habitat. The larger area of available wetland in the spring allowed the grebes and ducks to use flowage 300 without conflict. The reduced midsummer flowage area and the presence of the brood apparently were responsible for the initiation of attacks against the goldeneyes.

Whatever the releasers for the grebe attacks, the effects upon the goldeneye ducklings were profound. The young birds were denied access to the deeper water portions of the flowage whenever the grebes were active. This goldeneye brood, unlike many others observed, became scattered along the shoreline and often mixed with other broods after being harassed by the Pied-bills. Some portion of the goldeneye brood loss observed (4 ducklings) may have been indirectly attributable to the interspecific conflict. Although Pied-billed Grebes can rear broods on even very small water areas, their presence may, at times, be detrimental to some other species.

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Growth rate in the Monk Parakeet.—The Monk Parakeet (*Myiopsitta monachus*) has aroused considerable interest since its introduction into the U.S. Studies on the basic biology of this species have focused in particular upon their potential for establishment in this country. There is good evidence that physiologically this species is well adapted to invade many of the climatic regions of North America (Weathers and Caccamise, Oecologia 18:329–342, 1975), and based on the numerous breeding records it would appear that other aspects of their niche requirements are met at least in certain geographic areas.

One way of evaluating the potential for an exotic species to become established in a new area is to evaluate its breeding success. One important component of breeding success is the ability of parents to maintain the growth rates of young within those acceptable limits determined by the physiological capabilities of the species. The purpose of this study was to determine the growth rates of nestling Monk Parakeets in both caged and wild situations in order to provide a basis for comparative studies.

Subjects for this study consisted of 3 nestlings reared in an outdoor flight cage (4 × 3 × 2 m) by 2 pairs of adults using 2 separate nests. These birds were all live-trapped as adults in New Jersey and maintained in the cage for about 7 months before breeding began. In addition, data were collected on 3 nestlings reared by a pair of free-living birds nesting in Franklin Township, New Jersey. This nest was located near the top of an eastern hemlock (*Tsuga canadensis*) at a height of about 10 m.

The wild birds were part of a flock of 6 individuals of which only 1 pair bred at the nest under observation. This nest had been active for at least 3 years prior to 22 May–13 June 1974 when these observations were made. Local residents stated that this nest was constructed initially by only 2 birds, however, in the succeeding 3 years the flock grew to 6 individuals. Whether this increase was due to reproduction or to recruitment is not known.

Age-dependent weights are presented in Fig. 1. Since the free living birds deserted their nest about midway through the nest cycle none of their nestlings survived to fledge.

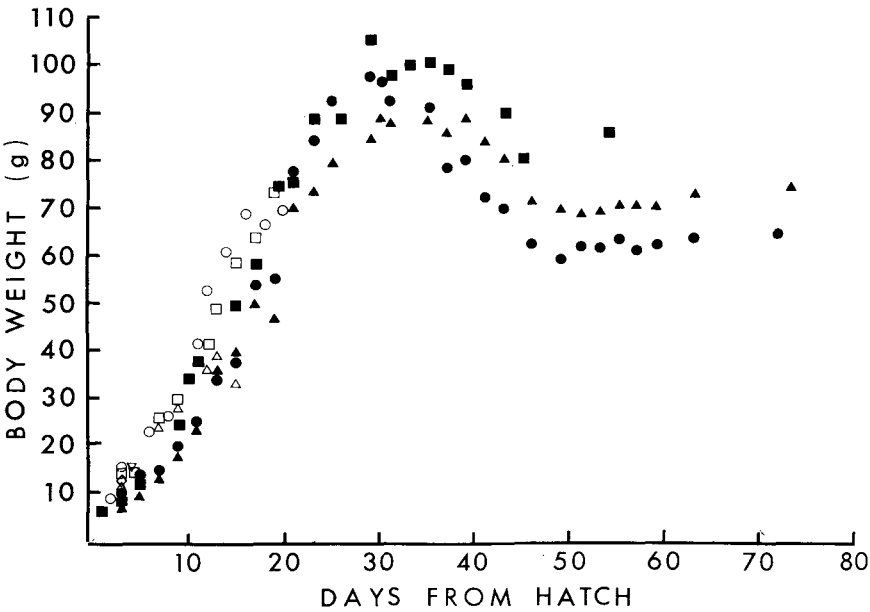

FIG. 1. Time dependent weights of nestling Monk Parakeets. Open symbols are free-living nestlings and solid symbols are nestlings reared in the cage.

However the growth rate of these nestlings was similar to that of the caged birds during the coincident periods of development.

In order to compare growth rates of Monk Parakeets with other species, the growth rate constants described by Ricklefs (Ecology 48:978–983, 1967) were calculated using his logistic equation. The resulting growth rate constants are expressed in both forms described by Ricklefs ($K = 0.1624$, $t_{10\text{-}90} = 26.98$). These are intermediate in value (Ricklefs, Ibis 110:419–451, 1968; Ibis 115:177–201, 1973), characteristic of birds generally much larger than Monk Parakeets. From the list of species presented by Ricklefs those with growth rates most similar to the Monk Parakeet include the Double-crested Cormorant (*Phalacrocorax auritus*) (1900 g), female Cooper's Hawk (*Accipiter cooperi*) (290 g) and the Common Crow (*Corvus brachyrynchos*) (450 g). A regression of maximum nestling size versus growth rate for temperate zone passerines and raptors resulted in an inverse relationship (Ricklefs 1968). Therefore, based on this regression the relatively low growth rate in Monk Parakeets would be expected for nestlings attaining a maximum size of about 1000 g. This is far greater than the 95–105 g maximum weight observed in the Monk Parakeet nestlings. Examples of growth rates for birds with weights similar to Monk Parakeets would include *Taxostoma curvirostre* (wt. = 79.3 g; $K = 0.384$) and *Xanthocephalus xanthocephalus* (wt. = 91.0 g; $K = 0.540$). The growth rate of Monk Parakeets is only 42.4% of the first species and 30.1% of the second.

Beyond day 35 there is a weight remission from about 97 g to as low as 60 g. Such a remission is not uncommon in altricial birds (Ricklefs 1968), however the magnitude of

the weight loss is impressive, particularly since these caged birds had access to a superabundant food supply.

Ricklefs (1968) analyzed the relationship between maximum nestling weight and average adult weight for individual species. For this he constructed a ratio (R) of the asymptote from the growth curve to the average adult weight. Ratios greater than 1.10 were most common in aerial feeders, while ratios less than 0.90 were most common for ground feeders. Also, species with high R values tended to have long nestling periods. The ratio for Monk Parakeets was 1.28. This was somewhat higher than the intermediate levels that might be expected of an arboreal and ground feeder such as this species. However, the high R value of Monk Parakeets is in accord with what would be expected in species with similarly long nestling periods.

Since the energy requirements for nestlings is the sum of maintenance energy and energy for growth, a low growth rate would tend to decrease the rate of energy demand for a nestling. If the number of surviving offspring is limited by the rate at which the parents can deliver energy to the young, then changes in the factors tending to lower the rate of energy demand of the nestlings could increase the number of potential offspring reared by the parents. One way to effect such a change is to lower the growth rate. However a low growth rate also increases the chances for predation and other nest losses by increasing the time in the nest. Monk Parakeets lay large clutches (5–9 eggs) and with their sizable stick-nests which are often built in clusters, this species would seemingly have a relatively secure nest environment. Thus it would seem that this safe nest environment could allow for the extended period of incubation (31 days) and the very low growth rate without a substantial increase in mortality. Therefore the low rate of development may be an adaptation for maximizing the production of young by maximizing clutch size.—DONALD F. CACCAMISE, *Dept. of Entomology and Economic Zoology*, and PETER J. ALEXANDRO, *Dept. of Zoology, Rutgers, State Univ. of New Jersey, New Brunswick, 08903.* *Accepted 1 July 1975.*

Foraging methods of the Song Thrush.—A recent review by Clark (Wilson Bull. 83:66–73, 1971) of bill sweeping in foraging behavior includes his personal observations on the Wood Thrush (*Hylocichla mustelina*), the American Robin (*Turdus migratorius*) and the European Blackbird (*Turdus merula*). Some time ago I was able to make incidental observations at close range of foraging behavior in the Song Thrush (*Turdus philomelos*) and these add some detail and expand the context of Clark's observations. These notes concern the coordination of bill sweeping and foot movements, the occurrence of a distinct form of foraging also using the bill, intra- and inter-individual differences, and the relative use of the 2 types of behavior on different substrates.

All my observations were made between August 1960 and June 1962 on hand-reared birds kept in a large aviary (15 × 5 m). Up to 7 birds lived in one-half of the aviary and were tested singly or in pairs in experiments on camouflage that were set up in the other half. This section contained 3 circular experimental plots about 150 cm in diameter. Two plots were formed from woodwool (a commonly used animal bedding material similar or identical to excelsior) which had been torn up into shorter pieces averaging 5 cm long by 0.2 cm wide. The third plot was formed from wood shavings, each about 1.5 × 0.75 cm, to simulate leaf litter. Each substrate was 2 to 4 cm in depth over a concrete floor. Also in the aviary was a large stack of untorn woodwool and a shallow gutter filled with a wind-blown loose detritus of decayed leaves, dust, small pieces from the experimental plots, etc. The birds regularly found maggots and mealworms in all substrates and also snails in the experimental plots.