

Also, Glover (1953) reported that grebes at unmanipulated nests usually lay an egg per day but sometimes skip a day toward the end of laying.

Our data provide only limited support for the egg limitation hypothesis, but other meaningful measures of egg quality could have been used, e.g. overall caloric content. Furthermore even if the quality of eggs in abnormally large clutches is found to be equal to that in normal clutches, it is still possible that resources for egg formation may indirectly limit clutches. Conceivably the cost to the female of producing a large clutch may be so great that her survivorship is lowered and lifetime reproductive output is maximized by laying fewer eggs during each breeding attempt.

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American Redstart feeding by artificial light.—On 2 August 1973, at 0300, one of us (GSB) was attracted to a second-floor window in the Lakeside Laboratory at the University of Michigan Biological Station at Douglas Lake by the fluttering of what we presumed to be a large sphingid or saturniid moth. Investigation revealed the source to be a warbler feeding on insects attracted to the screened window by fluorescent lights in the room. In rapid alternation, it hovered and perched on the window screen while selecting the larger insects (principally Ephemeroptera, Lepidoptera, and Trichoptera). After 5 to 10 minutes of observation, the bird was captured with an insect net and identified as a "yellowstart" or male American Redstart (*Setophaga ruticilla*) still in first nuptial plumage. We released it at the point of capture about 20 minutes later. After approximately 5 minutes, the bird returned to the window and fed for another 3 to 5 minutes. The bird then left the window and did not return during 20 minutes of subsequent watching, possibly because satiated, but most probably because feeding and opening the window screen to capture and release the bird depleted the insect supply. The behavior was not seen again, although an observer was present in the room until 0300-0400 most nights for a week, and large numbers of insects were often present on the screen.

We know of no other instance of nocturnal feeding by diurnal birds, outside of migration season, other than those commonly found in association with man. Species frequently reported to engage in such behavior include those that are generally opportunistic (e.g. gulls; Leck 1971, Blackett 1970) and those that exploit man-made environments on a regular basis. House Sparrows have been reported feeding by artificial light in airports (Broun 1971), at factories (Felton 1969), in regularly lighted areas on a college campus (Marti 1973), and at floodlights as much as 80 stories above the ground (Brooke 1973). Many other species that occur commonly in settled areas in Britain have been reported feeding during the hours immediately before dawn and after dusk (King 1967, Felton 1969, Blackett 1970, King and King 1974). This behavior may be seen as an extension of normal daylight activity in response to the continued availability of light and food. In each case, however, the birds were reported as exploiting a highly predictable situation.

The redstart behavior seen at 0300 occurred so long after sunset (2107) that it cannot be viewed as a

simple continuation of predusk feeding activity such as that reported for House Sparrows and other "city birds" (King 1967, Felton 1969, Blackett 1970, Broun 1971, Brooke 1973, Marti 1973, King and King 1974). Moonrise occurred at 1108 and moonset at 2240, so there was no moonlight to extend twilight. The behavior occurred over 3 hours before sunrise (0622), so it is not similar to the "early start" seen by Blackett (1970), who reported Blue Tits emerging from their nest holes to feed one hour before daylight, perhaps in response to early morning traffic. Lighting on the UMBS campus is kept to a minimum, and is usually limited after 2300 to a few offices and laboratories in active use. Thus the occurrence of a lighted window at 0300 is not a predictable event to the degree seen in other reported instances of nocturnal feeding by artificial light.

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Premature parental behavior of a Red-shouldered Hawk.—On 15 July 1976 I watched a young female Red-shouldered Hawk (*Buteo lineatus*), only 65-70 days old, carry a green leafy twig to the crotch of a tree. It was a clear but unsuccessful attempt to build a nest. The tree was 4 ft from, and almost above, three Harrier (*Circus cyaneus*) chicks on the floor of a screened porch. The two youngest Harriers were downy chicks about 11 and 16 days old; the third, about 22 days old, had lost much of its down. It was dark feathered and nearly as large as the Red-shoulder. The Red-shoulder made frequent visits, watching the chicks. All three chicks peeped loudly begging for food and the oldest chick flapped its wings and pushed against the screen in an obvious attempt to get to the Red-shoulder whenever she appeared.

The following afternoon the Red-shoulder brought a young mouse and tried to feed the Harriers through the screen. All three chicks competed to reach the proffered prey. At this time the young Red-shoulder had been at hack for 37 days and hard penned about 9 days. She was not yet self-supporting. She still received most of her food from me and had been known to make only four previous kills.

I moved the Harriers to a welded wire pen outdoors so the Red-shoulder could feed the chicks through the large mesh. An hour later, she pulled a dead branch from the ground and carried it to the pen: she tried to push it through the wire but when she couldn't she put it on top of the pen.

As it was not possible to tell whether the Red-shoulder was stimulated by the two small downy young or by the large dark one, I put two identical 36" × 24" × 10" wire pens 4 ft apart and placed the downy young in one and the older dark chick in the other on 17 July. That afternoon the Red-shoulder flew first to the oldest Harrier and then to the younger ones, perching on top of each pen and intently watching the chicks below. She then flew to a nearby bush and tried to break branches with both her beak and feet. When she couldn't break any she returned first to the downy chicks' pen and then hopped over to the older Harrier's pen.

To present more opportunities for feeding I put a 3-inch fish in a shallow tray near the pens. On 18 July the Red-shoulder killed the fish and immediately took it to the Harrier pens where the chicks were peeping loudly. She stood between the pens watching both the downy chicks and the older one before hopping onto the downy chicks' pen. She watched the older chick as it flapped its wings and pushed against the pen trying to get to her, and then flew to the older chick's pen where she promptly ate the fish herself.

The Red-shoulder did not react any more strongly to the downy chicks than she did to the older, dark feathered chick. It seems apparent that simply the presence of the Harrier chicks and their begging cries were enough to stimulate the Red-shoulder's attempted adoption.