

proximately two and one-half hours. At the end of this time their body feathers appeared wet as if the birds had been bathing. It is obvious that the insects had been crushed.

In the evening Mr. Kurata searched the ground in the restricted area where the birds had been but could not discover any of the ants, dead or alive. It is possible that the Cardinals had eaten the insects after applying their juices to their plumage.—L. L. SNYDER, *Royal Ontario Museum of Zoology, Toronto.*

**Observations on 'anting' by birds.**—For a number of years I have kept native songbirds in captivity and semi-captivity. The use of the word 'semi-captivity' in relation to songbirds seems to be little understood by bird students or at least it seems unfamiliar or far-fetched. By semi-captivity I mean that any pair of birds which nest in the aviary are given day-time liberty during the period of egg laying and incubation and full-time liberty—unless predators are known to be nesting within hunting distance—during the time of rearing the young and until they are weaned or ready for weaning. When eggs are being laid and incubation is taking place the birds are allowed out early in the morning and closed in the aviary before dusk. After the breeding season is over they are kept in the aviary or the bird-room until the next nesting season. The only exception has been with Blue and Blue-fronted Jays which were given their liberty again during the day, from the first of December to the first of March. These birds were called to the aviary before dusk and closed in for the night. At no time have I ever seen any of these birds 'anting' while at liberty. Nor have I seen them going through this peculiar performance in the aviary except when a shovelful of earth from an anthill was put in. As I hope to be able to make a much closer study of 'anting' during the summer of 1941 I will not at present go into much detail regarding my observations. At that time I wish, if possible, to confirm certain presumptions besides, so will largely confine myself at present to a few general remarks and a list of birds I have seen performing.

One point I would like to bring up at present is in connection with the theory advanced by some that ants may be used either to destroy parasites on the body or to prevent the entrance into the feathers of such parasites, having in view the possibility that formic acid exuded from the ant may act as a preventative. I will not express an opinion on this, but in view of the following I think it deserves considerable thought and study.

We are aware that birds may reach easily most parts of the body with the bill. Yet so far as my observations go they do not attempt to rub the ant on or among the feathers of those parts of the body most apt to be infested with parasites, such as under the wings, around the vent, or on the rump and head. Invariably the ant seems to be rubbed along the edge and under side of the outer primaries and on the tail only. The wings are spread and held spread to some extent during the performance and the greatest effort seems to be made to rub the ant on the under side of the tail. This effort, which should be so easy, is the cause of the comical contortions always prominent. They try continually to bring the tail under them to such an extent that they often tumble on their back while so doing and many times I have seen them actually sitting on their tail.

Whether or not the ants are eaten I am not sure, although I think they are. I have examined the ground after the performance is over and failed to see either live or dead ants, so that the presumption would be that they were eaten. As a great many of my birds are hand-reared and exceedingly tame—so much so

that I may sit among them while they are going through their strange antics—it should not be difficult during another season to substantiate my presumption, or otherwise. Certainly an ant is held in the bill for only a short time and another is taken in its place. The whole procedure seems to be so exciting to the birds and so intense that even enmity is forgotten. I have seen as many as twenty or more birds of a number of species, going through the performance on a space of only about six square feet. Not only is it a most comical sight which will nearly bring tears of laughter to the eyes, but a most beautiful sight, as such birds as those which are highly colored under the wings like the Rose-breasted Grosbeaks show these generally hidden colors to great advantage.

Although all the ground thrushes which I have had, perform, I have not seen the Bluebird (*Sialia sialis*) do so. They, so far, have been interested only in the ants or larvae as food. I keep very few exotics, therefore have not been in a position to determine whether or not they too 'ant,' with the exception of the Pekin Robin whose actions are the same as those of our songbirds.

The only birds which I have seen use any other material than ants are the Bronzed Grackles. They went through the identical performance with chokecherries. Curiously enough, although I feed large quantities of this fruit in season, none of the other birds has used them for this purpose so far as I know.

In a review of this subject, W. L. McAtee (Auk, 55: 98–105, 1938) lists sixteen species and six passerine families in which this behavior has been noted. M. M. Nice and J. ter Pelkwyk in " 'Anting' by the Song Sparrow" (Auk, 57: 520–522, 1940) add one species and one family. I am able to report this behavior in three more families and sixteen additional species. New records are indicated by asterisks.

The following is a list of the birds I have seen 'anting' in the aviaries:

CORVIDAE: Blue Jay (*Cyanocitta cristata*)

\*MIMIDAE: \*Catbird (*Dumetella carolinensis*)

TURDIDAE: \*Robin (*Turdus migratorius*), \*Wood Thrush (*Hylocichla mustelina*), \*Hermit Thrush (*Hylocichla guttata*), \*Veery (*Hylocichla fuscescens*)

\*BOMBYCILLIDAE: \*Cedar Waxwing (*Bombycilla cedrorum*)

TIMELIIDAE: Pekin Robin (*Leiothrix lutea*)

\*ICTERIDAE: \*Baltimore Oriole (*Icterus galbula*); \*Bronzed Grackle (*Quiscalus quiscula aeneus*) (choke-cherries only)

FRINGILLIDAE: \*Cardinal (*Richmondia cardinalis*), \*Rose-breasted Grosbeak (*Hedymeles ludovicianus*), \*Indigo Bunting (*Passerina cyanea*), \*Evening Grosbeak (*Hesperiphona vespertina*), \*Fox Sparrow (*Passerella iliaca*), \*Slate-colored Junco (*Junco hyemalis*), \*Harris's Sparrow (*Zonotrichia querula*), \*White-throated Sparrow (*Zonotrichia albicollis*), Song Sparrow (*Melospiza melodia*).—H. R. IVOR, *Erindale, Ontario*.

**Observations at Guaymas, Sonora, Mexico.**—The brief period from April 12 to 16, 1940, was spent by the writer at Miramar Beach, near Guaymas, Sonora, Mexico. It was purely a vacation trip and only superficial notes on the bird life were kept. However, it appears that Sonora records are so comparatively limited that the following observations may be worthy of publication. No specimens were taken and subspecific designations are assumed.

Ornithological highlight of the visit was a three-hour boat trip from Miramar Beach to Guaymas and return in the late afternoon of April 14. Every member of the party was greatly impressed with the untold numbers of waterbirds which the rich waters of the Gulf of California support. It was literally "a parade of the sea