

measurements are clearly those of the northern race. The date of capture, June 30, indicates that it was probably on its breeding grounds, though there is a possibility of its being a non-breeding wanderer. One other individual deserves mention. This is a specimen shot in August in San Pedro Bay, California, by "Lorquin" (probably E. F. Lorquin, zoologist of San Francisco) and obtained by J. G. Cooper in exchange; Cooper's label bears no date nor sex indication. This bird, which constitutes one of the southernmost published records for the California coast, was probably a vagrant. It belongs to the southern race, though approaching *furcata* slightly in both size and coloration.

How far the petrels of this species from each breeding colony wander from season to season remains yet to be determined. It is to be expected that individuals return year after year to the islet on which they were raised, or at least to some nearby place; the geographic trends that are the subject of this paper bear out this hypothesis. By application of the banding method it would be possible to learn whether wandering birds eventually breed in a colony far distant from that in which they were raised, and also how general an interchange of individuals may occur from year to year between neighboring colonies. The ease with which the birds can be captured while nesting should make such a study practicable.—J. GRINNELL and FREDERICK H. TEST, *Museum of Vertebrate Zoology, Berkeley, California, November 28, 1938.*

Mountain Bluebirds Hovering.—While hunting jack rabbits at Cannon, Solano County, California, on February 13, 1939, I was much interested to observe Mountain Bluebirds (*Sialia currucoides*) hovering in the air in one spot in such manner as do Sparrow Hawks and White-tailed Kites. From fifteen to eighteen birds thus hovered at one time, legs dangling, tail spread and pointing downwards, and eyes searching the ground below. They were of course feeding and appeared successful in recovering their prey at each drop to the ground. These drops were from elevations of from ten to fifteen feet. They were not rapid plunges or dives such as made by hawks or falcons, but gentle flutters to the ground, where they alighted and snatched the prey with the bill.

Being inquisitive as to what attracted these birds, I took one specimen and found in the stomach three whole black ground beetles (*Amara insignis*) and a cricket (*Gryllus assimilis*). There were also many fragments representing other individuals of these same species, and segments of other beetles, mostly Carabidae, and of orthopterans. These insect identifications were made by E. Gorton Linsley of the Division of Entomology, University of California.—EMERSON A. STONER, *Benicia, California, March 22, 1939.*

Observations on the Reproductive Behavior of Great Blue Herons.—While visiting some nesting colonies of shore birds on the islands off the coast of the Arkansas Migratory Waterfowl Refuge near Austwell, Texas, I had the opportunity of witnessing a pair of Great Blue Herons in the act of copulation. The blistering hot sun and the ever present grackles made it dangerous for the birds to leave their nests unguarded for a single minute, so I concealed myself in the brush to cause as little disturbance as possible. Nests were numerous, on the ground, beneath bushes, in stunted trees, anywhere that an overhanging leaf or branch afforded a little shade during even a portion of the day. One nest in particular had commanded my attention because of its peculiar position in the very top of a dense growth of prickly pear. Upon it sat a female Great Blue Heron (*Ardea herodias*).

While thus hidden, I could observe the undisturbed birds at rest on their nests. Of particular interest was the method by which the male and female egrets and herons exchanged places on their nests. Usually the female remained on the nest until the male was flapping directly overhead, and then the sitting bird left and its mate took its place. When the male blue heron came upwind and hovered directly over its sitting mate, I expected the female to leave and the male to replace her. To my surprise, the male slowly settled down facing the same direction as the female with feet clasping the edge of the nest close to the female's neck. With wings slowly flapping to maintain his balance, the male flexed his legs and lowered his body to meet the now rising female. In this position the act of copulation took place, after which the male flew away and the female settled down to protect her eggs.

Now that I have had time to think over the observation, I am wondering whether this is the usual manner of copulation for the long-legged wading birds, or whether the hot sun and the presence of the grackles made this method necessary.—F. WALLACE TABER, *Texas Agricultural and Mechanical College, College Station, Texas, May 8, 1939.*

Notes on the Salt-feeding Habits of the Red Crossbill.—During the latter part of July and August of 1938, crossbills (*Loxia curvirostra*) were found abundantly in flocks in the higher portions of Crater Lake National Park, Oregon. The increase of this species at this time in the rim area of the

park was coincident with the maturing of the cones of the white-bark pines and mountain hemlocks which served as a source of food for several species of birds. Often when feeding on the cones of these trees, large flocks of fifty or more crossbills (occasionally accompanied by a few Cassin Purple Finches and Pine Siskins) were seen to fly, seemingly without provocation, in a somewhat erratic flight to cliff faces of andesite or pumice. In all instances the birds flew only to those parts of the formation having a whitish or pink-colored surface. These light spots were found to consist of a powdery crust, probably made up of calcium salts dissolved from the rock material. The crust was usually not more than one-sixteenth of an inch in thickness and could be loosened easily with the finger nail. The faces of certain cliffs in a huge road cut on the side of Watchman Peak and parts of the eroded walls of "The Pinnacles" formation at Sand Creek are well supplied with such crusts and form a regular foraging ground for those members of the finch family that seemingly require salts in their diet. The crossbills visit the cliffs more than the other two species mentioned and are more easily watched. Careful approaches to within twenty feet of the birds were made and the actions observed for some time.

Sometimes the crossbills flew back and forth to the cliffs from a convenient perching tree nearby. If suitable perching places were present on the cliffs from which to take the salt, the length of time that the flock would stay was half an hour or more. In all types of foraging, however, the salt feeding process seems to be a slow one with deliberate movements predominating.

On nearly vertical and relatively smooth faces two types of positions were observed. By far the most frequent position assumed was that resembling a woodpecker's. The crossbills would fly to the cliff face and with some difficulty gain a foothold with the claws, depressing the tail and thus sustaining a vertical position on or beside a salt patch. Usually a pause of a few seconds was made prior to feeding on the salt, and then the slow methodical movements were begun. Since they can pick up nothing small with the crossed tips of the bill, they placed the head sidewise against the crust. The bill was then opened widely and the tongue was slowly moved in and out and the salty crust "licked off" with the side of the tongue. The tongue was distinctly reddish in bright sunlight and seemed unusually large for the size of the bird. This is probably a necessity in order to manipulate certain foods under the handicap of the crossed mandibles. Frequently the birds were seen to loosen the salt crusts by picking at them; then followed the usual sideward licking process.

Another salt-foraging position was similar to the upside down position of a nuthatch. This method of perching on a nearly vertical cliff surface was seen to be a result of downward pivoting from the woodpecker position. One bird in this pose was seen to have its lower mandible inserted in a notch in the rock to prevent slipping downward head first; all the time while in this position the tongue was at work.

Beside foraging on cliffs, crossbills were seen to peck at finely fragmented rocks on talus slides.—
ELMER C. ALDRICH, *Oakland, California, May 15, 1939.*