BENT, A. C. 1950. Life histories of North American wagtails, shrikes, vireos, and their allies. U.S. Natl. Mus. Bull. 197.

BENT, A. C. 1953. Life histories of North American wood warblers. U.S. Natl. Mus. Bull. 203.

FRIEDMANN, H. 1929. The cowbirds. Springfield, Illinois, Charles C Thomas.

NICE, M. M. 1953. The question of ten-day incubation periods. Wilson Bull. 65: 81–93.

NORRIS, R. A. 1958. Some effects of X-irradiation in the breeding biology of Eastern Bluebirds. Auk 75: 444–455.

RUDOLPH, T. D. (Ed.), 1974. The Enterprise, Wisconsin Radiation Forest: Pre-irradiation ecological studies. TID–26113, Oak Ridge, Tennessee, U.S. Atomic Energy Commission.

WAGNER, R. H., AND T. G. MARPLES. 1966. The breeding success of various passerine birds under chronic gamma irradiation stress. Auk 83: 437–440.

WELTY, J. C. 1962. The life of birds. Philadelphia, W. B. Saunders Co.

WETHERBEE, D. K. 1966. Gamma irradiation of birds eggs and the radiosensitivity of birds. Massachusetts Agr. Exp. Station Bull. 561.

WILLARD, W. K. 1963. Relative sensitivity of nestlings of wild passerine birds to gamma radiation. Pp. 345–349 *in* Radioecology (V. Schultz and A. W. Klement, Jr., Eds.). New York, Reinhold.

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Nocturnal predation by a Black-crowned Night Heron at a Common Tern colony.—Scattered reports appear in the literature of actual or suspected predation by Black-crowned Night Herons (*Nycticorax nycticorax*) at Common Tern (*Sterna hirundo*) colonies. Marshall (1942) reported seeing a single heron eating Common Tern eggs at night in a western Lake Erie colony that all adult terns had temporarily left; he gave no data on numbers of eggs taken or on the duration of observation. Collins (1970) reported the remains of a 2- to 4-day-old Roseate Tern (*S. dougallii*) chick in the stomach contents of a Black-crowned Night Heron collected at 0700 on 13 July 1968 at Great Gull Island, New York. He suggested that night-herons may also have been responsible for the disappearance of several 1- to 3-day-old Common Tern chicks from the same colony. Nisbet (1975) suggested that most of the nocturnal predation in a Massachusetts Common Tern colony was caused by Great Horned Owls (*Bubo virginianus*) although he noted footprints of Black-crowned Night Herons and a raccoon (*Procyon lotor*) near the colony. This note presents details of nocturnal predation in a Common Tern colony by a Black-crowned Night Heron and discusses the significance of such predation as a factor influencing the terns' reproductive success.

We made these observations at one of several Common Tern colonies near Port Colborne, Ontario, where we have been studying tern reproductive biology for the past 3 years. The ternery was on a concrete shelf forming part of a breakwater at the Lake Erie terminus of the Welland Canal. Egg-laying began in early May 1973 and continued until early August 1973. During the course of recording hatching and fledging data for approximately 400 marked nests, we noted that numbers of eggs and young chicks disappeared between daily visits for no reason obvious from diurnal observations. In an attempt to assess the possibility of loss

TABLE 1

NOCTURNAL OBSERVATIONS AT THE COMMON TERN COLONY

Date (1973)	Time of adult common tern departure	Time predator first seen or heard	Nature of observations	Time of adult common tern return
17–18 July	0020	Approx. 0120	Predator ate at least seven chicks, approximately 1–2 days old. Predator alarmed by capture attempt at 0205 and left. Gulls left with the terns.	—
19–20 July	2200	Approx. 2230	Predator heard above the colony but not seen. A small number of terns and gulls remained in the colony.	Approx. 0315
23–24 July	0315	Approx. 0330	Consumption by predator of unknown number of chicks until 0410 when alarmed by electronic flash and left. Gulls left with the terns.	0505
31 July–1 August	0210	Approx. 0240	Predator heard above the colony but not seen. A small number of gulls remained in the colony.	0500
1–2 August	2305	—	Predator neither heard nor seen. Most gulls remained in the colony.	0520
2–3 August	2306	Approx. 0005	Predator collected at 0016. Stomach contents contained two 1–2 day old chicks, one late stage embryo and egg shell fragments.	—
4–5 August	2115	—	Predator neither heard nor seen. A small number of terms remained in the colony. Most gulls remained in the colony.	0520

by nocturnal predation, we made a total of 13 night visits to the colony between late June and early August 1973. We usually watched from a blind at the edge of the colony from 2030 in the evening to 0700 the following morning.

Six nocturnal observation periods in June and July 1973 revealed that most adult terns remained on or near their nests for longer stretches than during daylight hours. While individual adults left and returned to the colony at irregular intervals, no large scale synchronous movements occurred. During seven nocturnal periods in July and August 1973, we observed the simultaneous departure and subsequent return of virtually all adult terns in the colony (Table 1). Five of these large scale synchronous movements were associated with the presence of at least one Black-crowned Night Heron. A single adult heron was first seen on the ground in the tern colony on 18 July 1973 and was subsequently heard or seen on four additional and separate occasions (Table 1). We do not know whether the same bird was involved nor could we establish the exact number of tern chicks or eggs taken while the predator was in the colony. When we collected an adult heron on the morning of August 1973, its stomach contained the remains of two Common Tern chicks plus a late stage embryo and eggshell fragments. Whenever it was sighted on the ground in the tern colony, the heron appeared to be selecting the prey items by sound. It moved through the tern colony by walking slowly forward with frequent stops during which the head was stationary. Prey consumption appeared to be preceded by a direct advance toward a nest from which young chicks were calling. Furthermore the predator often ignored unconcealed nests with chicks and ate instead chicks from adjacent nests partially concealed by vegetation. On the night the heron was collected, we were able to attract it to the blind by mimicking the sound of young tern chicks. Thus very young chicks and pipping eggs calling from a fixed position may be principal prey.

The apparent relationship between the presence of the predator and the synchronous departure of almost all the adult Common Terns from the colony is of considerable interest. On each of the three nights when the predator was on the ground in the colony, most and possibly all the adult terns left the site for periods of up to 3 h. On the two occasions when the heron was heard but not seen, most adult terns left the site for periods of up to 8 h. Further on all occasions when the heron was seen or heard most of the adults in two gull colonies near the tern colony also left temporarily. The synchronous departure of adult gulls occurred at about the same time as the synchronous departure of adult terns. We have no data on the time or synchrony or the return of gulls to the colony. The Ring-billed Gull (*Larus delawarensis*) colony immediately adjacent to the tern colony contained about 350 pairs of adults, while some 50 pairs of Herring Gulls (*L. argentatus*) nested in a group about 100 m away.

Except for a single Common Tern pair that briefly attacked the heron while it was on the ground the morning of 18 July 1973, neither terns or gulls harrassed the predator during its activity in the tern colony. These observations are in contrast to those of Collins (1970) and Marshall (1942) who reported terns actively attacking herons. The mobbing attacks noted by Collins were directed at herons in flight during daytime; it is not clear from Marshall's paper whether the attacks by "defending terns" were isolated incidents or whether they occurred during daylight or darkness.

Synchronous departure of adult terns from the colony also occurred on two nights when a heron was neither heard nor seen. As all departure movements preceded our detection of the presence of a heron predator, possibly the synchronous nocturnal desertions of adult Common Terns is unrelated to the presence of a heron predator. Marshall (1942) reported extensive nocturnal departures of adult Common Terns from a colony on Starve Island in western Lake Erie and speculated that the phenomenon could be explained as prolonged social flights or as periods of nocturnal foraging. In Marshall's study departure by adult terns was not synchronous but on each occasion when observed occurred gradually over a period of several hours with individual adults frequently returning to hover over their nests before leaving. These observations are in complete contrast to ours. The departures observed in this study are similar to the synchronous departures termed panic flights or "panics" by Palmer (1941: 96) which were induced by a sudden stimulus such as the blast of a ship's horn. It seems unlikely therefore that social flights or nocturnal foraging account for the departures observed in this study. Nisbet (1975) also reported nocturnal departures of adult terns from a colony in Massachusetts and suggested that Great Horned Owl(s) were the causal agent(s). He gave no data on numbers leaving or on synchrony of departure.

We are unable to explain the departure of terns on the two evenings when a heron predator was neither heard nor seen toward the end of our observation period (Table 1). Possibly the terns were sufficiently disturbed by the earlier presence of the heron(s) to leave without a direct stimulus. We suggest that the remaining synchronized departure periods were the result of the presence of a heron(s). We do not believe that the departure of terns in advance of the time of our detection of a heron contradicts this suggestion for the following reasons. First, we found no evidence that any other ground or avian predator that may have caused the terns to leave was ever in the vicinity of the tern colony. Second, on each occasion it was seen, the heron approached on the ground from the far end of the colony, more than 200 m from our blind. It seems likely therefore that the terns detected the presence of the predator before we did. Third, the absence of any large scale exodus on six nocturnal observation periods suggests that the phenomenon does not normally occur in the middle of the tern breeding season without an appropriate stimulus. Finally, preliminary analysis of data collected by means of battery-operated event-recorded monitoring 20 nests over the regular incubation period of 23± days in May and June 1973 suggests that massive and synchronized nocturnal departures of adult birds from the Port Colborne colony are extremely unusual events (Morris and Hunter 1976).

Nocturnal predation and nocturnal desertions by adult birds, whether causally related or not, may influence the reproductive success of a Common Tern colony. Marshall (1942) suggested that repeated long-term absence of terns during nocturnal periods contributed to a reduced reproductive success at the Starve Island colony, and Nisbet (1975) showed slightly reduced hatchability and extended incubation periods at a New England colony that incubating terns left at night. The influence of nocturnal departures and/or nocturnal predation on tern reproductive success would of course be impossible to detect in the absence of nocturnal visits by investigators. Several studies on the reproductive biology of the Common Tern have noted that eggs and chicks that simply disappear from colonies often contribute substantially to both pre-hatch and post-hatch reproductive loss (Langham 1968, Switzer et al. 1971). In most of the colonies these investigators studied, disappearance of eggs between data collection periods was a major pre-hatch loss category. In these and other studies, visits to tern colonies appear to have been restricted to daylight hours. In view of the probable importance of nocturnal events within a tern colony, we consider the restriction of investigator visits to diurnal periods inappropriate.

In conclusion we suggest (1) that Black-crowned Night-Herons and other avian predators of Common Terns may contribute substantially to both pre-hatch and post-hatch mortality of chicks, directly by predation, and indirectly by the extended exposure of eggs and chicks through interruption of incubation and nesting care by long-term departure of adult terns; and (2) that nocturnal visits by investigators studying Common Tern and other colonial fish-feeding bird species are of considerable importance if the causes of reproductive failure are to be fully elucidated.

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LITERATURE CITED

COLLINS, C. T. 1970. The Black-crowned Night Heron as a predator on tern chicks. Auk 87: 584–586.

LANGHAM, N. P. E. 1968. The comparative biology of terns, *Sterna* app. Unpublished Ph.D. thesis, Durham, England Univ. Durham.

MARSHALL, N. 1942. Night desertion by nesting Common Terns. Wilson Bull. 34: 25–31.

MORRIS, R. D., AND R. A. HUNTER. 1976. Monitoring incubation attentiveness of ground-nesting colonial seabirds. J. Wildl. Mgmt. In press.

NISBET, I. C. T. 1975. Selective effects of predation in a tern colony. Condor 77: 221–226.

PALMER, R. S. 1941. A behavior study of the Common Tern (*Sterna hirundo hirundo* L.). Proc. Boston Soc. Nat. Hist. 42.

SWITZER, B., V. LEWIN, AND F. H. Wolfe. 1971. Shell thickness DDE levels in eggs and reproductive success in Common Terns (*Sterna hirundo*) in Alberta. Canadian J. Zool. 49: 69–73.

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The affinities of the falconid genus *Spiziapteryx*.—The Spot-winged "Falconet," *Spiziapteryx circumcinctus*, the only species of its genus, is restricted to the rather dry chaco and monte areas of Argentina where it is apparently rare. It was first described in 1852 by Kaup, who placed it in the genus *Harpagus*, although he considered it distinct enough to merit its own subgenus for which he proposed the unfortunate name *Spiziapteryx*. Sclater (1862) briefly reviewed the history of this bird and ventured to doubt that it belonged with *Harpagus*, deeming it "safer to use for it the generic appellation *Spiziapteryx*, or leave it under the more general designation of *Falco circumcinctus*." Sharpe (1874) included *Spiziapteryx* in a subfamily Falconinae, which then embraced several genera of Accipitridae. He placed *Spiziapteryx* between the falconid genus *Polihierax* and *Falco novaezealandiae*, which species he placed in the monotypic genus *Harpa*. Martorelli (1900) discussed the relationships of *Spiziapteryx* and concluded that the bird was so distinct from *Harpagus* that it deserved its own subfamily, the "Spiziapteryxinae" (sic). His conclusions were based entirely on external features and his comparisons were evidently made chiefly with *Harpagus*, which is now known to belong to the Accipitridae.

The modern concept of the Falconidae and its various subfamilies has emerged largely through the work of Suschkin (1905). His study was based on the examination of skeletons of 140 species of Falconiformes. His list of material examined does not include *Spiziapteryx* and clearly his determination of its relationships was based on external characters only. Suschkin recognized four subfamilies of Falconidae: Herpetotherinae for the two primitive neotropical forest-dwelling genera *Herpetotheres* and *Micrastur*; Polyborinae for the exclusively New World caracaras of which four genera are usually recognized (*Polyborus*, *Phalcobaenus*, *Daptrius*, and *Milvago*); Falconinae for several genera now included in the single cosmopolitan