state (Hubbard, op. cit.:65). The southernmost breeding records to date are near Santa Fe and near Pecos, San Miguel County. There are also a few summer records in southwestern New Mexico in Catron County, and the species breeds in adjacent Arizona (Phillips, Marshall, and Monson. The birds of Arizona, University Arizona Press, Tucson, 1964).

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