Digital (A/D) Converter (Remote Measurements Inc. Seattle, WA; $400) and then to a NEC PC-8201 computer (NEC Inc., IL; $700). The computer, A/D converter and balance amplifier were housed in an ammunition box that was shaded on sunny days to minimize temperature extremes. The computer has a relatively small operating temperature range (5–37°C) and would require insulation in some field situations.

The computer was programmed to turn on all 8 balances (through the digital output of the A/D converter) once every 2 min and sample each balance momentarily to determine the presence or absence of a bird. If the presence of a bird that had not been previously weighed was noted, then the power remained on and the balances were sampled until a constant weight was obtained (typically within 5 s). The weight from any balance with a "new" bird and the time of day were then stored in memory. Regression equations for the balance calibrations were also stored in memory so that all readings could be directly converted to grams. Tare weights were verified every 15 min, permitting adjustments of the equations for each balance. The computer memory could store several hundred weight records in addition to the operation program; on reaching capacity the system would automatically transfer the weight records to cassette tape. The computer program used with this system is available on request and a copy has been deposited in the Van Tyne Library.

The entire system (balances and recorder) was powered by a 12-V, 6.5-amp sealed lead-acid battery. The strain gauges were the main source of power consumption. Because the balances were not running continuously, each battery lasted for approximately 40 h of use.

This balance design results in a somewhat lower accuracy than designs where it is possible to have the weight centered on a single point (greatest accuracy is obtained from suspended perches since the weight in such a situation is self-centering). Under field conditions these balances ranged in accuracy from ±1% to ±2%. Under extreme weather conditions it is expected that temperature sensitivity will add to this error. Accuracy is directly related to the size of the platform used. The accuracy of the balance along the axis parallel to the beam can be improved through accurate placement of the strain gauges but the transverse error of the transducer is unavoidable. I have used this design to record weights of entire nests with the incubating bird, however, because of the large size of the nest platform it was necessary to use 2 transducers under each nest.

There is a great deal of variation among birds with respect to their tendency to use the balances as perches. The balances were most effective at nest sites where visibility was impaired due to grass or brush.

I am indebted to Emmett Day, Bob Reinstatler, and Milt Smith for their engineering, electronics and computer expertise respectively. Dee Boersma provided the suggestion that led to the construction of these balances. This work was funded in part by National Science Foundation Dissertation grant BSR 84-00236 and by grants from Sigma Xi and the Chapman Fund.—WALTER V. REID, *Department of Zoology NJ-15, University of Washington, Seattle, Washington 98195.* Received 26 Feb. 1985; accepted 26 Nov. 1985.

Permanent Nest Marker for Long Term Field Studies of Birds.—Long term avian studies of pair bonds and breeding biology require permanent markers at individual nests. After several prototype markers were either eaten by birds, blown away, moved by growing vegetation, or corroded by salt spray, we devised a nest marker that is easy to find and lasts for several years at least: livestock identification flex nylon tags, about 5 cm × 7.6 cm with a 1.3 cm (½ in) hole fitted over the end of 1.3 cm (½ in) PVC pipe about 7 cm from the top, and sealed with outdoor caulking compound. We use 50 cm long pipe in tall grass and 30 cm pipe around bushes. The ear tags come in several colors and are consecutively numbered on both sides. The numbers are deeply etched into the plastic and are white. We found red tags to be the most visible, although in bright sun they fade faster than other colors.

The tags cost $0.55 each and are available from NASCO, 901 Janesville Ave., Ft. Atkinson, WI 53538, Model C1447N; telephone 414/563-2446. The pipe and caulking compound are available in most hardware stores. The PVC is easily cut with a saw or hand cutter. So far these nest markers have lasted for 3 yrs with no deterioration other than some fading of the red. We use a 5 lb mallet and a metal wedge stake to drive the initial hole in hard ground or coral, but the pipe itself can be driven into soft soil. It is useful to locate the marker on a specific side of all nests for consistent reference from year to year. We thank the National Science Foundation, National Geographic Society, and T. L. Cross for support.—ELIZABETH ANNE SCHREIBER AND RALPH W. SCHREIBER, *Natural History Museum, 900 Exposition Blvd., Los Angeles, California 90007.* Received 16 June 1985; accepted 2 Sept. 1985.

A Possible Reason for Age-differential Foraging Success in Brown Pelicans.— Numerous studies of piscivorous birds (reviewed by Brandt 1984) show that adults forage more efficiently than immatures. Among the proposed reasons for the observed disparity are that immatures have less efficient prey capturing and handling skills (Dunn 1972, Morrison et al. 1978, Orians 1969, Quinney and Smith 1980, Schnell et al. 1983, Searcy 1978, Verbeek 1977) or possible differences in choice of foraging area (Brandt 1984). The disparity in food capturing efficiency implies that younger animals expend more energy per capture than adults and probably hunt for longer periods of time before reaching satiation (Buckley and Buckley 1974, Burger 1980, Morrison et al. 1978), thereby putting themselves in a more precarious position regarding survival.

Beginning in December 1982, I watched adult and immature Brown Pelicans (*Pelecanus occidentalis*) feeding by plunge-diving on mixed aggregations of redear herring (*Harengula humeralis*) and false pilchard (*Harengula clupeola*) in Great Lameshur Bay, St. John, U.S. Virgin Islands. Casual observations indicated that adults were more successful than immatures, which supported the results of Orians (1969), Schnell et al. (1983), and Brandt (1984).

What aspects of hunting behavior predisposed immatures to lower success? I could not distinguish differences in the technique of plunge-diving or in the localities of the plunge-dives. However, I noticed a difference in the behavior preceding a dive. Adult pelicans often wheeled as if beginning a plunge dive (seen as a mid-flight pause either with the body wheeling to point in a more downward direction or the body pitching upward with the bill pointing down) and then resumed their searching flight pattern. This behavior appeared to allow a brief evaluation of the individual's probability of success with resumption of flight if the probability was deemed too low. I never saw immature pelicans pause or turn without completing the plunge-dive. This difference may have indicated that adults were better able to discriminate against plunge-dives whose failure was predictable. For search flights that I timed during March–April 1983, those of adults (time from takeoff until re-entry, $\bar{x} = 23.5$ s, SE = 1.35, $n = 114$) were significantly longer (t-test, $P < 0.01$) than those of immatures ($\bar{x} = 14.2$ s, SE = 2.07, $n = 45$).

Immature pelicans may have physical skills similar to those of adults, but simply be less able to correctly evaluate the probability of successfully capturing particular fish. Alternatively they may be less patient. Lack of success could increase hunger in an immature, and thus increase the likelihood of an impatient, premature dive.

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