indiv., 1.7% biomass). The foregoing suggests that the chlorinated hydrocarbons picked up by Harris' Hawks in my study, may be linked to a partial bird diet.

This investigation was supported in part by the Arizona-Sonora Desert Museum near Tucson, Arizona. I thank David H. Ellis and Robert E. White for arranging to have the eggs analyzed at the U. S. Fish and Wildlife Service Research Center at Denver, Colorado. I thank also Lloyd F. Kiff, of the Western Foundation of Vertebrate Zoology in California, for egg shell measurements of Harris' Hawks.—WILLIAM J. MADER, *13100 North LaCholla Blvd., Tucson, Arizona 85700.* Accepted 6 Apr. 76.

Winter observations of Brown Pelicans in Veracruz, Mexico.—From 2 November 1973 to 10 March 1974 I participated in ornithological research on the Gulf Coast of Mexico, 28 km north of Catemaco, Veracruz. The coastline in this portion of the Tuxtla Mountains consists largely of worn igneous cliffs, often forested to the level where salt spray reaches the vegetation. Beaches occur at scattered locations such as Jicacal and Balzapote. Local residents mentioned islands near the village of Montepio as possible pelican breeding sites.

Brown Pelican (*Pelecanus occidentalis*) activity was usually noted throughout the day. Work schedules at inland sites prevented consistent monitoring of daily patterns, which normally included a few birds feeding, resting, or passing by in either direction. On several occasions (see Table 1) I had the opportunity to watch evening movements as the pelicans flew northward along the coast within 275 to 450 m of shore. These movements, presumably to roost, usually began at 1630 and the last birds passed approximately 15 min. before darkness (1800). I classified each passing group as to percentage of immatures. Determination of an individual's age was based on whether it showed a white head (adult) or was totally brown (Palmer 1962, Handbook of North American Birds, New Haven, Yale Univ. Press).

TABLE 1
COMPOSITION OF BROWN PELICAN GROUPS OFF VERACRUZ

Date	Total	% immatures
15 November 1973	170	67.6
10 December 1973	83	84.0
14 December 1973[1]	439	72.0
15 December 1973	187	60.0

[1] This assemblage of pelicans spent the afternoon feeding just offshore.

Brown Pelican breeding status is poorly known along the eastern coast of Mexico (Schreiber and Risebrough 1972, Wilson Bull. 84: 119). The recent literature contains no reports of concentrations of this magnitude in Veracruz. The high proportion of immatures is intriguing but as it is unclear whether these birds belong to a local population, it is unsafe to conclude they represent a successful breeding colony in Veracruz. Actual breeding sites need to be found in order to ascertain the status of this species in eastern Mexico.

I thank Dwain W. Warner for help in preparing this note and Martin W. Sutfin for financial assistance while I was in the field.—ROBERT M. ZINK, *J. F. Bell Museum of Natural History, University of Minnesota, Minneapolis, Minnesota 55455.* Accepted 7 May 76.

An unusual interaction between Blue-winged and Golden-winged Warblers in Virginia.—Interactions of Blue-winged and Golden-winged Warblers (*Vermivora pinus* and *V. chrysoptera*) and their hybrids in zones of sympatry have continued to stimulate the interest of ornithologists in recent years. Attention has been focused on songs, territoriality, hybridization, and introgression. Most studies of the above problems have been conducted on well-known overlap zones in Maryland, Michigan, and New York while little attention has been given to other areas of overlap where hybridization may be expected (Short 1963).

Blue-winged and Golden-winged Warblers seldom show interspecific territoriality (Gill and Murray 1972, Ficken and Ficken 1968, Murray and Gill 1976), while among the "pure" types and their various hybrid forms mutually exclusive territories may be maintained between the most similar forms (as in the case of "Brewster's" types and Blue-winged Warblers; Ficken and Ficken 1968, Meyerriecks and Baird 1968).

We report here the interactions between a Golden-wing male, a Golden-wing female, and a Blue-wing male around a nest in Montgomery County, Virginia. In recent years Golden-winged Warblers have occurred regularly in this part of Virginia, while Blue-winged Warblers have seldom been encountered in the breeding season (Murray 1974). However, Blue-wings reportedly increased in abundance in 1974 and 1975 in southwestern Virginia, as have apparent hybrids (R. N. Conner and J. W. Via, pers. comm.). In May 1974 the VPI & SU ornithology class repeatedly encountered a male Blue-wing singing 0.5 km NE of Blacksburg on a tract of abandoned farmland where one or two Golden-wings could be heard singing. No nests of either species were found, and we never saw more than one Blue-wing. In June 1975 the junior author discovered a singing Blue-wing, a pair of Golden-wings, and a nest within 100 m of the 1974 Blue-wing sighting. We believe the interactions noted between the three adults to be interesting and not previously reported for these warblers.

The nest, discovered late on 18 June, was 0.3 m from the ground in a blackberry (*Rubus* sp.) bramble at the edge of an old field. On this date the two young warblers were clearly near fledging. Most of our observations were made on 19 and 21 June, the most detailed ones during 4.5 hours on the morning of the 19th.

From the beginning it was clear that the Blue-wing was dominant to the Golden-wing male in the area of the nest and that the young were fed almost entirely by the Golden-wings. Table 1 summarizes the interactions seen among the 3 adults during the 4.5 hour period. These data are representative of the entire period of observation, and show clearly that both Golden-wings fed the young frequently, while the male Blue-wing spent much of his time singing ("bee-bzzz" song) and chasing the male Golden-wing. The clashes between males nearly always occurred as the Golden-wing male approached the nest. On most of his approaches, the Golden-wing male made several attempts to feed before succeeding.

We saw the Blue-wing male feed the young only once in the 3-day period. Virtually all his approaches to the nest were made when the female Golden-wing fed the young. On 12 occasions the female chased the male Blue-wing from the immediate vicinity (within 1 m) of the nest. We saw no aggression between the male and female Golden-wings. On 2 occasions they were at the nest together, and once they sat preening within 5 cm of each other.

Only the Blue-wing male sang on the 18th and 19th, but on the 21st, we heard the Golden-wing sing near the nest 3 times ("bee-bzz-bzz-bzz" song), and each time the Blue-wing chased him out of sight. In the afternoon of the 19th the young fledged, staying in the blackberry patch near the nest. We were able to catch, band, and photograph one young, and we netted and banded the female Golden-wing as she performed distraction display.

By the 21st the female and banded fledgling had disappeared, but we found the second young and photographed and banded it. Both males were nearby, the Blue-wing singing in the top of a tree, the Golden-wing performing distraction displays as long as we held the fledgling.

As only the Golden-wings fed the young frequently and performed distraction displays we suggest that they had the greatest investment in the nest and young. In addition, the fledgling had faint yellow wing bars as expected if they were Golden-wings.

The behavior of the Blue-wing, and in particular his total domination of the Golden-wing male, are difficult to explain. One possible interpretation is that the Blue-wing was simply a helper at the nest. But this case differs from other cases reported in these warblers (Short 1964). The nest helper cases in New

TABLE 1

EVENTS OBSERVED NEAR THE NEST BETWEEN 0900 AND 1330 HOURS ON 19 JUNE 1975

	Number of times observed
Male Blue-wing chases male Golden-wing	76
Female Golden-wing chases male Blue-wing	12
Male Golden-wing chases male Blue-wing	0
Female Golden-wing chases male Golden-wing	0
Male Golden-wing feeds young	25
Female Golden-wing feeds young	28
Male Blue-wing feeds young	1
Male Blue-wing approaches nest with food	16
Male Blue-wing approaches nest without food	7
Male Blue-wing bouts of singing	10
Male Golden-wing bouts of singing	0

York involved an extra "conspecific" male in 3 of 4 instances (in 1 of these both males were hybrids), and in the 4th, involving 3 Blue-wings, the sex of the helper was apparently not determined. But in no case was overt aggression among the birds reported. Apparently, the resident males tolerated the helpers. In the Long Island cases, the males were adults, one of which bred in the same season as it "helped" another pair; the other may have bred, as it was later seen feeding young along with a female.

Our Blue-wing did not feed the young on most occasions when it was near the nest with food and perhaps should not be considered a nest helper. Other explanations seem possible. The Blue-wing may have lost its offspring, mate, or both to predators at a time when territorial and courtship drives were strong. Or, as Blue-wings are scarce in this area, it could have failed to find a mate and attempted to establish ownership of a space containing an acceptable female. As it frequently appeared to make advances to the Golden-wing female we favor the latter explanation or some variation of it.

Whatever the reasons advanced to explain the Blue-wing's behavior, the male Golden-wing's response might be expected. Lack of territorial response to heterospecifics is the rule in these birds (Gill and Murray 1972, Ficken and Ficken 1968). The Golden-wing male would be expected not to chase Blue-wings from his territory, and in the absence of a tendency to fight the Blue-wing, simply fled from the aggressor. The adoption of an inconspicuous habit may help avoid aggression, as reported by Murray and Gill (1976) for a case involving a Blue-wing and a Golden-wing in Michigan.

The interactions we watched appear to be new to the literature, but we see no clear interpretation of them. This situation may be indicative of stress upon individuals of the rarer form, especially when the other form is also not common (Murray 1974). Our Blue-wing's aggressiveness may be relevant to the reported replacement of Golden-wings by Blue-wings elsewhere. We believe Blue-wings to be increasing in abundance in southwestern Virginia, making this region worth watching as a possible developing zone of interaction between these two warblers.

We thank Frank B. Gill for reading a draft of this paper and for letting us see his and Murray's manuscript on these warblers.

Literature Cited

Ficken, M. S., and R. W. Ficken. 1968. Territorial relationships of Blue-winged Warblers, Golden-winged Warblers, and their hybrids. Wilson Bull. 80: 442–451.

Gill, F. B., and B. G. Murray, Jr. 1972. Discrimination behavior and hybridization between Blue-winged and Golden-winged Warblers. Evolution 26: 282–293.

Meyerriecks, A. J., and J. Baird. 1968. Agonistic interactions between Blue-winged and "Brewster's" Warblers. Wilson Bull. 80: 150–160.

Murray, B. G., Jr., and F. B. Gill. 1976. Behavioral interactions of Blue-winged and Golden-winged Warblers. Wilson Bull. 88: 231–254.

Murray, J. W. 1974. A check-list of the birds of Montgomery County, Virginia. Raven 45: 55–70.

Short, L. L., Jr. 1963. Hybridization in the wood warblers *Vermivora pinus* and *V. chrysoptera*. Proc. 13th Intern. Ornithol. Congr.: 147–160.

———. 1964. Extra helpers feeding young of Blue-winged and Golden-winged Warblers. Auk 81: 428–430.

Curtis S. Adkisson and Scott S. Campbell, *Department of Biology, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061.* Accepted 5 May 76.

Adaptive significance of cowbird egg distribution.—From an examination of the distribution of the eggs of Brown-headed Cowbirds (*Molothrus ater*) among the hosts in a community, Preston (1948, Ecology 29: 115–116) reasoned that if female cowbirds distributed their eggs randomly among the available hosts' nests, then the probability that a nest will have 0, 1, 2, 3 . . . cowbird eggs is equal to each successive term in a Poisson series. The expected number of nests in each category could then be predicted by multiplying each respective frequency by the total number of nests in the sample. After examining five reports on host nests in this manner Preston found that the distribution of cowbird eggs among all the nests in each sample failed to fit the theoretical distribution nearly so closely as when he analyzed only the parasitized nests in each sample and just considered the distribution of cowbird eggs laid after the first one in each nest. He concluded from this analysis that the first cowbird egg is placed in a nest nonrandomly,