SESSION 2: Chairman; Dr. R. H. Thornton

Diminishing Endemics at Chatham Islands and Possible Preservation

E. A. Madden

Chatham Islands were rich in endemic species when discovered in 1791. Centuries of Moriori habitation had no serious effect on plant and bird population.

New ecological factors, the axe and livestock, introduced by European settlers subsequent to 1840 to commence the farming era, took heavy toll of vegetation. Animal existence depended largely on native plants and the most palatable ones probably suffered most while others were destroyed or damaged by trampling. The importation of rabbits and hares was prohibited but similar wisdom was not shown regarding opossums.

Although most of the land is cleared now, numerous good-sized patches of bush still exist on many parts of the islands.

Olearia traversii trees are not scarce either in native bush or as single isolated trees on farmland. Most of the best trees have been felled for fence posts, for which purpose the timber is excellent.

Olearia chathamica is rare and now found only on exposed cliffs. It is a strikingly beautiful shrub when in full flower.

Olearia semidentata no longer can be found extensively in large colourful masses as in former times.

Senecio huntii is now a novelty. It is magnificent when in full flower. A few plants still exist on Chatham, Pitt, and outlying islands.

Cyathodes robusta is a small shrub confined to "clears" (open peatland) and not likely to become scarce for many years. The pink-berried variety is more attractive than the white.

Dracophyllum arboreum is unique in having juvenile and adult leaves on one stem. This small tree is found on bogland mainly.

Corokia macrocarpa is rare on occupied land but may be plentiful on the south coast. Its yellow flowers and orange berries make it an attractive shrub.

Geranium traversii was once prolific on coastal land but is now a rarity found only in places to which stock have no easy access.

Phormium tenax. I contend that as the endemic *P. tenax* is practically devoid of fibre and what it has possesses no tensile strength, it might rightly be regarded as a variety of the species. N.Z. *P. tenax* produces its characteristic good fibre when growing alongside the Chatham Island variety regardless of habitat.

Coxella dieffenbachii apparently suffered most from grazing animals. I have seen one plant in a garden on Chatham Island and a small colony in its natural habitat on Pitt Island. I hope some day to visit an almost inaccessible place where I understand several plants are thriving.

Mysotidium hortense is perhaps the most beautiful endemic plant. Due to grazing animals it is now extremely rare except in gardens where it loses none of its charm.

Poa chathamica being relatively unpalatable persists in swampy places on the "clears."

Gentiana chathamica will not become scarce for many years, indeed not until the vast expanses of its peaty bogland habitat are considerably modified will it disappear.

Aciphylla traversii was reputed to exist on cliffs at the extreme south of the island only, but I collected specimens on a station in the far north where sheep, but never cattle, may occasionally graze.

Sonchus grandifolius has big succulent leaves, of high palatability probably, so is found only occasionally amongst marram grass on sand dunes where stock are excluded.

The above mentioned are a few endemic plants of which I have acquired a little knowledge. I have avoided reference to interesting ones with which I am less familiar but you will realize from the examples quoted that some of these unique plants are worth preserving.

Now that South East Island has been declared a sanctuary and is soon to be cleared of livestock we can be reasonably assured that native flora will regenerate.

I believe that the right approach to some settlers would induce them to establish sanctuaries on their farms. This would not be without sacrifice such as loss of grazing, additional fencing, maintenance of fences and possibly opossum control at frequent intervals. One family willing to co-operate in such a scheme has commenced to fence-off the sanctuary area. This Society could render a service to future ecologists by supporting schemes to preserve endemic plants in their several natural environments in Chatham Islands.

Ecology of some New Zealand Seabird Colonies

Mary E. Gillham

Effects of colonial seabirds on the vegetation amongst which they nest fall into three main categories: (*a*) trampling and track formation; (*b*) burrowing; (*c*) manuring. Other biotic influences, such as the grazing mammal and man with his inevitable following of alien weeds, have more general implications but also involve specific aspects. For example, the degree of mammalian grazing and trampling affects the burrowing birds, and many alien plants appear to compete more adequately than indigenous ones in the heavily manured soil of bird colonies, their local distribution being assisted by gulls.

The effects of bird trampling are largely mechanical and the lush growths induced by guano are especially susceptible to breakage. Penguins breeding considerable distances from the sea may form well-defined tracks to the nests, sometimes bare, sometimes floored by nitrophiles such as *Tetragonia trigyna*. On steep tracks trampling may be localised at halting places—bare areas surrounded by guano-splashed coprophiles. Mutton birds nesting in bush often drop vertically through the trees but take off by flapping their way along well-marked flight tracks to the cliff edge, breaking the marginal ferns and fouling the peaty soil.

The most numerous bird species are burrow dwellers and ground may be honeycombed with tunnels affecting both soil water relations and erosion. Friable mineral soils suffer from the introduction of drying air currents and high atmospheric temperatures below ground. These aggravate soil drought and the only surviving plants may be creepers rooted at a distance (*e.g.*, *Mesembryanthemum australe*) or ephemerals exploiting a period of wet weather (*e.g.*, *Poa annua*). Peat soils in the shady bush and wet climate of Stewart Island get no chance to dry out in this way and burrows assist penetration of water and aggravate soil water-logging—*i.e.*, they make dry soils drier and wet soils wetter.

Mineral soils are often harder than peats, burrowing is hindered and burrows tend to be more superficial, so roofs cave in, causing further breaks in any protective mat of vegetation. Quite large slips may result and the soil so exposed erodes very easily. Domestic livestock trample through into the burrows, consolidating the soil and lessening the amount of erosion in spite of their grazing of the plant cover. Peaty soils are more fibrous and erode less easily. They are softer and burrows tend to penetrate deeper, the surface crust collapsing less readily. On erodible slopes, most burrows penetrate the more stable soil beneath the tree roots or boulders; on slopes consolidated by stock, the looser soil of steep faces between "terraced" tracks.

Diving petrels may form tunnels above ground in *Muehlenbeckia complexa* thickets, *Poa* tussock and sedge.

Where manuring is intense as in shag and gannet colonies all macroscopic vegetation is eliminated during the breeding season, nitrophilous algæ such as *Prasiola crispa* and annuals such as *Senecio lautus, Stellaria media, Poa annua* and *Hordeum murinum* occurring after the birds leave. Where nests are more widely spaced (*e.g.*, some gull colonies), a few peren-