

the growing of exotic forests in New Zealand, formerly viewed with suspicion, is now being justified by demands for war-time projects. *Pinus radiata*, which twenty years ago was little used now ranks third of all commercial timbers. It supplies all fruit casings and much temporary building material, and in addition large quantities are required for munition containers, and for concrete piling.

Utilization of Waste. Restriction of paper imports has necessitated the use of suitable thinnings for rough types of paper and cardboard-making, and dangerous waste material is now consumed in the production of formerly imported fibre-boards and mill-board. Such utilization increases the management efficiency and hygiene of these forests.

A major problem for long has been the utilization of thinnings, which in larch plantations formerly gave a return too small to render the operation economically; however, war-time use in tunnelling, trenching, and shelter building, and in power and communication lines now enables this process to be carried out on a financially sound basis.

Charcoal as a war-time commodity is being produced from waste material of beech milling and from sawn sawn timber.

The trend of demand, therefore, is having a significant influence upon the use and treatment of our forest areas.

IMPRESSIONS OF BUTTERFLY CREEK.

On November 29th three fortunate Bot. Sociers, under-led by heavy rain at getting-up-time, visited Butterfly Creek. The day was ideal. A fresh wind was a welcome spur up the shrubby hillsides. Within the beech-forest, filmy ferns and bryophytes, refreshed by the rain, looked very different from the parched, curled and faded shadows of themselves which alone might have been seen in drier weather.

The trip was particularly satisfying for the orchid-lover. Ground orchids were first met with in the stunted wind-swept scrub -- two species of *Thelymitra*, one in flower, and a fruiting specimen of the dainty fairy *Caladenia minor*. In the beech-forest patches of

Corysanthes triloba, some common. There was one small clump of *Chilodactylis cornuta*, with broad membranous leaves, characteristically two to a plant, and rather large green flowers. The leafless mottled flower-stalks of *Gastrodia cunninghamii* were found to be plentiful when once the eye had become used to discerning them in the shadows. A few of the large brownish-white flowers were fully open. This leafless orchid is a saprophyte, obtaining its organic nourishment from humus, with the aid of the fungus which inhabits its underground tubers, instead of elaborating it from carbon dioxide and water as do plants possessing green leaves.

In the swamp-forest on the level area between Butterfly Creek and Gillian's Stream, the broad-leaved epiphytic orchid, *Sarcochilus adpressus* was seen in flower. Here also the ground was strewed with shed corollas of putaputa (*Carpod. serratus*). A strange and unknown shrub later proved to be *Bignonia melia*, that myrtaceous tree confined to swampy ground, from which it raises untidy masses of aërating roots.

On the way to the fire-place (where later bilbies, milk and sugar were found to be superabundant, and tea by no means forgotten), the ground was strewn with pollen-gone clusters of metal, now brown and rain-sodden. Growth-stages of another podocarp were also of much interest -- rankkaka seedlings a few months old, plentiful on several small patches of wet ground, suggesting that 1942 had been a good seed-year for this species, and that germination conditions had been favourable.

Beyond the fire-place, the undergrowth is a paradise of diverse eating shrubs.

The homeward trip was made via the MacKenzie Track, where wood-rotting fungi of the shelf type abounded: tobacco-brown *Olyporus tabacinus* on a fallen log; *Peziza hemisphaerica*; stout young specimens, still creamy-white over their whole surface, made a striking sight on the trunk of a dead standing tree, while an older specimen, on the under-surface of a log, was brown on top.

Lythrum tetrapetalum, a parasitic shrub closely allied to the English mistletoe, had dropped its slender scarlet petals on the track, and the plant, a mass of blossom, was soon found high up the trunk of a beech tree. B.B. Ashcroft.

THE MOSSES OF WATERFALL GULLY IN THE TARARUA FOOTHILLS, NEAR CARTERTON.

(This article relates to a field of New Zealand botany in which few records are available. A similar but more general paper "Mosses and their Habitats in the Atiamuri District, New Zealand" by Mr K.W. Allison, was published in 1931 in the Victorian Naturalist, presumably for want of a suitable journal in this country.)

Most of the genera and many of the species here mentioned may be seen in any bush ramble near Wellington. For the most part they are recognizable in the field and some acquaintance with them adds to the pleasure and interest of any excursion. All except those species marked * are in the Botany Division Collection from Wilton's (Bush, Ed.)

Having in May noted or gathered a number of interesting mosses in Waterfall Gully at Dalefield near Carterton, revisited the area on December 22nd, 1942 in order to secure if possible "fruiting" plants of mosses which at the time of my earlier visit bore no spore capsules at all. The following summarizes my notes on the moss inhabitants of this area of not more than half a square mile and at an elevation nowhere greater than five hundred feet.

Clay banks in the lower valley had mainly Campylopus cruciatulus and C. introflexus, Polypodium juniperinum. Mosses are diminutive and less common cousin Pogonatum subulatum. The dominant mosses on the scattered, sun-baked boulders in and bordering the upper valley below the bush were Campylopus introflexus and Rhacomitrium crispulum. The latter a close relative of the hoary moss which on Mount and elsewhere is commonly known as 'The Moss'. This species was found in abundant fruit in May last.

Stones or logs near the stream in places exposed to full light carried golden mats of Thuidium furfuraceum, pale yellowish mats of Stereodon cupressiforme, fruiting tufts of Bryum truncatum, and what may be Brachythecium. Logs and stones subject to shade for part of the day it also in the stream bed, the Thuidium remained green, and Ptychomnion aciculare, Mnium rostratum and Bryum species noted, and the ubiquitous Stereodon was equally common.

On the upper side of the dilapidated bridge in mid-valley where water seeps down the bank into the main stream, Philonotis tenuis, more commonly found at higher levels, was fruiting abundantly, while in gritty soil adjoining the running water and also below it, Tridentium minus in early fruit was plentiful.

Following the northern branch of the stream towards the Kopuaranga Waterfall, we enter the sub-tropical rain forest typical of the eastern Tararua, where conditions in the stream bed become dark and humid. Here on the bank bordering the stream hepatics outnumber the mosses, a more conspicuous being species of Plagiochila.

Hymanophyton, Symphlogyna, Trichocolea, Monoclea, and Mastigobryum (?). The dominant mosses were the two umbrella mosses Hypopterygium setigerum and the larger H. filliculiforme, both fruiting freely in the more moist spots and sufficiently attractive to claim the attention of even the "great unobserved". Associated mosses were Thuidium furfuraceum in full fruit, the winter fruiting Cyatophorum bulbosum, Rhacomitrium strumiferum, and no less plentifully Rhacomitrium robustum, a moss omitted by Mr Zotov in his Tararua list (Trans. Roy. Soc. N.Z. Vol. 68, pp. 210-217), though it occurs also near Waikanae. Rocks wholly or partly submerged carried Fissidens rigidulus in mature fruit.

On rotting logs and tree trunks the mosses noted included all of the above excepting Fissidens, together with the following:- Stereodon chrysogaster, S. cupressiforme, Rhizogonium distichium, Thuidium furfuraceum, and what is probably variety Fulvastrum, Ptychomnion aciculare, and a single tuft of a Campylopus which may be C. arboricola, but which I have not yet sectioned. Homalia falcata was perhaps an unexpected find, though it ranges into the South Island. A moss fruiting abundantly I believe to be Rhynchosostegium tenuifolium, and on a tree fern Catharmonia ciliatum completely clothed the stem on the illuminated side to a height of ten feet. Like all the other mosses listed above, save the variety of Thuidium, this was in ripe fruit.

Pendent streamers of Weymouthia cochlearifolia and the more slender W. mollis, the latter alone bearing spore capsules, were common. Horizontal branches bore tufts of Cladomnion ericoides, Dicnemon calycinum, and Ptychomnion aciculare as their common epiphytes; while stems of sedge-jack (Rhipogonum) and upright tree stems had a different list comprising Trachyloma planifolia, Cryphaea tasmanica, Orthotrichum tasmanicum, Campitochaete ramulosa (?), Hypopterygium concinnum, as well as species of Lagiochila, and occasionally Cyatophorum bulbosum. The spray-washed rocks at the falls were carpeted with Fissidens rigidulus, dark green and fruiting copiously. This was bordered with Thuidium, but the rocks were quite too inaccessible for close examination. A few sterile pieces of what may be Thamnum pendulum were gathered.

Leaving the stream and following the track that leads to Totara Flat as far as the summit of the first of the first ridge, Neckera hymenodonta was observed on

chylotia stems, Funaria vesicularis on wet rocks and Funaria hygrometrica on the drier rocks on the forest floor, a recently fallen dead branch one remarkable tuft contained no fewer than three masses of comparatively rare occurrence in the area, viz. Neckera Hymenodonta already noted, Portula rubra only once previously recorded from the Tararua (by Miss Moore), and Dicelodontium nitidum, as previously noted at all.

Under beech trees (Nothofagus solandri and N. fusca) on the ridge summit, the stony ground carried a mossy carpet comprising for the most part golden mats of Thuidium reviviparum in early fruit (fruit is ripe in May), dense mats of Acanthocladium externatum, and pale yellowish mats of Tychochloa acicularis. Also abundant but of less systematic importance were tufts of Dicranoloma billardieri in full ripe fruit, and two other species without spores. Amongst these mosses the following, all fruiting freely were scattered: Bryum truncatum, Portella glycina, Hypopterygium novae-zeelandiae, Stereodon chrysosporum, Scapanus formosus, Campylopus truncatus, and a tuft of what I believe may be C. capillatus, though this requires confirmation. Breutelia pendula grows on the side of the track.

On the bark of live beech trees the following epiphytes are gathered: Cladonia ericoides, Dicnemon calycinum including a very slender form or variety, Macromitrium longipes, M. waimouthis, and most interesting of all Leucocarpus recurvum. Dixon states that this moss has been collected only at Kopuaranga in the North Island and one locality in the South Island. This may be the area referred to, as the falls on this stream are known as the Kopuaranga Falls. Ceratodon purpureus grows on dry soil where fire had burnt part of the forest, and a form of Leucocarpus recurvum was noted on the clay soil.

Of the sixty or more mosses observed, three are new additions to Zotov's list of Tararua mosses, viz. Dicelodontium nitidum, Macropodium robustum, and Macromitrium recurvum. If two other mosses are correctly identified as Rhynchostegium tenuifolium and Campylopus capillatus they would be further additions.

W. Martin.

PROBLEMS, POLITICS, AND THE PARASITIC FUNGUS.

By Dr. I. V. Newman, 20.11.42.

This lecture, based on a book "The Advance of the Fungi" by E. C. Large, emphasized the social relations of science and scientists.

The basic thread-like structure of fungi was described and the wide range of organic matter utilized by various fungi was indicated.

Parasitic fungi often destroy their hosts, and when these are food plants human welfare is affected. The relation between the incidence of potato blight in Ireland and the political events in Britain in the nineteenth century were traced in some detail. The repeal of the Corn Laws had accelerated emigration from Ireland to America, were shown to be direct results of rapid growth and spread of Phytophthora infestans (causing blight), following a particularly favourable weather cycle.

Not destruction but a reduction in the quantity and quality of the harvest is caused by rust (Puccinia graminis) on leaves and stems of wheat. Over-production of wheat occurs periodically, and the size of the crop is sometimes limited by political means. Reducing the damage due to rust is the province of the scientist, the success of whose work in developing rust-resistant strains of wheat may lead to over-production, with its political and social repercussions.

Most of the complicated life history was worked out in the sixties, when it was shown that barberry was the intermediate post-winter host from which the new crop of wheat was infected each year. It was only in 1927 that Canadian workers showed that the cycle is completed only when flies transfer material from a pustule of the one strain to a pustule of the other strain on the leaves of barberry. In the less rigorous winters of the southern hemisphere, it appears that wheat rust can overwinter in the summer form on grasses, and the barberry stage is usually eliminated.

The production of varieties of wheat resistant to different strains of rust (there are at least 53 described within Puccinia graminis tritici) has developed plant breeders' methods of identifying hybrids between rust strains and the probable future lines of research indicated.