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EXOTIC EGGS IN NESTS OF CALIFORNIA GULLS

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Exotic or foreign eggs in the nests of California Gulls (*Larus californicus*) have been found so often in so many different nesting colonies and under such conditions that it has become obvious that their occurrence can be ascribed neither to mere chance or accident nor to misplaced laying nor to parasitism. The observations reported here point to a possible explanation. Although the gull colonies listed have been visited many times, exotic eggs were not noted prior to 1944.

Record of Nests

No.	Locality	Date	Exotic egg	California Gull
1.	Rock Island, Utah Lake, Utah	May 26, 1945	Pheasant	2 eggs
2.		May 28, 1944	Pheasant	2 eggs, 1 young
3.			Pheasant	2 eggs
4.			Pheasant	2 eggs
5.			Pheasant	2 eggs
6.			Coot	2 eggs
7.	Farmington Bay Refuge, Utah	May 12, 1946	Shoveller	3 eggs
8.	Bear River Refuge, Utah	May 19, 1946	Pheasant	3 eggs
9.			Pheasant	2 young
10.			Pheasant	1 egg, 2 young
11.			Cinnamon Teal	3 young
12.			Coot	2 eggs
13.			Coot	2 eggs

Of the 13 exotic eggs found in gull nests, 8 belonged to the Ring-necked Pheasant (*Phasianus colchicus*), 3 to the American Coot (*Fulica americana*), 1 to the Cinnamon Teal (*Querquedula cyanoptera*), and 1 to the Shoveller (*Spatula clypeata*). In no instance did any of the birds whose eggs were found in the gull nests inhabit the area of the gull nesting colony. Sometimes nests of Cinnamon Teal or other ducks are found in the vicinity of gull nests, but there was no indication that they were nesting in the areas at the times these records were made. No acceptable nesting sites for pheasants or coots were in the vicinities of the colonies.

Gull nesting colonies in Utah are nearly all on islands and occasionally are on dikes or peninsulas where water almost surrounds the nesting area. The colony on Rock Island in Utah Lake is situated on a small island which varies in area depending upon the water level of the lake. In the years 1944 and 1945, the island was small because of the high water level and the gulls occupied nearly all the island. There were no pheasants or coots on the island and the nearest nesting place for them was in the marshes of the east shore of the lake, several miles from the island.

The gull colonies at the Farmington Bay Refuge are situated on artificial islands made from dredgings within the flooded areas where the water was impounded by dikes.

These islands are nearly bare, having only a sparse vegetative covering of mineral weeds, and no pheasants or coots have nested on the islands. Both, however, might nest in the marsh edges within a mile or two of the islands. In past years, an occasional duck has nested on the islands, but recently, only gulls have occupied the sites.

The gull colonies at Bear River Refuge are situated on a dike two or three rods in width between units 3 and 4. There is a sparse surface vegetation, water on either side of the dike, and some marsh vegetation at a distance in the units. Near the end of the dike, in 1946, there was a colony of Avocets with nests containing eggs or newly hatched young. No Avocet eggs were found in any of the gull nests. Two Canada Goose nests, one occupied and one deserted, were near the edges of the gull colony. Pheasants,

Fig. 17. California Gull nest with three gull eggs and a pheasant egg. Bear River Marshes, Utah, May 19, 1946.

coots and ducks were nesting in the marshes beyond the water, but none was on the dike.

Although ducks have occasionally nested on Rock Island and the islands of Farmington Bay Refuge, it is certain that they were not nesting in these places in 1945 and 1946.

Never more than one foreign egg has been found per gull nest, and in all instances the foreign eggs were unincubated and were either fresh or in various stages of decomposition. Those eggs found in nests where the young had hatched were markedly nest stained and were covered with debris, indicating that they had been in the nest during the period of incubation, although probably the young birds had added to the stain. In one nest on Rock Island, a pheasant egg had about half of a shell of another egg covering one end and securely attached by the dried egg albumen. The fit was so even that the general egg outline was not greatly disturbed.

The presence of these exotic eggs in gull nests cannot be interpreted as true parasitism as practiced by the cowbirds, European Cuckoo and other birds of similar habits. Nor is it comparable to the misplacement of eggs, as in the Mallard, Redhead and Ruddy Duck, which sometimes deposit several eggs in the wrong nest. Composite nests of ducks have been found in which two different females of either the same species or different species have laid their eggs in the same nest. Mixed or "dump" nests have been found

in which large numbers of duck eggs of more than one species have been deposited without any female assuming responsibility for the nest and with subsequent lack of downing and incubation.

Occasionally, gulls themselves deposit eggs in the wrong nest and sometimes nests are found containing an egg that more nearly resembles the eggs of a nearby nest than its mates and which has been accepted as part of the complement. This may be ex-

Fig. 18. California Gull nest with two gull eggs and a coot egg. Bear River Marshes, Utah, May 19, 1946.

Fig. 19. Avocet nest with six normal eggs and a runt egg. Bear River Marshes, May 9, 1923.

plained on the basis of mistaken identity of nest or territory. John B. Van den Akker informs me that he has found Forster Tern eggs in gull nests, presumably deposited by terns from a nearby colony. These examples, however, may be explained on a similar basis to that of the foreign pheasant, coot and duck eggs.

Apparently the shape of the egg is more important in determining the acceptance of an object in the nest than the size and color. It has been shown by McClure (1945)

that Mourning Doves will accept and incubate their eggs regardless of the color that they have been painted. Western Willet eggs have been accepted in Long-billed Curlew nests and visa versa in areas where the two species nest in similar habitats. In this instance, the eggs were similar in coloration but not in size. Runt eggs are usually accepted in the nest and may even be left by two birds using a composite nest, as was true once in an Avocet nest containing six eggs and a small runt (fig. 19).

In areas where Avocets nest in gravel, round pebbles have been found among the eggs and have been accepted by the bird as part of the set. Sometimes other odd shaped objects of about the same general size may be accepted by incubating birds. A. O. Treganza found a ball in a gull's nest on Hat Island, Great Salt Lake.

The circumstances indicate that the exotic eggs here recorded have been obtained by the California Gulls and have been transported to their nests. The actual carrying of eggs to the nest has not been observed, but Stephen J. Terry states that he has seen California Gulls raid pheasant nests at the state game farm at Springville, Utah, and carry eggs to adjacent fields before they would alight to eat them. These eggs were carried in the bill of the gull. Objects as large as coot, pheasant or duck eggs can be carried by gulls. One gull was seen to alight on the fairway of the Salt Lake Country Club, grasp a golf ball in its bill and fly away. Dr. L. D. Pfouts of Payson, Utah, believes that pheasant eggs are swallowed by the gull and regurgitated, but he has never witnessed the procedure and the process may be questioned. Other birds have been suspected of, or observed in the act of carrying eggs. Lindsey (1946:491) states that there is either "direct observation or strong evidence of ducks transporting eggs away when deserting [the nest] or [when] very nervous." Hochbaum (1944:92) reports that on two occasions local guides told him "that they have seen Mallard hens carrying eggs in their bills." Also, he watched a female Shoveller which passed within thirty yards of him and which "was carrying an egg between the upper and lower mandibles, the egg being held near the tip of the bill."

It is well known that gulls raid other nests and take eggs for food. That they carry them home to their own nests instead of eating them may be due to hormonal influences exerted during the height of the breeding cycle. Fosdick (1936:29-30) has mentioned the complete change in attitude and disposition of a rat which at first is completely oblivious to offspring offered her for adoption but which after stimulation by injections of prolactin (a pituitary hormone) eagerly mothers as many young as may be placed in the cage with her. She will cherish not only infants of her own species but infant mice, rabbits or even squabs. The same hormone has been shown by Riddle, *et al.* (1935) to induce broodiness in fowls. In all probability, the gulls have raided nests for food and have carried the eggs back to their own nests preparatory to eating them. The nesting impulses then have overpowered the feeding impulse so that the exotic eggs become component parts of the nests, rather than objects of food.

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