

SOME OBSERVATIONS ON STILTS IN THE FIRTH OF THAMES.

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These observations on Stilts were made on the west coast of the Firth of Thames. From July, 1941, to October, 1942, we were able to visit this interesting stretch of wader-country at more or less monthly intervals. A road, running close beside the shore for the nine miles or so which we had under observation, enabled us to survey the area quickly and easily; and by timing our visits so that they coincided with a rising tide, it was possible to take a census of the wader population, which allowed for only a small margin of error.

In the breeding season there are three colonies, two small and one rather larger, of Stilts along this coastal strip; and for the purpose of the census, it was convenient to divide the area up into three sections adjacent to the three colonies. There is a big influx of Stilts for the winter. The coastal plain, consisting mainly of rough pasture, ends abruptly with bluffs or steeply-rising hills and varies in width between a few hundred yards and about a mile. With the doubtful exception of one or two pairs, all the Stilts' nests were within 200 yards of the shore.

The northernmost section, approximately three miles in length, centres round Kaiaua settlement, where four or more scattered pairs breed in damp paddocks less than 100 yards from the shore. Shallow pools with patches of rushes and open water which does not dry up till late summer provide an ideal habitat. The Kaiaua Stilts are quite acclimatised to the presence of human beings; and at least one pair habitually feeds in pools which are within the grounds of a small school. The foreshore is composed of big, rounded stones and pebbles, with patches of mud and sand in between. The coast here sweeps round in a wide curve, at the northern end of which, beyond a stony promontory, a clear stream splays out over the beach. At the centre of the curve a muddy creek enters the Firth; and beside this is a high bank of shingle, where White-fronted Terns have nested and in winter Stilts habitually gather at full-tide. To the south the character of the coast changes. The foreshore becomes mud and sand instead of large stones. There is also an extensive area of mangrove flats, through which a second muddy creek trickles seawards. Such, then, are the varied ingredients of the Kaiaua terrain.

The middle section of the census lies some two and a-half miles to the south of Kaiaua; and its central point is a white bridge. Ecologically, it is rather different from Kaiaua. The coastal plain is here much wider, and there are no human habitations. The foreshore is simply mud and sand without any mangroves, and at low tide its flat monotony is broken only by one prominent shingle-bank, a favourite high-tide roost for Gulls, Terns, Shags, and in winter South Island Oyster-catchers (*Haematopus ostralegus finschi*). Deposits of shell begin here to extend inland. They are covered with thin grass, and in the damper places there are clumps of *Plagianthus divaricatus*, *Olearia*

solandri, and *Coprosma propinqua*. Two natural features which have attracted three or more pairs of Stilts to nest here are a long, shallow, permanent pool of fresh or only slightly brackish water and a small canalised tidal river which at low tide trickles over the beach. For the purposes of the census the country half a mile north and south of the white bridge is included in the middle section.

Something over half a mile south of the white bridge colony and linked to it by a high shingle beach, behind which extend some acres of rushy swamp, is the main colony. Here shell deposits reach inland for more than 100 yards; and recent excavations by the Miranda lime works have created a chain of pools which, because they vary in length and contain many small islands, afford a wholly attractive breeding ground for at least a score of pairs of Stilts. These pools are at the northern extremity of the southernmost and biggest section. Southwards in order are a muddy lagoon nearly a mile long and covered only by the highest tides; a wide, muddy creek, with mangroves running half a mile inland; and lastly, three miles of flat, muddy coast fringed south of the creek by a belt of small mangroves and for the last mile by salicornia-covered saltings.

Owing to the intervals between our visits, we were not able to study the breeding habits of the Stilts in as great detail as we would have wished; but, nevertheless, much useful information was collected.

Adult birds begin taking an interest in their breeding grounds in July; and the antics and postures of courtship were observed on August 3. The first eggs are laid in September, and a few pairs may have complete clutches by the end of the month. Thus on September 27, 1942, three nests with eggs were found; of which only one had the full complement of four eggs. October is the main month for laying. On October 12, 1941, of ten nests visited six had complete clutches; and several other nests on which birds were sitting hard were left undisturbed.

A shallow scrape in the shingle, with or without the addition of a few bits of stick or flood-rubbish, most commonly serves as a nest. But some nests on marshy ground were built up of shells and flannel-weed, pulled from the adjacent puddles; and by this provision at least one nest was saved from inundation when a sudden rise in the water ruined many eggs.

The three or four pairs at White Bridge are an offshoot from the main colony half a mile south towards Miranda. There is no doubt that they nested later than the birds in the main colony. Thus on October 12 one pair here had two eggs; on October 27 this nest contained four eggs, and on November 9 they had just hatched. In the meanwhile two more pairs had laid; and on November 30, while one brood could already fly unsteadily, a second brood were at an intermediate stage and the third brood were only a few days old. In "Bird Flocks and the Breeding Cycle" Fraser Darling, dealing mainly with seabirds, makes the point that birds in a large colony tend to nest earlier than those in small outlying colonies; and he suggests that

keener competition for nesting sites arising from the density of the population stimulates the birds sexually. It has, however, also been pointed out that the occupants of outlying colonies are likely to be young, inexperienced birds nesting for the first time. Whatever the reason, both Kaiaua and White Bridge birds were later nesting than the big Miranda colony.

Usually four eggs make up the full clutch; but one nest containing five eggs, all of same type, was found. The average measurements of five eggs from different clutches are 45×31 mm. The incubation period of European Stilts is given as 25-26 days; and the same seems to be true of the New Zealand subspecies. Evidently they begin to sit only when the clutch is complete. In one nest on October 27 four young Stilts, just out of the egg, were lying quite still. They had not, like the young lapwing in Hamlet, run away with the shell on their head.

Once they have left the nest, young Stilts are not easy to find, and readily resort to thick herbage to hide. Undisturbed, they frequent the water's edge, where there is an abundance of insect life hatching out. They do not leave their freshwater pools or flooded grasslands for the mudflats till they are strong on the wing.

Flocking begins in November, soon after the young Stilts are able to fly and look after themselves. On November 9 a loose mob of at least 60 birds, among which were many young, was sitting about on a grass paddock near the largest breeding pool; but no young birds had yet taken to the mudflats. Three weeks later there was a big decrease at the pools, which were beginning to dry up as summer advanced; and there was a corresponding increase on the tidal flats. Some families seem to stay on their nesting territory as long as any fresh water lasts; and as late as February 8 two pairs, one with two full-winged youngsters and the other with three, refused to move far from their favoured, albeit much reduced, pools. Even as late as this some parents are absurdly excitable and over-anxious for their quite capable young.

December and January are good months for assessing the success or otherwise of the breeding season. We estimated that during the 1941-42 season the Stilts of our three colonies on the average raised two young per pair; a remarkably good average for a ground-nesting bird with a normal clutch of four eggs, breeding in exposed country where Harrier-hawks are abundant and stoats not unknown; added to which most nests were within view of a road and men were working on an excavator near the main colony.

When we took the census on February 8, it was clear that there had been a big decrease. Two counts had been made in January, both of which had shown about 150 birds present. These were made up roughly as follows: 30-35 pairs which had bred (60-70), two flying young per pair (60-70 +) and a few non-breeders. But on February 8 only about 80 birds could be found.

There is certainly some local Stilt movement in February, if not earlier. At this season Stilts reappear in Manukau Harbour at places where they have been missing since September, and they are often heard at night calling as they fly over Mangere and Otahuhu. Much earlier than February, H. R. M. has known a flourishing colony at Clevedon to be quite deserted. Evidently when the breeding season is over, a restlessness comes over many of our northern Stilts; in a lesser degree the same feeling which makes their southern congeners migrate northwards. It can hardly be a question of climate or food supply that makes some of the Thames Stilts move away, for their places are immediately taken by plenty more.

In March the numbers begin steadily to increase, and most of the immigrants have settled in for the winter by the end of April. They keep entirely to the mudflats and beaches, over which for feeding they scatter more or less evenly. Towards full tide they mostly congregate at three or four regular resting places, but do not generally pack closely like Godwits. In the winter they do not hesitate to come up among the mangroves, though at other seasons it is not usual to see them there. Numbers begin to decline about the end of July; and a month later there are few left except the breeding pairs and some juveniles.

These non-breeding juveniles, nearly a year old, are always present in the early spring, easily distinguished by the smudgy markings still on their heads. For instance, over 60 of them were seen on September 27 feeding on the flats, while the breeding pairs were busy on their territories. It is tempting to think that they were the bulk of the young reared in this area the previous year; but it is an unverifiable conjecture. It was noticeable that while in spring 1942 there were at least 60 juveniles present, they were scarce in 1941. The explanation may be that this region in the Firth of Thames has only recently been colonised, and 1941 was the first season of breeding on such a scale. Certainly man by his excavations and consequent pool-making is rendering the area more and more attractive to Stilts.

Young Stilts have a distinctive note. It is higher-pitched than the parental yep, yep, yep; and might be syllabised as quip or kip, kip, kip. When Stilts are flying over at night and calling, it is easy to tell whether there are young birds among them. As they lose the smudgy markings on their heads, their voices "break," and in spring juveniles with husky voices are not uncommonly heard.

So far, although we have not seen a "Black" Stilt in the Firth of Thames, we have come very near doing so. When we made our first hurried visit on July 13, 1941, one was seen, which was black except for a narrow white band across its forehead and some smudginess on its underparts; and three weeks later the same bird and another, with slightly more white on it, were seen in the same creek. On March 8 H. R. M. reported that four nearly black Stilts had appeared at Miranda; and a month later we were able to note the details of the plumage of three of them, viz.: (a) Some white on the face and round

the eyes. Black coming down over crown nearly to bill. Stomach and under-tail coverts smudgy. (b) Almost the same, especially about the head, but smudgy patch of stomach much smaller, owing to more black on lower chest. (c) Very similar, but with more smudginess where black and white ran into one another.

The strip of coast which we worked is only a fraction of the area in the Firth of Thames where Stilts occur. The winter population of the flats extending along the southern shore from Waitakaruru to the Thames River runs into thousands. On April 5, 1941, we succeeded in reaching the somewhat inaccessible estuary of the Piako River, where we estimated that there were at least 2000 Stilts present. The Hauraki plains, where they border the southern end of the Firth, would not seem to afford the same attraction to Stilts for breeding as the western side; but there is reason to believe that considerable numbers nest in swamps up the rivers, which run into the Firth. On January 2 150 were counted in a riverside meadow near Waitakaruru, and on January 12 over a score at Pipiroa Ferry had resorted at full tide to an old jetty, a queer roosting place.

Some two miles north of Kaiaua a pair bred in 1941 and 1942 beside a shallow pool in a paddock just behind the beach. Their family history is rather sketchy, but we give it for what it is worth.

1941—

July 12.—One pair evidently in occupation of territory.

August 3.—Not seen.

October 12.—Very quiet. Nesting in progress.

October 27.—Very quiet. Eggs were evidently laid late.

November 30.—Very demonstrative. Probably have small young.

December 31.—One pair with three flying young. A second pair had appeared.

January.—(Evidence of local movement?)

1942—

January 13.—Missing.

February 8.—Missing.

March 8.—Missing.

April 4.—Missing.

May 3.—Missing.

June 21.—Missing.

August 23.—One pair + two juveniles. If a family, interesting that they should have kept together so long.

September 27.—One pair already with a nest.

October 18.—One pair. One on guard, one sitting hard.

1943—

January 1.—Missing. (H. R. M.)

POPULATION OF STILTS.
West Coast of Firth of Thames, 1941-42.

Date.	Kaiaua.	White Bridge.	Miranda.	Approx. total.
July 13/41 Aug. 3	c. 30. ← c. 120	17. →	c. 450 (1 nearly black). Hundreds (including 2 nearly black). Courtship attitudes & postures observed among birds at big pool.	c. 500 c. 500
Oct. 12	4 pairs & 2 apparently single birds. (1 bird sitting hard.)	c. 14 (1 juvenile). 1 pair with 2 eggs.	c. 25 pairs breeding and a few unmated or juvenile birds. Of 18 nests found, the majority had 4 eggs. Some sitting birds were not disturbed.	c. 74
Oct. '27	4 pairs—not disturbed.	3 pairs (2 nests, each with 4 eggs; 1 pair not yet laying?).	Many nests had hatched. Away from colony were a few non-breeders.	70 +
Nov. 9	4 pairs, evidently with small young or well-incubated eggs.	3 pairs (1 nest hatched, 1 destroyed by an animal, 1 new with 4 eggs).	60+ in a loose mob, including flying young; 4 birds seen still sitting (second attempts after flooding?). Many pairs noisy with hidden young.	c. 90
Nov. 30	4 pairs. No young seen, though obviously there.	3 pairs with young, all at different stages. One brood flying unsteadily, another a few days old.	30-40, including many flying young at the breeding pools. 34+ on the mudflats.	100 +
Jan. 1/42	4 pairs with respectively 2, 2, 2, 3 flying young. Also a party of 6.	5 pairs with respectively 2, 2, 4, 2, 1 flying young, and a few adults.	2 flocks. 30+, of which 50% were juveniles and 60+ also with a high percentage of juveniles.	c. 150
Jan. 12-13	20-30 scattered along shore.	12+ (the parents of two capable youngsters were still absurdly anxious).	c. 114 spread over mudflats.	c. 150
Feb. 8	c. 27.	c. 10.	9 at pools (2 family parties of 5 & 4); 30+ along creek.	c. 80
March 8	c. 45.	5.	c. 72 (4 nearly black).	c. 120
April 4-6	80-100.	c. 50.	500+ (4 nearly black).	c. 650
May 4	120+.	100+.	600+.	800-1000
June 21	30+.	c. 60.	c. 10 at breeding pools. Hundreds on the mudflats.	c. 800
Aug. 24	c. 20.	c. 12.	30-40 at breeding pools. Scores on mudflats, of which a large proportion were juveniles.	200 +
Sept. 27	4 or 5 pairs & some juveniles.	None on last year's nesting sites; 6 (including 2 juveniles) on shore.	16-20 pairs & some juveniles. 1 nest with 4 eggs & 2 with 1 egg each. No birds sitting hard. 60+ juveniles on mudflats.	c. 120
Oct. 18	4 pairs, not disturbed.	8 (4 juveniles); none apparently nesting.	c. 60 (including some juveniles) at breeding pools. Probably 20+ pairs nesting. Nests found with 5, 4, 4, 4, 2 eggs. 12+ juveniles in big creek.	c. 90

Note.—Young are not included in census till they reach the flying stage.

