A PRELIMINARY REPORT ON A RECENT BOTANICAL SURVEY OF THE CHATHAM ISLANDS

I. M. RITCHIE

Forest and Range Experiment Station, Rangiora

SUMMARY: A preliminary report is given of a survey, made in 1968, of various islands in the Chatham Group (240,000 acres, 44° S., 176° 30′ W.). Regeneration of vegetation on South-East Island (540 acres) has been considerable since sheep were finally removed in 1961. Mangere Island (279 acres) was declared a reserve and all sheep destroyed in 1968. Recovery of its vegetation will provide increased habitat for the small populations of Forbes' parakeet and the Chatham Island robin, now found only on Little Mangere Island (10 acres). Urgent action is still necessary to conserve bird and plant communities found only on the two main islands, Chatham (224,000 acres) and Pitt (15,630 acres).

INTRODUCTION

The Chatham Islands are well known for the number of plants and birds endemic to them; and recent authors (Bell 1956, Findlay 1956 a and b, Madden 1957) have stressed the need for prompt and active conservation measures. This paper deals with some of the findings of a joint Wildlife Service — Botany Division, D.S.I.R., team which visited the group during August and September 1968. The main aim was to assess the status of the endemic species of the flora and avifauna and, in so doing, to visit as many of the smaller islands as possible. With the increase in crayfishing in the area, helicopters were available and their use greatly improved our mobility.

GEOGRAPHICAL AND HISTORICAL

The archipelago consists of 10 islands or island groups (Fig. 1), lying 450 miles east of New Zealand at about 44° S. and 176° 30′ W. The total area is approximately 240,000 acres of which Chatham Island makes up 224,000 (49,300 of which are occupied by lakes and lagoons), and Pitt, 15,630 (Wright 1959).

The Chathams were discovered by Europeans in 1791; at that time there were some 2,000 Morioris (Polynesians) in the group (Robertson 1890), their occupation going back about 1,000 years (Fowldes 1967). The present total population (European and Maori) is about 500 and only Chatham and Pitt Islands are permanently occupied.

Sheep, cattle, horses, pigs and goats were all well established by the 1860s (Cockayne 1901). Red deer (*Cervus elaphus*) were introduced about

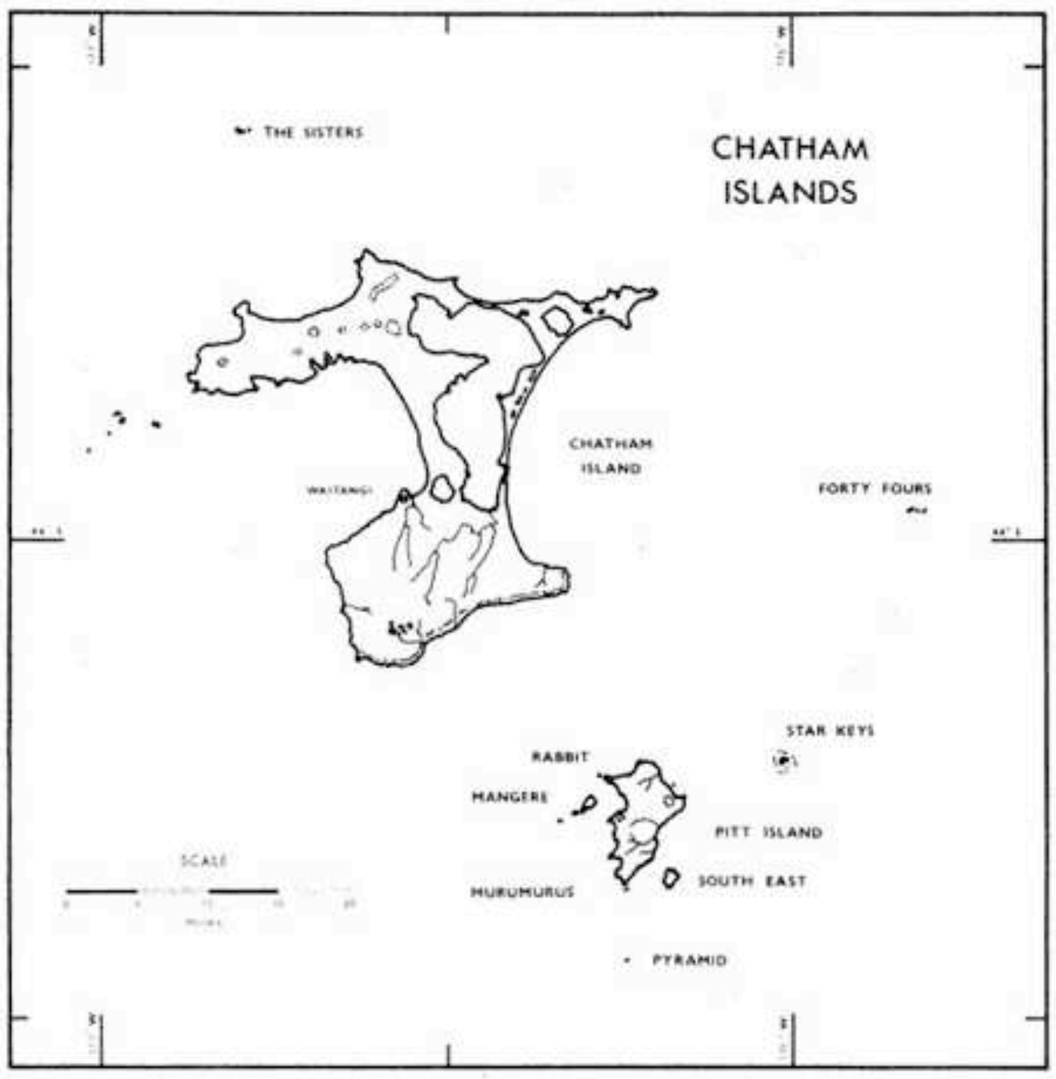

FIGURE 1. *Map of Chatham Islands*

the late 1880s but the last doe was seen in 1904 and the stag had been shot several years earlier (H. G. Blythe, *in litt.*). Opossums (*Trichosurus vulpecula*) were liberated near Kaingaroa in 1911 (Pracy 1962) and have been gradually spreading towards the south. Rats (*Rattus rattus* and *R. norvegicus*) and cats are common on the main island with cats and mice (*Mus musculus*) on Pitt Island (Bell 1954).

The climate has been summarised as, "windy, damp and cool" (N.Z. Met. Office, unpubl. report). South-westerly winds prevail throughout

the year, with southerlies next in order of prevalence (mainly in winter) and west- to north-westerlies in other seasons. Skies are generally overcast; the average amount of total cloud being eight-tenths. The mean annual rainfall at Waitangi is about 34 in. but Wright suggests that the figure may rise to over 50 in. for the southern tablelands. The wettest months are from May to August and there are occasional summer droughts. The mean annual temperature is 51.6°F. (11°C.) with a seasonal variation of about 6°F. (3.3°C.). The mean diurnal range is 10.4°F. (5.8°C.). On the average, screen frosts occur only once a year. Falls of snow average one per year and hail storms average 10 per year.

The physiography of the group has been discussed in detail by Allan (1928) and the soils of the main island by Wright. Peat and peaty soils cover 59% of this island and there are smaller areas of volcanic and sandy soils. Many of the peaty soils have been burnt, the earliest record of this being Dieffenbach's (1841). Cockayne even attributed the formation of some of the lagoons to burning.

RESULTS

Chatham Island

The party spent about 10 days on the main island and visited the *Dracophyllum arboreum* forest and 'peat clears' of the southern tablelands. Cockayne, writing at the turn of the century, stated that "there alone may be seen tracts of country clothed with unaltered primeval vegetation, but which unique and interesting spots are every day becoming fewer in number and more limited in extent, so that without a doubt in a year or two there will be no longer any virgin plant-formations on the island, except those of inaccessible rocks or of the larger pieces of water". In the same year the southern cliffs were opened to stock and since then tracks have been cut and bridges put in to allow greater access. Burning, grazing by wild and domestic stock and the effects of wind are still making inroads on the remaining forest. In 1968 it was obvious that Cockayne's predictions were justified: forest remnants were restricted to pockets in gullies; and obvious burn-lines on the 'peat clears' suggested that many, if not all, of the 'clears' as they are today have been induced by fire. Bog surfaces have suffered greatly from trampling by stock and much of the floor in the forest has been ploughed by pigs. Only a few seedlings and saplings of species such as *Myrsine coxii* were found.

Cox, one of the early settlers, informed Cockayne that late last century great clumps of *Myosotidium hortensia* grew along the coast above the high-water mark and extended onto the dunes and into open parts of the *Myrsine–Olearia* scrub. At the turn of the century *Myosotidium* was hardly to be found. Now, apart from its cultivation in the gardens of the local residents, this plant is a rarity on the main island; and only on Little Mangere is it still to be found in anything like what must have been its original abundance.

Cotula featherstonii, the woody cotula, which grows to about three feet in height, has suffered the same fate. It is associated with deep, moist, rich, bird-burrowed soils. It was present on a small islet close to the main island in Cockayne's day but is now found only on the more inaccessible islands, usually those well offshore. We found it on only two of the groups we visited: Star Keys and the Murumurus, but there were a few poor speciments on Little Mangere.

However, not all of the species are in danger of extinction: *Sporodanthus traversii*, the cane rush, which is also found in some of the bogs in the Waikato on the New Zealand mainland, occurs over thousands of acres. It appears able to withstand periodic burning and moderate trampling and grazing. *Olearia semidentata*, often found in association with *Sporodanthus*, is also widespread. *Cyathodes robusta* was common on some better-drained areas of less frequently burnt-over peat scrub.

To date, little has been achieved on either of the main islands towards the reservation of types of vegetation such as the *Dracophyllum* forest and mixed lowland forest, which are not found on the smaller islands. Multiple ownership, family rivalries and the high cost of fencing materials accentuate the usual problems of acquiring suitable reserves.

South-East Island

South-East Island is the only major reserve. It is 540 acres and reaches 680 feet above sea level. It lies 1¼ miles from the south-east coast of Pitt Island. For a short time in the middle of last century it was a shore base for whaling. Sheep

were first introduced in 1880 but were removed in 1900. Goats over-ran the island for the next 15 years but were destroyed when it was next leased for sheep-grazing in 1914 or 1916. For the next 40 years there were at least 500–600 sheep and over 1,100 in later years with some cattle as well (L. C. Bell, unpubl. report). The lowland areas were burnt and sown in pasture. The island was bought for the Crown and set aside as a reserve for the preservation of fauna and flora in 1954. However, the grazing lease was allowed to run until it expired in 1957. Virtually all stock was destroyed by March 1959 and the stragglers were shot in November 1961 (B. D. Bell, unpubl. report). Bell described the regeneration, only two and a half years after the virtual removal of stock, as spectacular and occurring all over the island. In 1968 *Myosotidium* was found sprouting vigorously from under logs of coastal forest remnants on the south-east end of the island (Fig. 2). Some plants were found near the summit under fairly

FIGURE 2. Myosotidium *regeneration from under logs, South-East Island*

dense shade. Regeneration in the forest was dense in places (Fig. 3) and was a contrast with the open, bare, coastal forest on Pitt Island nearby

FIGURE 3. Hymenanthera *regeneration, South-East Island* $9\frac{1}{2}$ *years after elimination of grazing animals*

[Photo, D. V. Merton, Wildlife Service

FIGURE 4. *Coastal forest, south-eastern Pitt Island, open to browsing animals*

[Photo, J. L. Kendrick, Wildlife Service

(Fig. 4), which is browsed by stock. Two sites were chosen for permanent quadrats: one in a dense, introduced grass sward about a chain from the forest edge behind the woolshed and the other on the edge of an eroded area on the bare south-east corner (Fig. 5). Here *Disphyma* was colonising the exposed subsoil and there was one tussock of *Poa chathamica* among a tight sward of halophytes. Behind the plot were dead stumps of the coastal *Olearia traversii* forest which had been killed by the wind after the stunted, sheltering margin had been broken by sheep and cattle.

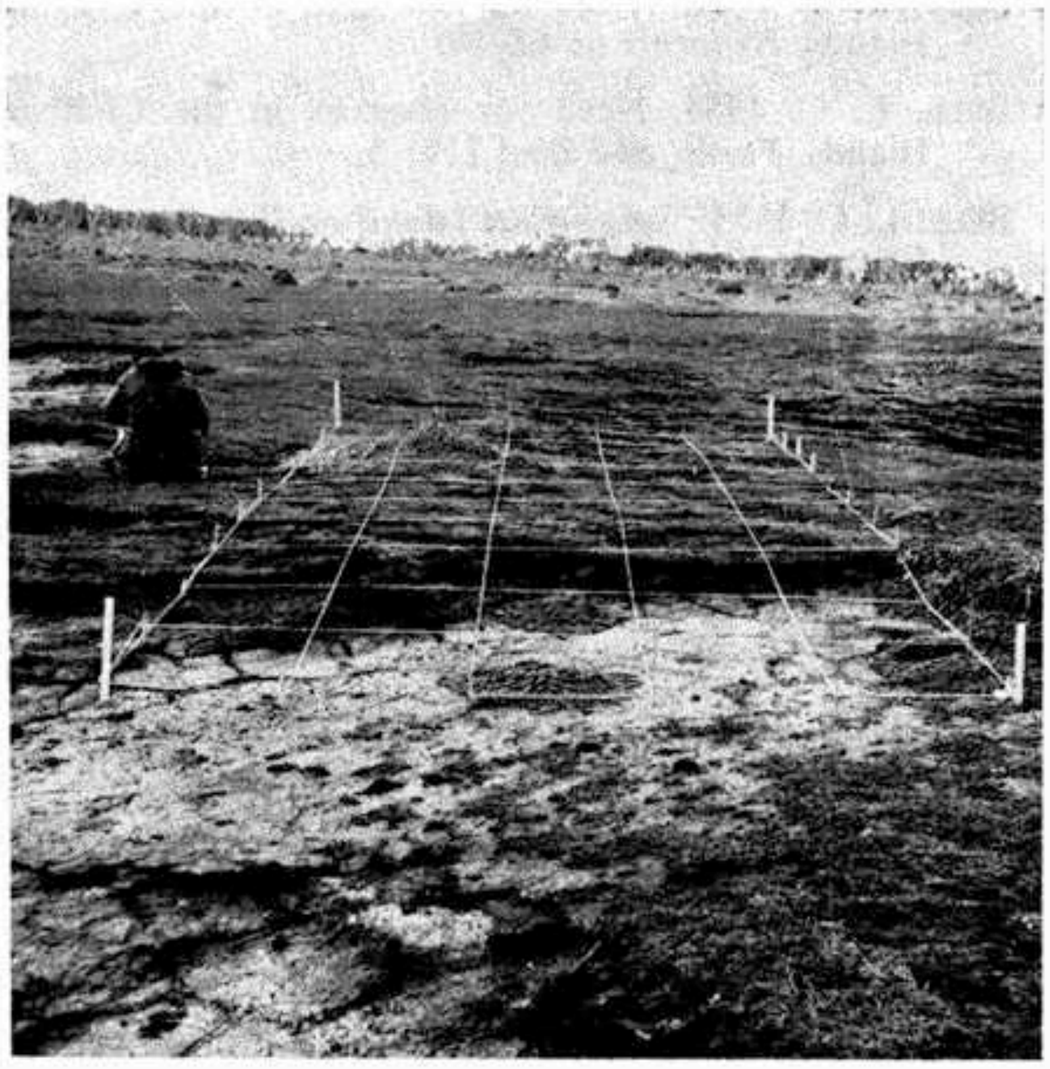

FIGURE 5. *Permanent quadrat, South-East Island*

Mangere and Little Mangere Islands

These lie three miles to the north-west of Pitt Island. They are separated from each other by a channel only 50 yards wide. The smaller island, Little Mangere, is steeply cliffed with a vegetated area of only about 10 acres, consisting mainly of wind-shorn *Myrsine chathamica* and *Muehlenbeckia australis* with probably only an acre of taller *Olearia* forest. Despite its size the islet is well known for its populations of the Chatham Island robin (*Petroica traversi*) and Forbes' parakeet (*Cyanoramphus auriceps forbesi*) which are now found nowhere else.

Mangere Island has an area of 279 acres. A low, narrow neck connects a low peninsula with a larger block which rises to 940 feet above sea level. This island has a long and varied history of grazing by sheep, goats and rabbits; but fire and wind probably played the major part in the removal of most of the bush early this century (Fleming 1939). By 1968 most of the island had a thick sward of English grasses and clovers with a few pockets of native, coastal scrub perched on inaccessible ledges and a remnant of coastal forest among the large boulders at the foot of the bluffs. On the main block isolated stems of *Olearia traversii* still supported tufts of leaves and a few flowers on the sheltered side. With the protection of the robins and parakeets on Little Mangere particularly in mind, Mangere Island was bought for the Crown in 1966 with finance from two Government departments and the Royal Forest and Bird Protection Society. In 1967 it was declared a reserve for the protection of fauna and flora. Tenders were called for the removal of the sheep but as no serious bids were obtained, one of the aims of the 1968 party was to eliminate them and the complete population of 250 was shot. In an attempt to assess the rate of regeneration, two permanent quadrats were laid out, one on the peninsula and one on the main block (Fig. 6). Despite the pastoral appearance of the

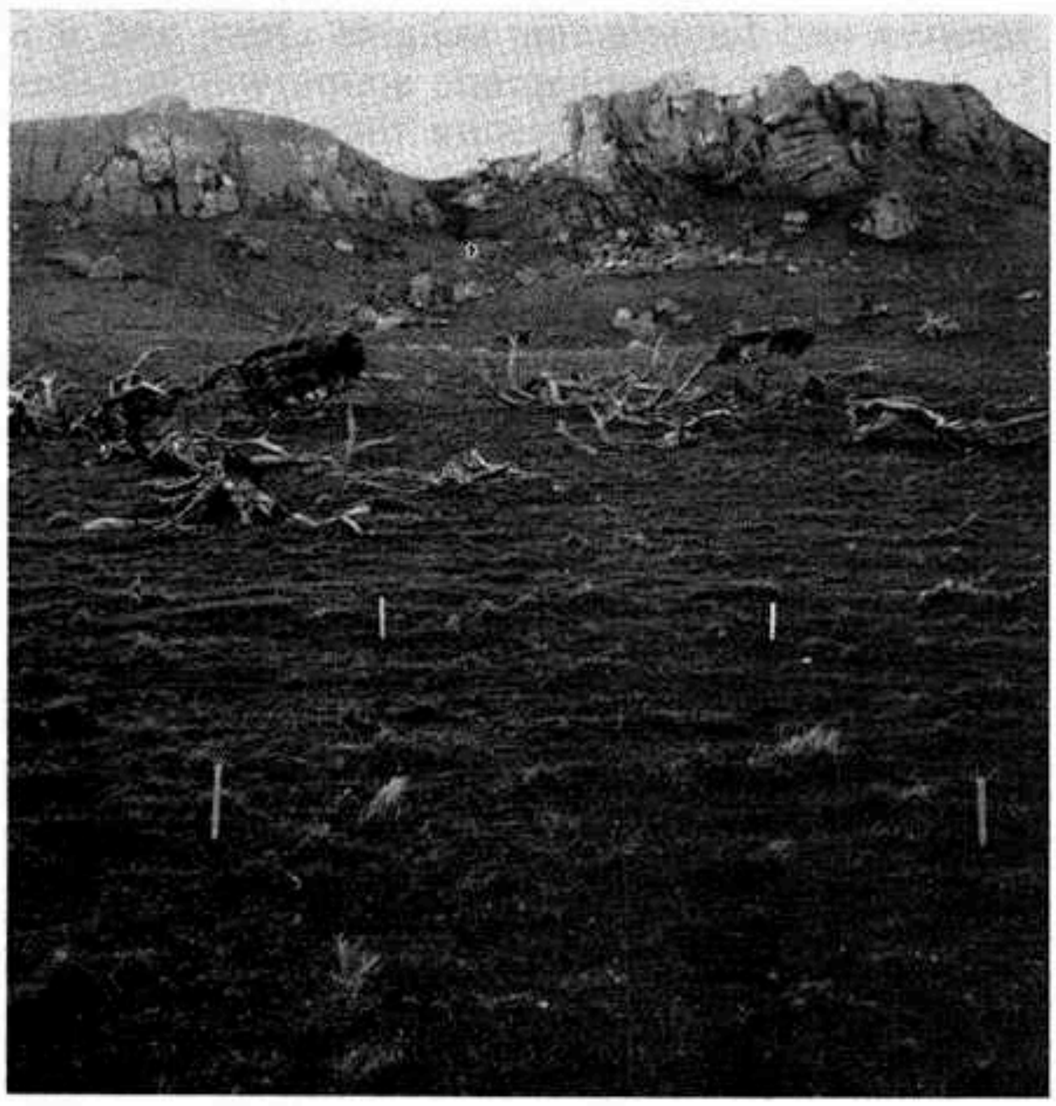

FIGURE 6. *Permanent quadrat, Mangere Island*

island, the bluffs supported a variety of native species, and seedlings of many of these were found under the numerous logs. The state of the native vegetation on Mangere suggests that action may have been taken just in time and that regeneration might be rapid and able to provide additional habitat for the two rare and threatened bird species.

CONCLUSIONS

Fleming (1939) stated that "The Chatham Islands, botanically and zoologically, are one of the most important biological provinces of the

New Zealand Region, and are at the present date the only such province in which no sanctuary has been set aside for the preservation of the characteristic flora and fauna". The situation now is not nearly so grave as far as the smaller islands of the group are concerned, with the notable exception of Little Mangere. Until recently, steep cliffs have ensured the isolation of this island. However, with helicopters in the area, a conservation policy based on remoteness is no longer valid, and so efforts are being made to acquire the island as a reserve. As for the bird and plant communities found only on the two larger islands. little has yet been achieved. Recent surveys should provide a reliable basis for assessing the need for reserves and for selecting suitable areas; and it is to be hoped that appropriate action will be taken in the near future to ensure their establishment.

ACKNOWLEDGMENTS

I am indebted to Mr B. D. Bell, Wildlife Service, Department of Internal Affairs, for the opportunity to accompany the party and to Dr E. Godley, Director, Botany Division, D.S.I.R., for financial assistance. I wish to thank Dr E. Godley and Mr D. A. Franklin for their constructive criticism of the manuscript.

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