June to the presence of fledglings accompanying their parents to the foraging sites. As mean flock size of birds that bred in Oklahoma was comparable in September to what we saw among migrants during the previous winter, we hypothesize that at least some young spend their first winter with their parents.

Our hypothesis is supported by additional observations. Flocks of foraging crows often had the same number of individuals within the same vicinity for 2–20 days consecutively, as if on a winter territory. Two such flocks (of four and five individuals, respectively) were noted repeatedly about 0.5 km apart in a field along a highway over the course of 9 days in mid-January. On the ninth day we watched the flock of four fly into a cottonwood tree within 50 m of where the flock of five was foraging on the ground. The flock of five immediately flew to the tree, and all nine crows fought noisily for about 15 sec. After the interaction the crows left the site in two flocks (four and five individuals) in opposite directions. On subsequent days only a flock of five was present in that vicinity. Finally, we noted that during the winter many (48 of 144, 33.3%) flocks of foraging crows were accompanied by 1–2 sentinel birds. D'Agostino et al. (1981) recently proposed that sentinel behavior by American Crows was an extension of parental care.

From these observations we infer that the basic social unit of nonbreeding crows may be the family and not the roost as implied by theories proposing information exchange about the location of food resources. Family relationships may be obscure where crows winter in large roosts and also forage in large flocks. However, large roosts in Oklahoma occur in areas of abundant, localized foods in the form of cultivated crops (grains, pecans, etc.) produced by intensive agricultural practices (Aldous, J. Wildl. Manage. 8:290–295, 1944). Our observations were of a smaller roost in native grassland/savannah habitats with negligible tillage. Whereas crows may follow other birds (share information) from large roosts to feeding sites or be attracted to birds already foraging (local enhancement) in areas of abundant or concentrated foods, in native landscapes the roost appears to serve some other (thermoregulatory, antipredator, etc.) functions (Broom et al., Bird Study 23:267–279, 1981) which seem inherent to the roost-site itself.

These interpretations benefited from discussions with Fred B. Samson.—FRITZ L. KNOPF AND BARBARA A. KNOPF, *Dept. Ecology, Fisheries and Wildlife, Oklahoma State Univ., Stillwater, Oklahoma 74078.* (Present address: FLK: *Denver Wildlife Research Center, 1300 Blue Spruce Drive, Fort Collins, Colorado 80524-2098;* BAK: *Wildlife Society Bulletin, 201 Wagar Building, Colorado State Univ., Fort Collins, Colorado 80523.*) *Accepted 30 May 1982.*

Wilson Bull., 95(1), 1983, pp. 155–157

An additional method of foraging in litter by species of *Turdus* thrushes.—Although ground-foraging birds often feed directly from the surface, many also excavate the litter in one or more distinct ways to uncover hidden food. For example, unilateral (single) scratchers use one leg at a time to move litter, e.g., many gallinaceous birds and Caracaras (*Polyborus*) (Brown and Amadon, Eagles, Hawks and Falcons of the World, Vol. 2, McGraw-Hill, New York, New York, 1968; pers. obs.). In contrast, bilateral (double) scratchers displace the litter in a backward jump using both feet simultaneously, e.g., in many American emberizines (Greenlaw, Condor 79:426–439, 1977). Bill-sweepers such as jays (*Cyanocitta*) and thrashers (*Toxostoma*) move litter with sideways sweeps of the bill (Clark, Wilson Bull. 83:66–73, 1971).

At least two avian genera employ either bill-sweeping or bilateral scratching. Egyptian Plovers (*Pluvianus aegyptius*) use bilateral scratching and bill-sweeping at different times

TABLE 1

NUMBERS OF OBSERVATIONS OF KINDS OF TERRESTRIAL FORAGING BY SPECIES OF *Turdus*

Species	No. excavation	Bill-sweeping	Bill-sweeping plus unilateral scratch	Bill-sweeping plus bilateral scratch	Totals
Eurasian Blackbird	562	354	2	60	978
Redwing	24	6	0	2	32
Song Thrush	238	52	0	3	293
Mistle Thrush	68	5	0	0	73
American Robin[a]	96	7	0	0	103

[a] Data from 15 March–17 June 1979 in Connecticut.

(Howell, Univ. Calif. Publ. Zool. 113, 1979). Paynter (Bull. Mus. Comp. Zool. 148:323–369, 1978) summarized records of bill-sweeping and bilateral scratching for the Neotropical emberizine genus *Atlapetes*, especially the Chestnut-capped Brush-Finch (*A. brunneinucha*), but whether individual birds use both methods is unknown. Here I report the occurrence of bill-sweeping combined with synchronous bilateral scratching in three species of thrushes (*Turdus* spp.). This is a foraging method previously unrecorded for birds.

From 30 June 1979 through 23 June 1980 I observed unmarked wild *Turdus* around Reading, Berkshire Co., England. I had previously seen bill-sweeping by the Eurasian Blackbird (*T. merula*) (Clark 1971). This species, on occasion, also excavates with a foot; Witherby et al. (The Handbook of British Birds, Vol. 2, Witherby, London, England, 1938) mentioned without further detail the occasional use of the feet in foraging, and Snow (A Study of Blackbirds, Allen and Unwin, London, England, 1958) noted briefly the use of a unilateral scratch simultaneously with bill-sweeping. Throughout the year I saw blackbirds using the bilateral scratch synchronously with bill-sweeping (Table 1). In this method the entire body moves backward while the head sweeps to the side as the birds excavate concavities up to 2.5 cm deep in litter, particularly in woods. Only twice (2 July and 13 December) did I detect unilateral scratching together with bill-sweeping as mentioned by Snow (1958); hence the bilateral scratch appears to be far more common than the unilateral one. Bilateral scratching never occurred without synchronous bill-sweeping, and the bill consistently displaced more litter than did the feet.

The foraging method used appeared to be associated in part with the depth of the litter. On litter-free lawns blackbirds often captured earthworms and arthropods by pecks or stabs. Bill-sweeping without foot excavation was often used on shallow litter (e.g., scattered leaves on a lawn), whereas both bill and feet were often used in deep litter in wooded sites. Here excavation was prolonged, frequently lasting for many seconds.

The three other species of European *Turdus* I observed excavate much less in litter than do blackbirds, as noted by Simms (British Thrushes, Collins, London, England, 1978). Redwings (*T. iliacus*) sometimes bill-sweep in litter (Tye, Wilson Bull. 93:112–114, 1981; pers. obs.), and I observed bill-sweeping synchronous with bilateral scratching performed by two Redwings together on litter in woods on 19 October.

Only after 8 months of watching did I see Song Thrushes (*T. philomelos*) bilaterally scratching while bill-sweeping; on 5 March one bird repeatedly did this, and one, possibly the same individual, did it twice on 19 March. Henty (Wilson Bull. 88:497–499, 1976) previously reported bill-sweeping by captive Song Thrushes as well as the occasional use of the unilateral

scratch synchronous with bill-sweeping. The unilateral scratch together with bill-sweeping was not performed, however, in the Song Thrushes I watched.

I only rarely saw Mistle Thrushes (*T. viscivorus*) on litter and detected bill-sweeping in litter only twice by one bird on 20 March and three times by one on 5 June. I am unaware of previous records of Mistle Thrush bill-sweeping. For the American Robin (*T. migratorius*) in Connecticut I have repeatedly observed occasional bill-sweeps in litter (e.g., Clark 1971) but never detected the use of a foot to excavate litter.

In a review of the occurrence of bilateral scratching Greenlaw (1977) listed no thrushes. However, I have seen this behavior in blackbirds, Redwings, and Song Thrushes, though only when synchronous with bill-sweeping. Considering the apparent rarity of this behavior in Redwings and Song Thrushes it would be premature to conclude from the absence of records for the Mistle Thrush and American Robin that such species entirely lack this behavior.

At Reading I saw bill-sweeping performed by five other species that fed in some of the same sites used by the *Turdus* thrushes: Common Gallinule (*Gallinula chloropus*) on 8 February and 12 March, Magpie (*Pica pica*) on four occasions from 1 October–31 March, Dunnock (*Prunella modularis*) on four occasions from 3 December–9 April, European Robin (*Erithacus rubecula*) on 22 January, and Great Tit (*Parus major*) on four occasions from 15 December–9 April. On numerous other occasions these five species fed directly from the surface of the ground.

Bill-sweeping has apparently not been previously reported for Common Gallinules but has been seen regularly in Magpies (Clark 1971) and exceptionally in Dunnocks (Caldow, Br. Birds 67:516, 1974; Goodwin, pers. comm.), European Robins (Goodwin, pers. comm.), and Great Tits (Perrins, British Tits, Collins, London, England, 1979:136).

Acknowledgments.—I thank D. M. Broom and D. Goodwin for helpful information and Prof. K. Simkiss for providing facilities at the University of Reading.—GEORGE A. CLARK, JR., *Biological Sciences Group, Univ. Connecticut, Storrs, Connecticut 06268.* *Accepted 22 June 1982.*

Wilson Bull., 95(1), 1983, pp. 157–158

Northern Mockingbird kills Cedar Waxwing.—Northern Mockingbird (*Mimus polyglottos*) defense of winter territories, usually centered on fruit-bearing trees or shrubs, has been well documented. In California, Michener and Michener (Condor 37:97–140, 1935) reported vigorous defense of date palms (*Phoenix* sp.), hawthorn (*Crataegus* sp.), and persimmon (*Diospyros* sp.). Similar behavior has been reported in defense of hollies (*Ilex* sp.) in South Carolina (Moore, Behav. Ecol. and Sociobiol. 3:173–176, 1978) and pyracantha (*Pyracantha* sp.) shrubs in North Carolina (Stewart, J. Field Ornithol. 51:375, 1980). Moore (1978) concluded that the aggressiveness of the defending mockingbird was directly proportional to the degree of frugivory of the intruding species. He recorded the highest aggression index (proportion of intrusions repulsed) for the Cedar Waxwing (*Bombycilla cedrorum*), a species dependent almost wholly on fruits in the winter (Martin et al., American Wildlife and Plants: a Guide to Wildlife Food Habits, Dover Publications, Inc., New York, New York, 1951:158). Moore indicated, however, that physical clashes were infrequent. We report here a physical clash carried to the extreme.

Our observations focus on a small cherry-laurel (*Prunus caroliniana*) tree located on our office grounds in the city of Montgomery, Montgomery Co., Alabama. This particular tree is usually fruit-laden in the winter and has, in the past, been visited regularly by flocks of