

SUMMER OBSERVATIONS OF BIRDS ON OKINAWA, RYUKYU ISLANDS

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As a consequence of naval duties the author spent the period from May 22, 1945, to October 12, 1945, on the island of Okinawa, situated about midway in the Ryukyu chain between Formosa and Japan proper. Publications in English pertaining to the ornithology of western Pacific islands have been few, and for many islands such as Okinawa, they are practically non-existent. Therefore this list of the birds observed there by the author together with notes made on each species is presented; all occurrences reported are based on sight observations, which usually were made with the aid of 8×30 binoculars.

There has been one large folio work published concerning the avifauna of the Ryukyu Archipelago in particular (Kuroda, 1925). Although it is detailed in the description of critical specimens collected by or for the author and his associates, little is included on distribution, other than the naming of the islands from which the specimens came, and even less as to seasonal status, field marks, or habits. The 1942 edition of "A Hand-list

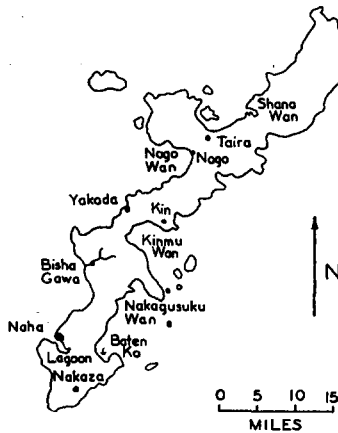


Fig. 4. Map of Okinawa, Ryukyu Islands.

of Japanese birds" (Hachisuka, *et al.*) also includes distributional references to the Ryukyus, and it is assumed to afford a complete list of the birds of these islands as of the date of publication; but again nothing more is given for each species than the names of the islands from which it has been recorded, plus, in some instances, an indication as to whether it breeds thereon. No other direct references to the ornithology of the Ryukyus, nor of Okinawa in particular, were found in the library of the University of California at Berkeley or in the Bishop Museum Library in Honolulu.

Ornithologically, Okinawa is apparently closely related to Japan, most species having been derived from the north along the Ryukyu chain which in the geologic past was probably more easily traversed than are the present rather scattered stepping-stone islands. The tropical zone of Formosa is represented by a few of its characteristic species as far north as Miyako, 160 miles south of Okinawa, but no really tropical species is listed from Okinawa. The distance between Miyako and Okinawa is also the greatest all-water gap in the Ryukyu chain, no gap between islands in the 325-mile stretch from Okinawa to Japan being more than about 50 miles in extent.

As seen on the accompanying map, Okinawa is a long narrow island. North of the

narrow isthmus in the south-central part the interior becomes more and more rugged with roads only near the coast, while south of the isthmus numerous roads criss-cross the island providing ready access. The population of both natives and service personnel was much thinner in the northern half of the island than in the south, except at certain points along the west coast.

The base camp near which much of my observing took place was situated one-half mile inland from the west shore of the island on the high bank of the Bisha Gawa (river), here a tidal stream about 50 yards in width, although just a creek a mile farther upstream. The obvious, widespread ecological associations, as indicated by the vegetation were: (1) pines, not unlike *Pinus radiata* of California, the large trees only around better residences and ceremonial tombs, but small to medium trees widespread in the hill regions; (2) abandoned sweet potato and rice terraces with strips of intervening grassland; (3) broad-leaved trees of abandoned native villages, the windbreaks around each lot usually of banyan—but no “riparian” strip, as cultivated or rocky land extended to the water; (4) the river and its tributaries; (5) beaches and coral platforms extending a varying distance offshore, especially in the bays. No trips were taken into the un-



Fig. 5. The lower Bisha Gawa, from camp on Okinawa. Pines cover the high banks of this tidal section of the river.

settled country of the northern part of the island, although the west coast road was traversed as far as Nago twice and as far as Shana Wan once. One trip by truck and one by foot were taken through the central isthmus area. From the isthmus southward frequent trips were made across the island by truck (which I usually could not stop to observe birds), and several trips were taken to the southern portion of the island, including one completely around the southern cape.

Ardea cinerea. Gray Heron. One was seen in rice and reed beds near Awashi on May 30, and 7 on tidal flats of Naha Lagoon on September 26, all in company of the next species. Appearance and habits were similar to those of *A. herodias* of North America at the distance at which I observed them.

Butorides striatus. Streaked Heron. Evidently a migrant or winter visitant, at least along the Bisha Gawa, since it was not found on mid-summer trips along that river but was there regularly after September 19. A total of 4 birds in 2 miles of stream on October 6 represents my maximum count. They were always very wary—much more so than the Green Heron of North America in my experience. They perched regularly in pines on the cliffs fronting the lower river and were nearly impossible to approach within good binocular range in that position. Such good views as I had were

obtained by careful stalking along the top of the cliffs to peer down at the birds feeding in shallows 60-70 feet below. In their feeding habits, flight, and appearance at a distance they were similar to the North American species, but at close range the thorough grayness of the plumage was markedly different. Of note also was their silence; at no time, even when frightened into sudden flight, did they give a call note of any kind.

Casmerodius albus. Common Egret. Identical in appearance with the American form of this species. I saw them at three widely separated points on the island: (1) Awashi (rice paddies and reed beds), flock of about 35 on May 30, 12 on June 6, none there on August 31; (2) Yakada (coral platform near small offshore islets), 1 on September 8, 2 on September 23, all in company of Reef Herons; (3) Naha Lagoon (shallow, mud-bordered estuary), 34 on September 26. The disappearance of the Awashi birds between June 6 and August 31 suggests migratory movements, at least locally. The birds at Naha were apparently feeding on the frog-like (but long-tailed) amphibians so abundant on the muddy shores.

Egretta garzetta. Little Egret. Only 5 birds were positively identified as this species: a single bird on the Bisha Gawa near camp on August 22, and four well separated birds in the shallows of Naha Lagoon on September 26. These were all observed closely, the lustrous black bill and legs, yellow feet, and slender neck all being noted.

Demigretta sacra. Reef Heron. A total of about 15 individuals was seen at various points along the rocky west coast or on the coral platforms in bays between June 6 and October 2. The gray phase and the white phase were represented in approximately equal numbers; no distinctly mottled birds were seen.

Nycticorax nycticorax. Black-crowned Night Heron. During late May and early June, and again in late September and early October, lone herons were seen flying up the Bisha Gawa at late twilight or were heard giving a *quok* call while flying overhead in the darkness. On October 5 a bird believed to be of this species was flushed from windbreak trees in the abandoned village of Nakaza near the southern end of the island; its white underparts and blackish upperparts were briefly but well observed.

Gorsachius goisagi. Brown Night Heron. Two herons the size and shape of a night heron and rich rufous-brown in color were seen on July 15 flying over the tall grass of fields in the shallow, open valley east of Naha. Two other similar birds were seen over fields near Baten Ko on the south-eastern coast the same day; but none of these was seen at close range. Caldwell and Caldwell (1931) emphasize the general brown appearance under recognition marks of this species, and no other species listed for the Ryukyu area by Hachisuka *et al.* (1942) is so described. Therefore it seems that the brown color would indicate that the birds which I saw were of this species.

Pandion haliaetus. Osprey. Apparently a fairly common migrant. Four records as follows: September 19, Bisha Gawa, one passed over at low altitude, apparently migrating; it glanced up and down the river bed as it passed it at right angles, but did not veer from its course; September 21, Yakada Bay, one foraged over the shallow sea above coral flats; September 23, Yakada, one flew from the bay inshore and soared up over the mountains to the northeast; September 26, Naha Lagoon, one perched on the limb of a pine jutting out from a small rocky islet (Ono Yama).

Falco tinnunculus. Kestrel. On October 11 a small hawk, definitely of falcon proportions, flew southward over the Bisha Gawa at tree-top height. This species is the only small falcon listed from the Ryukyus (Okinawa not specified) by Hachisuka *et al.* (1942).

Turnix susciator. Chinese Button-quail. These quail were the most difficult birds to observe satisfactorily that I have ever found. From June 18, when one flushed from under my feet near the upper Bisha Gawa, until late September nearly all my records are of quick glimpses of birds rising quickly in irregular flight and settling so suddenly again into tall grass or weeds that I could never get binoculars focused on them. On these brief views the plumage was seen to be of a rich light brown or orange-brown, some individuals (supposedly males) much brighter than others. The wings were long for the body size, as compared with North American quail.

On September 17 near our camp I finally saw one bird on the ground when it scuttled along the border of a sweet potato terrace under the overhanging grass blades. It was a dull-plumaged bird, the wings and back mottled with dark brown, with no evident tail. I saw quail at several localities in the central part of the island, always in similar situations—abandoned vegetable fields and the grassy terraces separating them or sometimes in medium to dense brush intermixed with scattered pine trees. Kuroda (1925:201) lists this species as common on Okinawa.

Gallinula chloropus. Black Gallinule, or Water Hen. A pair, accompanied by at least one two-thirds grown young, were found in the matted down rice and weeds of flooded paddies in the bottom of a small gully off the upper Bisha Gawa on September 10. The old birds scurried out of the water and up the brushy hillside when I came suddenly around the slope; but the young one tried hiding along the bank, finally struggling over the small dike into the next higher paddy. Two half-completed nests floated on the shallow, open water in the center of the paddy field. On September 26 another

gallinule, answering the descriptions of the immature of this species, was seen at close range on a small pond in the abandoned village of Matambashi in southern Okinawa.

Pluvialis dominica. Golden Plover. Apparently not nearly so common on Okinawa (up to October 12 at least) as in the Hawaiian Islands. My first record was in late August, followed by single birds on September 5, 12, and 17 at inland areas of short grass or bare earth, flocks of 2 to 4 from September 8 into October on sandy beaches and coral platforms, and the maximum flock of about 10 birds on October 12. The last were frequenting the runway of a busy airfield near the east coast of the island, flying from one spot to another as they were disturbed by planes or trucks.

Smaller plovers thought to be Dotterels (*Charadrius mongolus*) also were noted.



Fig. 6. Offshore islet in Yakada Bay, Okinawa. Shorebirds, Reef Herons and Egrets fed on tidal flats.

Charadrius alexandrinus. Snowy Plover, or Kentish Plover. Recorded from August 9 to October 2, with a maximum of 6 on September 25. Most of them were on beaches near the mouth of the Bisha Gawa, foraging out on the sandy portions of the exposed coral flats at low tide. In similar habitat were single birds seen at Kurawa on August 21, and in Yakada Bay on September 8, and two in Yakada Bay on September 23, while one at Naha Lagoon on September 26 was the only individual observed on a tidal mud-flat.

The plumage was noted as essentially similar in the field to our North American Pacific coast form. The legs, however, were dull greenish. When feeding, they habitually carried the bill at an angle of about 30° below the horizontal, as contrasted with the "dotterels," which raised the head until the bill was horizontal between each feeding "run." The snowies frequently attempted to hide by squatting, but the "dotterels" never did so far as I determined. As a consequence the snowies could be approached much more readily than the "dotterels"; and even when both were feeding together the snowies would sometimes remain behind when the "dotterels" flew.

Numenius phaeopus. Whimbrel, or Curlew. One was seen at Yakada Bay, September 8 and 23; one alighted on the rocky retaining wall of the tidal portion of the Bisha Gawa on September 25; and three were seen in flight over Naha Lagoon on September 26, the last giving a loud *kek, kek, kek* call. All had prominently whitish lower backs and rumps, indicating the subspecies *variegatus*, and differing thereby from the American form, *hudsonicus*, with which I was familiar. The head striping seemed less marked than in *hudsonicus*, the central light line being very narrow, and the dark lines through the eyes were incomplete on the lores. The bill appeared dark except for reddish flesh color at the base; the legs were grayish green. The Yakada Bay bird fed chiefly by picking up from the surface of the wide area exposed at low tide, but occasionally it probed with the bill up to its full length. They were all wary, as I could not approach them in the open closer than about 75 yards.

Tringa nebularia. Greenshank. On September 23 I saw one in a brackish (or fresh?) stream near the beach at Yakada. It was foraging below muddy banks overhung by tall grass and pandanus trees, gathering some kind of animal food which must have been very active in attempting escape. Although obviously a relative of the Yellow-legs, I could not positively identify the bird until I checked my notes with descriptions in Caldwell and Caldwell (1931), wherein the white lower back, rump and most of the tail, blackish bill fading to bluish-gray basally, and greenish gray legs all taken together are considered diagnostic of this species. I noted all these points at the time of observation.

Both when on the ground and in flight, the bird gave a note similar to that of the Yellow-legs—*whee-whee, whu-whu*, the last two notes lower and harsher.

Actitis hypoleucos. Common Sandpiper. These teetering sandpipers, so like the American Spotted Sandpipers in habits, were apparently coincident with the tattlers in arrival and departure. Several were on the lower Bisha Gawa in late May, but none was seen thereafter until August. By late August there were 4 to be found at all times along the river between Owan and Hiza bridges (tidal stream) and from 1 to 3 in early September on the strictly fresh water stream above Hiza. One was also seen on September 10 at a small artificial lake in the hills north of the upper Bisha Gawa, and one on September 17 at a small rain pool in a new dirt fill near our camp. On September 20 one was seen at a range of about 15 feet as it chased insects at the border of a roadside field (dry) north of the lower Bisha Gawa.

On the rocky and coralline beaches they were of regular occurrence throughout September and early October, with maximum counts of 5 in 2 hours on September 8 and 23 at Yakada, 13 on September 25 along the Bisha Gawa near its mouth, and 20 in 2½ hours on September 26 around the mud-flats of Naha Lagoon, where several were flushed from water-filled bomb craters in the abandoned vegetable fields.

Their regular call note was a sharp *peeeet-weet*, not so musical as that of the Spotted Sandpiper. I did not hear it uttered in the long series given by the latter species.

Heteroscelus incanus. Wandering Tattler. On May 24, two days after my arrival at Bisha Gawa, there were at least 3 tattlers foraging regularly on the rocky banks of the tidal stream and in the muddy areas of nearby rice paddies. A single bird at the same locality on May 31 was apparently the last of northward moving migrants, since the species was not recorded again until August 9. By August 20 they were fairly common on rocky beaches of the central section of the island and from 1 to 3 were present daily along the lower Bisha Gawa. A count of 15 seen in 2 hours of walking across the extensive coral flats at Yakada on September 8 and a count of 12 in a 2½ hour walk around the inshore end of Naha Lagoon (mud-flat) on September 26 were the maximums recorded at any one locality.

Tattlers which I saw on Okinawa appeared identical in habits with those on Oahu in the Hawaiian Islands. They fed on mud flats and sandy areas near the more favored rocky shores as well as on the rocks themselves. The call notes of the Okinawa birds, however, I interpreted as less often trebled or quadrupled: a clear whistled *cher-weeee* or sometimes merely the rising *weeee(t)*, rather than the *chi-lée-lée* of the Hawaiian birds.

Arenaria interpres. Ruddy Turnstone. On the sand and coral rubble beach areas near the mouth of the Bisha Gawa two were seen on September 17 and again on September 25. On the 17th, the day after a violent typhoon, there was still a stiff wind blowing, against which the turnstones could barely make headway in flight. They spent some time huddled in the lee of a sand bluff one foot high, and then fed first with a Wandering Tattler and then with a single Snowy Plover.

Sterna sumatrana. Black-naped Tern. Apparently fairly common locally around the coast of Okinawa, breeding on nearby islands according to Kuroda (1925:192). I recorded it in late May, and through August in the larger, open-mouthed bays on both east and west sides of the island (Nago Wan, Kinmu Wan, Nakagusuku Wan). Close views were obtained only on August 14 south of Nago on the west coast, where 6 to 8 birds foraged up and down just offshore.

The plumage is so extensively white that at a distance they look just as white as the White Tern (*Gygis alba*). At close range, however, the very pale gray mantle was visible and the black crescent on the nape was noticeable. Their wing beats were more regular than those of most terns; this is also true of the White Tern. When feeding over a calm sea, they frequently swooped down and snatched something from the surface after the manner of a gull, yet without dropping the feet as a gull would do. No call notes were heard.

Sterna albifrons. Little Tern. Recorded as follows: June 27, Awashi, 1 adult foraging over shallow water of coral flat; July 14, mouth of Bisha Gawa, 16, 12 of them at rest on the tide-exposed coral, including 2 immature birds still begging food from any adult which approached them on the wing.

The adults were, for field purposes, identical with the Least Tern (*Sterna albifrons*) of North America except that they had dull red instead of orange-yellow feet. The immatures, however, seemed much less brownish than those of the Least Tern at the same stage. The Okinawa birds had no noticeable brownish in the plumage except for a slight tinge on the tips of the crown feathers; nape, dark gray to blackish at sides (behind eye); middle of back light gray as in adults; feathers of scapulars and primaries broadly edged with black, some (at least on scapulars) with an added very light gray tip; secondaries and inner primaries, white—the whitest part of the wing; rump white, fading into light grayish along the vanes of the spread tail; tail not noticeably forked; feet dull gray or grayish-yellow; bill lead gray.

The adults gave a slight, sharp *kack* occasionally. The immatures tittered musically when old ones approached.

Streptopelia orientalis. Turtle Dove. These large doves were apparently well distributed over the island, but were nowhere common. They were exceedingly wary. Out of a total of 18 different meetings with them, from May 22 to October 11, only on 5 occasions was I able to approach them closely enough to observe details of their plumage through binoculars. They seemed larger to me than the congeneric *S. chinensis* with which I was familiar in southern California and Oahu, as well as differing in field characters by having a paler whitish crown, bronzy coloration on the flight feathers, a patch of pale bluish containing white spots on the side of the neck, and a dark gray tail with a pale gray tip.

Their favorite feeding grounds seemed to be the abandoned villages and the borders between pines of the hills and the terraced paddy fields of the gentler slopes. One was seen on a small brush-covered island on the coral platform off the mouth of the Bisha Gawa. The largest number seen on any one date was 12, on October 5, on a trip around the southern part of the island. In the abandoned village of Nakaza on that date they were feeding on berries of the banyan windbreak trees. I did not hear them call at any time.

Alcedo atthis. River Kingfisher. These sparrow-sized kingfishers frequented the Bisha Gawa both along the tidal and the upstream portions, and they were also noted at several points along the rocky west coast north nearly to Nago. Maximum count along the nearest 1 mile stretch of the Bisha Gawa (tidal portion) was 4 (pair, plus 2 "singles").

Their flight resembles that of a small speedy sparrow. With the big bill projecting in front as they fly, they reminded me also of an overgrown hummingbird. It was odd to see them buzz out horizontally from a streamside rock or twig and then veer downward into the water, still buzzing, only to reappear almost immediately buzzing back to a perch. After making several unsuccessful sallies into the water the male of the pair which lived adjacent to our camp would return to a perch and jerk his head up and down vigorously. This species seems to be rather silent as compared with the Belted Kingfisher of North America, but I occasionally heard them give a shrill *tswee-tsee-tsee-tsee-tsee-tsee-tsee-tsee* when in flight, and a single *pip* when perched.

Halcyon coromanda. Ruddy Kingfisher. One record: On October 5, in the abandoned village of Nakaza near the south end of the island, one flew across the windbreak-lined courtyard affording a fine, though brief, view of its bright reddish brown plumage with lens-shaped patch of light blue on the lower back and rump.

Hirundo rustica. House Swallow. Fairly common, especially along streams such as the Bisha Gawa and over fields adjoining them or the beaches, or even over the coral tide flats themselves. I recorded them along the west coast as far north as Shana Wan (August 21) and south to the Bisha Gawa, where they were present at least from May 24 through October 10.

The male of a pair seen regularly by our camp was engaged in courting activities on June 7, even carrying a rootlet to a beam under the ruins of a bridge, but no nest developed at that point. On July 24 at least 13 swallows collected on wires over the river gorge just upstream from this point, among them being many in obvious juvenal plumage; thus, they nested somewhere nearby.

These breeding birds were assumed to be of the subspecies *namiyei*, listed by Hachisuka *et al.* (1942) for the Ryukyus. The males present during June and July all had notched tails without particularly elongated lateral rectrices, although they were otherwise much like the Barn Swallow of North America with somewhat paler underparts below the pectoral crossband. On September 8, at Yakada, 10 or more were resting on wires over rice and sweet potato fields. Several of these were males with very long lateral tail feathers, so I concluded that they were migrants of another subspecies (probably *gutturalis* of Japan proper). They also allowed a much closer approach than the summer resident birds. On the same date some were foraging up over brushy hillsides even to the crest of the ridge in the narrow center of the island, and also about some of the islets in Yakada Bay. On September 26 migrants were common everywhere on a trip around the southern third of the island, an estimated several hundred being seen. By September 29 this large flight had apparently passed on.

On October 9 and 10 swallows were foraging in the river gorge during the waxing and waning stages of a very destructive typhoon, keeping mostly within the protection of the river banks, but rising every now and then into the gale (against which I could barely stand upright) only to be tumbled crazily about and to drop back into the less violent air. One foraged for some time up and down a small road cut between our camp and the river, rising into the wind at either end of its beat and just skimming the mud in the center. Sometimes it would be blown almost out of control at the turns, but again it managed quick dashes through the trees and over the hillside grass and brush despite wind velocities estimated at 70 to 80 miles per hour.

Pericrocotus roseus. Ashy Minivet. Present in small numbers, usually in pairs, about the lower Bisha Gawa and in the low plateau to the north, from the time of my arrival in late May through mid-August. Then none was seen until September 25 and 26, at which time flocks of 10 to 35 birds suddenly appeared and roved up and down the river valley for a few days, apparently leaving about

October 1, except for a few stragglers (1 on October 11, the day before I left). Three at Nakaza, $\frac{1}{2}$ mile inland from the southern end of the island, on October 5, were the only ones I saw at any point far from our camp area.

The flight of minivets, especially when in flocks, resembles that of waxwings, except when about to alight, for then the long, slender tail is jerked forward and slows them to a sudden stop. A noisy, wheeling flock of 35 on September 25 surprised me by the suddenness of their descent into the pines, followed by utter silence. In late May pairs engaged in chases through the tree tops and called a rapid *pill-a-pill-a-pill-a-pill*, and the same call was heard, though less frequently, through August. The note given by flocks in flight, however, I interpreted as *chid-dl-dl-dl-dl*.

Two plumage patterns were evident in the fall birds, one with much black about the head projecting into the ear region and with black tail and primaries marked with much white, the other with a pale gray head, neck and back darkening on the tail and primaries, but with the same white markings. The latter I assumed were immatures.

Corvus leuillantii. Jungle Crow. On all trips into the central uplands or north along the west or east coasts of the island (August 14 to September 21) crows were seen which answer the description of this species in Caldwell and Caldwell (1931) except that the bill did not seem heavier than that of the American Crow (*C. brachyrhynchos*). They were found chiefly on the pine-covered hillsides away from villages, only once being seen in a clump of trees in a small terraced (and formerly cultivated) valley between two hills. Not over 8 were seen on any day's trip.

These birds all gave similar calls—a drawled, hoarse *gwaarh* and a shorter *cawh*. They were extremely wary and could not be approached on foot, all good views that I obtained being of birds flying past me as I stood still. Their flight was quite similar to that of the American Crow.

Parus major. Great Tit. Fairly common, chiefly in the windbreaks and other broad-leaved trees of the abandoned villages or on hillsides where pines were mixed with at least a few broad-leaved trees. A pair was frequently found in the summer in and near our camp area. On my trip into the hills of the central isthmus on September 8 at least 3 pairs were found in 4 hours in a mixture of pines, broad-leaved trees, and brushland. On August 30 and several subsequent dates I found them foraging in company of white-eyes in the sort of loose aggregation common among winter birds of the northern forest areas. Their foraging seems to be done anywhere in the trees or in the brushy understory, but I never saw them high in a tall tree.

The two most frequently given call notes I set down as follows: (1) *ka-cheedl-cheedl-cheedl*; (2) *tchik-tchik-tchik-tchik* in diminishing volume. Away from the Bisha Gawa area (strangely never from the pair in camp) I also heard them call: (3) very rasping *tsee-kidl-kidl-kidl-kidl*, quite wren-like and yet may be just a rapid and harsher variation of call number 1. On October 7 I heard one give still another call: (4) a churred trill—*tsee, tr-tr-tr-tr-tr-tr*.

Ixos amaurotis. Brown-eared Bulbul. Throughout the Bisha Gawa area, in the trees and bushes of the hillsides, this jay-like bird was common. Bulbuls were wary and it was only with careful stalking plus a good deal of luck that I finally approached one close enough to see the characteristic brown ear patch. They are much darker in general plumage than the subspecies of Japan proper (*I. a. amaurotis*). They were assumed to be of the subspecies *I. a. pryeri* listed by Hachisuka *et al.* (1942) from all the Ryukyus.

Elsewhere than along the Bisha Gawa I saw them on all trips through the hillier portions of the island. They were numerous in the wilder country north of Nakaoshi on both of my trips up the west coast in August. In similar habitat on August 30 through the east-central portion of the island the few seen were less conspicuous because they were not nearly so noisy as earlier. On September 8 about 25 were seen during four hours of hiking through the hills east of Yakada. On October 6 at least 7 were found in the abandoned village of Kadena (approximately $\frac{1}{2}$ mile square) and 13 were counted along $2\frac{1}{2}$ miles of the upper Bisha Gawa. They seemed most abundant just before I left the island, 10 being estimated in $\frac{1}{2}$ mile of river bank and adjoining hills just above our camp on October 11; perhaps there was an influx of migrants.

The Brown-eared Bulbul has quite an extensive vocabulary, which heightens its likeness to jays. I listed at least five different notes: (1) A harsh *zrack, zrack, zrack, zrack, zrack*, given by both birds of a pair as they go long distances in shallow pitching flight. Often they become silent upon alighting again. (2) A two-syllabled wheezy whistle, *whéee-chack, wheee-chack*. This also is given by both sexes and may go on for some time while they remain hidden on a perch. (3) A hoarse *char-r-r-u*, sometimes given by one bird while the other keeps giving note number 2. (4) A soft, almost whispered *cheee, cheee, cheee, cheee, cheee*. This is heard infrequently. (5) The two birds together, one calling *chū, chū, teeeea-teeeea-teeeea*, the other interspersing with a harsh *chack-chu-chack*.

Bulbuls perched in our camp area ceased calling immediately upon discovering an approaching human, and resumed their noise, with call number 1, only after flying halfway across the river.

Monticola solitarius. Red-bellied Rock Thrush. This species was one of the first birds with which I became acquainted on the island and my notes concerning it are extensive. A few excerpts from my daily record follow:

May 22 and following days. Owan Mill (ruins of sugar mill). One pair regular about the ruins of the mill, especially the smokestack, and up through the scattered pines and other trees on nearby hillsides to rocky river banks. Their forage range seems to cover a large area and seldom do the birds stop near the mill to hunt for food. Their favorite grounds are rocky ridges along the river, with pines being used for perching. They have some of the demeanor of a robin, but without the erect head when on a perch. The tail is slowly wagged up and down after alighting. Their flight is usually very direct with only occasional pauses in the wing beats.

June 6. I climbed the rusty ladder on the 40-foot broken-off smokestack and saw their nest at close range where I had seen the male bringing food intermittently several days before and both sexes during the last few days. The nest is placed on a brick ledge inside and under the bent-over metal portion of the broken-off top of the stack, thus perfectly shielded from rain. The base of the nest was composed of rootlets and small rocks (mostly coralline) up to 1½ inches in diameter intermingled with a few twigs, graduating upward into dry pine needles with which it was presumably lined. There were 5 young, all presenting a wide, lemon-yellow gape. The bit of down that could be seen (on head) was neutral gray. Their eyes were not yet open; I estimate them about 4-5 days old. Their food call was a slight *seee-tseee-tseeee*. As I neared the top of the ladder, the female flew down from the nest and hopped about the top of the brick wall scolding with a metallic nasal *pee(n)* repeated every few seconds. With each alternate scold she would bob her head downward and tail upward, remaining in normal perching attitude on the other notes.

June 8. The male makes fewer trips to the nest than the female. He also carries more before going in to feed the young, usually stopping on a brick wall, then the metal top of the stack, or sometimes even going up to the top of the nearby tall smokestack (90 feet above ground), and often waiting on his final perch as much as 30 seconds while the young give their food call from the nest. When he does go in, he returns promptly with a fecal sac and flies off beyond the river (400 yards away) before dropping it.

June 12. The female was at the top of the nest stack when the male came flying up to the wall with food in his bill. Both called with melodious whistles (which compose their song, but unlike that of the Dipper). Then the male began what appeared to be a courting display. He teetered drunkenly along the narrow brick wall with upraised and half-fluttering wings, leaning far to the left for a while, then far to the right. This lasted 15 to 20 seconds, during which the female fluttered her wings and both birds called frequently.

June 13. The food call of the young has increased to so insistent a begging that it is the first sound I hear in the morning as I struggle to wake up in my cot 150 feet away from the nest.

June 16. Young no longer heard in the nest (14-15 days after hatching); but neither could I find parents carrying food to them outside. The nest is so situated that they would have had to fly across the open top of the stack and below the bent-over metal underneath which the nest was placed; I think they may have fallen down the stack, which leads to an underground flue of the old mill. Male and female both still around, the male singing as usual at dusk.

June 18, 19, 20. The female sat at various points around the mill ruins calling in monotonous repetition an indrawn *whheeeep*, occasionally alternated with a grating *clacket-t-t-t-t*. The male not seen.

June 20. First juvenal out of nest found on rocky cliff above the river some 400 yards from the nest. It may or may not have come from the mill nest. It was mottled slate gray above with typical thrush-like spotted breast, stubby tail feathers with white tips, bill yellow. One was seen in same locality on the 30th.

July 4. Two immatures, in plumage now resembling females, but with white-tipped tail feathers, were feeding on lantana berries at Owan bridge. They were very tame in contrast with the adults.

July 29. An immature male seen which showed red in patches on belly.

August 9. One flew along the river bank as late as 7:30 p.m. when it was so dark that the new moon and 2 stars were plainly visible. Owan mill birds still sing morning and evening.

September 12. Two miles north of the lower Bisha Gawa a male on a new coral fill in an old vegetable field was doing the semblance of the wing-shuffling, tippy acrobatics seen on June 12.

October 1. Two immature males were disputing perches on rocks along the river bank. Both sang short warbled phrases when in flight.

October 5. Nakaza, near sound end of Island (½ mile inland); 4 or 5 in this area; here there are denser trees and brush than those in which I have previously seen them. Ruins of tile and stone buildings provide the rocks, but most of their activity was in the windbreak trees! An immature male and one female were engaged in courtship preliminaries.

Elsewhere than at places mentioned above this species was seen commonly along the west coast of the island at least as far north as Shana Wan (August 21), where they often forage on rock outcrops along the shoreline, on the dead coral ledges at low tide, or even on the sandy beaches nearby. The farthest inland that any was seen was ¾ mile up the Bisha Gawa.

Cisticola juncidis. Fan-tailed Warbler. Common in grassy areas and old sweet potato fields at all altitudes throughout the southern half of the island, but they often use small pines or bushes for perching. Also seen on August 14 and 21 in suitable areas along the west coast north to Taira and Shana Wan, and on August 30 along the east coast north to at least 2 miles beyond Yaka.

From late May through July the flight songs of the males were prominent along roadsides everywhere except in the more densely wooded areas. Caldwell and Caldwell (1931:123), writing of the subspecies *tintannabulans*, say: "The peculiar characteristic which definitely identifies the bird is the flight, when it will arise to a considerable altitude and remain poised in the air with an up-and-down and bobbing motion, uttering its 'pete pete pete pete' call, suddenly to drop to earth with a series of sharp, clicking notes."

I interpreted the note of the Okinawa birds as a *jit-jit*, *jit-jit*, *jit-jit*, *jit-jit*,—etc., one double note being uttered at every change of direction in the jerking flight. The erratic plunges the male makes in giving this flight song often carry him low over the spot in the grass where the female is hiding or feeding. When she flies, he follows and continues the performance over her new location. Besides the song thus given, they (both sexes, I think) have a shrill sharp whistle, *keet, keet, keet, keet, keet, keet*, given both in flight or from a perch. The flight songs diminished in frequency during August, but these latter calls were given at all times during my stay on the island. The last song heard was on October 5.

This species was very difficult to approach; but after several trials I succeeded in observing both males and females, and one supposed immature on September 29, close enough to take detailed notes on the plumage, which tally closely with Caldwell and Caldwell (1931), except that the males were yellowish rather than "buffy-rufous" on the breast and belly, but the yellowish fades into white on the throat and shades into rufous-tan on the flanks and rump.

Phylloscopus borealis. Arctic Willow Warbler. Birds attributed to this species were seen in increasing numbers from September 25 to October 11, the day before my departure. On the latter date 8 were counted in a ½-mile walk among the scattered pines around the abandoned village of Kadena near the Bisha Gawa. On September 26 two were seen in a tangle of *Hibiscus* trees southeast of Naha lagoon. The following description was written at that time: warbler size and form; tail shorter than in American warblers, slightly notched at tip; bill a little heavier than in American warblers; upperparts greenish-olive to more brownish on top of head and on wings and tail; light buffy or cream-colored superciliary; dark brown to black line through eye; throat and belly whitish, the breast washed with olive green in tiny, obscure streaks; bill horn-color; legs dark (color?); one short wing-bar evident, but not prominent. They flashed their wings open and shut like a Ruby-crowned Kinglet as they foraged indiscriminately through the trees and bushes in warbler manner, but without "flycatching" outside the canopy.

Kuroda (1925) lists *P. b. borealis* as "Migrant and not common on Minami Daito and Yonahuni" [extreme eastern and southern islands in Ryukyu area] and *P. b. xanthodryas* as "through Japan, China, Riu Kiu Islands, Formosa, and Borneo. Migrant—not common on Iriomote [southern Ryukyus] and Minami Daito."

Hemichelidon griseisticta. Gray-spotted Flycatcher. One record: one on October 7 in an area of scattered pines with lantana underbrush on the cliff above the Bisha Gawa and with broad-leaved trees at the river bank. It perched much like the smaller American tyrannids, regularly on the lower limbs of the pines either within the canopy or under it. Its flight, however, was with more irregular wing beats and rather warbler-like; and it did not return to the same perch after a sally to capture an insect. These sallies were made mostly to points within or very near the canopy of the trees, but several were down to the top of the lantana underbrush. No call notes were heard.

According to the description of this species in Caldwell and Caldwell (1931), to which my notes correspond closely, this species is "unmistakable." Kuroda (1925) says of the subspecies *H. g. griseisticta* in the Ryukyus: "Migrant and not common on Minami-Daitojima and Yonakunijima. Mr. Yaita obtained one specimen on Tanegashima." These islands are at the extreme locations in the Ryukyu Archipelago, east, south and north, respectively.

Motacilla cinerea. Gray Wagtail. Starting with 5 on September 10, this species became increasingly common along the Bisha Gawa until on October 6 I counted 16 on a two-hour walk up the upper river. They usually fed at the edge of the stream or about the rocks and earthen banks undercut by the stream. Although I frequently heard and saw them flying over in groups of 1 to 3, I found them on the ground away from streams on only two occasions, both by mud puddles in the streets of abandoned villages.

The call commonly given in flight or from the ground is a light *yip* or *yip-yip*. On October 6 one of a group of three flying ahead of me up the rocky stream bed gave a sharp *tee-pin, pin, pin*.

Sturnia philippensis. Red-cheeked Starling. Migrant or winter visitant. The first one was seen on September 26 in a tangle of *Hibiscus* tree branches on the shore of Naha Lagoon, while both the bird and I took refuge from a sudden shower. It fed on insects by leaning forward from perches and grabbing them off the twigs and leaves.

On October 6 I watched a flock of 30 for a half hour in the abandoned village of Kadena. They wheeled about between and over the banyan trees for long periods, taking up to 50 or more laps around the village, only to settle eventually in the same tree from which I had flushed them. Many times, as they approached the tree top in which they had been feeding on green berries, they would sail in as if preparing to land; but at a slight *churr* call note from one or more of them, the whole flock would pick up speed and go around again and again. I once heard a collision between birds in the closely spaced flock, but all kept on, apparently unhurt.

Birds in this flock which were without the reddish brown area on the lower throat and ear region were assumed to be immatures, as was the one bird seen on September 26. Such birds appeared to compose half or more of the flock.

Zosterops palpebrosus. Japanese White-eye. Common in all the "settled" areas of the island, around the villages and in scattered pine areas on the hills. I found them fairly common in August along the west coast north at least to Shana Wan and on August 30 along the east coast north at least to Kin. I counted 10 in a 2½-mile hike up the Bisha Gawa on September 10 and estimated that 20 were in trees along a half-mile stretch of the lower part of the same area on September 25. The largest flock actually counted was one of 16 birds on October 7 at Owan.

No songs were heard from any of these fall flocks, but songs were frequent through late May and June, especially in early morning and in the late afternoon.

Fully grown young begging food from adults were present in our camp as early as May 24. Two young, still with short tails, were being fed by adults on July 30. A nest, assumed to belong to this pair, was saddled on a small horizontal branch one foot out from the trunk and 12 feet up in the same pine tree in which the family was perched. The nest measured 4 inches in outside diameter by 2½ inches in total height, with inside cup 2¼ inches by 2¾ inches by 1½ inches deep. The base was composed of paper (1 piece nearly covering bottom), thin strips of birch-like bark, rootlets, and vine stems. A few small twigs were placed loosely in the outer ring. The lining was of dead pine needles, 3 inches long and pressed into the cup.

Passer montanus. Old World Tree Sparrow. This species very effectively filled the niche of the House Sparrow (*P. domesticus*), which was absent from Okinawa. They did, however, range well up into the pines on the hillsides and were not seen taking dust baths as the House Sparrow certainly would have been. I recorded them commonly on August 14 and 21 in all towns along the west coast north through Taira and less commonly between towns. Very few were found on September 26 and October 5 in the southern part of the island.

Several pairs about our camp apparently had nests inside the smokestack of the old sugar mill ruins; they went in and out through the bullet and shrapnel holes. They were frequently chased away from the top of the smokestack by the Red-bellied Rock Thrush which nested there. On June 6 I found a nest about 15 feet up on a horizontal branch of a pine along the lower Bisha Gawa. It was of globular form similar to tree nests of *P. domesticus* in California.

By July 4 Tree Sparrows were found widely in definite flocks of 10 to 12 birds each, containing both old and young. Those flocks fed extensively on the ripening rice and abundant insects in abandoned paddies along the river. By mid-September they had disappeared but small flocks were still frequent along dry roadsides and in abandoned sweet potato fields in the uplands.

Many of the call notes given by this species were similar to the chattering of *P. domesticus* but usually less harsh. A note often repeated in flight is a more warbler-like *tchlip*, or even a musical *tzrink*.

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