TABLE 1
STOMACH CONTENTS OF 30 SPARROW HAWKS AND 3 CRESTED CARACARAS

Item	Sparrow Hawks		Crested Caracaras	
	Frequency in stomachs	*Number of individuals*	*Frequency in stomachs*	*Number of individuals*
Liolaemus sp.	15	22	—	—
Akodon olivaceus	1	1	—	—
Sheep remains	—	—	1	1
Earthworms	—	—	1	7
Carabidae				
Larvae	21	235	—	—
Adults	4	28	—	—
Elateridae	—	—	1	64
Pinotus sp. (Cuculionidae)	1	1	—	—
Other Cuculionidae	1	1	1	1
Other coleopterans	3	4	1	6
Diptera	7	not counted	—	—
Antandrus sp. (Orthoptera)	1	2	—	—
Other orthopterans	8	10	—	—
Lepidoptera				
Larvae	12	74	3	96
Adults	1	1	—	—
Hymenoptera	1	1	—	—
Scorpionida	1	2	—	—
Arachnida	6	19	—	—

capensis); the male Rufous-tailed Hawk (950 g) had eaten a Southern Lapwing (*Belanopterus chilensis*); and the Great Horned Owl had eaten a common field mouse (*Akodon olivaceus*).

The stomach contents of 12 male and 18 female Sparrow Hawks, weighing an average of 109 and 139 g, respectively, and of 3 Crested Caracaras, averaging 1130 g, are listed in Table 1. The invertebrates were identified by Bullock.

Dr. George J. Wallace read and commented on this paper.—J. KEEVER GREER, *The Museum and Department of Zoology, Michigan State University, East Lansing, Michigan,* and DILLMAN S. BULLOCK, *El Vergel, Angol, Chile.*

Utilization of shad as winter food by birds.—In two earlier papers (*Wilson Bull.*, 75: 42–55, 1963, and 76: 121–137, 1964) I reported that the primary food of Bald Eagles (*Haliaeetus leucocephalus*) wintering in an area near Savanna, Illinois, was gizzard shad (*Dorosoma cepedianum*). This fish is extremely abundant in the Mississippi River and its backwaters. Small shad (3 to 4 inches long) are especially numerous but occasionally larger individuals (up to 12 inches long) are also present. Several portions of the river and the backwaters remain unfrozen, or open periodically, in the winter. Ice conditions and the distribution of open areas were usually stabilized by late December and, at about this time, shad began to appear in large numbers at the open holes. Factors affecting ice conditions were discussed in the above-cited papers. Undoubtedly this area would be unable to support a large population of wintering eagles (up to 267 in February, 1962) without the availability of gizzard shad. Continued studies in 1964 and 1965 substantiated the value of this species as food for eagles. Although other food sources exist, they do not occur in abundance or with the regularity of shad.

TABLE 1

SPECIES OF BIRDS OBSERVED FEEDING ON GIZZARD SHAD

Species	*Number of observations*
Common Merganser (*Mergus merganser*)	Many
Bald Eagle (*Haliaeetus leucocephalus*)	Many
Herring Gull (*Larus argentatus*)	Several[1]
Ring-billed Gull (*L. delawarensis*)	Several
Belted Kingfisher (*Megaceryle alcyon*)	2
Red-bellied Woodpecker (*Centurus carolinus*)	1
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	1
Yellow-bellied Sapsucker (*Sphyrapicus varius*)	1
Downy Woodpecker (*Dendrocopos pubescens*)	Several
Blue Jay (*Cyanocitta cristata*)	1
Common Crow (*Corvus brachyrhynchos*)	Many
Black-capped Chickadee (*Parus atricapillus*)	Several
Tufted Titmouse (*P. bicolor*)	1
White-breasted Nuthatch (*Sitta carolinensis*)	Several
Cardinal (*Richmondena cardinalis*)	Several
Slate-colored Junco (*Junco hyemalis*)	Several
Tree Sparrow (*Spizella arborea*)	1
Song Sparrow (*Melospiza melodia*)	2

[1] Several = 5 to 10.

In addition, many other birds, and some mammals, wintering in the Savanna area are also dependent upon shad for at least part of their diets. The populations of some species (woodpeckers and passerines) appeared to be more dense in areas of shad availability than in adjacent areas of similar habitat where shad were not available. About 78 per cent (18 species; see Table 1) of the avian species I observed wintering near the open water (scattered over eight linear miles of sloughs) were seen feeding on shad at least once in the months of January through March (1962–1965). Presumably, had my assistants and I directed our attention away from eagles and toward this problem, we would have found shad to represent a significant part of the winter diet of several of these species.

Occasionally Common Goldeneyes (*Bucephala clangula*) appeared in the area and, although I never saw them feeding on shad, it is likely that they did so. Remains of shad were found in the proventriculi of two Common Mergansers. Species recorded in the area but not observed feeding on fish were: Red-tailed Hawk (*Buteo jamaicensis*), Red-shouldered Hawk (*B. lineatus*), Pileated Woodpecker (*Dryocopus pileatus*), Red-breasted Nuthatch (*Sitta canadensis*), and American Goldfinch (*Spinus tristis*).

Red-tailed and Red-shouldered hawks occurred in the area regularly. The density of these two species, particularly the latter, was higher within this eight-mile area than in any similar stand of deciduous forest I have investigated, including areas adjacent to the study area. Although I lack substantiating data, it seems possible that the hawks were attracted to these sites by the high populations of small birds which may serve as prey. It appears, therefore, that the gizzard shad serve as primary producers in the food cycles of many birds wintering in this area.

In addition to the birds mentioned, such mammals as opossums (*Didelphis marsupialis*), raccoons (*Procyon lotor*), mink (*Mustela vison*), red foxes (*Vulpes fulva*), gray foxes (*Urocyon cinereoargenteus*), and various mice (Cricetidae; tracks and signs of feeding observed) fed on shad.

Most of the species (exceptions being ducks and the Belted Kingfisher) listed in Table 1 fed on the numerous dead shad that were forced up on the beach, frozen into the ice, or dropped on the ice by eagles or crows. Bald Eagles utilized both dead and live shad, but preferred the latter. In most instances the smaller passerines and the woodpeckers fed near the banks. Occasionally, however, individuals fed on the ice at distances up to 200 feet from the shore and cover. The gulls arrived in the area during March and fed on the dead shad that were freed as the ice thawed.

During a 10 minute period (1315 to 1325 hours) on 27 January 1965, Alfred Bjelland, Gary Schnell, and I recorded the following birds feeding on shad remains left from earlier feeding activities of eight Bald Eagles and many crows: 1 Red-bellied Woodpecker, 1 Red-headed Woodpecker, 3 Downy Woodpeckers, 1 Blue Jay, several Common Crows, 4 Black-capped Chickadees, 1 Tufted Titmouse, 1 White-breasted Nuthatch, 4 Cardinals, and 10 Slate-colored Juncos. In nearby trees, were a Red-tailed Hawk and a Red-shouldered Hawk. The sky was clear and the temperature about normal; however, the preceding three days had included heavy rain, some sleet, and finally three inches of soft snow.

Weston (*Auk*, 80: 550–551, 1963) reported 11 species of birds feeding on several species of dead fish on 30 March in Iowa. All but two of the species (Ring-billed Gull and Common Crow) recorded by Weston are different from those I recorded. Thus, in the two areas, 27 species of birds have been observed feeding on dead fish in mid- or late-winter. Some of the species I recorded feeding on fish, although present in Weston's area, were not observed utilizing this food source in Iowa. Weston suggested that permanent residents use fish as emergency food; however, it appears to me that shad may represent a regular and substantial portion of the winter diet of several species occurring in northwestern Illinois. Some of the birds involved are not normally expected to feed on foods of this type (e.g., Slate-colored Juncos).

It appears that the gizzard shad play an important role in maintaining winter populations of several species of birds and mammals found in northern Illinois. Perhaps similar situations exist in other areas. This factor should be taken into consideration during formation of management practices aimed at control of gizzard shad and related forms.—William E. Southern, *Department of Biological Sciences, Northern Illinois University, DeKalb, Illinois.*

Notes on the food habits of the Korean pheasant.—The contents of 11 crops and 17 gizzards of the South Korean Ring-necked Pheasant (*Phasianus colchicus karpowi*) were obtained during September, October, and November, 1953, in northern Kyonggi-do Province, Paju-gun County, Korea. This area is located immediately south of the 38th parallel near Seoul and is marked topographically by steep-sided ridges and hills dissected by numerous low-lying valleys and flood plains. The valleys are planted mostly to rice (*Oryza sativa*), while the contiguous hills and ridges support moderate to dense stands of low-growing black pines (*Pinus thunbergii*) and oaks (*Quercus* sp.). Many small sites adjacent to the rice fields are planted to grain sorghum (*Sorghum vulgare*), or other field-row crops, or both. The juxtaposition of the rice paddies, pine-oak forests, and small farm plots appears to provide excellent pheasant habitat. Taka-Tsukasa (*fide* W. H. Bohl, Special Scientific Rept.-Wildl., No. 83. U. S. Fish and Wildl. Serv., 1964; see p. 56) stated that in these habitats of South Korea pheasants eat fruits, grass seeds, young shoots, chestnuts, acorns, grains from crop lands, soybeans, and red beans. He also mentioned that grasshoppers, ants, field mice, small reptiles, snails, and earthworms are eaten.