

## ANALYSIS OF PEREGRINE FALCON EGGS IN ECUADOR

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A population of Peregrine Falcons (*Falco peregrinus*) may exist along the Andes Mountains (Ellis and Glinski, Condor 82:350-351, 1980). In 1979 Ortiz (Jenny et al., Condor 83:387, 1981) found a pair of peregrines within 10 km of the equator in Central Ecuador; these birds raised two young. In 1980 Jenny found an adult and a subadult occupying the site, but the falcons did not breed. During the fall and winter of 1981, peregrines again occupied this site and one young female fledged in early December. On 20

January 1982, Burnham, with Jenny's assistance, rappelled to the nest ledge and collected prey remains in order to determine on what the falcons were feeding. He also removed two unhatched eggs in order to measure shell thickness and analyze their contents for chlorinated hydrocarbons. These properties indicate the reproductive ability of peregrines.

Thickness was optically measured by Jenny and Burnham from fresh chips taken at three places on the equators of the rinsed and desiccated shells and included shell plus membrane. Optical measurements, accurate to  $\pm 0.004$  mm, were made with a 60 $\times$  compound microscope using an ocular scale calibrated from a Bausch and Lomb 0.01-mm stage micrometer. Reproducibility of measurement on each chip, and for chips from the same egg, was greater than that obtained with mechanical micrometers (Anderson et al., Can. Field-Nat. 96:255-264, 1982).

Chemical analyses were performed by Hazleton Raltech, Inc., Madison, Wisconsin, on egg contents for chlorinated pesticides, polychlorinated biphenyls (PCB), and mercury; analytical methods were described in Anderson et al. (1982). The results (Table 1) showed that the eggshells were in the normal thickness range and their contents contained relatively low pesticide concentrations. The shells were of similar thickness to those collected before 1947 in the Rocky Mountains region of North America (0.359 mm with membrane for 71 eggs) and measured by Anderson and Hickey (Proc. XV Int. Ornithol. Congr. (1970): 514-540, 1972).

The land surrounding the eyrie has been intensively farmed for several centuries, and at present the chief crops are avocados and various cereal grains. Hilgert and de Vries observed the falcons from October through December of 1982, and frequently saw peregrines carrying Eared Doves (*Zenaida auriculata*), an abundant species in the region, which they fed to the single young reared. We found only dove remains about the nest. Because doves eat seeds and also contain little fat, they do not accumulate high concentrations of organochlorines (Kreitzer, Pestic. Monit. J. 7:195-199, 1974). Although pesticides are used in this area of Ecuador, the low contamination level found in these falcons is perhaps related to their feeding habits rather than to their location.

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TABLE 1. Egg contaminants and shell thickness.

	Egg A	Egg B
Shell thickness (mm)		
with membrane	0.399	0.363
without membrane	0.329	0.288
Chlorinated insecticide, PCB (ppm, wet basis) <sup>1,2</sup>		
p, p' - DDE	1.40	0.69
p, p' - DDD	<0.01	<0.01
p, p' - DDT	<0.01	<0.01
Polychlorinated biphenyl	0.27	<0.10
Dieldrin	0.07	0.04
Alpha Benzene-hexachloride (BHC)	0.01	<0.01
Gamma BHC (Lindane)	0.01	<0.01
Beta BHC	0.09	<0.01
Hexachlorobenzene	<0.01	0.01
Endrin	<0.01	<0.01
Heptachlor epoxide	0.05	0.03
Mirex	<0.01	<0.01
Oxychlorodane	0.04	0.02
% lipid	—	2.78%
Mercury (ppm)	—	<0.05

<sup>1</sup> Values are uncorrected for loss of moisture in eggs. Corrected residue values would be lower than those shown.

<sup>2</sup> The lower limit of detection for chlorinated pesticides was 0.01 ppm and for PCBs (Arochlor 1254) 0.10 ppm; the range of recovery was about 80-90%.