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**Variation in size and quality of the Starling egg.**—The size of eggs varies within populations and, to a lesser extent, within clutches of birds. In several species large egg size results in increases in size of chick, rate of growth, and survivorship (Halberson and Mussehl 1922, Wiley 1950, Skogland *et al.* 1952, Parsons 1970, Schifferli 1973). Amounts of protein and lipid vary in direct proportion to egg size in domestic fowl (Romanoff and Romanoff 1949) and the Herring Gull, *Larus argentatus* (Parsons 1970), but the relationship between egg size and composition has yet to be determined for any species of bird with altricial development. Furthermore, proportions of egg constituents may vary as a function of egg size, resulting in eggs of different quality. Romanoff and Romanoff (1949: 116) have shown for the leghorn chicken that as egg weight increases the proportion of albumen in the egg increases slightly and the proportion of yolk decreases slightly. Parson's (1970) data on Herring Gulls similarly indicate a decrease in the proportion of yolk with increasing egg size, but with no corresponding change in the proportion of lipid in the eggs.

This note reports on the relationship between egg composition and weight in the Starling (*Sturnus vulgaris*). I collected 12 eggs on 23 April 1973 from incomplete clutches in nest boxes near Kennett Square, southeastern Pennsylvania, taking 1 egg from each of 8 boxes and 2 eggs from each of 2 boxes. Egg contents were analyzed the same day. Amounts of water, lipid, and nonlipid dry matter were determined separately for shell, albumen, and yolk. Components were dried in a vacuum oven at 50°C. Lipids were extracted in a 5:1 mixture of petroleum ether and chloroform.

The sample of eggs had an average weight of 7.20 g (range, 6.3 to 8.0 g) with a standard deviation of 0.53 g and coefficient of variation of 7.36%. The eggs contained 12.5 ± 1.2% (mean ± SD) shell (undried, including shell membranes), 17.0 ± 1.7% yolk, and 70.6 ± 2.0% albumen; the yolk contained 57.0 ± 0.9% water, 27.2 ± 2.6% lipid, and 15.9 ± 2.4% nonlipid dry matter; the albumen contained 89.4 ± 0.6% water, 0.8 ± 0.6% lipid (or other ether extractible material), and 9.7 ± 0.6% nonlipid dry material.

I calculated product moment correlations and regression statistics for each component as a function of egg weight. Albumen weight and shell weight both increased as egg weight increased (correlation coefficients, $r = 0.95$ and 0.89, $P < 0.01$) but yolk weight did not vary with respect to egg weight ($r = 0.25$, $P > 0.05$). Because the slope of the regression of albumen weight on egg weight $b = 0.79$ g albumen/g egg weight) was greater than the average albumen content of the eggs (0.71 g/g), the proportion of albumen in the eggs increased as egg weight increased, but not significantly ($r = 0.30$, $P > 0.05$). The proportion of shell remained constant ($r = -0.10$). The proportion of yolk in the egg decreased significantly with increasing size ($r = -0.52$, $P < 0.05$, $b = -1.68$%/g egg weight). Proportions of water, lipid, and nonlipid dry matter did not change significantly in either yolk or albumen. Because the proportion of yolk varies inversely to the proportion of albumen, the level of nonlipid dry matter in the egg as a whole (yolk plus albumen) did not vary significantly with egg weight ($r = 0.19$). The level of lipid in the egg as a whole decreased with increasing egg weight, but not significantly ($r = -0.41$, $b = -0.6$%/g egg weight).

Although coefficients of variation in yolk weight (8.60%) and albumen weight (8.58%) were similar to the coefficient of variation in egg weight (7.36%), only albumen weight was correlated with egg weight. Egg size in the Starling apparently depends on the amount of albumen laid down, which has been related to the weight of the oviduct (Ricklefs 1976). Because yolk size is not related to egg size, growth of Starling young may be independent of egg weight, in contrast to findings on the Great Tit, *Parus major* (Schifferli 1973). Growth parameters of the Starling (asymptote and growth rate constant of logistic equations fitted to growth curves) are, in fact, unrelated to egg size (MS). This is not to say that growth is not influenced by the size of the yolk, only that yolk size and growth are both unrelated to egg weight.

The relationship between proportion of yolk and egg weight in the chicken (Romanoff and Romanoff 1949: Fig. 57) has a slope of −0.176%/g; the same relationship in the Starling has a slope of −1.68%/g. These slopes may be normalized for comparison by relating the decrease in proportion of yolk to the standard deviation in egg weight (5.31 and 0.53 g, respectively). Multiplying the slopes in %/g by the standard deviation gives a normalized percentage decrease of −0.93% for the chicken and −0.89% for the Starling. The relative size of the yolk appears to be about equally conservative with respect to variation in egg weight in both species. In absolute terms the decrease is much greater in the Starling because the proportion of yolk in the egg is only slightly more than one-third of that in the chicken (Ricklefs 1974).

Variation in egg weight within Starling populations is not great, and most of the variation is expressed between clutches. Within clutches, egg size is relatively uniform. Other species with greater variation in egg size, particularly many seabirds with marked differences in egg size within clutches (Parsons 1970) might be expected to show less conservatism of yolk size with respect to egg size, hence a greater influence of egg size on the subsequent development of the young. Studies of individual variation within populations may yield considerable insight into the evolutionary significance of patterns in egg-size variation between species.

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**Second record of the Mississippi Kite in Guatemala.**—A Mississippi Kite (*Ictinia mississippiensis*) I banded as a nestling (U.S. F&WS band no. 535-26824) on 3 August 1971 in a colony of nine nests northwest of Knowles, Beaver County, Oklahoma, was shot near Escuintla, Department of Escuintla, south-central Guatemala on 29 October 1971; it recovered from its wounds and was presented to the Aurora Zoo of Guatemala City. Although Mississippi Kites were long thought to winter only as far south as Guatemala, their presence there has been documented by only one undated specimen collected (1861 or earlier) by Salvin near Coban, Vera Paz, central Guatemala (Blake 1949, Eisenmann 1963, Land 1970). Only a handful of additional records report this kite's migratory and wintering presence elsewhere in Central and South America (Eisenmann 1963).

The Plumbeous Kite (*I. plumbea*), which some have considered conspecific with *I. mississippiensis* (Sutton 1944), is known in Guatemala as a fairly common migrant and uncommon resident in the Caribbean lowlands and Petén of the north and northeast, but it has been recorded only once in the Pacific lowlands (Land 1970). Thus, the immature kite reported here represents the second record for *Ictinia* from the Pacific slope.

Because both species of *Ictinia* migrate in large flocks, the occurrence of the immature *I. mississippiensis* suggests that this species may occur more often in the Pacific lowlands of Guatemala. In support of this Wetmore (1965: 179–180) recounted three sightings in the Panamanian Pacific lowlands of large flocks of *Ictinia* that he believed to be *mississippiensis*, and E. Eisenmann (pers. comm.) has seen what appeared to be *mississippiensis* over forested and open areas of the same region.

The recent increase of Mississippi Kites in North America seems related partially to the effects of