

about. It is possible that attraction to the Great Egret, a taller as well as a more wary bird, could have survival value in acquiring a sentinel that would be particularly effective among weeds and grasses, the white color of the larger bird playing a significant role in the attraction (Kushlan, 1977b).

On the morning of 20 February, a warm, sunny day, I watched three Great Egrets feeding with about 40 White Ibis for 110 min. The egrets followed as the ibis moved back and forth along 35 m of shore. A tactic of the egrets was to keep a meter or two ahead, behind, or to the side of the advancing mass of ibis to strike at prey that fled from them. One egret made 28 strikes in 10 min. On the following day I saw four egrets following ibis in the same place. A question was why should the single egret watched on 10 February have been so territorial, driving away conspecifics, whereas three egrets tolerated each other 10 days later. This may have been a matter of water levels. With no rain of consequence in intervening days, many shallow ponds and ditches had dried up, giving the egrets fewer places to feed. Mock (1978) noted that although Great Egrets were highly territorial in Texas, they became more flexible as ponds dried up. The plasticity of foraging territories among wading birds was further discussed by Kushlan (1978b).

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**Novel Use of an Unusual Food: American Robins Eating Parts of Fish.**—American Robins (*Turdus migratorius*) have been reported to capture and swallow trout fry (Phillips, 1927; Michael, 1934; Kimball, 1944) which weigh <1.5 g and are <5 cm long. With the exception of Erickson (1978), most reports of robins capturing large prey such as garter snakes (Richmond, 1975; Davis, 1969) have not indicated if or how the bird ingested the prey. Here, I describe the techniques that American Robins used to eat parts of larger fish.

From 4 June to 4 August 1978, I observed the unusual feeding behavior of male and female robins at a freshwater salmon hatchery near Newport, Oregon. At the hatchery, salmon (*Oncorhynchus* spp.) smolts (5-15 g, 8-11 cm long) occasionally jumped out of the tanks. Robins used their bills to grasp the head of smolts (alive or dead) and quickly shook the smolt back and forth. When alive, the smolt would sometimes shake free. Then the robin either walked away and foraged for up to 18 min in grass before returning or immediately regrasped the smolt. It shook the fish until the head or parts of the head were broken from the body. First the head was eaten. Then the robin eviscerated the smolt by either pulling on the viscera attached to the head or by poking the bill into the body cavity where the head had been detached and pulling out the viscera. The viscera were then eaten, but the rest of the body was abandoned. The abandoned body weighed from 5.7-13.0 g (n = 23). Based on similar sized smolts, I estimated that the head and viscera would have weighed 2.0-2.7 g. Thus the largest part of the smolt was abandoned. Perhaps robins found the headless bodies too long (7.4-10.2 cm, n = 23) to swallow whole and too solid to break into pieces and swallowed as Erickson (1978) had observed a robin sever and swallow a garter snake.

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**Limits to Egg Size in the Western Gull, *Larus occidentalis*.**—Among *Larus* gulls, most species usually lay clutches of 3 eggs, occasionally 1 or 2, and very rarely more than 3. Egg size in normal 3-egg clutches is related to the laying sequence: the first egg is often the largest and the third egg is usually the smallest (Preston and Preston, 1953; Barth 1967-1968; Parsons, 1975; Mills, 1979; Coulter, Ms). Furthermore, Parsons (1970) has shown that in the Herring Gull (*L. argentatus*) chick survival during the first few days posthatching is related to hatching weight and egg size; small chicks hatch from small eggs and suffer higher mortality during the first few days. He suggested that because of the low survival of small chicks it is not advantageous for Herring Gulls to lay eggs smaller than a "minimum" egg size and that birds do not usually lay eggs smaller than this "minimum" size.

In the Western Gull (*L. occidentalis*) also, egg size is related to laying sequence (Table 1). Furthermore, hatching weight is correlated with egg size ( $r = 0.783$ ,  $P < 0.001$ ) and chicks with lower hatching weights suffer higher mortality during the first few days than all chicks combined: the average hatching weight (57.5 g) of chicks that died within the first 10 days was significantly lighter than the overall average chick weight (63.2 g, Mann-Whitney U-Test,  $P < 0.001$ ). Because the Western Gull is similar to the Herring Gull both in the relation of egg size to laying sequence and in survival during the first few days after hatching, I examined the size distribution of Western Gull eggs collected on the Farallon Islands, California, in 1970, to determine whether the distributions according to laying sequence would support Parsons' hypothesis of a "minimum" egg size. In the case of a "minimum" egg size one would expect the distribution of the third, usually the smallest, egg to be skewed toward small eggs. That is, if few small eggs are laid, the tail on the small side of the statistical distribution would be lacking and hence the distribution would be skewed. Egg-size distributions are shown in Figure 1. The distribution for third eggs

TABLE 1.  
Ranking of egg volume according to laying sequence for the Western Gull.

| Position<br>in laying<br>sequence | n  | Numbers of eggs, ranked according to<br>egg volume within the clutch |        |          |
|-----------------------------------|----|--|--------|----------|
|                                   |    | Largest  | Middle | Smallest |
| First eggs                        | 32 | 21   | 7      | 4        |
| Second eggs                       | 32 | 9  | 20     | 3        |
| Third eggs                        | 32 | 2  | 5      | 25       |