

Chick Shelters Decrease Avian Predation in Least Tern Colonies on Nantucket Island, Massachusetts.—During the summer of 1980, chick shelters were successful in preventing avian predation in Least Tern (*Sterna albifrons*) colonies on Nantucket Island, Massachusetts. As part of the Tern Management Program's protective efforts, the chick shelters were designed to decrease incidents of avian predation caused by American Kestrels (*Falco sparverius*) and Northern Harriers (*Circus cyaneus*). The shelters provided shade and protection for tern chicks prior to fledging.

For 2 consecutive years kestrels and harriers had posed serious problems to Nantucket's Least Tern population. In 1978 a pair of kestrels considerably reduced the chick population of a colony containing 80 nests. Feeding their own 5 nestlings nearby, the adult kestrels were observed picking up a tern chick approximately every 15 min for 2 h. This hunting behavior continued until 4 July when storm waters washed away the rest of the colony.

In 1979 a pair of Northern Harriers and their fledgling reduced the productivity of another Least Tern colony by about 80%. In a colony containing 20 nests, only 4 tern chicks managed to escape the harriers. In comparison to the colony plagued by predation the previous summer, this colony contained more vegetation, providing more protective cover for chicks until they fledged.

Traditionally, Least Terns nest on sparsely vegetated sandy beaches near the high tide mark (Bent, U.S. Natl. Mus. Bull. 113, 1921; Austin, Bird-Banding 5:123-140, 1929). The chicks usually leave the nest about 3 days after hatching. These nesting sites provide little or no shelter for chicks once they leave the nest. With only clumps of vegetation or beach debris to crouch beside, the tern chicks become easy prey for avian predators.

The period which follows the chick's departure from the nest is characterized by great activity. Chicks run randomly throughout the colony. The period when the chicks leave the nest coincides with the appearance of avian predators. When the first 3-day-old chick wandered from its nest and protective brooding of its parent, the hawks arrived. This increase in chick activity appears to attract the hawks to the tern nesting colony. These hawks have not been observed to prey upon adult or fledged terns, nor did the predators attack the incubating or brooding terns on their nests.

For the 1980 nesting season, chick shelters (Fig. 1) were designed to provide both protective shade from the sun and protective shelter from hawks. The shelters are constructed of recycled snowfencing. The snowfence is taken apart and reassembled into a "chick shelter." The wooden slats are removed from the wire supports of a 1.5 m section of snowfencing. Eleven slats are cut, drilled, and returned to the wire supports. Now in the shape of a cone, it stands 43 cm high with the opening at the top measuring 12 cm across and the bottom opening having a diameter of 66 cm. The spaces between the slats at the bottom of the cone are about 10 cm, which allows easy access by chicks. The shelter is placed over a center post which has been driven into the sand. This secures the shelter in the wind.

The shelters were randomly placed throughout the 7 tern colonies on Nantucket once nesting had been initiated but before hatching occurred. The cone-shaped shelter provided shade at all times. The open design allowed sand and beach litter to blow through the shelter without accumulation and discouraged rabbits and mice from using the shelters for nesting.

The first observed use of a shelter was on 3 July when 3 chicks from a 3-egg clutch made their way to a shelter 18 m from their nest. As shelter use increased, the amount of running about which had characterized the tern colonies prior to fledging was reduced. Adult birds arriving with fish entered the shelters to feed their young, the chicks never having to leave the protective shelter.

Shelters were placed no closer than 3 m from an active nest. Late nesting or re-nesting terns did not establish nests any closer than this distance. The chick shelters were not defended by adults as were the nest sites. Up to 5 chicks were observed using a shelter at one time. Chicks of all ages were observed in the shelters throughout the season. Even fledged birds were found standing in the shade provided by the shelter. The greatest amount of use occurred when temperatures were highest. Shelter use was less in the early morning hours and on overcast days.

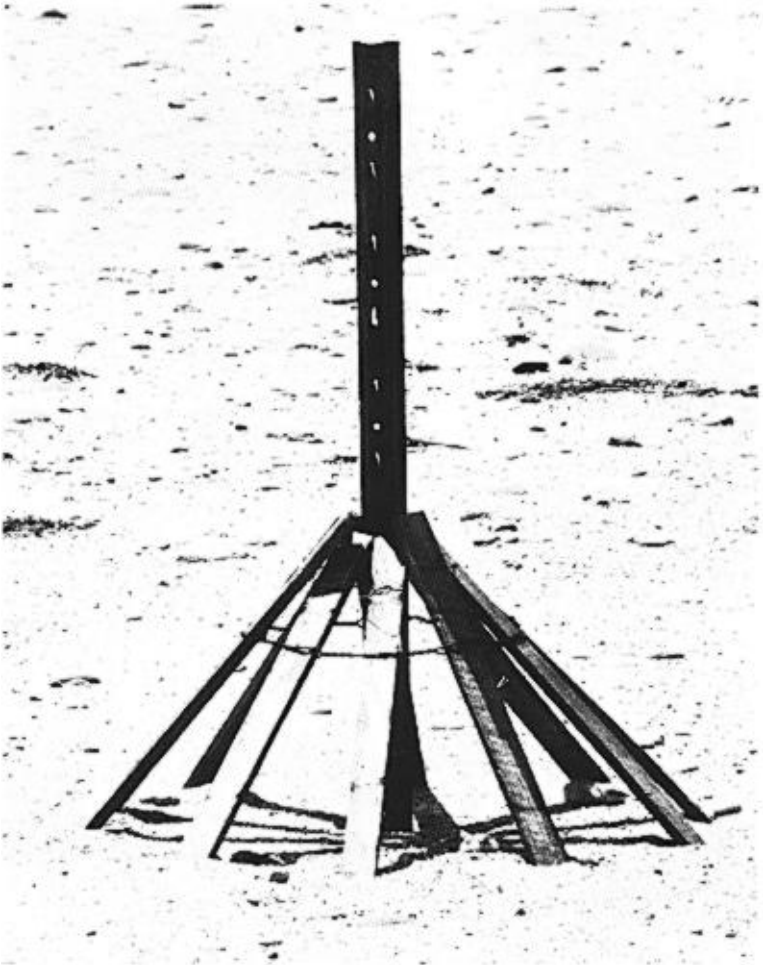


FIGURE 1. Three Least Tern chicks on Nantucket Island, Massachusetts seek shade in "chick shelter" constructed of recycled snowfencing.

Harriers or kestrels were sighted in the vicinity of 3 tern colonies but, throughout the entire nesting season, these predators were not observed in the colonies.

In conclusion, the Least Tern chick shelters were constructed with a minimal expenditure of effort and money. They should endure for many seasons of use since there were no occurrences of damage in 1980. The shelters are lightweight and easily transported. With the center post removed, the shelters can be stacked for convenient storing.

The chick shelters provided protection on Nantucket from avian predators. However, the shelters also provide necessary shade for chicks. They help to retain the chicks within the colonies where posting has restricted intruders. By the end of the 1980 season, the tern chicks sought refuge in the shelters in instances of disturbances by humans, dogs, and vehicles. The chick shelters may prove useful to tern management programs as a protective and shade providing device.

More detailed instructions for the construction of the Tern Shelter can be obtained

by requesting the 1980 Report on Nantucket's Tern Population by Nan Jenks-Jay from the Trustees of Reservations, Milton, Massachusetts, who provided funding for the Tern Management Program on Nantucket Island.—NAN JENKS-JAY, *Williams College, Williamstown, Massachusetts 01267*. Received 26 Feb. 1981; accepted 7 Nov. 1981.

Hypothermia Used Instead of Anesthesia for Surgery on Nestling Passerines.—

Surgery on birds generally depends upon immobilization of the subjects by means of general anesthesia. When Fiala (*Bird-Banding* 50:366–367, 1979) developed a procedure for laparotomy of nestling Red-winged Blackbirds (*Agelaius phoeniceus*), he preferred anesthesia by methoxyflurane to ether, but he noted that its use on very young nestlings was difficult to monitor because of irregular breathing and frequent cessation of breathing. He presented no data on mortality.

There is probably no safe anesthesia for young nestling passerines, and anesthesia is unnecessary since torpor is easily and safely induced by hypothermia. Featherless nestling passerines are ectotherms (see O'Conner, *Symp. Zool. Soc. Lond.* 35:277–306, 1975). I used hypothermia in skin grafting experiments on nestling House Sparrows (*Passer domesticus*; Mueller, *J. Exp. Zool.* 202:45–48, 1977). Most of the subjects were featherless nestlings 2 to 4 days old, and only 2 of the 85 nestlings died during surgery. When body temperature was reduced by swabbing with 70% ethanol, which was used to surface-sterilize the skin, struggling usually ceased, but on days when the ambient temperature exceeded 25°C, ice cubes were placed around the nestlings. Breathing was regular and slow, and there were no adverse effects even when hypothermia was maintained for as long as 30 min. After the surgery, each nestling was warmed in the hand until struggling resumed, and it was then returned to the nest. In the case of 6-day-old nestlings, which were feathered and had at least some endothermy, it was necessary to use ice to eliminate struggling, and recovery was rapid with no ill effects.

My experience with House Sparrows suggests that there is considerable risk of nest desertion when all young are removed from a nest simultaneously or even when all young from a nest are subjected to surgery within a few hours, since both the parents and the young are affected by the disturbance. I found that when surgery was done on all young from a nest within 4 h, 3 of 5 nests were abandoned. In subsequent experiments, at least one young was left in the nest, and only 5 of 21 nests were abandoned. It is possible to use all the young from a nest if several hours, or preferably one day, are allowed for the adults and the young to recover from the disturbance. Nest desertion can also be reduced if surgery is done in the field near the nest. A transportable "operating room" may be as simple as a folding table and chair and a dissecting microscope if such magnification is necessary. The aseptic conditions of an operating room, or even a laboratory, are unnecessary for surgery on birds. The major concern should be for minimizing the time when nestlings are away from, or inactive in, the nest.

Fiala (1979) reports some problems with the use of New-Skin as a dressing for incisions on his birds. I found that flexible collodion is an excellent surgical dressing; it dries rapidly, adheres tightly to the skin, remains for several days, and when it loosens and falls off it removes any sutures that might be used to close an incision.

Anyone contemplating surgery on young nestling altricial birds should consider the following: (1) induced hypothermia is preferable to anesthesia, (2) nest desertion can be minimized by leaving at least one nestling in the nest for the day, (3) surgery can be done in the field in proximity to the nest, and (4) flexible collodion provides an excellent surgical dressing.

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