GENERAL NOTES

Least Terns Nest alongside Harrier Jet Pad.—The Least Tern (*Sterna antillarum*) is a colonial nesting bird that typically nests on the flat, open expanse of sandy beaches near shallow water where food can be procured (Bent 1921). In recent years these suitable nesting habitats have been seriously depleted both in quantity and in quality due to human encroachment in the form of recreation and development. The consequence for Least Terns has been a population reduction in many areas and complete extirpation in others (Nisbet 1973, Downing 1973, Fisk 1975). Of the 3 U.S. subspecies of Least Terns, the California race (*S. a. browni*) is listed as endangered by the U.S. Fish and Wildlife Service (1980), while declining populations have been documented for the eastern race (*S. a. antillarum*) (Nisbet 1973, Fisk 1975), and the interior race (*S. a. athalassos*) (Downing 1980).

This trend has been offset where man-made disturbances have created new nesting habitats (e.g., dredged material islands and development spoils) that Least Terns frequently use (Downing 1973, Jernigan et al. 1978). In addition, nesting colonies have been reported on paved streets (Downing 1973) and roofs (Fisk 1975). Herein we describe another nesting situation that further indicates the opportunistic nature of this species.

The colony site was on the Patuxent River Naval Air Station, a 2590 ha military installation located in St. Mary's County, Maryland at the confluence of the Patuxent River and Chesapeake Bay. On 28 June 1982, air facilities personnel notified the Environmental Office about a small group of birds nesting between runways. We found 11 Least Tern nests on the concrete rubble surrounding a pad used by U.S. Navy test pilots practicing vertical takeoffs and landings in experimental Harrier Jets (AV-8B). The site was a circular concrete area (105 m in diameter), with an aluminum pad (30 × 34 m) near one edge of the circle. The nests were between 28 and 50 m from the edge of the pad in areas where the concrete had crumbled to gravel and stones. The only vegetation within .4 km was less than .5 m high grass in cracks in the concrete. The colony was .8 km inland and 3.8 km from the 3 previous years' shoreline colonies at the naval base.

Harrier Jets are equipped with an engine on each wing which is directed downward during a takeoff or landing. Tests by Navy engineers indicate that exhaust from these engines will displace sand and small stones, but effects of temperature and air turbulence were negligible beyond 18 m. Noise levels were not measured, but nearby Naval personnel were required to wear hearing protection devices during jet activity, indicating the severity of the noise. Norman and Saunders (1969) noted that aircraft, particularly helicopters, caused confusion in nesting terns in England. Since the behavior of Harrier Jets is similar to that of helicopters, the proximity of the jets could have been stressful to the nesting birds.

During tern nesting activities, the pad was used by jets once or twice a day. Although we were not permitted to observe the birds at these times, an inference into their behavior can be drawn from reports by firefighters manning a crash truck at the site. During a takeoff or landing they parked the truck at least 305 m from the pad, but immediately returned to the pad after the jet departed. The firefighters commented that the birds were always on the nests upon their arrival. It is uncertain whether the terns left the nests during the jet activity, but their presence on the nests immediately following jet departure suggests that they remained. P. Jorgensen (pers. comm.) reported that an incubating adult of *S. a. browni* remained on eggs as the wing of a taxiing plane passed directly overhead.

In addition to the daily jet disturbances, the colony was subjected to vehicular traffic to and from nearby runways, and the presence of the firetruck at the pad during daylight hours. Passing vehicles often came within a few meters of the nests, and the firemen occasionally approached the nests to observe the eggs. The birds apparently habituated to a parked truck by remaining on the nests, but the passing trucks and the approach of a human always caused them to flee.

We placed a survey flag near each nest and monitored the colony daily. Prior to 15 July, 4 eggs had hatched, but on the following day the remaining 18 eggs at 7 nests were gone. No visible evidence of predation (e.g., broken shell fragments, yolk material, or

disturbances to the nests) was present. This lack of physical evidence and the extent of the colony destruction suggests that the eggs were removed by humans, although our attempts to confirm this proved futile. Despite disappearance of the eggs, the hatching and eventual fledging of 4 chicks can be considered successful in light of the potentially stressful situation induced by the jet activity.

This colony site documentation not only demonstrates the opportunism of *S. a. antillarum*, but also a degree of tolerance to high noise levels and aircraft. This trait has also been noted by Davis (1968), who reported *S. a. browni* nesting very close to a frequently used railroad track. *S. a. browni* has also shown tolerance to disturbance by aircraft at colonies located on 4 California airports (L. Collins, pers. comm.; P. Jorgensen, pers. comm.). When considering the declining populations throughout their range, these 2 qualities, opportunism and tolerance, may be extremely important in determining the future status of the Least Tern.

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An Improved Stomach Pump for Penquins and Other Seabirds.—Emetics (e.g., Chaney and Kare 1966, Prŷs-Jones et al. 1974, Radke and Frydendall 1974, Tomback 1975) and stomach pumps (e.g., Emison 1968, Dahlgren 1982) have been used to avoid killing birds to obtain stomach contents for study. However, emetics can cause fatalities (Radke and Frydendall 1974, Randall and Davidson 1981) and the types of stomach pumps used previously may not always give representative samples (e.g., Croxall and Prince 1980).

Many species of seabirds regurgitate when handled, allowing stomach contents to be obtained without killing individuals (e.g., Ashmole and Ashmole 1967). Penguins, unlike most other seabirds, do not regurgitate when handled (J. Cooper and A. J. Williams pers. comm. for 5 species). Until recently, unsatisfactory samples of stomach contents have been obtained for several penguin species using emetics and conventionally-designed stomach pumps (Croxall and Prince 1980, Randall and Davidson 1981, J. Cooper and A. J. Williams pers. comm.). Randall and Davidson (1981) have developed a technique for use with the Jackass Penguin (*Spheniscus demersus*) that involves flooding the stomach with water and then letting the contents drain out through a large tube. This method requires at least two people to restrain the penguin. The associated trauma can cause desertion of eggs or young and the size of prey items that can be recovered is restricted by the internal