0.08 mm, for an overall sample thickness of both eggshell and membranes ranging from 0.55 to 0.60 mm. This value compares well with pre-1947 (pre-DDT) Bald Eagle eggshell thicknesses from Florida (0.584 mm) and Texas (0.603 mm) reported by Anderson and Hickey (Proc. Int. Ornithol. Congr. 15:514–540, 1972), and suggests that the Sonora eagle nest did not fail due to eggshell thinning.

A second Bald Eagle nest found 12 km upstream (8 km overland) in March 1986 may have been an alternate nest of the pair we observed. The second nest (height, 1.8 to 2.1 m; outside diameter, 1.2 m; and inside diameter, 0.9 m) was in a 10-m hecho cactus (*Pachycereus pectin-aboriginum*) on a steep, north-facing talus slope overlooking the river. The vegetation at the site was subtropical deciduous woodland dominated by *Jatropha cordata, Bursera fragilis, Lysiloma divaricata,* and kapok (*Cieba acuminata*). On the ground below the nest was a large (ca 20 cm deep) accumulation of sticks, debris, and fecal and prey remains. The relative depth of the nest and the accumulation of debris below it suggested the second nest was older than the active nest downstream. Prey remains below the nest included numerous fish bones and the sternum of an American coot (*Fulica americana*) (T. R. Huels, pers. comm.). Numerous adult Bald Eagle feathers, including two tail feathers, were collected on the ground near this second nest and later deposited with the University of Arizona bird museum. Ospreys (*Pandion haliaetus*) were the only other large, fish-eating raptors that could have been breeding in the vicinity. However, we saw no Osprey nests along the river during our surveys, and Ospreys were not known to nest anywhere within the Rio Yaqui basin (S. M. Russell, pers. comm.).

A 180-km stretch of the lower Rio Yaqui between the El Novillo and Obregon reservoirs was surveyed intensively by boat for Bald Eagle nests between January and April, 1986, resulting in the discovery of these two nests. Several hundred km of perennial riverine habitat in northern Sonora have yet to be surveyed for eagle nests. Clearly, future research is needed to determine the range and abundance of breeding Bald Eagles throughout Sonora. Such information could have substantial implications regarding the recovery of the endangered Bald Eagle population in adjacent Arizona.

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Field observations and comments on the Indigo Macaw (*Anodorhynchus leari*), a highly endangered species from northeastern Brazil.—The Indigo Macaw (*Anodorhynchus leari*) is found locally in Bahia State, Brazil, in the region of the Vaza-Barris river (Sick, Alauda 47: 59–60, 1979). The species was described from captive specimens, and nothing was known about its range and habits until its discovery in the wild by Sick (1979). Here I present information on roosting and feeding behavior of the species and assess the likelihood of its survival. Field work was done from 12 to 30 July 1983.

FIG. 1. Macaw cliff. Note burrows (indicated by white arrows) and droppings on the burrow entrances. Some individuals roost in ablation concavities at left.

Roosting sites and behavior.—The range of the Indigo Macaw is within the "caatinga" region of Brazil, which is dominated by thorny scrub vegetation. Altitude in the region varies from about 380 to 800 m, with daily temperatures varying between 15° and 45°C. Macaws roost in the cliffs or canyons (locally known as "Talhados," or "Serras") that vary in height from 30 to 60 m.

Macaws roost in burrows in the top third of the cliff faces in sedimentary lacunae created by weathering of the sandstone (Fig. 1). Burrow tunnels are fairly narrow, allowing passage of only one individual at a time. As many as 4 birds used a single burrow. Burrows were often within 0.5 m of one another.

Some macaws roosted outside the burrows, clinging to the cliff or shallow shelves. The Indigo Macaw is very shy and quite different from other Macaws, and it has an extensive social organization. Individuals leave their roosting cliffs before dawn for feeding grounds, and return after sunset. Just after sunset, 2 or 3 individuals return to the roost area, flying over the canyon and crying out. They then sit quietly on the tallest tree, cracking the tips of the branches. Trees used by these individuals are easily recognized by the presence of broken branch tips. After about 10 min, these "scouts" begin to call out loudly, and the rest of the flock approaches. The numbers of individuals in the flocks vary. Groups of 22, 33, 19, and 23 were seen on successive days in the same canyon. The birds fly over the canyon screaming, and then land near the scout birds and sit quietly. It is already dark. The birds then begin to scream again as they fly directly to the cliff edge where they sit before quietly entering their nest holes. The "scout" macaws roost in an adjoining canyon. These latter awake before sunrise and fly screaming over the canyon harboring the flock's nest holes. All the macaws then drop out of their holes, and the whole group flies out of sight.

Feeding habitat and behavior.—The Indigo Macaw, like other macaws, feeds largely on hard nuts, which it obtains from palm trees found in the thorn scrub and in pastures cleared

for cattle grazing. Its most important food source is the "licuri" palm (*Syagrus coronata*), which grows on top of the plateau (locally known as "Raso da Catarina") and on crystalline soils in the surrounding lowlands. This palm ranges in height from about 0.7 m to 2.0 m.

I saw flocks of Indigo Macaws feeding on four occasions. The birds feed on palm nuts on palm leaves in small subgroups of 2 or 3 individuals distant 5 to 30 m from one another. They also search the ground (Sick, Int. Counc. Bird Pres. Bull. 1:439–444, 1980) for palm nuts. After they grab a nut with their beak, they fly to a palm tree where they manipulate the nut with their feet, rolling it to remove the pericarpal skin. They then make two transverse cuts before extracting the meat. They open "licuri" nuts (approx. 30 × 20 mm) easily with perfect transverse cuts. There is always a sentinel keeping watch on flocks as they feed. The birds alternate their watching and feeding activities.

Conservation.—The distribution of *A. leari* is located on a contact area of crystalline rocks and sandstone, occupying an extremely small area of only 15,000 km² of which 60% has been thoroughly surveyed to date. Only two colonies were localized in the covered area, and the total number of known individuals is 60. On a very optimistic scale, and assuming the remaining 40% of the species' range consists entirely of optimum habitat (which is not very likely), the total population consists of far less than 200 individuals.

Two heavily traveled roads cross this area. The area has been densely populated since the late 1800s, and there are many foot and donkey trails in the area. Hunting is a serious problem. The local human population is very poor, and hunters either eat their catch or sell both live and dead wildlife products in regional markets. The local economy depends on subsistence agriculture and free range cattle and goat farming. The local farmers cut the "caatinga" but leave licuri, which in the dry season provides an important food supply for cattle that eat its racemes and young leaves. Cattle consumption of racemes and unripe fruit may limit the abundance of ripe nuts for macaws. Although macaws prefer mature fruit and cattle prefer green fruit, many farmers believe that macaws compete with cattle for food.

Although many cliffs are seemingly available in the range of *A. leari,* macaws roost in only a few canyons. The reason for this is not known. The present sandstone cliffs that are used as roosting sites are fractured. High thermal variation from day to night produces slides, and a slide occurring at night or during nesting could reduce substantially this rare macaw's population.

Unfortunately, *A. leari* is not protected in any Public Reserve or National Park. The Ecological Station of Raso da Catarina (SEMA—Secretaria Especial do Meio Ambiente) has no resident group of this species. Although *A. leari* sporadically feeds in this "protected" ecological reserve, cattle feed on unripe racemes at the station, and the area furnishes little food.

It is difficult to be optimistic on *A. leari*'s survival as both roosting and feeding areas are privately owned, highly vulnerable, and already subject to considerable human pressure.

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