REEF HERON (*Demigretta sacra sacra*).—This species was seen along the rocky shore of the island on several occasions; all the individuals seen were of the gray phase.

FAIRY TERN (*Gygis alba candida*).—This is a common and fairly abundant species, and probably nests in the trees at the base of the hills. It is highly prized for food by the natives. Two specimens were collected; the stomachs contained fish.

COMMON NODDY (*Anous stolidus pileatus*).—This is a common species, and appears to nest on the island. Two colonies were found, on cliffs in the southern part of the island. A female collected on August 10 had the following measurements (in inches): length, 16.0; wing, 11.0; bill, 1.6; tail, 6.8; and tarsus, 1.1; its stomach contained fish.

WHITE-CAPPED NODDY (*Anous tenuirostris*).—On August 11 several noddies were seen along the southwestern shore of the island which appeared to be this species; they were smaller and darker than the Common Noddies. and had more white on the head.

PACIFIC GOLDEN PLOVER (*Pluvialis dominica fulva*).—Two individuals were seen on August 10, on a beach along the southwestern shore of the island.

WANDERING TATTLER (*Heteroscelus incanus*).—This species was seen along the beaches on two occasions, August 2 and August 12.

TURNSTONE (*Arenaria interpres*).—Small flocks of Turnstones were seen along the beaches on August 10 and August 11.

WHITE-COLLARED KINGFISHER (*Halcyon chloris owstoni*).—This is a common and abundant species, and probably nests on the island. Two specimens were collected; the stomachs contained grasshoppers.

MICRONESIAN STARLING (*Aplonis opacus aeneus*).—This is a common and abundant species, and probably nests on the island. One specimen was collected; its stomach contained a grasshopper.

CARDINAL HONEY-EATER (*Myzomela cardinalis saffordi*).—This is a common species, and probably nests on the island. One specimen was collected; the stomach contents were not recognizable.

Department of Zoology and Entomology,
The Ohio State University,
Columbus 10, Ohio

FIELD OBSERVATIONS ON THE SPOTTED BUTTON-QUAIL ON GUADALCANAL

BY ROBERT C. PENDLETON

Plate 14

MAYR (1945: 58), in his 'Birds of the Southwest Pacific,' gave a description of the Spotted Button-Quail (*Turnix maculosa*) and stated: "Most field naturalists will look in vain for these elusive birds, even in their proper habitat." He also said (op. cit.: 219): "The subspecies *salomonis* Mayr 1938 is known only from a single bird from the grasslands of Guadalcanal. The building of airfields in these grasslands may seriously have threatened the existence of this race."

While in the Medical Corps of the U. S. Navy, the writer spent eleven months on Guadalcanal. His duties consisted, mainly, of

field malaria control and gave opportunity to be in the field eight to ten hours daily. This field survey work, much of it in the grassland habitat of *Turnix maculosa salomonis,* gave many chances to observe this interesting species, but, unfortunately, made searching for nests and protracted life-cycle studies impossible. Because of the lack of information pertaining to this species, however, the following notes are offered.

The area on which the study was made is typical of all the northwestern coastal plain of Guadalcanal. The plant communities in this area are: rain forests bordering the streams and covering the highlands above the fog line, mangroves at the river mouths, strand associations following the shore line, and grasslands occupying the areas behind the strand associations and between the rivers back to, and in many places well up, the hillsides. Large coconut groves (*Cocos nucifera*) have been planted in several places. This area lies east of the Little Tenaru River about two miles inland from the coast. Many field trips were taken beyond the limits of this area approximately three miles inland in all directions. Because this area had been a scene of battle, and later a bivouac area, large areas of grass had been destroyed, but this was growing back in a mixed shrub-herb-grass community.

There was one area of about three-quarters of a square mile of comparatively unharmed grasslands. The grass in this area was four to six feet in height and so dense and interwoven that passage through it was extremely difficult. In the shadow of the rain forest along the streams the grass in some places was shorter and less dense. This was true also in the densest parts of the coconut groves, but in many places the grass grew well into the groves.

On October 10, 1943, the Button-Quail was first seen when two were flushed simultaneously from the short grass near the edge of a coconut grove. This was the only time that two of the birds were observed together, possibly indicating that the birds are solitary much of the time. Individuals were observed repeatedly in this area and in near-by shrub-herb-grass communities throughout the writer's stay on Guadalcanal.

All the Button-Quails observed were seen at the edges of the grass areas. None were seen in the tall grass, but this may be due to the impossibility of seeing the elusive creatures in such dense cover. If disturbed, the bird would, of necessity, have either to run ahead or to 'freeze' since flight through this tangle would be almost impossible.

Five Button-Quails were seen during one day of survey work, indicating that the bird is more secretive than rare. These observa-

tions were made over widely scattered areas during the work of searching in the grass for shell holes and bomb craters which, filled with water, are a potential source of malarial mosquitoes.

This species is active only in the cool of morning and the late afternoon shortly before sunset. During these hours individuals were seen wandering about in short-grass areas (areas where the natural stand had been cut short near camps), but all mid-day observations were of forced flights or flushes.

While feeding, the bird progresses by a series of short walks or nervous runs, stopping often to look about or listen. The head, almost constantly in motion, is held low while the bird is moving, but is often raised nervously, interrupting feeding. It was most difficult to follow the bird in its feeding because of its coloration, so perfectly advantageous for hiding in the dry grass. The orange-brown of the sides blends perfectly with the grass culms while the spotted, gray back melts into the gray soil. The exact food taken was not determined, but much of it was secured from the ground at the bases of grass clumps.

When approached, the Button-Quail first attempts to run, but when surprised or pressed it 'freezes,' and when motionless it is almost impossible to see. The writer has lost sight of one less than a yard away, so perfect is the coloration and control, and several times has spent ten or more minutes standing with the bird within a foot of his feet. The yellow bill is often the only portion than can be plainly discerned.

Flight would appear to be a last resort, often not being used until there is actual danger of being crushed or until a sudden, quick movement is made toward the place of concealment. The bird rises with a slight whirring of wings, and its flight is fairly swift, but of short duration. Seldom is the flight higher than the minimum necessary to clear the grass, and is usually for a distance less than twenty yards. In general the individuals observed followed a definite flight pattern in the nature of an uneven arch, grading slowly upward from origin and dropping sharply at the end. Usually the flight was a curve to right or left with a sharp increase of the curve just before landing. After landing, a short run was usual at an angle to the line of flight. This habit of running after flight was observed several times when the bird flushed in grass that had recently been cut, thus making the whole flight pattern observable.

Throughout the studies, no actual cases of predation upon the Button-Quail were observed, but several predators hunt in or near the grassland habitat. Undoubtedly these are a part of the predators with which *Turnix* must cope. These predatory forms are as follows:

The Rufous Breasted Hawk (*Accipiter novaehollandiae pulchellus* Ramsay) frequents the rain forest along the edges of the grassland, and was often seen in the coconut groves near places where many observations of the Button-Quail were made. On one occasion this hawk was seen eating a freshly killed bird identified by sight as a Willie Wagtail (*Rhipidura leucophrys melaleuca* Quoy and Gaimard).

The White and Red Eagle-Kite (*Haliastur indus girrenera* Vieillot), although primarily a bird of the seacoast, hunts over the rain forest, coconut groves, and grasslands. It was common to see a pair of these striking hawks circling over the rain-forest stream belt and near-by grassland.

An unidentified owl, brown above, rufous to buff-breasted with moderate spotting of the breast, and about the size of the Western Short-eared Owl was seen several times in the edges of the rain forest and in the coconut groves.

The monitor lizard (*Varanus indicus* Daudin) was common in the rain forest, coconut groves, and edges of the grassland. Its stealth and speed over short distances make it a dangerous predator for small animals, and its presence in the grassland habitat probably indicates that it preys upon the Button-Quail. It was actually observed catching a rat in the grass.

Two snakes [*Boiga irregularis* and *Enygrus carinatus,* as identified from Burt and Burt (1935: 54–65)] were collected in the rain forest bordering the grasslands. These reptiles were not observed in the grass, but their presence within a few feet of the areas apparently most frequented by the Button-Quail is thought to be significant.

Rats have been observed in the grasslands of Guadalcanal. They are quite numerous in and near military storage and bivouac areas there, but whether or not they will multiply and repeat the havoc wrought on Lord Howe, Laysan, Midway, and other Pacific islands only future studies will show.

The domestic cat has been introduced on Guadalcanal by military personnel, and many will probably be left when the island is evacuated. It will be of interest to see whether this species will adapt itself to the heat, humidity and periodic flooding of the tropics.

Despite the presence of new predators and the destruction of a portion of the grassland, it is the writer's opinion that the Spotted Button-Quail is not in any immediate danger of extinction. The secretive habits of this species augur well for its success in partially eluding the domestic cat, thus leaving the rat as the most questionable factor. It is also pertinent to note that the biotic complex of

Guadalcanal is quite different from that of Laysan Island or Midway where the Laysan Rail has been exterminated (Baldwin, 1945). The presence of native raptors, both nocturnal and diurnal in habits and of sufficient size to take rats, is cause for hope that rats may be kept in check or at least impeded in their occupation of the island.

As to the influence of man, it appears that the Spotted Button-Quail is able to live near man as shown by numerous observations of individuals within thirty yards of camp areas over a period of ten months. Compared with the whole area, the amount of grassland destroyed or occupied by the building of airfields, roads, bivouac areas, and ammunition dumps is insignificant. Several flights in aircraft over the northwest coastal plain of Guadalcanal showed that the major portion of this area from the Kema River to Cape Esperance, a distance of approximately fifty-five miles, with an average depth of three miles, is a steppe region in which only the areas belting streams running through the plains, a narrow strand association, a few large coconut groves, and a few low swampy areas are wooded. Presumably all the rest of this area is habitable by the Spotted Button-Quail.

SUMMARY

Observations of the Spotted Button-Quail, *Turnix maculosa salomonis,* of Guadalcanal Island indicate that it is an inhabitant of the large grassland area that occupies the major portion of the northwest coastal plain. Within this habitat, it occupies the ground stratum, feeding among the bases of the grass clumps. When disturbed, it either seeks cover, 'freezes,' or makes short flights over the grass tops. It lives in a biotic complex which includes hawks and owls overhead and domestic cats, rats, snakes, and monitor lizards on the ground. Since only an insignificant portion of the available grassland habitat has been destroyed or occupied by military forces, it is believed that the Spotted Button-Quail is not in any immediate danger of extinction.

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University of Utah
Salt Lake City
Utah