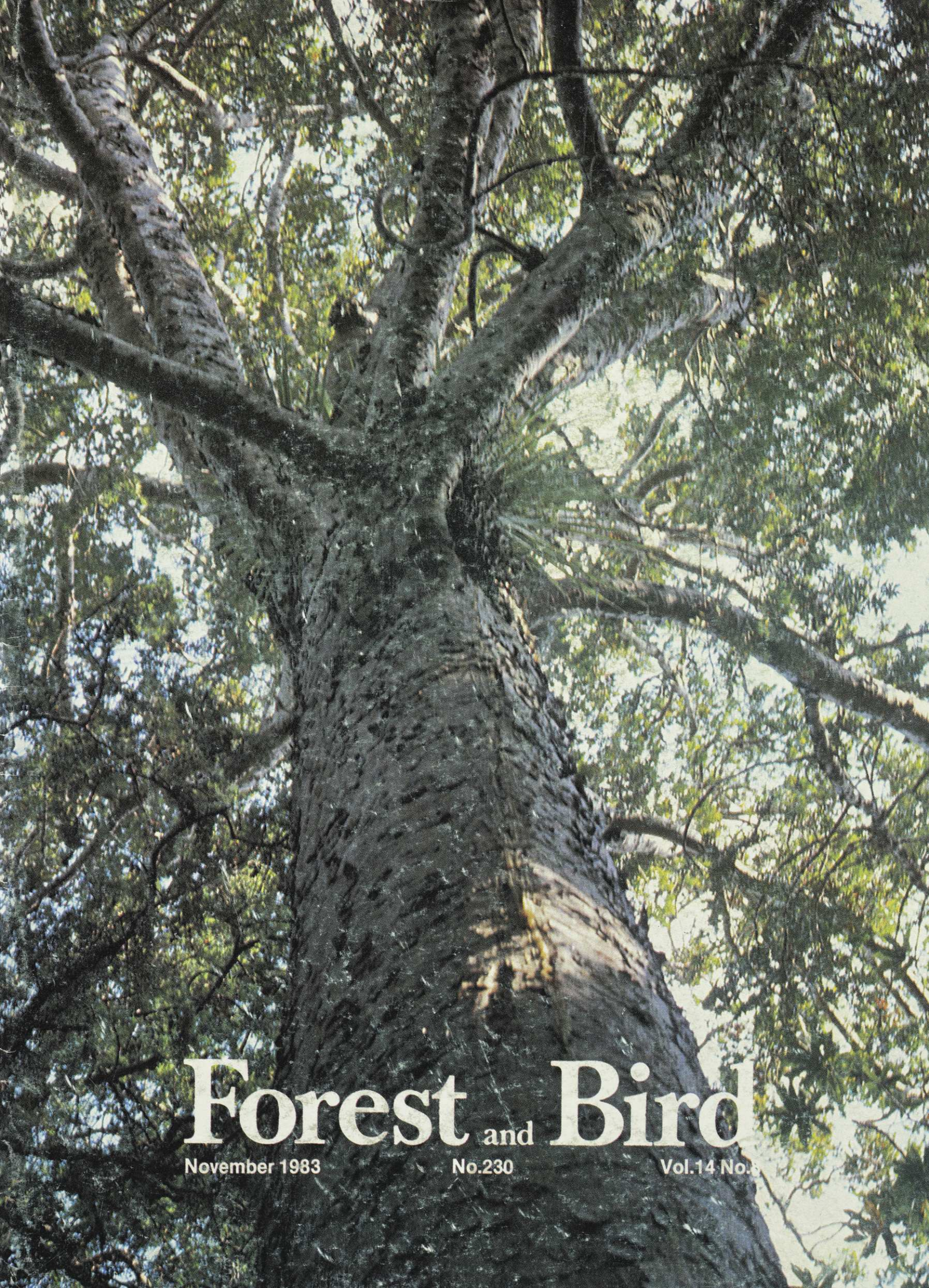

Forest and Bird

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IN THIS ISSUE

COVER: Standing sentinel on a spur, a magnificent Coromandel kauri faces down on the deserted old shafts of the Comstock gold mine on the Waiomu Stream bank. But fresh mining threats are on the Paroquet Stream 2 km to the west. Photo by David Collingwood.

INSIDE COVER (OPPOSITE): Old Mill Nugget, a picturesque islet in Halfmoon Bay, Stewart Island. Photo by David Gregorie.

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Conserving wetlands

PROPOSALS to conserve natural habitats don't stand much chance of succeeding these days unless they are comprehensive and take account of the effects of forgone development on the local community and the country generally. We might expect, therefore, that development proposals might equally take adequate account of the natural habitats that they may change or destroy. And this has been the case, so it seems, for the proposal to mine kauri resins from the Kaimaumau wetlands in the far north.

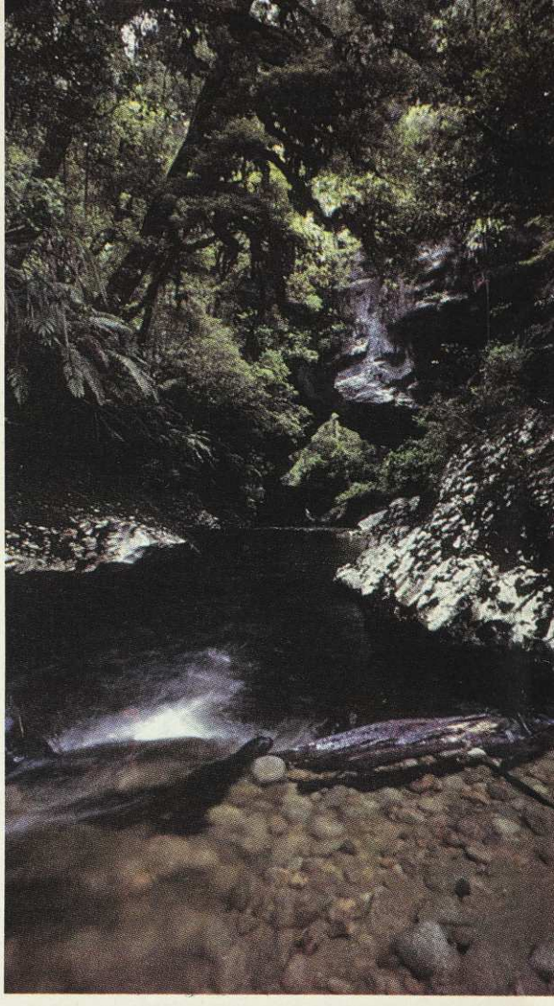
The Government's recent decision to set aside 895 ha of the swamp as a public reserve because of its high environmental value while licensing 1400 ha for mining seems a satisfactory outcome. Many of our members would hold that all of the swamp should be conserved for the benefit of its native plants and animals, but to do so would deny the far north the prospect of jobs which are so needed there.

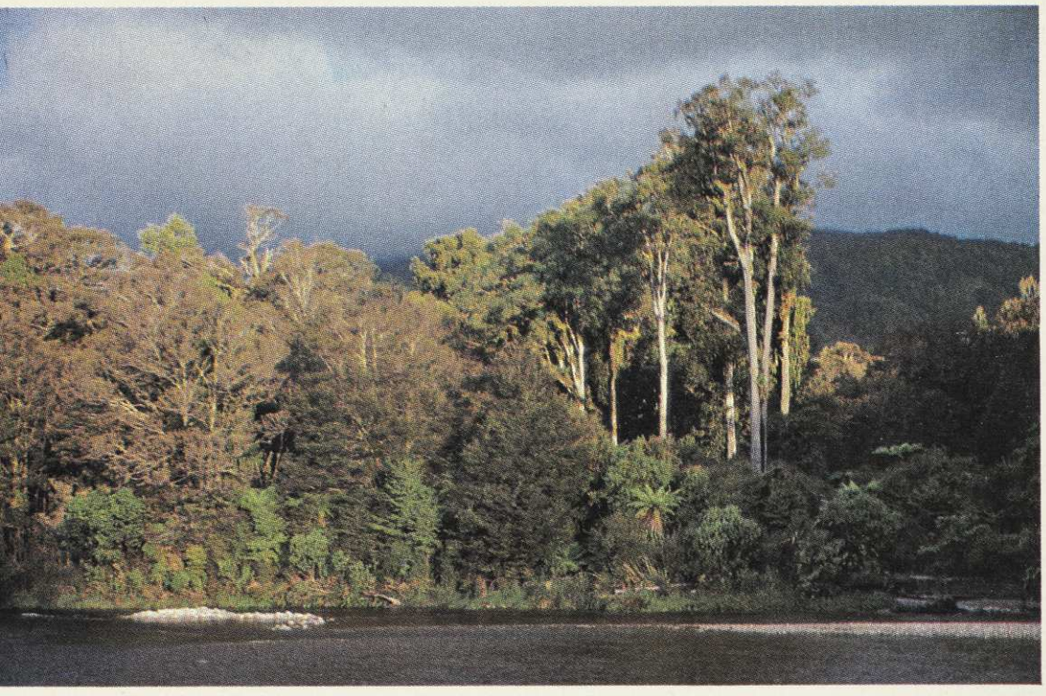
It's a different story in the Maniototo in Central Otago, where half of the great upland moss swamp has already been destroyed by development work for an irrigation scheme which may now not proceed because of a reappraisal of its cost. Wetlands are so vulnerable. Once drained they can never be fully restored. And so this already shrunken habitat of so many of our special animals and plants contracts still further.

The deferment of the polder scheme for reclaiming much of Lake Wairarapa has bought some time for that important wetland, but in the Waikato development proposals for coalfields present a major threat to another significant area of wetland habitats.

In a year in which the Society has concentrated on conserving wetland habitats there have been some successes, but the threats remain. It is one thing to defer or compromise a development proposal that threatens to destroy wetland, but what the Society wants is recognition of the importance of wetlands which will result in their permanent protection.

— A. S. Edmonds,
Deputy President





Above: Moria Gate (north side). This is the uppermost (and prettiest) of the three limestone arches of the Oparara, at present untracked.

Top left: Moria Gate (south side). Note the figure under the arch, on the river bed, for scale and also the overhanging New Zealand tree daisy, *Senecio hectori*.

Middle left: Podocarp-beech forest on rich alluvial soil in the upper valley. In 1978 DSIR botanists gave the Oparara forests top priority as a key site for the preservation of lowland forest stands in the northern South Island.

Bottom left: The native blue duck, once abundant on fast-flowing waterways, is rapidly decreasing in numbers. Pairs and individuals can still be seen on stretches of the Oparara River.

The scenic splendour of the Oparara

THE OPARARA BASIN encompasses an area of about 10 000 ha of native forests and spectacular and deeply entrenched streams. The basin lies just north of Karamea in the North-west Nelson State Forest Park, close to the well-known Heaphy Track.

By Peter Lusk

NATIONAL attention focused on the Oparara in 1981, when holiday makers discovered the Forest Service using jellied petrol to burn 57 ha of logged native forest to make way for pines. Protests flared up in the newspapers, questions were asked in Parliament, and conservationists set up a barbecue selling "fried kiwis" and "baked land snails" outside the Forest Service head office in Wellington.

Soon after this the Forest Service released management plans for the Oparara which zoned a substantial part of the basin for logging or conversion to pines (see map). Public submissions have been highly critical of these proposals, but so far no plan revisions have been made public.

Extraordinary area

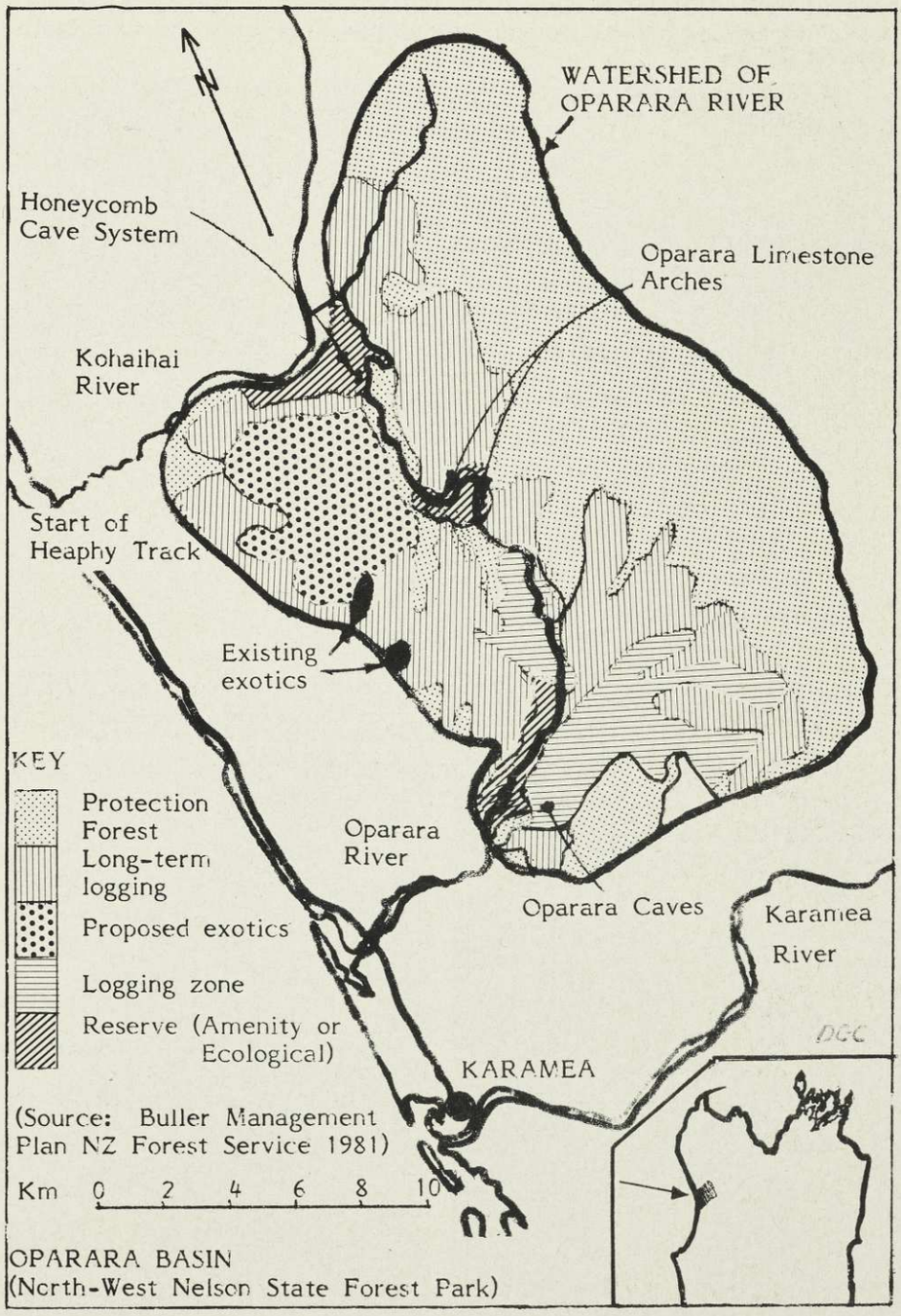
Now is a good time to look beyond the burn and learn more about this extraordinary area, which Friends of the Earth has nominated for a World Heritage Site.

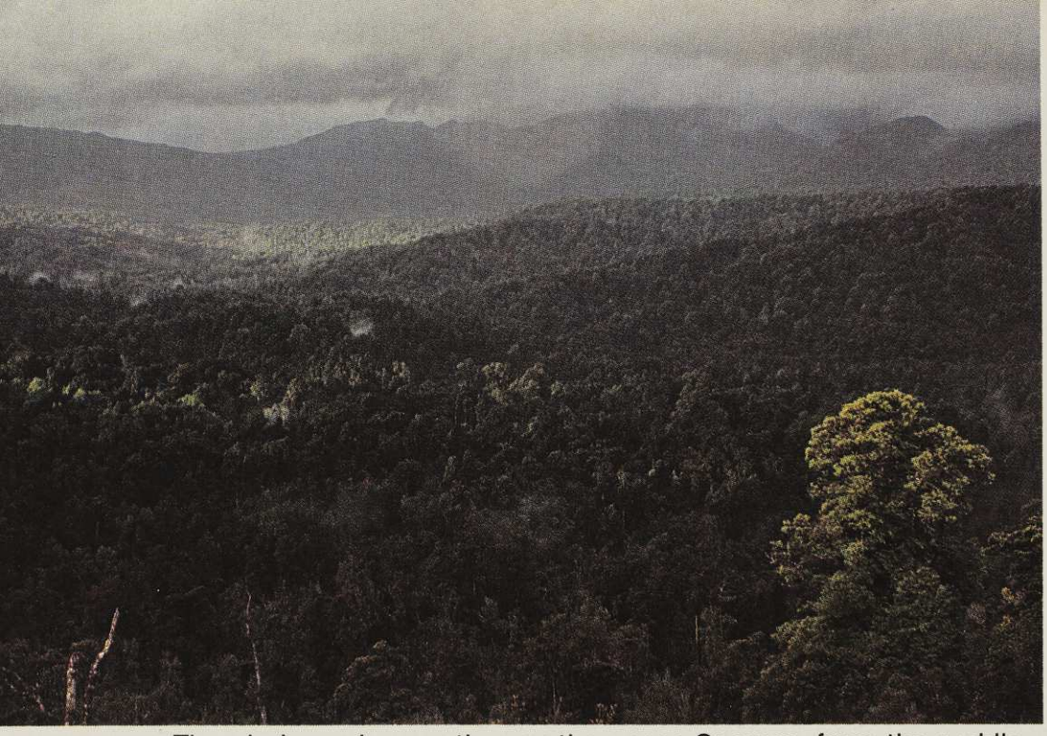
The Oparara River drains a long, broad basin flanked by granite mountains. A narrow belt of limestone runs the full length of this basin, with the river flowing through it for most of its 16 km.

Native wildlife abounds. Kiwis, parakeets, robins, wekas, and blue ducks are fairly common. When I camped there last Christmas a flock of four kakas woke me up every morning with their screeching.

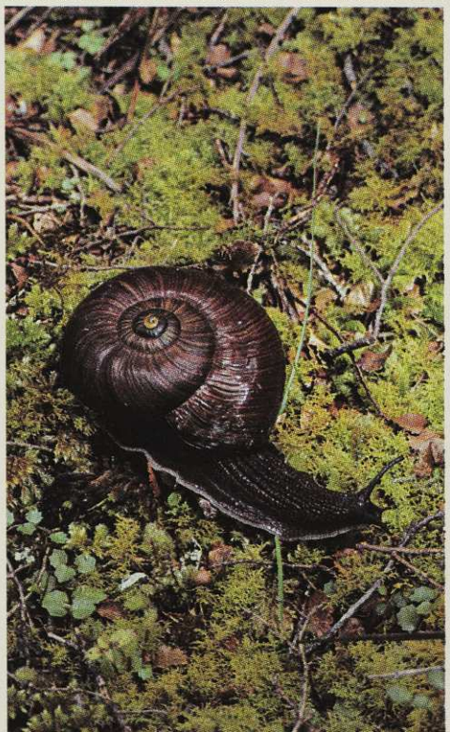
Cradled in the valley floor, on a flood plain where the river makes one of its rare excursions from the limestone, is a very special area of forest. In a DSIR survey this virgin kahikatea, rimu, and silver beech forest was given the highest rating in the northern part of the South Island. Untouched forest of this quality on fertile soils has become very rare. It is only in isolated pockets such as this, beyond the reach of loggers and farmers, that it has survived.

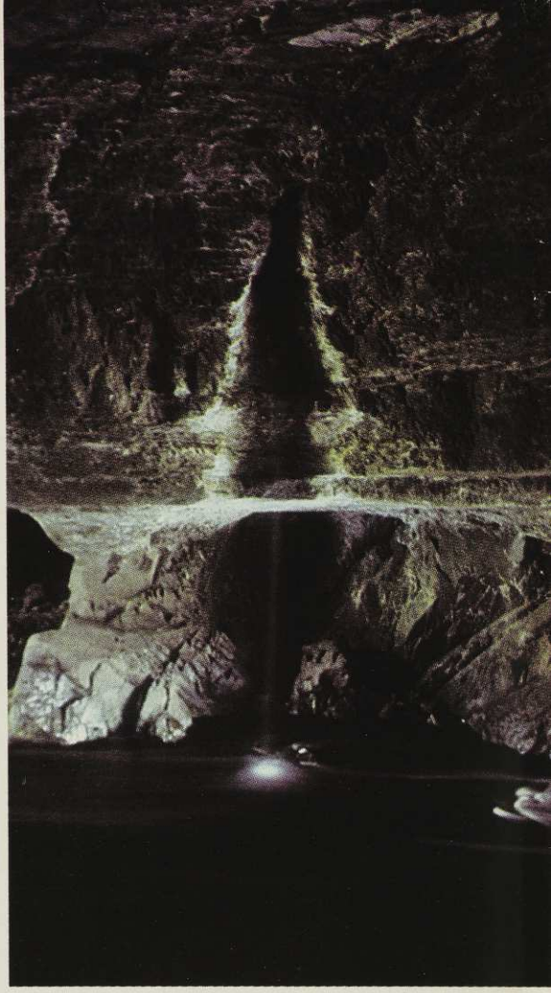
The limestone belt of the Oparara has only recently been carefully explored. Deer and possum hunters always





The glorious view north over the upper Oparara, from the saddle road. The DSIR has recommended that all the unlogged forest in the valley be designated an ecological reserve. This has been endorsed by the Society.





Above: This unusual waterfall, in the middle of the Oparara Arch, occurs where water flows through a crack in the limestone and drops into the Oparara River.

Left: This area of native forest has been clearfelled ready for burning and planting in pines. An adjoining area was napalmed by the Forest Service in 1981, raising the ire of conservationists. There are plans to burn and plant 600 ha, unless members write to the Minister of Forests and the Forest Service.

Left: *Powelliphanta annectens*, the carnivorous giant land snail, is confined to only a few colonies in the Oparara and on the Gunner Downs to the north. Much of its Oparara habitat has been severely modified by logging and eucalypt interplantings.

Far left: The kidney fern is just one of the many different plant species that await discovery by botanists in the diverse forests of the Oparara Valley.

skirted around the edge, fearing the cracks and sinkholes that lace the surface. Local enthusiasts had found many caves over the years, but often lost them again.

Honeycomb Hill Cave

When Phil Wood and the Buller Caving Group began exploring in a systematic way they found a treasure — an enormous underground complex with the richest deposits of sub-fossil bird bones ever found in New Zealand. They called it the Honeycomb Hill Cave.

At least 39 entrances and 6 km of passages have been mapped so far. National Museum scientists are now studying the bone deposits, and the Forest Service is providing financial support. More than 50 bird species, many of them extinct, have been recorded.

Of special interest is the first South Island specimen of the Stephens Island wren. This bird has previously been known only from Stephens Island, a small wind-swept island in Cook Strait, but it was wiped out by the lighthouse keeper's cat in 1894.

The scientists have also been excited by an entirely new species of extinct wren. From the look of its heavy pelvis and stocky legs the wren seems to have been flightless.

The primitive and unique New Zealand wrens have no close relatives anywhere in the world, and knowledge of them is necessary to understand the evolution of more advanced birds both in New Zealand and overseas.

Among the other extinct birds are nine different moa species, giant flightless goose, Finsch's duck, the giant New Zealand eagle, the giant flightless rail (*Aptornis*), the flightless coot, and the New Zealand owlet nightjar.

The bone deposits show that many birds which are now rare in New Zealand were once very common in the Oparara, for example, kakapo, South Island kokako, takahe, and the yellowhead (native canary). Petrel and shearwater remains show that these sea-birds once nested in the valley.

The scientists Phil Millener and Sandy Bartle believe the find is of international significance. But they have appealed to the public not to visit Honeycomb Hill until the study is completed and "graveyards" are cordoned off.

Oparara Guidebook

Pete Lusk, in association with Friends of the Earth, has compiled an informative guide to the Oparara Valley. With attractive colour illustrations, this 20-page booklet is now available from Forest and Bird, or from Friends of the Earth, P.O. Box 715, Nelson, at $2.95 (plus postage).

Oparara Arches

All visitors to Karamea should, however, make a point of seeing the magnificent Oparara Arches. These are three giant bridges of limestone which straddle the river, and two are within easy walking distance of the road. The whole Oparara basin is part of North-west Nelson Forest Park, and the Forest Service has opened up tracks to two of the arches. The third, several kilometres upstream, is hard to find in the jumbled limestone country.

The forests of the Oparara are home to the giant land snail (*Powelliphanta annectens*). In some places, especially during rain, you have to be careful not to tread on them. The biggest ones are up to 8 cm across. They are protected by law, and the public are not even allowed to take empty shells. The Forest Service has always been exempt, and during a burn hundreds of these handsome snails are incinerated.

Logging has been going on in the Oparara for more than 20 years. About one-third of the merchantable forests in the catchment has already gone, including the best of the rich forests on the valley floor. At the present time the rimu-rata forests on the western slopes of the basin are being logged.

After the rimu has been taken the remaining trees are clearfelled, spread with a herbicide to kill any regrowth, and burnt on a hot afternoon in summer. A helicopter is used to drop jellied petrol around the burn area to get a good firestorm. The following winter the exotics are planted, mostly *Pinus radiata*.

30 years' logging

The Forest Service plans a total of 600 ha of exotics to keep the timber industry going in Karamea. But because the pines have only just been planted, the native logging must continue for at least 30 years until the exotics mature. And 30 years' logging would just about skin out the lowland forest of the Oparara.

Karamea depends for about 15 percent of its jobs on the timber industry and though many of the local people are very anti-conservationist, they are starting to realise that native logging can only continue to decline. On the other hand tourism has a great potential for growth and when outsiders praise their district for its scenic wonders Karameans do respond with pride.

Veteran conservationist Tom Hay, of Lyttelton, has been working to save the Oparara since his first visit in 1959. This

year he persuaded Friends of the Earth to devote its 1984 calendar entirely to the Oparara. Friends of the Earth has applied to UNESCO for World Heritage status for the Oparara. Its many special features, and the fact that it is bounded by the proposed Tasman Wilderness Area and the Heaphy Ecological Area makes it a prime candidate.

Access to the Oparara is by an 18-km logging road which is not open to the public when logging trucks are working. The lower Oparara or Fenian area is easily reached by a beautiful bench track dating from the gold-mining days. It is not signposted, and the turn-off is through the Karamea limeworks. Do not be put off by the notice "Persons trespassing do so at their own risk".

Photos by Derek Shaw. ■

Holiday house

Mr and Mrs Wallace Bennett, members from near Dannevirke, have a vacant house on their property at Weber which they would lend, for a nominal charge, to members wanting a country holiday.

The house is fully equipped with utensils and crockery, and only bedding is needed.

Weber is about 35 km south-east of Dannevirke on the road to Herbertville and Akitio. The countryside is interesting for walking, and the house is within driving distance of Herbertville and Akitio beaches.

Details are available from Mr and Mrs Bennett, Private Bag, Weber, Dannevirke, or telephone 658 Weber.

Supplements to issue

Accompanying this issue are two leaflets and a supplement, *Bush Telegraph*.

BOOKS

Hawke's Bay for the Happy Wanderer: Sheila H. Cunningham

This is an excellent walks book, well illustrated and including clear maps for a series of 75 bush and open country walks that take one to the interesting and beautiful places in Hawke's Bay and its hilly hinterland.

Sheila Cunningham, who has contributed articles to the Junior Section of *Forest and Bird* for several years, has now made an admirable handbook for the visitor to Hawke's Bay. It is the result of 8 years of walks by members of the Napier Branch of the Society, who explored on both private and public land in parties with ages ranging from 8 to 80.

As she says, "The aim was to have a happy day in the country" with ample time to absorb something of the local history, enjoy the views, and take an interest in the flora and fauna.

The book can be dropped into a pack or the glove box of a car; it would even fit into a capacious pocket, as it measures only 15 by 21 cm and is 1.3 cm thick for all its 175 pages of text and 36 colour pages.

The 72 colour photos included are a half page each, and every one illustrates the text with clarity and sharpness.

The book is very readable. It is brimming with historical information, and one can clearly trace the walk in the mind's eye through the wealth of flora and fauna and landscape description.

This excellent book is a personal endeavour by the author, who has also funded the publishing at much personal cost. It is a wonderful act when she throws such great light on the beautiful places in an area so localised. That this seemed to limit the success of the venture has been disproved by the wide acceptability the book has achieved. I have shown it to colleagues and friends and they all say it makes them want to go to Hawke's Bay; they had never realised!

This book is of interest to all Society members throughout New Zealand, who will be the richer for knowing about the delightful country and its walks.

It is very much a Forest and Bird publication and will give the Napier Branch and its walkers much credit.

I strongly recommend this book to all and it is a "must" if you are going to holiday in the Hawke's Bay region.

— David G. Collingwood

S. H. Cunningham. $14.95.

Natural History in Auckland: *Tane*, journal of the Auckland University Field Club

Every year the Auckland University Field Club publishes *Tane*, a handy booklet covering major studies and researches done by the club during the year, plus allied contributions by individual students. It has built up to be one of the largest scientific journals in New Zealand and is the only regular scientific publication from the University of Auckland. Managed as well as written by students, it can always be counted on to produce good science written in an interesting way.

But the 1983 *Tane* is something even more special. To mark the centenary of the University of Auckland it has widened its scope and drawn on the field of high expertise available among members of the university staff and on other scientists associated with the university who also have links with the field club.

The result is a soft-covered book of 249 pages which deals with more than a dozen different aspects of the biology of Auckland — with a special theme of natural history over the past 100 years. It is not only a record of achievement; it makes a most valuable handbook for anyone with a close interest in ecology on such topics as shore birds, marine life, kauri regeneration, fungi, butterflies, and tree ferns. Sir Charles Fleming, who has been associated with the field club since 1943, leads off an expert list of commentators and contributors.

A one-off feature of this issue of *Tane* — it would cost too much to do it every year — is the use of some excellent colour plates. These are most effective in illustrating the variety of nature subjects.

Not often does so much come so reasonably in such useful form.

— Vernon Sale

Available from the editor, *Tane*, c/o Botany Department, University of Auckland. $9.

KAIMAUMAU—a successful campaign to protect a forgotten habitat

THE GOVERNMENT decision to create an 895-ha Kaimaumau Swamp reserve has been greeted by the Society as a landmark decision for forgotten habitats throughout New Zealand. It creates the largest reserve of its type in New Zealand.

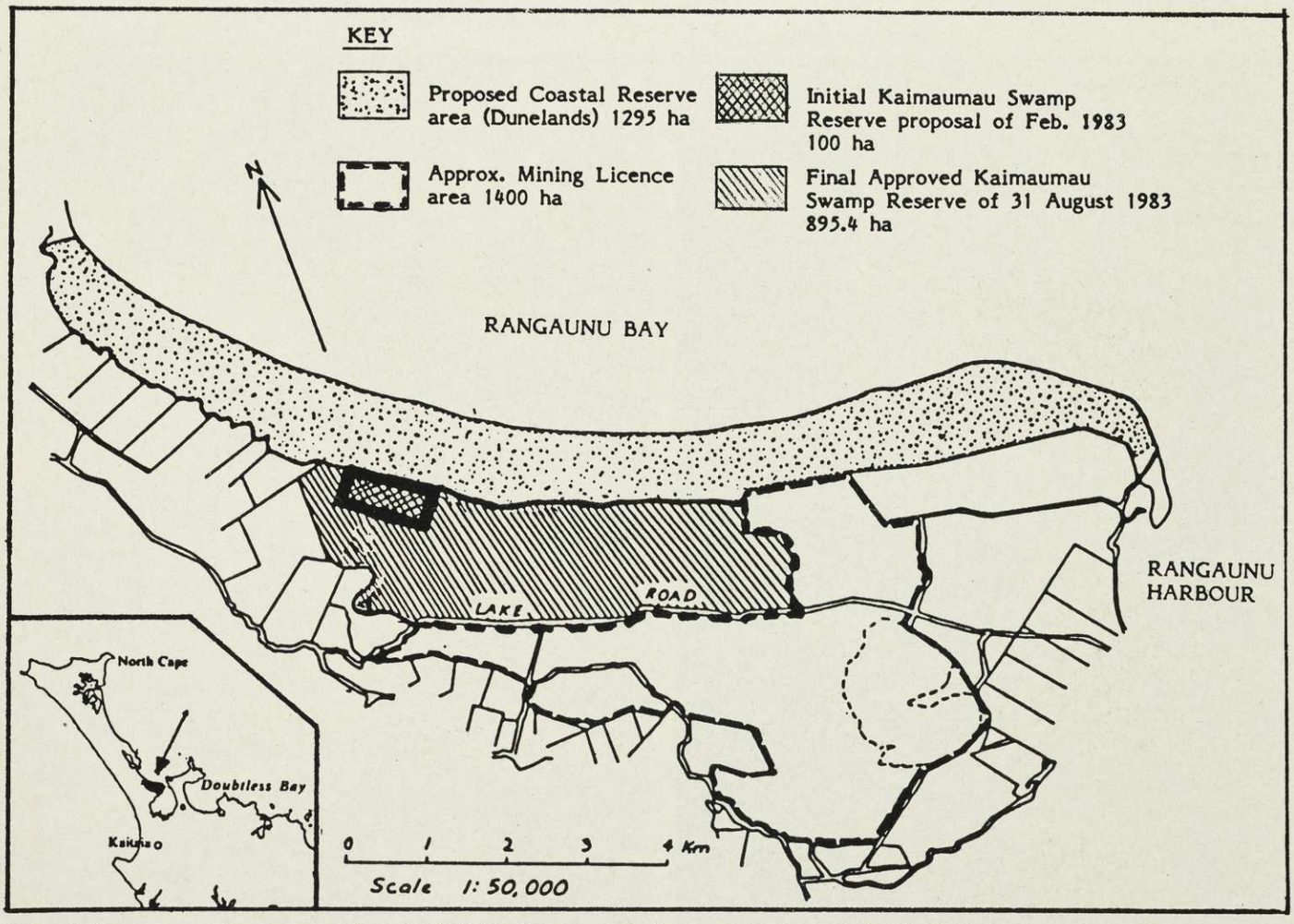
By Gerry McSweeney, Senior Conservation Officer

THE KAIMAUMAU Crown land block covers 4635 ha and lies 27 km north of Kaitaia (see map). Much of the block is a low-lying, peat-filled depression traversed by parallel sandstone ridges and bounded to the west by the Ninety Mile Beach dunes and to the east by the dunes of Rangaunu Bay. This is known as the Motutangi or Kaimaumau Swamp.

Geological research has shown that kauri forest flourished on at least three occasions in the swamp, the most recent being 10 000 to 14 000 years ago. Forest was probably destroyed each time by increasing sea levels as the climate warmed and swamp vegetation reinvaded the site.

Recent scientific studies of Kaimaumau have revealed its national and international importance. It is the most outstanding remaining Northland swamp and is the third largest swamp in the North Island still in a reasonably natural state (after Piako-Kopuatai and Whangamarino).

Kaimaumau's wetlands and peatlands provide an opportunity to protect, in a large system with the potential for long-term viability, a represen-



The Kaimaumau Crown land block (4635 ha), showing the small size of the initial proposed swamp reserve of 100 ha and the final large 895-ha reserve approved by the Government.

C. C. Ogle photo

Kaimaumau Swamp, looking north-east over the system of parallel sand dunes, ridges, and wetlands to Houhora and Mount Camel in the distance. Motutangi Stream flows away from the viewer in the right of the picture and takes some of its water from inter-dune wetlands further inland, through visible breaks in the sand ridges.

Swamp drainage near Kaimaumau. Formerly widespread, swamps and peat gumlands are today becoming scarce because of farm drainage and exotic forest expansion.

G. D. McSweeney photo

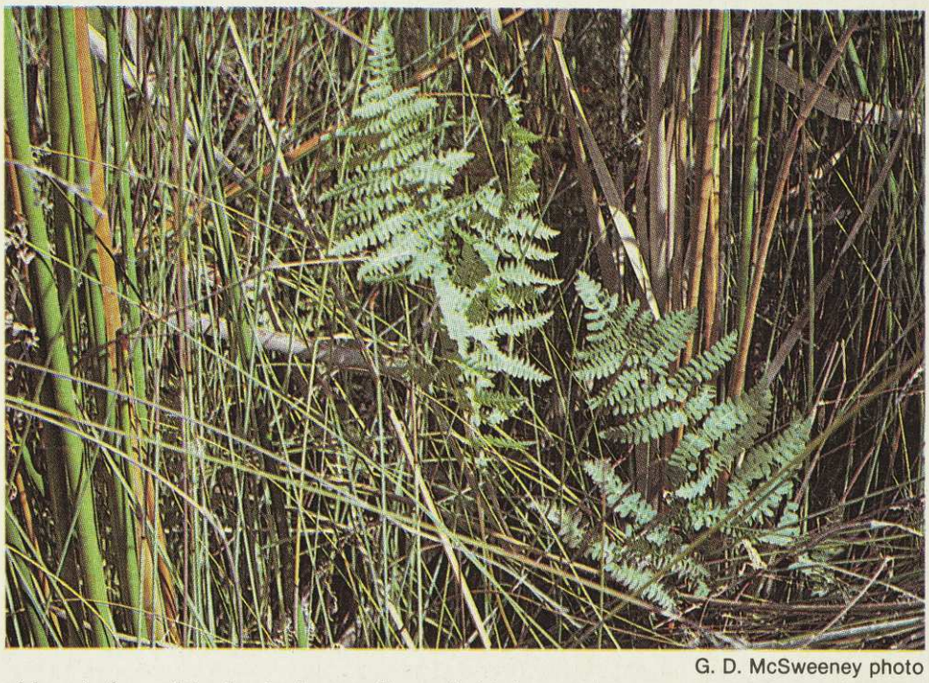
Australasian bittern occur throughout the Kaimaumau Swamp together with large numbers of fernbird. Bittern favour large wetland areas, but these have been dramatically reduced throughout New Zealand since human settlement.

Wildlife Service photo

G. D. McSweeney photo

The rare fern *Cyclosorus interruptus*. Kaimaumau is the New Zealand stronghold for this species.

The black mudfish (*Neochanna diversus*) occurs only in swamps north from Lake Taupo. Its habitat has been extensively destroyed, and Kaimaumau is considered the most significant Northland area still to support this native fish.



G. D. McSweeney photo

Marsh fern (*Thelypteris confluens*). Kaimaumau supports one of the most significant populations of this endangered species in New Zealand.

tative reserve of dune land, peat gumland, and wetland vegetation (Wardle and Clunie 1983). This would be the key representative reserve in the Aupouri ecological district.

Kaimaumau is also the refuge for at least four endangered and vulnerable plant species, the marsh fern (*Thelypteris confluens*), the fern *Cyclosorus interruptus*, the duck orchid (*Cryptostylis subulata*), and the club moss *Lycopodium serpentinum* as well as other uncommon plants, including the bladderworts *Ultricularia delicatula* and *U. protrusa* and the orchid *Prasophyllum pumilum* (Anon. 1983).

Kaimaumau is one of the few remaining sizeable habitats in the North Island suitable for bittern, fernbird, and New Zealand dotterel. Significant breeding populations of these species occur in the swamp and adjoining dune areas (Elliott *et al.* 1983).

The wetland parts of Kaimaumau contain at least eight species of native fish, including banded kokopu, inanga, and bullies (Bioresearches Ltd. 1982).

The most significant fish present in the swamp is the rare black mudfish, a species found only north of Lake Taupo. It has the capacity to survive drought by aestivating in moist mud.

Fisheries scientists describe Kaimaumau as the most significant northern area to support black mudfish still and have commented that everywhere else the fish's habitat is being dramatically reduced by swamp drainage. (R. M. McDowall in *Forest and Bird*, November 1980, discussed black mudfish conservation and Kaimaumau in detail.)

An interdepartmental scientific team that investigated reserve needs for Kaimaumau reported in May that the area satisfies the major botanical and wildlife criteria of IUCN for recognition as a wetland of international importance. Until recently, however, the area has been regarded as useless wasteland.

Publicly owned

Kaimaumau is publicly owned land administered by the Department of Lands and Survey. The area was proposed for agricultural development by the department in 1976. A drain had been dug through the swamp in 1974, and agricultural development has gradually encroached on the swamp margins. However, by 1981 the department recognised that "drainage of the rest of the block would be an expensive and probably difficult business" (Anon. 1981).

Meanwhile, since 1973, Kauri Deposit Surveys Ltd., has investigated the extraction of kauri gum from the swamp's peat. In 1979 the company presented an environmental impact assessment to support a mining proposal for resin extraction and land reclamation. This assessment concluded that the project would transform "an area of wasteland which has little to commend it environmentally into productivity" (Cuttriss, Mackenzie, Martin and Co. 1979) and reflected the lack of scientific information on the area.

Scientific survey

The company commissioned a scientific survey of the swamp (Bioresearches Ltd. 1982) which looked only at a 100-ha area proposed by the Department of Lands and Survey as a scientific reserve. This survey revealed the presence of rare plants and the black mudfish and led to further Government-sponsored surveys of the area over the 1982-83 summer.

As a result of these surveys DSIR Botany Division recommended a 700-ha reserve (Wardle and Clunie 1983) and wildlife researchers sponsored by the Department of Lands and Survey and the Wildlife Service recommended that there be no development of the swamp (Elliott *et al.* 1983).

The need for total protection of the swamp was supported by the Society when it became closely involved in the issue in February this year. Since then we have presented carefully documented cases backed up by widespread public support which have sought recognition of the swamp's natural values and the creation of a large sustainable reserve.

There has been a major public debate over the mining proposal and reserve needs, with TV, radio, and newspaper coverage and intense lobbying in Wellington. The Society (particularly the Far North Branch, spearheaded by member Alex Macrae, of Awanui), the Environmental Defence Society, and Government departments charged with nature conservation responsibilities have sought protection for the swamp. The mining company has sought the maximum possible area for its mining licence. The Commission for the Environment and Ministry of Energy have had the difficult task of reconciling conflicting interests.

Conservation efforts reached fruition with the 31 August decision by the Ministers of Energy and Lands to create a 895-ha swamp reserve at Kaimaumau, which protects a representative reserve, including habitat of the rare plants and the best wildlife habitat. Though mining company director Ray Strickland thinks that the reserve is unjustified and too large, the company's managing director and long-time Society member, Bill Rolfe, agrees that the reserve is needed.

Compromise

Though we still feel that the whole swamp is worthy of reservation, we have accepted that this decision was a compromise between nature conservation and mining needs.

The granting of a mining licence over 1400 ha **outside** the reserve will allow the development of a mining industry that has promised earnings of up to $30 million a year and up to 70 jobs. However, this will not be at the expense of the area's outstanding natural values, which are now largely protected within the reserve.

If the mining operation proceeds, the Society will be watching closely to see that mining conditions are enforced, that mining does not affect water regimes in the swamp reserve and on surrounding farm land, and that the discharges from the operation do not affect the internationally important Rangaunu harbour.

The Kaimaumau debate shows how critical it is for representative and distinctive natural areas throughout New Zealand to be identified **before** they are threatened by major developments so that we are not again forced into an eleventh hour battle to ensure their survival. The Society therefore welcomes the Government's endorsement of the Biological Resources Centre's Protected Natural Area programme. The BRC will begin an intensive field research programme this summer to identify a representative reserve system throughout New Zealand's ecological districts.

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The sea entrance to the Hollyford River, the graveyard of many boats approaching Jamestown in the 1870s.

The Hollyford experience

ONE OF THE MAGNIFICENT WALKS in Fiordland National Park is the Hollyford Valley walk, which takes the observer from the Hollyford road end to historic Jamestown and Martins Bay. In April this year five members of the Society undertook the walk, and they tramped, jet-boated, and flew sections of this wonderful natural route. The trip, which lasted 3 days, is described in the following article by D. E. Trotman.

THERE ARE three organised tramps that can be made in Fiordland, the sort that have a meal and a bed organised for you at the end of the day's plod. One is world famous; most Americans seem to have heard of the Milford Track even if they are not entirely positive about the whereabouts of "Noo Zeelan". The Routeburn and the Hollyford Tracks are known only to the "natives" and the fortunate overseas visitors who discover them.

The Hollyford attracted us. It seemed from the brochure that a jet-boat figured considerably in the arrangements and should reduce the slog of the day's march to a great degree.

So in late April we set forth. The Milford Track was already closed, but as the Hollyford does not climb to high altitudes, and indeed never even leaves the bushline, it remains open as long as there are parties willing to set forth.

Start at Te Anau

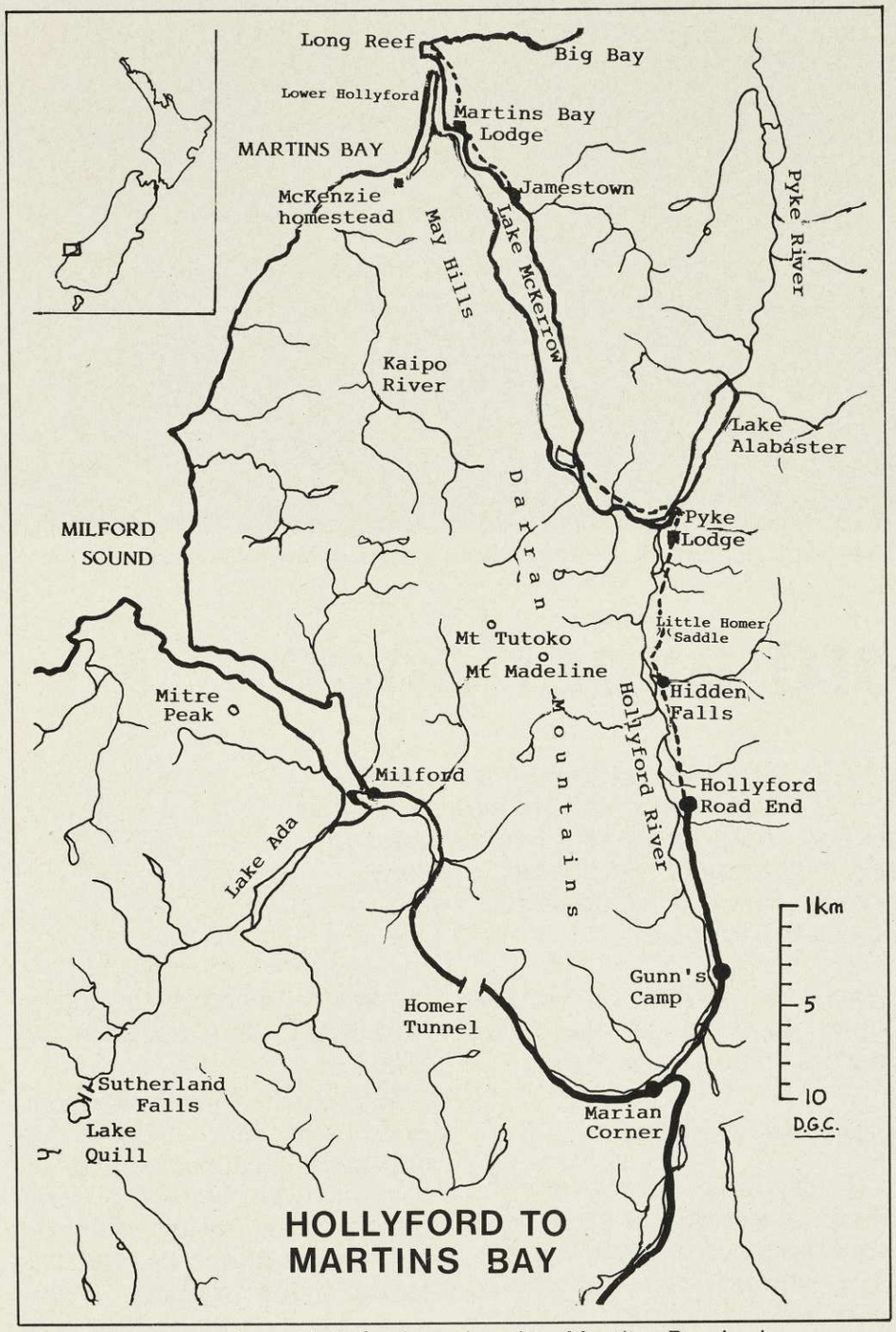
Everything starts at Te Anau, it seems; it is no wonder that the place is mushrooming. The Milford, the Routeburn, and the Hollyford trampers usually rendezvous there on the night before departure.

In the morning we bussed to Marian Corner, the head of the lower Hollyford Vally, and on to the Hollyford road end after inspecting a very interesting museum at Gunn's Camp, where there were items from the old Jamestown and Martins Bay settlements, whence we were bound. (Gunn's Camp was founded by well-remembered Davy Gunn, of the Hollyford, who bought land from the McKenzies in 1926 and ran treks to Martins Bay down the years. He was drowned in the Hollyford River on Christmas Day 1955.)

We adjusted our boots, rain gear, and our light 7-kg-maximum day packs and set forth. The weather was cloudy, mist enshrouding the high peaks above us, but was pleasant for walking. There were 11 in our party, four Americans (two of whom were celebrating their golden wedding), an Englishman and his small, beautifully spoken 8-year-old son, and five New Zealanders (all members of the Society).

We followed the Hollyford River for several kilometres, crossing two or three creeks on swing bridges.

The track was in excellent condition and we passed two groups of young people working on it. One group had an all-girl cast and were wielding spades and pick axes with great dexterity.



The route taken from Hollyford road end to Martins Bay Lodge.

Our guide, Judy, was a girl of amazing energy, an ex-school teacher married to a local ranger. She brought up the rear of our party, but every so often did a great dash to the front to give instructions to those leading. Before long she had donned an extra pack belonging to the elderly American lady, but this did not appear to impede her in the slightest. The track was muddy in patches.

The forest on this stretch consisted of kahikatea, matai, and rimu with ferns edging the way. Near the river an all-weather track had been built, including projecting wooden walkways round the bluffs with views over the river. Here and there natural clearings in the bush canopy gave place to huge fuchsia and pepper trees and enabled views of mountains soaring 2000 m above. We saw bellbirds and tuis and fantails there.

At mid afternoon we stopped at a lovely waterfall, Hidden Falls. Tea was brewed in the hut there and after replenishing our energies we began the climb up to the Little Homer Saddle. No great exertion was required, but our guide divided us into two groups so that the slower ones could make their own pace.

From the top of the saddle excellent views of Mount Madeline and Mount Tutoko can be obtained on a clear day, but, alas, they were shrouded in mist.

On by jet-boat

The afternoon was wearing on, the bush becoming rather shadowy and mysterious, as we came down towards the river and followed our instructions: "Stop at small waterfall, 6 paces on, turn left at fuchsia bush, and you will find path to take you to the boat-landing." We did **all** that exactly, but there was no boat there.

We stood there for a few minutes and then heard the whirr of a jet engine in the distance. Around the bend it came with clouds of spray flying behind it. We climbed in and shot down the Hollyford River, bounding over rapids, and were deposited quarter of an hour later at Pyke Lodge.

We were invited to go in — "kettle's boiling; make yourself at home!" — and Jeff, the jet-boat driver, was off in a great churning rush of waters to collect the second group.

We peeled off our soggy socks and boots and pattered bare foot into the lovely, warm kitchen. Cups and saucers were brought out and we found a brand new batch of bran muffins that Jeff the Jetter had just pulled out of the oven. What an amazing man! We polished off half of his cookies, and when the second group arrived we went into the shower block and eased away the exertions of our 16-km hike under gallons of soothing hot water.

We also found a drying cabinet and started hanging out our wet gear, though our hopes were not high, as the door carried a legend to the effect that "if socks are still damp in the morning, why not try the bushman's trick and run them under the hot tap before putting them on?"

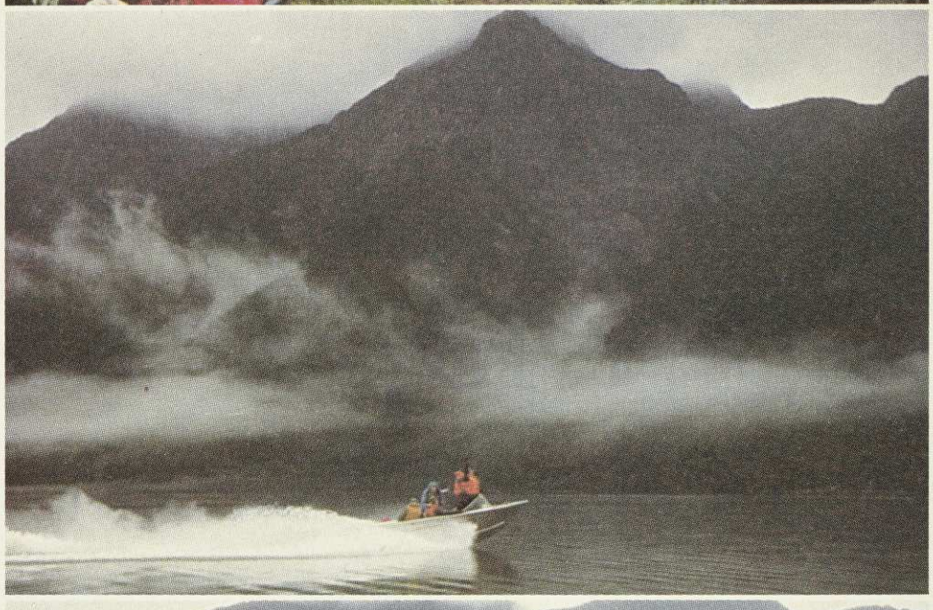
Judy had duly arrived with the last group and with Jeff's help had produced an immense and delicious dinner, of which we made short work. We chatted over coffee and then later piled into our warm sleeping bags and slept like babes.

Down Lake McKerrow

Next day was child's play. After breakfast we walked a short distance to lovely Lake Alabaster. Our jet-boat collected us and we skimmed down the lake and lower Pyke River into the Hollyford, where we bounced over rapids, then into beautiful Lake McKerrow.

The lake stretches almost to the sun and is considered to be a fiord the mouth of which was raised by earthquakes and thus closed, apart from where the lower Hollyford River breaks through to the sea. It is fringed all around by kowhai (in spring it must look incredible).

It was there, at the seaward end of the lake, that in 1870



Top: The track between Hollyford road end and Hidden Falls.

Upper middle: Jet-boating down Lake McKerrow under the May Hills to the Darran Mountains chain.

Lower middle: Historic Jamestown beach. The forest now covers the deserted town site just to the right of the jet-boats.

Bottom: Martins Bay. Blue gums now mark the site of the McKenzie homestead.

over 29 settlers were persuaded to take up land at £2.10s. per acre in the new settlement to be called Jamestown. However, only a hotel and seven or eight houses were built in the settlement, even though the land prices dropped to 10s. an acre.

Remains of Jamestown

We landed in the lovely horseshoe bay where once Jamestown stood. A hundred years have passed since the last dispirited pioneer gave up and left. A hundred years of luxuriant growth hides all but a mute pile of stones here and there, once a fireplace or chimney.

Great matais and rimus stand tall, and yet, somewhere among them, is the lost cemetery where some of the children of the settlers lie and some of their parents too, for there was no medical help here, and often near starvation, floods, and boating disasters dogged them in their isolation.

The gold in Big Bay up the coast soon petered out, boats had foundered on the vicious bar of the Hollyford River so often that the captains would not enter, but would only stand offshore, the promised road from Queenstown never eventuated, and at last only one family remained — the McKenzie family.

They, too, left Jamestown in 1879 and built their house a few miles away behind the sandhills at Martins Bay so that they would be nearer their only communication with the outside world, the 3-monthly steamer *Hinemoa*. The two McKenzie sons, Hugh and Malcolm, stayed on until the mid 1920s, when they sold out to Davy Gunn.

After Jamestown there followed a 2-hour walk to Martins Bay Lodge, first along the lake shore with its massive driftwood logs and overhanging ancient kowhais on the edge of the coastal forest interspersed here and there with perching scented orchids cloying the air. Then on through a grove of tree ferns shrouded by tall kahikateas where fernbirds were heard and out to cleared grasslands (the last cattle died in 1978) and across a small grassed airstrip to Martins Bay lodge, where lunch was awaiting us.

We enjoyed delicious soup and hot bread, then piled into the jet-boat once more. We almost reached the mouth of the lower Hollyford, passing one or two whitebaiting cabins on the way and seeing a white heron, black shags, and paradise ducks.

After landing we started around the beach towards the seal colony. After a while the track disappeared and we bounded from boulder to boulder. Some of the party decided to give the seals a miss at this stage, but we carried on and were rewarded by meeting up with about 200 very tame mothers and pup seals and about four decidedly unfriendly bull seals, terribly overworked trying to protect their many females.

A wonderful meal, marvellous drying rooms for our wet gear, and comfortable beds ended the second day.

The third day

Day three brought a gusty southerly wind which blew away all the clouds and mist. By midday the sky was blue, the peaks all clear, and even the wind had dropped.

We climbed into the jet-boat once more and again bounded down the lower Hollyford, turning left near the mouth into a lagoon that runs the length of Martins Bay.

We were landed at the end and as we pushed through the flax bushes to the cleared land beyond were reminded that it was around there in 1880 that little Alice McKenzie had what is believed to be the last sighting of a small moa. She tried unsuccessfully to noose its leg with flax.

An account of this is written in her book *Pioneers of Martins Bay*. The gum trees and huge macrocarpa which stood beside the McKenzie house still tower above, but the house itself was taken down some 15 years ago. The remains of the stockyard and the like are still there. We walked along the magnificent beach, white-capped peaks in the distance, and we could understand why this family remained in this wild and remote bay.

When we returned to the lodge our party had been joined by Judy's husband, who showed us slides of all the peaks that can be seen from the Little Homer Saddle. He also introduced us to the pilot who was to fly us out next day. Supper, and, of course, the manuka tea — a great pot of everyday tea with a branch of manuka sticking out of the lid. Exciting stuff for our tourists, but it tasted just like ordinary tea anyway.

Next morning we divided into two groups again. We were in the first group and boarded a little plane. The weather was perfect and we followed the beautiful coast, ablaze with southern rata flowers, right down to the entrance to Milford Sound, then flew up to the head of the sound, then on up to Sutherland Falls, further up — up — to Lake Quill, hanging high in the peaks and spilling over to make the second highest falls in the world. After two circles of the lake we went down to Milford Airport at journey's end.

The Hollyford experience was over, but never to be forgotten.

Photos by L. L. Maddever. ■

Moths of the Awarua Bay area

AWARUA BAY lies 16 km south of Invercargill and is easily reached by a sealed highway that leads on to the Tiwai aluminium smelter. The areas surrounding Awarua Bay are an assemblage of diverse non-forest habitats of intense interest to botanists, ornithologists, and entomologists.

By Brian Patrick*

THE AREA encompasses a wide variety of shrub, bog, and grasslands that have persisted despite the encroachment of forests in pre-European times and agriculture and industry in more recent times. Many of the plant associations are sub-alpine and therefore it is interesting to find them at sea level and to find that the insects feeding on them are also of normally sub-alpine species.

Much of the area is at present being considered for an extensive reserve by the Department of Lands and Survey because of the valuable flora and fauna there. Public appreciation of the area is low at present, but reserve status followed up with education will make the area a valuable asset to the people of Southland.

The distinctive brown stony shores of the bay have patches of short native grasses and herbs on which two small, brightly coloured tortricid moths, *Merophyas paraloxa* and *Protithona potmias*, breed. Both day flyers, they are often seen sunbathing on the hot stones or on pieces of kelp strewn on the shore.

Attractive boulder butterflies, *Lycaena boldenarum*, are also found on the shores, the larvae feeding on *Muehlenbeckia*. The female is orange, and the male is a beautiful shining purple.

Another slightly larger copper butterfly, *Lycaena salustius*, is also common in the area, but it frequents the adjacent shrub lands as well. In this species both sexes are orange, but their larvae, too, feed on the common liane *Muehlenbeckia*.

Tiwai Peninsula

Tiwai Peninsula is well known for its industrial development, but it also has distinctive flora and fauna that are worth preserving. For here is a variety of shrub, herb, and grasslands that would not be out of place 1000 m up in the Otago mountains. The moist and windy climate, combined with the sandy soils, contributes to a luxuriant habitat dominated by a daisy shrub, *Olearia nummularifolia*, red tussock, *Chionochloa rubra*, and mingimingi, *Cyathodes juniperina*. The usually exposed wild Irishman shrubs, *Discaria toumatou*, are barely distinguishable here among the dense shrub land, and the stiff, spiny *Hymenanthera alpina* grows to a metre high and is often covered in shaggy white lichens.

The daisy shrub has a new species of leaf miner of the genus *Stigmella* feeding on it, at present unknown elsewhere. The adult moth is barely 2 mm in wing span and is grey.

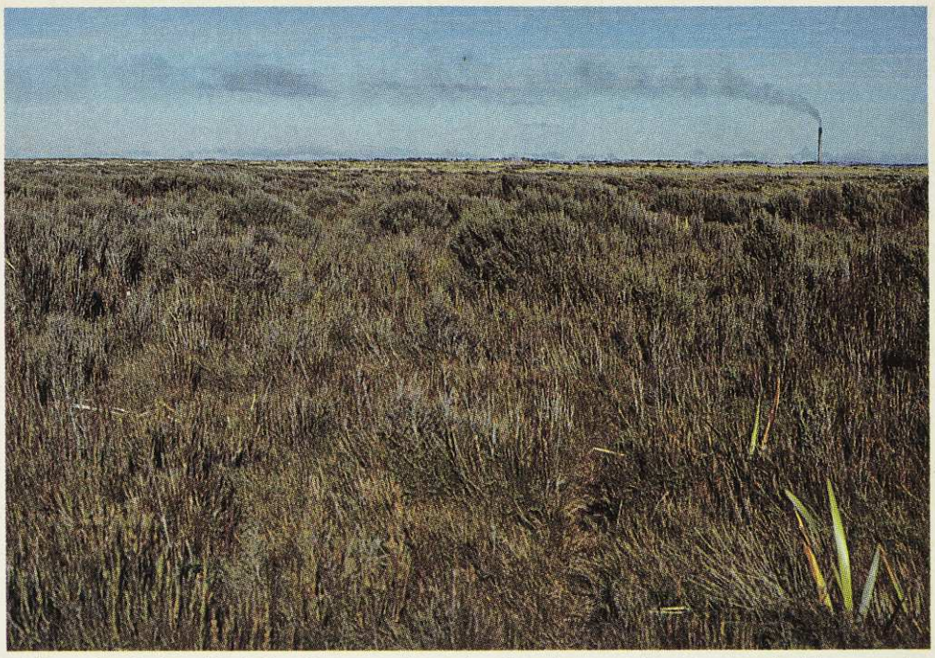
An *Aciphylla* species grows here and supports a beautiful orange day-flying moth called *Dasyuris partheniata*. The larvae scour out the green tissue from the stiff, sharp-pointed leaf blades through winter and early spring, escaping attention by lying flat along the leaf blade. Twelve related species of the alpine regions of Otago-Southland also feed on *Aciphylla* species and the closely allied genus *Anisotome*.

Two more day-flying geometrid moths are found on the peninsula and both are also found in sub-alpine regions. *Lythria catapyrrha* is a small brown moth with orange hindwings and has pretty brown and green caterpillars that will feed on herbs, including *Plantago*. The adults occur in barer areas and are often seen sucking the nectar from the profusion of *Gentiana saxosa* flowers that appear in autumn.

The other geometrid is *Lythria perornata*, the distinct coastal form of an alpine species. The reddish purple caterpillars feed under the mats of two *Pimelea* species here. The adults are spectacular moths, with orange, black, and white striped forewings that constantly vibrate as the moth momentarily settles on the hot sand adjacent to its food plant. It is hard to catch, being ever alert to any movement.

*Brian Patrick is an amateur entomologist and botanist specialising in the biology of endemic moths.

Lythria catapyrrha is a diurnal geometrid moth, shown here resting on a gentian flower growing on Tiwai Peninsula.



The shrub land of the Awarua bog is dominated by *Dracophyllum* and wire-rush. The Tiwai smelter chimney is in the distance.

The sprawling *Pimelea* plants at Tiwai Peninsula are home to this pretty diurnal geometrid, *Lythria perornata*.

Tiwai Peninsula also has a flourishing array of shrubs. This part is dominated by rigid shrubs of *Olearia*, *Hymenanthera*, and *Cyathodes*.

The tiny golden *Palaeomicra caustica* belongs to an ancient family of moths that have jaws. The species breeds on liverworts in the Awarua bog.

Dasyuris partheniata is a fast-flying diurnal geometrid that breeds on clumps of *Aciphylla* on Tiwai Peninsula.

Notoreas synclinalis. This striking species is often seen flying over the wire-rush bogs.

Two plume moths and many noctuid and pyralid moths breed on the peninsula, mainly on the herbs and the beautiful mosses there.

Different habitat

Across the bay lies quite a different habitat for plants and insects. Here beside Awarua Bay, and stretching both north and east of it, is an expanse of sub-alpine wetlands at sea level. Within this huge area are various plant communities occupying areas of different water levels.

Tarns surrounded by sphagnum moss are numerous, but equally so are the better drained expanses of shrub land and grassland, and despite a century of burning and drainage, large tracts of native vegetation still exist, though much of it is modified. It is a fascinating place to visit, for unlike a forest, where the canopy is far out of reach, here one can stand on the canopy of the miniature forest of cushion plants and examine and study them.

Orchids and sundews abound in the bog, as do shrub lands of dwarf manuka and *Cassinia*, and expanses of red tussock grasslands add a splash of colour in autumn.

Many large cushions of *Donatia novae-zelandiae* are seen with *Cyathodes empetrifolia* or *Pernettya nana* growing on them and surrounded by wire-rush (*Empodisma minus*). Wire-rush is the food plant of the area's most distinctive moth, *Notoreas synclinalis*.

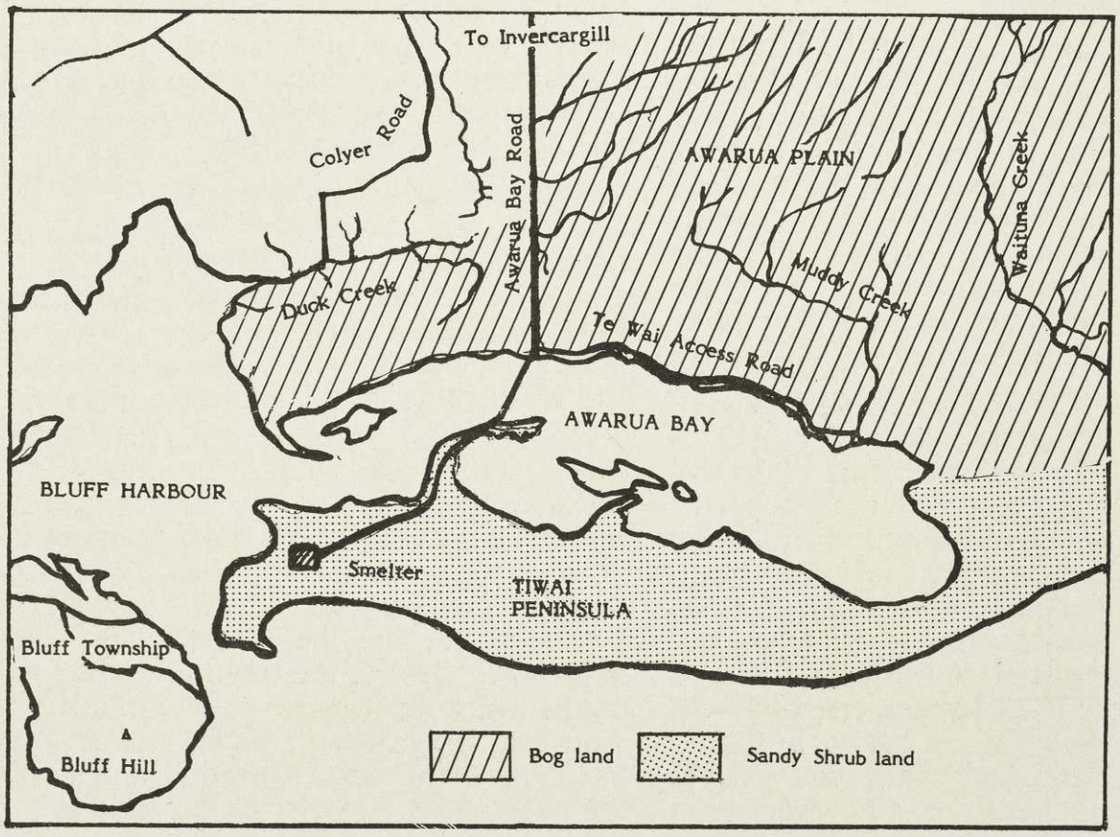
The species was discovered here in 1900 by Alfred Philpott, an early entomologist of the Invercargill district. The strikingly marked moth flies swiftly over the herbage on sunny days from late December to May, often settling to suck the nectar of *Dracophyllum* flowers. The species is also found on Stewart Island, the Longwood Range to the west, and the low hills of south-west Fiordland.

Stands of *Dracophyllum longifolium* support a large assemblage of insects, including a silver-grey tortricid, *Ericodesma melanosperma*, whose caterpillars tie the terminal leaves together and feed on the leaf tissue within, and a yponomeutid moth, *Orthenches* new species, that has larvae that bore into the buds and flowers.

A delicate grey geometrid moth, *Pasiphila humilis*, also competes for the *Dracophyllum* flowers, the adult moths emerging in October and laying their eggs on the developing buds. The slender white and orange larvae feed up very quickly, then travel down to pupate in a cocoon below the layer of dead leaves on the ground, where they remain for 10 months.

A variety of yellowish brown gelechiid moths are associated with leaf litter; these include *Gymnobathra sarcoxantha*, whose larvae drag around a protective case, and *Tingena hastata*, which has been found only here and on top of the Longwood Range (800 m). Both moths can have populations with short-winged females that run and jump instead of fly.

The yellow-green shrubs of *Cassinia* growing among the



The Awarua Bay area, showing the juxtaposition of the bog land of the Awarua Plain and the sandy shrub land of the Tiwai Peninsula.

red tussock are the food plant of two moth species. One is a brown noctuid species, *Graphania homoscia*, whose pretty green and yellow larvae browse on the foliage at night. The other is a day-flying grey and white tortricid, *Harmologa petrias*, with larvae that web the stems and leaves together and feed within. The latter species is found in sub-alpine areas of Southland and Otago.

Alongside the *Cassinia* shrubs are the compact divaricating plants of a *Coprosma* species. A variable, mainly whitish, tortricid, *Epichorista persecta*, has larvae that feed here, also joining leaves together for protection.

Mountain daisy

Two species of mountain daisy live on the bog; both are small species, but their yellow and white flowers are conspicuous among the sward of wire-rush. *Asterivora marmarea* is a small diurnal choreutid moth that has larvae which feed on the under sides of the leaves of *Celmisia gracilenta*.

Another very small species on the bog in October is *Palaeomicra caustica*, also diurnal, but it is very easily overlooked. The larvae feed on liverworts. The species belongs to a group of moths remarkable because the adults have jaws instead of the normal sucking tube.

The dull-coloured foliage of *Pernettya nana* supports a common moth, *Epicyme rubropunctaria*; elsewhere the larvae of this moth feed on *Haloragis erecta*. The noctuid genus *Tmetolophota* has several species feeding on monocotyledons on the bog; *T. similis* is an uncommon autumn moth with attractive chocolate brown and white marking, *T. steropastis* is the widespread flax notcher, and *T. arotis* has larvae that feed on *Cortaderia*.

Two sub-alpine noctuids also present are the conspicuously marked *Ichneutica ceraunias* associated with *Chionochloa* and *Aletia longstaffi*, a blue-grey moth that has caterpillars feeding on composite herbs in summer. From November to April the tussock lands are filled with the orange-brown tussock butterfly *Argyophenga antipodum*, gently flying back and forth. Females are paler coloured and fly much less than the males.

In contrast to the graceful butterfly are the three swift-flying hepialids that breed in the bog. Two of the species are interesting in that this is the only known lowland habitats of the species or genus. *Dioxycanus fuscus* is a crepuscular moth emerging from the damp tussock lands at the end of December. The other species was discovered only in 1981 and is of an undescribed genus also. The larvae have been found feeding in sphagnum moss here, living in deep tunnels and assuming an almost aquatic existence. The moth, though large and distinctive, has escaped notice because of its emergence so close to winter in late April and May.

A closely related species was also recently discovered in similar habitats at 800-1200 m at Dansey Pass, Rock and Pillar Range, Great Moss Swamp, Lammermoor Range, and lower down in the Catlins area.

Four interesting geometrids are associated with herbs in the tussock lands; all have females with reduced forewings. *Xanthorhoe occulta* and the autumn *Asaphodes stephanitis* are fine orange moths whose females have not quite lost the power of flight, but in *A. frivola* and *A. oraria* the wing area is so reduced that the female is incapable of flight and merely runs about. Both these have males which are unmarked and dull-coloured moths.

Few plants uneaten

Few plants in the bog go uneaten by moths, and the dwarf manuka shrubs are no exception. Competing for space on this plant are two carposinids, two tortricids, and two geometrids, and even the small *Gaultheria* plants do not go untouched. An undescribed gracilarid scours the leaves and produces a tiny, agile brown moth. Rushes are the food plants of an elegant, neatly marked, grey geometrid, *Adeixis griseata*, and various glypterigids, and other glypterigids, including the uncommon *Circica aulogramma*, frequent grassy areas.

Adjacent to the bog are areas of salt marsh, which contain distinctive vegetation of the deciduous salt marsh ribbon wood (*Plagianthus divaricatus*) — *Leptocarpus*, *Juncus*, and a *Poa* species. A tiny undescribed nepticulid breeds in the salt marsh ribbonwood, as does an oecophorid moth. *Eutorna inornata* occurs among the rushes, and a tiny grey elachistid mines the *Poa* stems.

Because it contains such a diversity of habitats, flora, and fauna, the Awarua Bay ecosystem is of extreme interest and importance in the understanding of New Zealand's biota and the unlocking of its geological past. The surprising assortment of life present in a non-forest area is typical of our mountainous regions, and its nearness to a large city creates a unique chance to view lush moss bogs, miniature forests of cushion plants, and magnificent sub-alpine shrub lands all at sea level. ■

We can fight old man's beard — and win

THE PROBLEM with troublesome weeds is that we don't tackle them early enough. Despite warnings we delay until they are widespread, and the trouble they cause is obvious. At that stage we are prepared to cry out and to spend much money on efforts to show that we are doing something. The last stage follows when we say that the task is too big, that control will never be possible, and that we must learn to live with the weed as part of the environment. Think of blackberry and gorse as examples. Think, too, of what picnic spots, farms, and road sides would be like if blackberry and gorse had never become established in New Zealand.

WITH OLD MAN'S BEARD (*Clematis vitalba*) we are at the beginning of the second stage. The plant arrived in Taihape in the 1950s and was seen by the Department of Lands and Survey as a problem in the early 1970s. In 1973

By Stan Butcher, Lower Hutt Branch

Seedling plants of old man's beard can be recognised and pulled out.

the curator of parks and reserves in Wellington (Mr R. H. Mole) said in a newspaper article, "The vine is rampant in the western suburbs."

Since then old man's beard has become established in more and more localities from Hamilton, Hawke's Bay, and Taranaki to the Marlborough Sounds and North Canterbury.

Now that it is becoming increasingly visible the call is going out that we must attack it. We have lost the opportunity for the control of small invasions over the past 30 years, but now we must respond to the call with the determination that we can fight old man's beard — and win.

The Society can play a major role if it can mobilise all its members. Throughout the country we make up a network that can locate the sites where old man's beard is growing, collate the information for the Society and for local authorities, and eradicate it, especially young plants in new infestations.

Recognition of mature vines

There are two periods each year when recognition is easy and positive. First in winter, when the vines have lost their leaves and are usually covered with a mass of silky, grey seed heads. Second in the late spring or early summer, when their small, creamy white flowers are visible against the abundant, light-green foliage.

Confusion with the native bush clematis (*C. paniculata*) is easily avoided by remembering that bush clematis flowers in early spring, August-September, and is an evergreen with thick, fleshy leaves. Old man's beard flowers in November-December and has thin, papery leaves.

Old man's beard is readily identified from the form and habit of the vines as they rise from their roots. The stems are covered by a light-

coloured, hairy bark which can be rubbed off. They may lie along the ground, where they take root and create further plants that send their numerous quickly growing, ridged stalks climbing into the light. Bush clematis will have only one or two climbing stems with firm brown bark that does not shed fibres when rubbed.

Recognition of young plants

If seedlings of old man's beard can be spotted and pulled out, control of them is quick and easy. Watch for seedlings along tracks and paths, along fence lines, and in gardens. They are shade tolerant and can be found under standing bush.

Young plants have leaves that are bluntly serrated and covered with very fine hairs. The leaves come off the greenish, mauve stem in pairs and have five leaflets (actually an opposite pair, then a terminal three). The seedling plants illustrated were growing in an ornamental garden outside a city shop.

When seedlings are found look for the mature plant that was the source of seed. This may be nearby, but seed distributed by wind may have come from a long distance. Members who live in or are travelling through parts of the country where old man's beard is not known have a special responsibility and opportunity to watch for seedling colonisers and to remove them.

Control methods

Pull young plants by hand. This is easy, as they are not deep rooted. Roll up and carry the plant off the site or hang it in the fork of a tree to wither and die. Return to the site from time to time to look for further plants which may come up later.

Where ground has been cleared by the removal of a mature vine a special watch must be kept. Planting with native shrubs to give quick cover will help repress the germination of seedlings.

With established vines winter is the best time to begin cutting, especially those difficult ones where the vine is spread along a fence or over the ground. With the leaves fallen the root system can be seen and attacked methodically. Those covering the ground can be rolled up as cutting proceeds to release the roll from the numerous rooted sections.

Vines that are climbing up into trees should be cut with tree loppers, secateurs, or a sharp knife about 30 cm above ground level. Follow up each stem and cut it again about eye level. This makes a gap which shows up the stem still to be cut and identifies the site as one being treated.

Leave the vines that are in the tree tops; you will waste energy and become disheartened if you try to haul them out. Vines left in the trees will die and eventually rot. Carry away and burn or bury the cut sections.

When cutting vines in spring or early summer carry out the operation above and then apply a systemic herbicide to each severed stem showing above the root system. Wear rubber gloves and apply the herbicide with a brush or squeeze bottle. If all cutting is complete, and one member of a working party goes systematically over the area, there is no risk to others from handling material that has been treated.

Winter-cut vines do not respond to herbicide as well as those with active sap. Leave the poisoning of them until a return visit in spring, when a further 3 cm of the ground stem can be cut off and the herbicide applied.

Plants can be killed without poison if visits are made every week to rub off new shoots as they appear. This is practicable, but time consuming and better suits plants in home gardens.

The purpose in cutting is to stop the season's flowering and seed setting; so concentrate effort into the 6 months from June to November. Winter cutting also frees trees from the smothering of the dense new growth put out by old man's beard which has covered them. But cutting at any time is useful; so make it a year-round campaign.

Recording of sites

Once a site has been found a record should be made by the member or by the group. Identify the site with a numbered stake which relates to the record listing location, date, action taken, etc. Return visits can then be straight to the right location and information correctly credited.

Each branch committee should collate reports in its area and use them in its own control programme or pass them on to a local authority programme. Head office of the Society wants reports from all branches where old man's beard is found and these will be passed on to the Department of Lands and Survey, which is keeping a national record.

Getting help

The thrust of this article is to ask individual members to play a personal part in fighting old man's beard. Our efforts can be multiplied if other groups and authorities join in.

Branch committees should write to their local city, borough, or county council and ask it to take action. They

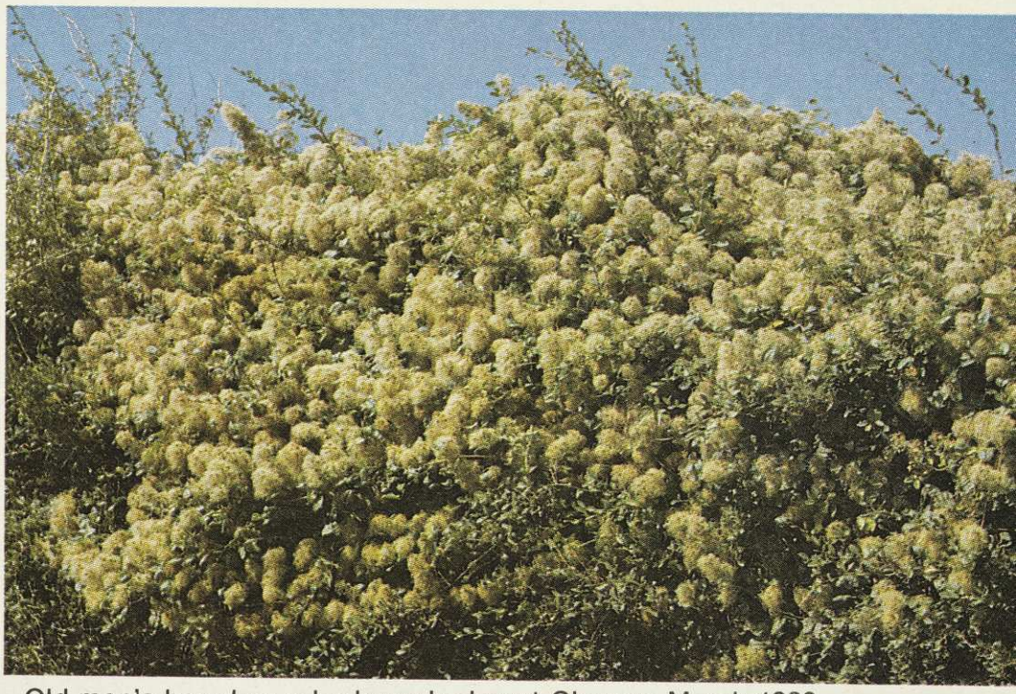
Mature stems have pale, loose bark and put out roots when layered on the ground.

will be encouraged by knowing that in Lower Hutt a P.E.P. project to control old man's beard has been approved by the Department of Labour. It began in August and will run for an initial 6-month period with a supervisor and six workers. It is operating not only on council and Crown land, but also in bush areas on private property.

Contact with the local Noxious Weeds Committee and its officer should be established and the request made that *Clematis vitalba* be declared a noxious B plant. This was one of the recommendations made in November a year ago at a national seminar on old man's beard sponsored by the Department of Lands and Survey.

The Noxious Weeds Council has declined to do so on the grounds that there must be a practical means of control before it can be declared a noxious weed. They have agreed to investigate funding a research programme on what is known about the plant and avenues of control.

Old man's beard has a firm hold on bush at the northern end of the Manawatu Gorge.



Old man's beard on a barberry hedge at Ohaupo, March 1983.

Silky plumes on fresh seed heads of old man's beard.

We need to keep up a steady public pressure that there must be legal sanctions against the presence of old man's beard. It flaunts its silken banners still in the bush reserve south of Taihape as symbolic witness to the procrastination and indifference of us all.

Publicity for the threat posed by old man's beard can be made through articles and letters to newspapers, by displays during Conservation Week, or at horticultural society shows and by talking with friends and neighbours. Until the public at large becomes informed there will be no demand that urgent action be taken.

As members of a Society pledged to protect New Zealand's forest we must take our own action and get others to act as well. Together we can make certain that this troublesome weed does not get past the second stage of public concern and effort. We **will** fight old man's beard — and **win**.

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Photos by C. S. Butcher. ■

OBITUARY

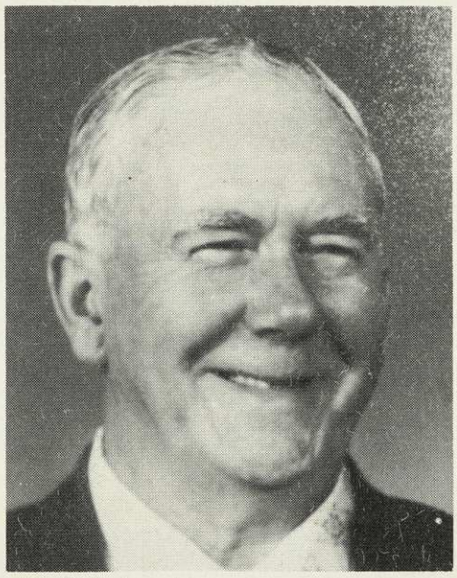
P. A. Prichard

Percy Albert Prichard, a life member of the Society, died after a short illness in Wanganui on 14 June at the age of 73 years.

"Perce", as he was known to members, and his many friends, lived from his very early years close to nature. His parents' farm at Retaruke, in the lower King Country, was situated only 5 miles from the Wanganui River and the houseboat landing, but so isolated that schooling was haphazard. Living close to native bush, however, had its compensations, and Perce developed an extensive knowledge of the land around him.

After his marriage, and in the late 1930s, with a young family, he moved to Wanganui, where he and his wife opened a home cookery, which, except for his absence during the war, was for 34 years well known and popular.

Besides his 35 years of membership in the Society, he was a member of the Wanganui Branch committee for more than 20 years and the Bushy Park committee since its inception. At times he also



Mr Pritchard.

stood in as Wanganui councillor at council meetings.

With his wide, perhaps exceptional, knowledge of New Zealand flora and fauna he took a keen interest in all aspects of conservation. Perhaps, however, his special love was Bushy Park. In 1975 he was a foundation member of the Friends of Bushy Park Guild, and as its secretary-treasurer, organiser, and principal worker since the August of that year he inspired all who met him.

Perce was a most conscientious man, with an infectious enthusiasm that resulted in many successful fund-raising ventures. Through these he was instrumental in obtaining furnishings and many additional facilities for the park.

His wife, Margaret, shared his interests, and Bushy Park became at times almost a second home to them. They worked a great deal in the grounds, mowing lawns, helping with the upkeep of the long drive, and even growing plants for the flower beds. On occasions when the custodian was away they took complete charge, at one time for several months.

With his own experience, Perce was keenly aware that good conservation habits start early in life, and for many years he met with school groups, guiding the students through the bush, explaining, teaching, and identifying the plants and bird songs encountered.

A great worker, he was always available for local undertakings, whether they be tree planting, raffle selling, or leading outdoor trips.

Many have appreciated Perce for his devoted and enthusiastic work for the Society, the results of which will not be easily forgotten. He will be sadly missed. To his wife and four sons we extend our deepest sympathy.

—C.H.J. and I.B.

Seed production in podocarp trees

NEXT TIME you are in the bush look closely at the podocarp trees and get to know them better. Are they male or female? Can you find developing male cones or ovules? This is the first of a series of short articles in which Mary McEwen, formerly of the Forest Service Forest Research Institute, Rotorua, describes the stages of seed development in the seven major indigenous tree species in the family Podocarpaceae.

THOUGH the male cones in these trees are basically very similar, there are distinct differences between the ovules both in appearance and in their location on the tree. These articles describe and illustrate the various stages of ovule development from their first appearance as tiny objects just before pollination through to the mature seed and its fleshy coloured receptacle so attractive to fruit-eating birds.

In the Coniferales there are two types of seed development and both are represented among these New Zealand tree podocarps. In the short type the reproductive cycle occupies about a year, and the time between pollination and fertilisation is only 6 or 8 weeks, but in the long type the cycle occupies 2 years, and the time between pollination and fertilisation is 12 months or more.

The dates given in these articles refer to the Rotorua district, and the timing of events in other parts of the country is likely to vary somewhat, being earlier in the north and later in the south.

Fig. 1: An upturned rimu shoot-tip in which the ovule is developing. (Photographed in December.)

Fig. 2: A young ovule of rimu developing on the inner surface of the uppermost leaf (the carpidium) of an upturned shoot-tip. The ovule is surrounded by a green, fleshy epimatium, but the shiny micropyle is visible through the opening in the epimatium. (January.)

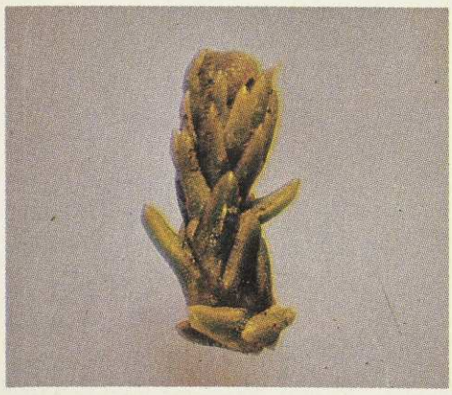


Fig. 3: A rimu ovule on an upturned shoot-tip. The green epimatium still surrounds the darker ovule, which can be glimpsed on the right of the picture. The ovule has grown to extend above the leaves. (Late March.)

Fig. 4: A rimu ovule close to fertilisation time. The ovule protrudes from the cup-like epimatium, and the sealed micropyle lips face outwards. The receptacle leaves have begun to swell, but the whole structure remains green. (November.)

RIMU

Rimu (*Dacrydium cupressinum*) has a long reproductive cycle occupying 2 years. Rimu trees are either male or female,

Fig. 5: A ripe rimu fruit. The dark glossy seed with the sealed micropyle lips towards the top is set in a red, fleshy cup-like epimatium atop a juicy, red receptacle composed of swollen rimu leaves. (Late March.)

and the species is therefore said to be dioecious.

Exactly how old rimu trees must be before they begin to produce reproductive organs is not known, but trees growing in the open or at the forest edge are likely to begin seed production at a younger age than those growing in the shade in the understoreys of the forest. I have known rimu trees in a garden which began to produce a few ovules when they were about 25 years old.

Rimu grows extremely slowly and even when trees are old enough to produce ovules and male cones, plentiful seed is not produced every year. Usually 3 or 4 years pass between good seed crops, because the production of a mass of seed and the fleshy coloured receptacles they are carried on uses up a large proportion of the tree's carbohydrate reserves, and it takes time to build up sufficient reserves before the next crop can be initiated.

Both male and female reproductive structures are believed to be initiated in late summer or autumn, though they do not become visible until the following summer. In December the tips of certain shoots of female trees turn upwards and the innermost leaf of such an upturned shoot-tip develops a minute ovule on its inner surface (Fig. 1).

In late December certain shoot-tips of male trees become slightly differentiated and develop rapidly into small male cones, 10 mm or less in length, with two pollen sacs (microsporangia) on the lower side of each specialised leaf (microsporophyll). Pollen is shed in early to mid January and is dispersed to the ovules by wind. This pollination time is later than in any of the other tree podocarps described in these articles.

At the time of pollination the ovule is enclosed in a hood-like structure, the epimatium, and surrounded by leaves, and the micropyle — the opening into the ovule through which the pollen grain must pass — is directed more or less downwards (Fig. 2). The pollen falls down between the leaves of the upturned shoot-tip and is then picked up by a droplet of sticky liquid (the pollination droplet) which flows through the micropyle from inside the ovule. The pollination droplet is exuded from the nucellus within the ovule at night when the humidity is high. The droplet is later reabsorbed and pollen grains are thus carried into the ovule on to the tip of the nucellus.

Once it is pollinated the micropyle is quickly closed off by the outward growth of its surrounding walls and the deposition of a thick protective waxy covering.

During summer and autumn the ovule grows and becomes reorientated, but it remains more or less enclosed in the epimatium (Fig. 3). Different ovules enter a winter resting stage in May or June at slightly different stages of development.

Growth recommences in about November, and the ovule begins to protrude from the surrounding epimatium while the micropyle, which appears like green, fleshy lips, is lifted up to face outwards (Fig. 4). The ovule and epimatium are green at this stage, and the bases of the 12 or so leaves above the bend in the shoot-tip have begun to swell somewhat. These leaves will produce the red, fleshy receptacle when the seed is ripe.

Meanwhile the pollen grain on the tip of the nucellus inside the ovule has produced a pollen tube which has penetrated the nucellus in search of one of the three archegonia which have developed near the micropyle end of the female gametophyte within the nucellus. (Growth of these organs ceases during winter, but recommences in November.) Fertilisation of the egg nucleus in the archegonium by the male nucleus from the pollen tube occurs in January, a year after pollination, and a tiny embryo develops inside the female gametophyte, which becomes the nutritive endosperm.

The seed (as the fertilised ovule may now be called) rapidly grows to its full size (about 3.6 mm long), and the epimatium is left as a small cup at its base while the micropyle is raised to face upwards. As the embryo develops, the receptacle leaves begin to swell and coalesce and change colour from green through yellow and orange to red, and the seed coat turns from green to a very glossy dark brown (almost black) or a rich glossy red-brown (Fig. 5). The fruits are ripe from about March to May. ■

Society author prize winner in book award

Audrey Eagle, a member of the executive for 5 years and chairman of the Waikato Branch for 2 years, recently won the second prize in the James Wattie Book of the Year Award for her book *Eagle's Trees and Shrubs of New Zealand, Second Series.*

In 1976 she received the third prize in the award for her first book.

This award, now in its sixteenth year, is the biggest in the Southern Hemisphere, and this year there was 53 entries.

Exploitation of virgin indigenous forest

By Rod Hay

HANDS UP those who have furniture or boats made from Fijian kauri! I don't blame you. It is not hard to obtain, it is probably not as expensive as New Zealand kauri, and it is very attractive and workable, just like our own beloved timber. Its very availability, however, illustrates one of the sad ironies of forest exploitation in the Pacific region.

With the failure to husband kauri properly in the early days of logging, whatever potential there may have been for sustained yield harvest of our own resource has been all but lost, with the result that the demand for such timber has shifted to the Islands. In fact, New Zealand is one of the biggest customers for Fijian kauri or dakua (*Agathis vitiensis*).

In many areas, clearing and "timber mining" are occurring at a rapid rate, and virgin indigenous forest is disappearing, as illustrated by the following two examples, one from Fiji and the other from the Solomon Islands.

Plea for reserve

According to a recent article in the *Fiji Times*, the National Trust for Fiji has, with difficulty, been trying to raise the $50,000 needed to secure reserve status over what could become the last remnant of virgin dakua forest on Vanua Levu, Fiji's second largest island. The size of the area proposed, a mere 120 ha, shows the nature of the conservation problem in these islands.

Timber concessions are held over vast areas of tribally owned land, and conservation proposals such as this one must entail payment to the landowners of considerable compensation for the loss of logging royalties. In this case the payment will entitle the Trust to lease and control the reserve with the conditions that the landowners can revoke the lease at any time and that signs are erected advertising the contribution the company has made in forgoing their cutting rights.

It certainly seems that conservation is bearing all the expense for a very small reserve, but under the system of land ownership in Fiji that is the best that can be done at the present time.

Notwithstanding all this, the project is an important and urgent one, as the Trust still has a shortfall in the money needed, and the timber company and the landowners may withdraw from the agreement. Contributions can be sent to the secretary of the National Trust for Fiji, P.O. Box 2089, Government Buildings, Suva, or to head office of the Society, P.O. Box 631, Wellington.

Conservation of areas of Fiji rain forest are essential if species such as the long-legged warbler (*Trichocichla rufa*), red-breasted musk parrot (*Prosopeia tabuensis*), orange dove (*Ptilinopus victor*), and silktail (*Lamprolia victoriae*) are to survive.

The curious endemic silktail is particularly endangered on Vanua Levu.

Solomons logging

In some parts of the Pacific apparently large areas of rain forest habitat still exist, but not for long if an extension of the American logging industry heralded by Howell Enterprises continues.

Dave Howell has shifted out of the Pacific north-west and obtained timber rights to the whole of San Cristobal Island (112 by 32 km) in the south-east Solomons. He has these rights for 20 years, and 5 percent of the gross income from them will be paid to the Government, which will then be responsible for any reafforestation.

Some of the wood will be processed in the Solomons, but it appears that most will be exported directly. It is not difficult to imagine what San Cristobal will look like after the loggers have been. Howell states that they are "there to provide jobs as well as an inflow of money". It is hard to see, however, that the Solomons Islanders will gain much from such an enterprise.

Think twice before ordering that timber from the Islands! ■

Wildlife reserves in Maniototo wetlands are urgently needed

THOUGH wetlands have not attracted the sort of conservation effort accorded to New Zealand's native forests, there has been a rapid change in the public's perception of wetlands in the last few years, with a torrent of articles, in a variety of publications urging wetland preservation, and a veritable mudslide of policy statements from resource management agencies.

PUBLIC awareness of the value of swamps and bogs has never been higher and with this has come an acceptance that wetlands are:

- Highly productive ecosystems which sustain a diverse flora and fauna.
- Important scientific and recreational areas.
- A rapidly diminishing resource.

And that they can have other values in:

- Maintaining base flows in rivers and streams during summer by storing and slowly releasing rainwater or snow melt.
- Ponding flood waters and mitigating flooding.
- Protecting downstream water quality by sieving off nutrients in run-off from agricultural land.

What comes through from the mass of information available supporting wetlands preservation is the need to act immediately to protect what little wetland remains.

The Maniototo wetlands from the air in winter. The regular flooding replenishes oxbows and lagoons adjacent to the river. This reach of the river is a magnificent example of a scroll plain.

P. R. Henriques photo

What is happening, in practice, is quite the reverse. The loss or degradation of swamps, bogs, and estuaries is continuing unimpeded throughout the country.

The drainage and development of wetlands for agricultural purposes has, without question, played a major role in New Zealand's growth and prosperity. There **was** nothing wrong with carving farms out of the extensive swamp land which confronted the early settlers. But now there is so little natural wetland left that the development of the remnants of what was once so common must be seen as being closely akin to vandalism.

The upper catchment area of the Taieri River, in Central Otago, provides a good example of how difficult wetlands are to protect.

Much of Central Otago is characterised by tussock-covered, block-faulted mountain ranges separated by sediment-filled basins on which have developed fertile soils and which contribute much of the area's agricultural production.

The course of the Taieri River's upper reaches has been dictated by the pattern of block faulting — first flowing north out of the western side of the Rock and Pillar Range down through the Styx Basin, then north and east across the Maniototo Basin, and then

south to the eastern side of the Rock and Pillar Range.

Oxbows and lagoons

Where the river crosses the plains of both the Styx and the Maniototo Basins it runs at a shallow gradient and its course meanders back and forth across the flood plain, leaving behind, as a result of natural meander development, countless oxbow lakes and lagoons.

From the air the magnificence of this intricate meander pattern is more fully appreciated, and it is easy to understand why these reaches of the river were included in the Draft List of Wild and Scenic Rivers (N.W.A.S.C.O. 1982) as an outstanding example of a scroll plain.

The upper Taieri has a regular pattern of flooding, especially in winter, which has conspired with the topography to create major wetland areas in the river's flood plain as it crosses both these basins. The flood waters replenish the oxbows and lagoons adjacent to the river and provide a diversity of habitat for both waterfowl and wading birds.

The area of open water in both wetlands gradually recedes as summer progresses and the habitat available to water birds changes in character and reduces in size; the wetlands are markedly seasonal in nature.

The Styx wetlands, some 1000 ha in extent, have been extensively modified with the encroachment of agricultural land — in many places to the water's edge. It is nevertheless an important wildlife area and supports good populations of waterfowl, especially black swan, grey teal, paradise shelduck, and mallard and grey duck.

The Maniototo wetland downstream has suffered less modification, with extensive

By N. R. N. Watson, Manager, Otago Acclimatisation Society

areas of wetland vegetation such as rushes and sedges, but with the tussock grassland which confronted the first settlers now replaced by exotic pasture.

Effect of willows

Another dominant vegetative feature is the growth of crack willows, which were originally planted along the river's course by farmers, presumably to stabilise the river's banks. These willows have thrived and spread to such an extent that they have now restricted the capacity of the river channel and, as a result, seasonal flood waters take much longer to dissipate than in the past.

This has resulted in the wetland, which is more than 2000 ha in size, becoming less seasonal and more permanent in nature than it was formerly, with large open areas of standing water all year round.

Waterfowl dominate the wetlands, with large numbers of swans, shelducks, grey teal, shoveler, grey, and especially mallard ducks. Pied stilts, pied oystercatchers, pukekos, white-faced herons, shags, spur-winged plovers, and gulls are common.

Bitterns and fernbirds are also found there with Australian coot. The wetlands also host, from time to time, a number of visitors, including banded dotterels, glossy and white ibis, and white herons.

This represents quite a change from the wetlands known to early settlers, and the avian fauna described in a paper by Bathgate (1922):

> Some idea of the changes may, however, be realised by those familiar with the country now by my giving the purport of some notes received from Mr Noel Buchanan, who lived at Patearoa Station, on the Maniototo Plain, in 1862. The Taieri then, he says, was a "bright translucent stream" and at every bend of the river (and they were numerous) "there was a bank of clean small gravel and on these flocks of waders and other birds disported themselves. Those which I remember clearly were dotterel, golden plover, pied stilts and the pied redbill (or oystercatcher), all running up and down on the beaches, and swarms of terns sitting around or whirling over the river, now and then dipping to catch something out of the water. In the swamps and lagoons back from the river were a good many pukeko, and along the river not infrequent bitterns; on the open plains large flocks of paradise duck. On the lagoons and river bends grey duck, shovelers and teal were numerous. Weka were plentiful among the rocks and scrub in the gorge near the Styx as also blue duck, an odd kingfisher now and then, with a few fantails and tomtits. The little grebe (or dabchick) was not uncommon in the quiet reaches of the river or deeper lagoons. The native ground lark was abundant. Both the pied oystercatcher and the dotterel used to breed on the top of almost bare terraces, among the stones and sparse tussocks.

Major modifications

The Maniototo wetlands are today considered as a nationally important wildlife habitat by both the Wildlife Service and the acclimatisation societies and receive extensive public use. However, they have no protective status, and major modifications at present being implemented leave their future in question.

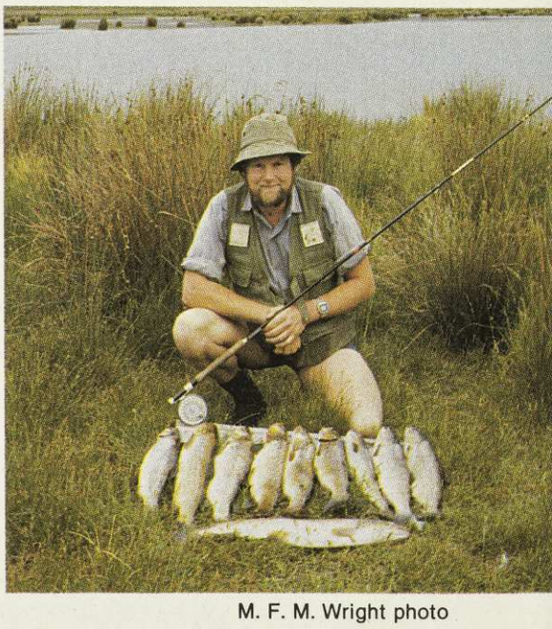
These modifications began in 1975, when firm development plans were put forward for a combined hydro-electric and irrigation scheme in the upper Taieri which would irrigate large areas of the naturally arid Maniototo Plain. This scheme involved the damming of the Logan Burn, a major tributary of the Taieri River, and the flooding of a third major upper catchment wetland — the Great Moss Swamp — as a storage reservoir.

The Great Moss Swamp is also a valuable wildlife habitat

Maniototo wetlands in midsummer. The wetlands are highly productive and support a variety of water birds, especially waterfowl such as black swan, paradise duck, grey teal, and shoveler, grey, and mallard duck.

N. R. N. Watson photo

A low-lying area adjacent to the river at present classified as plantation reserve. Moves to reclassify the area to wildlife management reserve status have become bogged down.



M. F. M. Wright photo

An angler with a limit bag of brown trout. The Maniototo wetlands and the upper Taieri River support a trophy trout fishery which provides anglers with the chance to catch larger than average fish. Limit bags are not uncommon among experienced anglers.

and, though it is not considered nationally important, its size, nearly 700 ha, makes it at least regionally important. A major part of its biological value is the peripheral peat bogs which surround the area. However, the Logan Burn dam is now complete and the reservoir is at present in the process of filling.

At the time these proposals were first put forward the Wildlife Service recommended that areas of the Maniototo wetlands should be reserved, partly to compensate for losses elsewhere in the catchment, but primarily because of the area's high wildlife values. However, at about the same time the Otago Catchment Board began investigating, at the request of local landholders, a scheme to restore the flow capacity of the river to its original condition before the growth of willows in the river channel, because the prolonged flooding caused by willows choking the channel was resulting in a considerable loss of agricultural production.

The Otago Catchment Board's remedy to this problem, a "Channel Improvement Scheme", involved not only willow clearance along the river's course, but also the cutting off of some 17 meander loops, shortening the river by 13 km over a 60-km reach. These cut-offs were intended as an economy measure to save the cost of willow clearance in difficult situations. But with hindsight this gross approach to river control works, untried in a river of this type, may not prove to be as economically attractive as originally thought.

Such a proposal was bound to run into major opposition and result in considerable delays, which would probably not have been so with a simple willow clearance programme. Objectors to the scheme included both the Otago Acclimatisation Society and the Wildlife Service, which were both concerned at the likely impact of cutting off meanders on the river's stability specifically and the wetland generally.

Predictably, the scheme was subjected first to an Otago Regional Water Board Tribunal, which considered the water rights required to divert the river by cutting off meander loops and which granted the necessary rights, and an appeal to the Planning Tribunal in 1980 by both the Otago Acclimatisation Society and the Wildlife Service.

The Planning Tribunal, while accepting that the wetlands were nationally important, also found in favour of the scheme proceeding and suggested that land purchase was an appropriate means of protecting some of the wetlands in reserve areas.

Negotiations to buy two reserve areas

As a consequence the acclimatisation society and the Wildlife Service sought out areas of value for wildlife and began negotiations to buy two separate areas totalling 83 ha to set aside as wildlife reserves. The channel improvement works began in autumn 1982 after the Soil Conservation and Rivers Control Council granted a 60 percent Government subsidy on the scheme's estimated cost of $681,928.

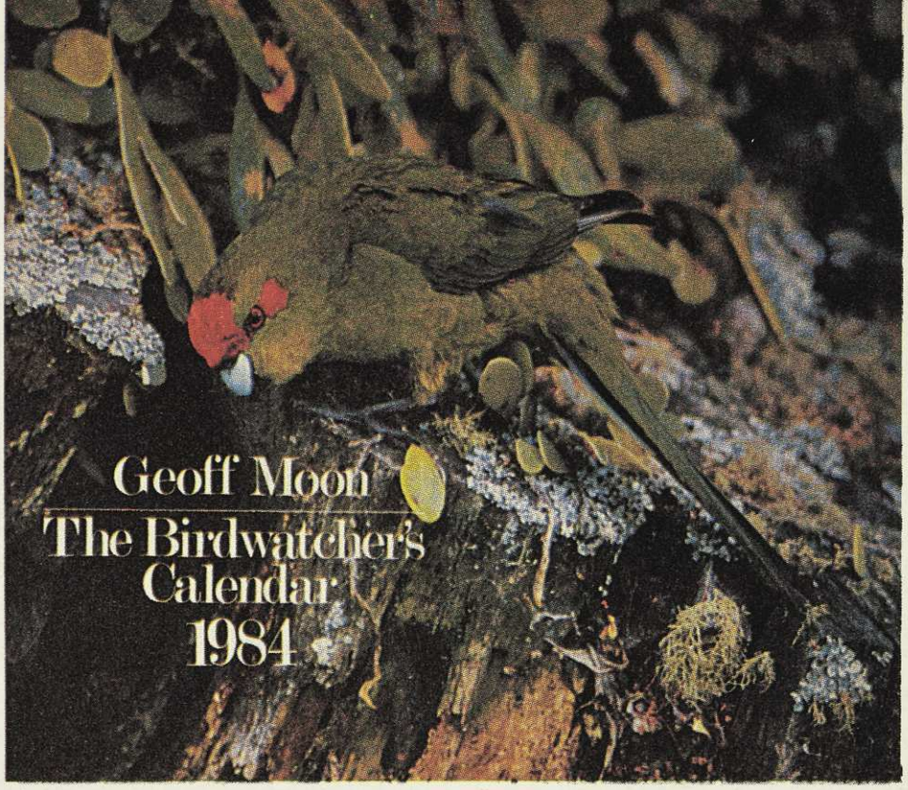
In granting the Government share the Soil Conservation and Rivers Control Council noted that "the Wildlife Service is reported to have acquired two parcels of land" for wildlife management purposes. The assumption on the part of the council that the reserves had been acquired was quite reasonable considering the advanced stage of the negotiations and suggests that the council considered that wildlife matters were at least getting some representation.

However, though both negotiations were well advanced, they still required the permission of the Maniototo County Council for consent to subdivide. This was refused in both cases. The county council blocked the acclimatisation society's reserve proposals because it considered that, among other things, the land had potential for food production and that the area concerned — 50 ha — would not be an economic farming unit should the wildlife values diminish as a result of the Channel Improvement Scheme.

One of the major points continually raised by the Maniototo County Council as justification for its continued opposition to the riverside reserves is the assumption that what it describes as "historic wetlands" (wetlands existing before willow infestation) would be more easily identifiable after the implementation of the Channel Improvement Scheme, when the river's channel capacity is restored. And that, therefore, all reserve proposals should be shelved in the meantime. This was, in the acclimatisation society's opinion, contrary both to the spirit of the Planning Tribunal decision and catchment board thinking on the matter.

The Maniototo County Council's determination that reserve proposals should wait until those developments benefiting agriculture are complete was not intended by the Otago Regional Water Board, which included the following conditions in its original decision over water rights for the catchment board scheme:

> That before embarking on any such works . . . and during the course of the execution of any such works, the Otago Catchment Board under the supervision of the Water Board will confer with officers of the Wildlife



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Division of the Department of Internal Affairs and identify, preserve, and develop selected areas of existing wetlands as wildlife habitat (Otago Regional Water Board 1979).

Furthermore, the Channel Improvement Scheme's Environmental Impact Report (Otago Catchment Board 1978) stated that areas could be maintained and enhanced for wildlife by the construction of low earth banks to pond water in low-lying areas, and the board has advised that such works would be simple to construct.

Moreover, to allow the economic analysis of the benefits of the Channel Improvement Scheme the Otago Catchment Board was asked to calculate the area of land which would be restored to agricultural production as a result of the more rapid dissipation of seasonal flood waters from the wetlands. The board must therefore be able to identify, with a similar level of accuracy, the areas that are expected to remain wetland and those which are not. Surely if the information is sufficiently accurate to justify the expense of $400,000 of public funds on developments benefiting agriculture it is good enough to use for the identification of suitable reserve areas.

Appeal hearing

The Otago Acclimatisation Society is now awaiting a Planning Tribunal appeal hearing against the Maniototo County Council's decision to refuse subdivision consent on one wetland area under negotiation and is optimistic of a favourable result.

Proposals for two other reserves in the Maniototo have also become bogged down. The Wildlife Service recommended that a further 60 ha of low-lying Crown land adjacent to the river should be reclassified from plantation reserve status to that of wildlife management reserve. These areas have never been used for the establishment of plantations, but they do have high wildlife habitat values at the present time.

The Department of Lands and Survey called for submissions on the desirability of this change in status and it is my understanding that the matter was then referred to the Minister of Lands, Mr Jonathan Elworthy, for a decision.

The matter has been with the Minister for almost a year now and does not look like resurfacing while the Maniototo County Council is opposed to the establishment of reserves.

This major legal wrangle has developed over the desire by wildlife agencies to acquire a total of 140 ha of one of New Zealand's 10 most important freshwater wetlands (which represents less than 10 percent of the Maniototo wetland's total area). The acquisition of these areas does not preclude continued use as grazing land; in fact a level of grazing would be desirable in the future management of the areas. The present landowners are not opposed to the proposals and are prepared to sell.

What it does demonstrate is the need for a more co-ordinated approach to the management planning of land and water resources and the difficulty that can be encountered when a local authority decides to stonewall a proposal that does not appeal to it despite the area's recognised wildlife values.

Recreational activity

The Taieri River and Maniototo wetlands are a major focus for recreational activity in the upper Taieri catchment, attracting waterfowl hunters from as far away as Christchurch during the game season and receiving high pressure from anglers over summer. In addition the area is used and enjoyed by picnickers, campers, and bird-watchers. The district could only benefit from more reserves and better defined access to the Taieri River. Wildlife reserves are, after all, intended to cater for recreational use.

Wetlands are, at the present time, not given sufficient protection by legislation based on multiple-use concepts, such as the Town and Country Planning Act or the Water and Soil Conservation Act. Further, they are not yet appreciated for the positive values they offer in land management practices, and they have not been, despite the increase in public awareness, protected by public opinion or the printed word. In fact the adverse economic assessment of wetland development proposals has probably played a greater part in wetland protection than all the well-meaning articles, technical reports, and policies put together.

Considering the acknowledged importance of the remaining major wetlands in maintaining a large part of New Zealand's water-dependent flora and fauna, that is simply not good enough. What is needed is a simple legal mechanism that allows deserving wetland areas to be protected.

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■

Ways sought to deal with bush fires in summer

SUMMER WEATHER brings renewed interest in the outdoors, with families and individuals spending time enjoying the many activities that the superb natural surroundings of New Zealand provide. For many this time of year is marred by the frequent fires which destroy semi-natural rural areas or local areas of bush.

By Russell Bell

REGENERATING FOREST or mixed native plant and gorse areas referred to as "scrub" in the news media are of importance to Society members. They are regarded as potential local reserves, and some are the only natural local area where children play.

Larger fires in natural areas exact a considerable toll in wildlife and habitat.

Cost

In all fires there are high costs — men's wages, equipment, chemicals, transport helicopters, accidents, and property damage.

Bush fires are started by one of these causes:

- Natural (spontaneous).
- Accidental.
- Controlled burn-off.
- Uncontrolled burn-off.

Once started they are fought by one or a combination of the following: Local volunteer bush fire force, local volunteer firemen, the Fire Service, or the Forest Service. Sorting out who is in charge and who pays is not easy and does not always go smoothly. Resolving who is responsible for the damage and how to prevent recurrence seems to be an even more difficult task and is seldom undertaken.

Hot-spots

When a fire is out, hot-spots remain, which depending on the seriousness of the situation, may be dealt with or left in the hope that they will not flare and burn more "scrub". Hot-spots (slow smouldering places where air circulation is limited) occur when native bush burns and are most prevalent in tree fern trunks and in holes in logs or where log are in partial contact with the ground.

Hot-spots can flare up 1 or 2 days after a fire is thought to be out. They occur generally during a windy period of the day and are preceded by the appearance of smoke, which allows (usually) sufficient time, if equipment and spotters are on hand, to ensure that the hot-spots do not trigger another fire.

Eastbourne fires

The circumstances described above were all present in fires this year in Eastbourne (on the eastern side of Wellington Harbour). The borough there is fortunate to have large reserves cloaked in native forest. Slopes facing the borough's main road contain the poorest quality vegetation and all have areas of gorse, some of it recently burnt. As the gorse grows it provides an ideal nursery for native plants. It has but one failing: It is susceptible to fire.

When the gorse burns, the native plants are also incinerated. Flax and tree ferns may survive, especially if growing beside a track where the heat is less intense, but plants like five-finger, hange-hange, and manuka will be lost.

The pattern of growth and destruction will be repeated again and again unless a factor can be introduced which allows the native growth to continue past the danger point and crowd out the gorse.

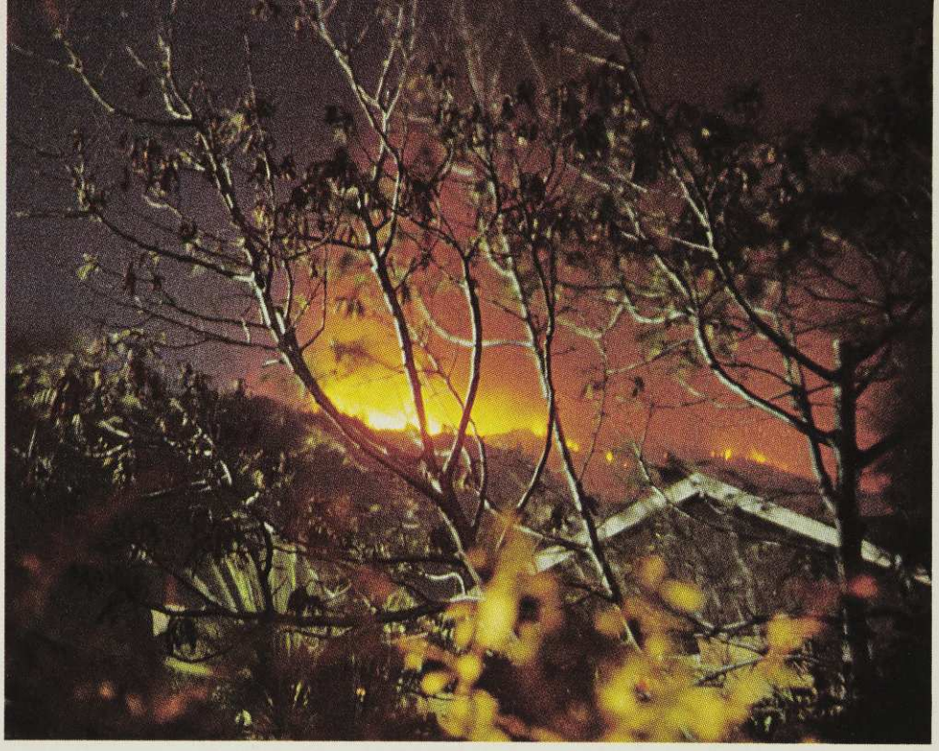
Two other factors were present in Eastbourne fires:

- All fires started from a roadside.
- The presence of pine trees intensified and aided the spread of the fires. Subsequently the fire helped the spread of pines by providing high light conditions suitable for their regeneration from seed. Seed is dispersed from cones after the pine trees have been burnt.

Solutions

Eastbourne Borough has attempted to solve some of the problems as follows:

The borough council has



Above: Tree ferns that are partly protected from a fire's main heat by a track may survive. The central fronds of this fern are undamaged.

Top right: After 3 days of burning fire at Eastbourne became a grave threat as it swept closer to houses.

Middle right: The disheartening sight of blackened gorse trunks brings the realisation that the regeneration process has to begin all over again.

Bottom right: Fire burnt quickly through the gorse on the distant hill and on the right. Once native vegetation, even manuka, is established the likelihood of fire is lessened.

Below: Though this flax is badly burnt, it will survive. In many burnt areas this plant provides the first green in a blackened landscape.

established a fund to be used to fight local bush fires regardless of land tenure or responsibility. It is hoped that intensive activity (monsoon buckets and the like) at an early stage may short-circuit a fire.

The East Harbour Environmental Association has set up a list of observers who will monitor or control renewed activity after a fire or call for reinforcements. Radio telephones are available.

Strips of land along roadsides have been cleared of gorse and planted with non-burning vegetation such as karaka, flax, taupata, and agapanthas.

Tree lucerne seed is to be spread on burnt ground. Other areas studied which have a cover of tree lucerne have no gorse and have good regeneration of natives underneath. Tree lucerne was chosen because it is fast growing, non-burning, leguminous, short lived, and attractive to seed-dispersing wood pigeons.

Further work needed

The recovery of areas in native plants would be aided by:

- Public recognition of the importance of regenerating forest "scrub" to allow high technology methods to be used at an early stage.
- The provision of legislation to ensure a decrease in uncontrolled burn-offs.
- Scientific studies on the best way to regenerate native forest after fire instead of using gorse as a nursery. The information published in the *Revegetation Manual* by the Queen Elizabeth II National Trust is an important start in these studies.
- The use of infra-red detection systems to show the presence of hot-spot activity.

The ideas adopted by Eastbourne are given here in the hope that they will be of use in other localities. The problems raised need resolving and the information so gained would need to be available to councils and the like.

This surely is a matter in which the Society could play a part. ■

AUTUMN 1983

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RF&B

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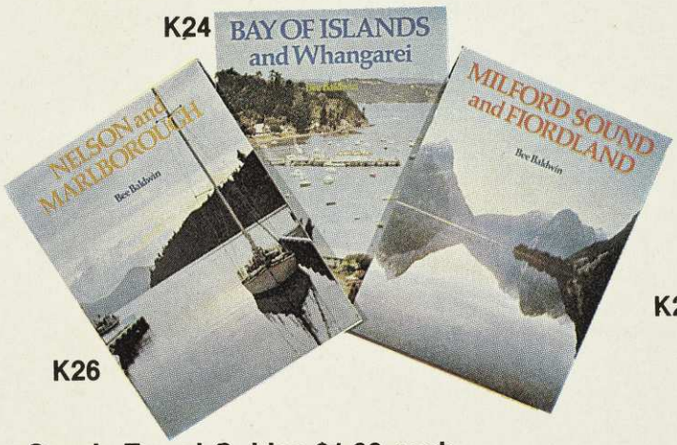

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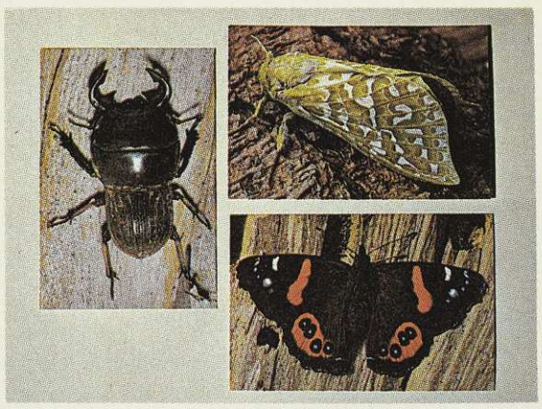

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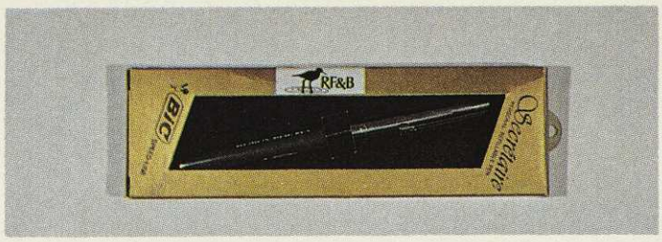

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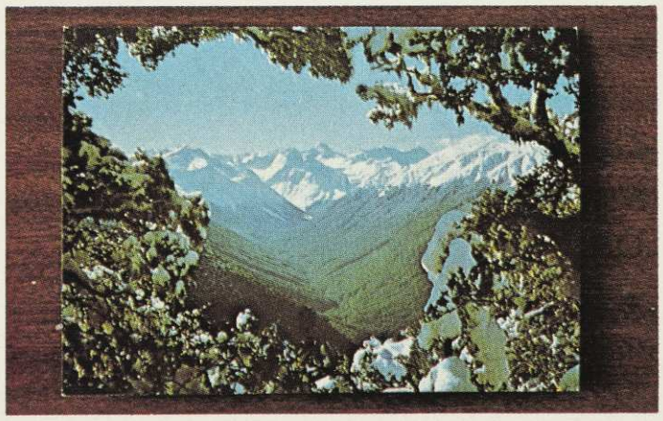

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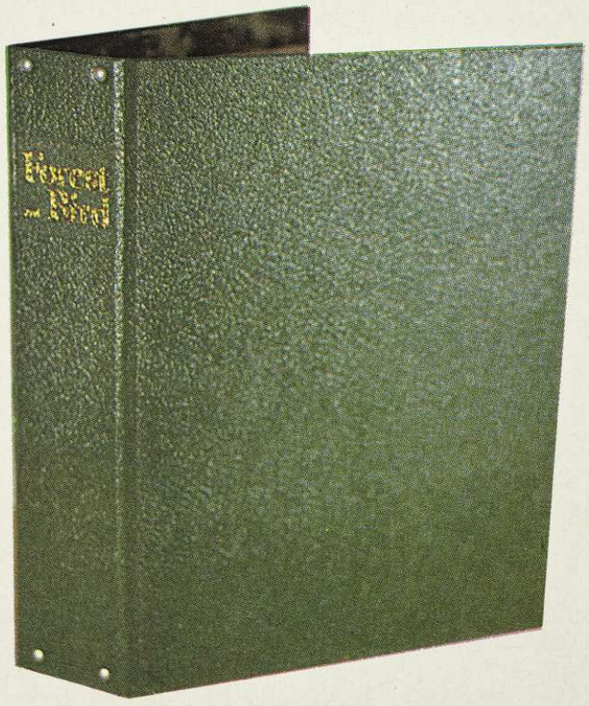

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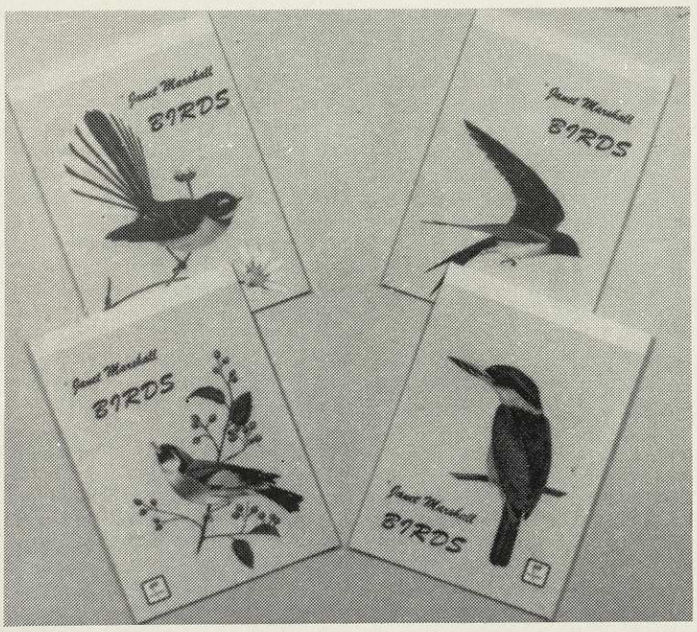

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Some like it muddy

By David Gregorie

A FEW SUNDAYS ago I was driving with a friend along a straight stretch of Gray's Road, north of Pauatahanui. On both sides stretched mud flats and salt marshes, rush-covered swamps, and pools of water reflecting the grey sky. Dead boring. Until we looked closer.

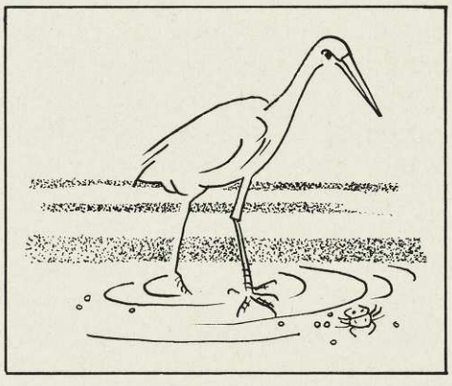
When we did we discovered that it wasn't quite as dead as it seemed. A small group of pied stilts waded in the shallow water, obviously finding food. Sometimes two or three of them would sprint quickly across patches of dry ground as if their friends had found something tasty they wanted to share.

A white-fronted heron, with its chin well tucked back, flew across the inlet. Its wings were moving so slowly we wondered why it didn't crash. Ducks puddled around the edges of the mud banks and three swans headed out across the harbour. I guess they thought that at 500 m we were too close.

I could hear (but couldn't see) a kingfisher. Welcome swallows flitted across the pools hunting for insects, and black-backed gulls "squarked" past, hoping we were having a picnic.

I have been to Pauatahanui many times, as it is only about 30 km from my home in Wellington. There is always plenty to see if you know what to look for. Mallard ducks, spotless crakes, and pukekos are breeding there now, their nests hidden by clumps of scrub, flax, or rushes. Skylarks will nest on the drier patches in the grass, and swallows will hide their mud-built nests under bridges, pipe drains, and overhanging banks.

Towards the end of summer the migratory birds — the godwits and the curlews — will spend the long days feeding in the shallow water, "fuelling-up" for their flight across the Pacific to Alaska or Siberia, where they will spend the northern summer.



A white-fronted heron stalks crabs and other mud flat creatures.

The plants are worth more attention than they usually get. The flowerheads of the flax look magnificent at this time of the year, and the fresh-water sedges on the margins of the marsh above the high tide mark have a weird browny gold colour when you look over them against the light. The glass-worts are unexpectedly colourful, lurking in the shallow pools like part of an underwater rock garden. Just as well I had a pair of gumboots in the car.

My friend was getting bored. Sludging around in the mud and stopping in the most uncomfortable places to take photos didn't appeal to him. He wanted to know what use it all was — why they couldn't put a causeway across the marsh next to the sea and shorten the road by a couple of kilometres — why they didn't drain the marsh and put cows on it.

I explained that estuaries, salt marshes, and tidal flats are the only places where many wading birds can feed and breed and that many of the fish we like to eat feed and breed there too. No mud flats — no godwits, no fish 'n' chips.

The tide was right out, so we looked at the mud flats, not smooth, but covered all over with bumps and tiny mud volcanoes. The bumps are mud snails, and the volcanoes hide the burrows of worms and shellfish. There are hundreds of thousands of them — all good food for wading birds.

A pukeko in the dense vegetation around the reserve.

This section is sponsored by the J.R. McKenzie Trust.

The fish come in from the sea at high tide to feed on the plankton and the plants in the shallow water. Some kinds of fish lay their eggs in the warm, shallow water and let the sun do the hatching for them.

This wonderful area will be managed by the Society as a wildlife reserve. The Society plans to make paths and boardwalks around the edges of the reserve with screens of native trees so that watchers won't alarm the birds. "Hides" will enable people to sit concealed as they watch the birds going about their daily work of finding food.

Forest and Bird owns an early settler's cottage built in 1860, the oldest in Pauatahanui village. A member lives there keeping an eye on the birds and their habitat.

This is one "forgotten habitat" that has been remembered.

Drawings by Betty McKinnon.

BIRDS I HAVE MET

20. The wrybill — ngutu-parore

By Avis Acres

THE WRYBILL, sometimes called the wrybilled plover, was first discovered by two zoologists from the French ship *Astrolabe* in 1827. They reported sighting a flock of small grey and white birds with unique, twisted bills on mud flats in the Hauraki Gulf.

There are various speculations as to what advantage the wrybill gains by having a bill twisted to the right. Some ornithologists believe it enables the bird to catch insects retreating round a stone. Whatever the explanation, little ngutu-parore seems quite satisfied with its odd, wry bill.

On Manukau Harbour

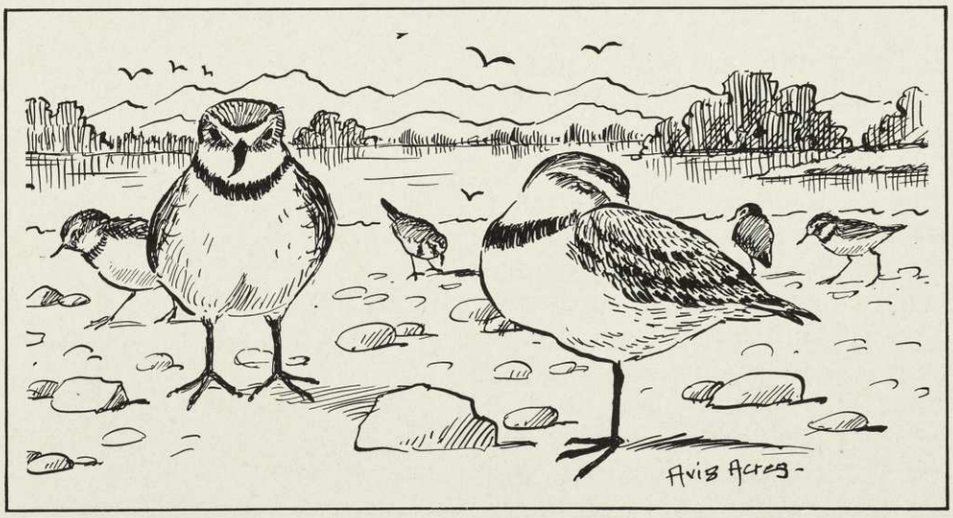
My first meeting with the wrybill occurred during a winter visit to Auckland some years ago when Mr Sibson took my husband and me bird-watching on mud flats in the Manukau Harbour.

It was quite a memorable afternoon. We saw huge flocks of wading birds, terns, oystercatchers, stilts, and banded dotterels. Quite a large flock of wrybills were assembled the day we were there. They announced their presence before we saw them with shrill high-pitched "peeps" resembling the call of the banded dotterel. We were able to observe them at close quarters, as they were so friendly and unafraid. In fact, they can be stroked while sitting on the nest.

Both sexes have similar plumage — bluish grey above and white below with a black band across the chest. A white band across the forehead extends above the eyes, and the male has a dark line above the white. They have black bills and greenish black feet.

The wrybill is slightly smaller than the banded dotterel, about the size of a starling. We noticed that the birds ran at a fast pace while searching for food, with their heads hunched closely to their bodies. I was worried to see several birds hopping along on one leg until I learnt that they often forgot to untuck the other leg after they have been resting.

Mr Sibson told us that the birds gathered at the same resting place regularly each day



Some wrybills hop on one leg because they forget to untuck the other leg after they have been resting.

Flight south

About July or August, the wrybills fly south to nest on shingle banks in the rivers in Canterbury and Otago. When I visited the Opihi River one November I found it extremely difficult to spot the nesting wrybills against the grey river stones, and the tiny grey and white speckled chicks were almost impossible to see.

Ngutu-parore is rather lazy about nest building. The only effort the female makes is to scratch a small hollow in the sand in the shelter of a large stone and surround it with a few pebbles. Two pale grey eggs tinged with blue and green with dark spots are laid. The chicks leave the nest the day after hatching and toddle after their parents. They can swim within a few days.

By the end of February the wrybills have all departed to spend the winter in the North Island. Between April and August their favourite haunts are the Firth of Thames and the Kaipara and Manukau Harbours. I have also seen a few at Foxton, on the Manawatu Estuary, usually in the company of banded dotterels. ■

New Zealand plants

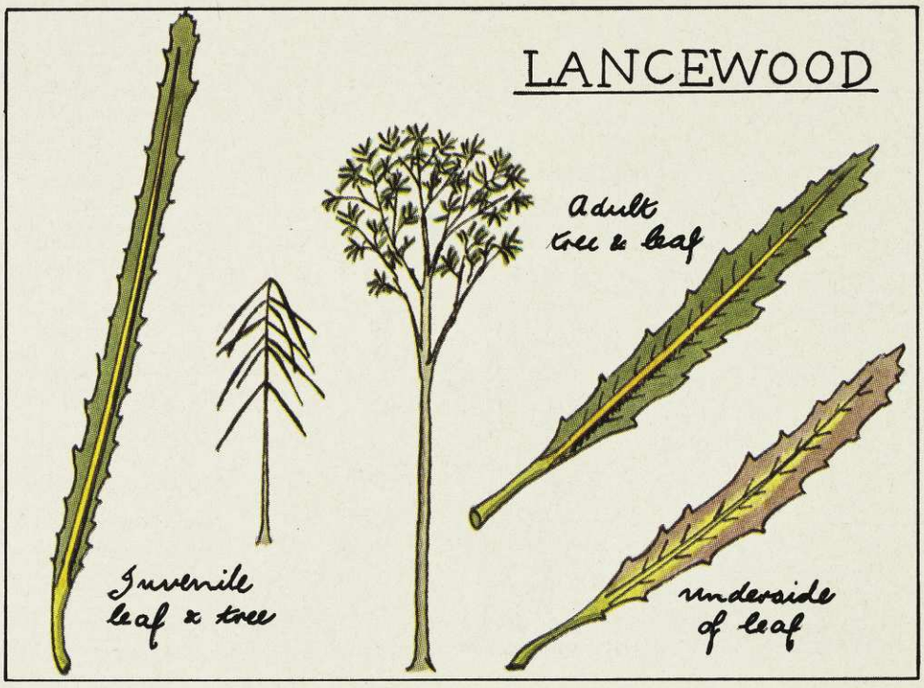
By
Sheila Cunningham

Lancewood

Lancewood (*Pseudopanax crassifolium*) grows to 15 m high. It progresses from a juvenile to an adult tree through several stages, being most conspicuous when half grown, with the long, thin, stiff leaves still deflexed as in a partly open umbrella. The juvenile form remains for from 15 to 20 years.

The leaves in all stages have an attractive raised coloured midrib. The bark is grey, and the leaves and wood have a pleasant smell. The wood is durable and is used for fence posts and piles. The tree is drought and wind resistant.

The Maori name of lancewood is horoeka.

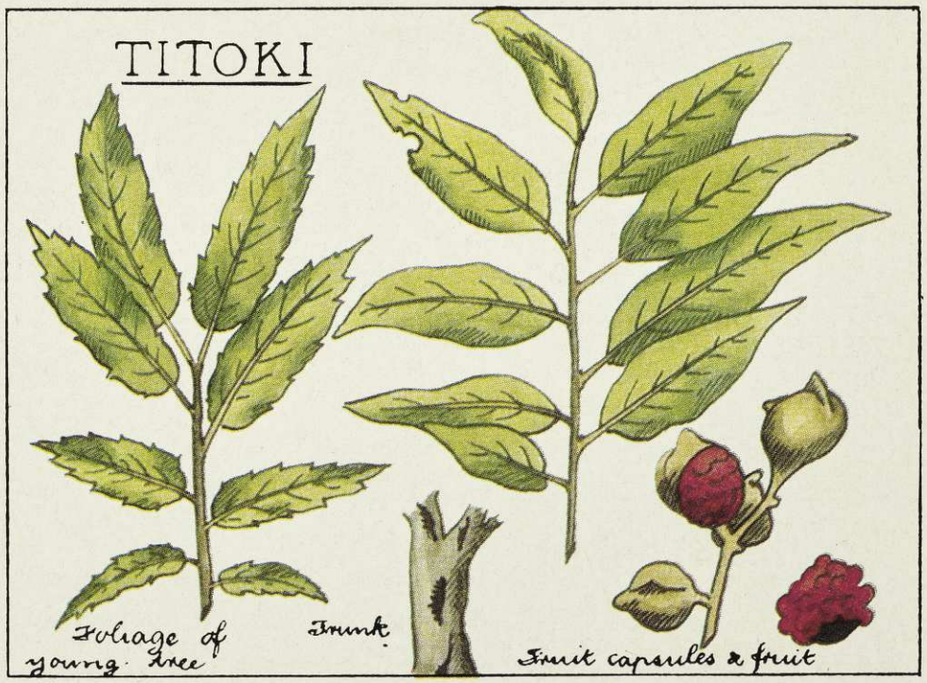


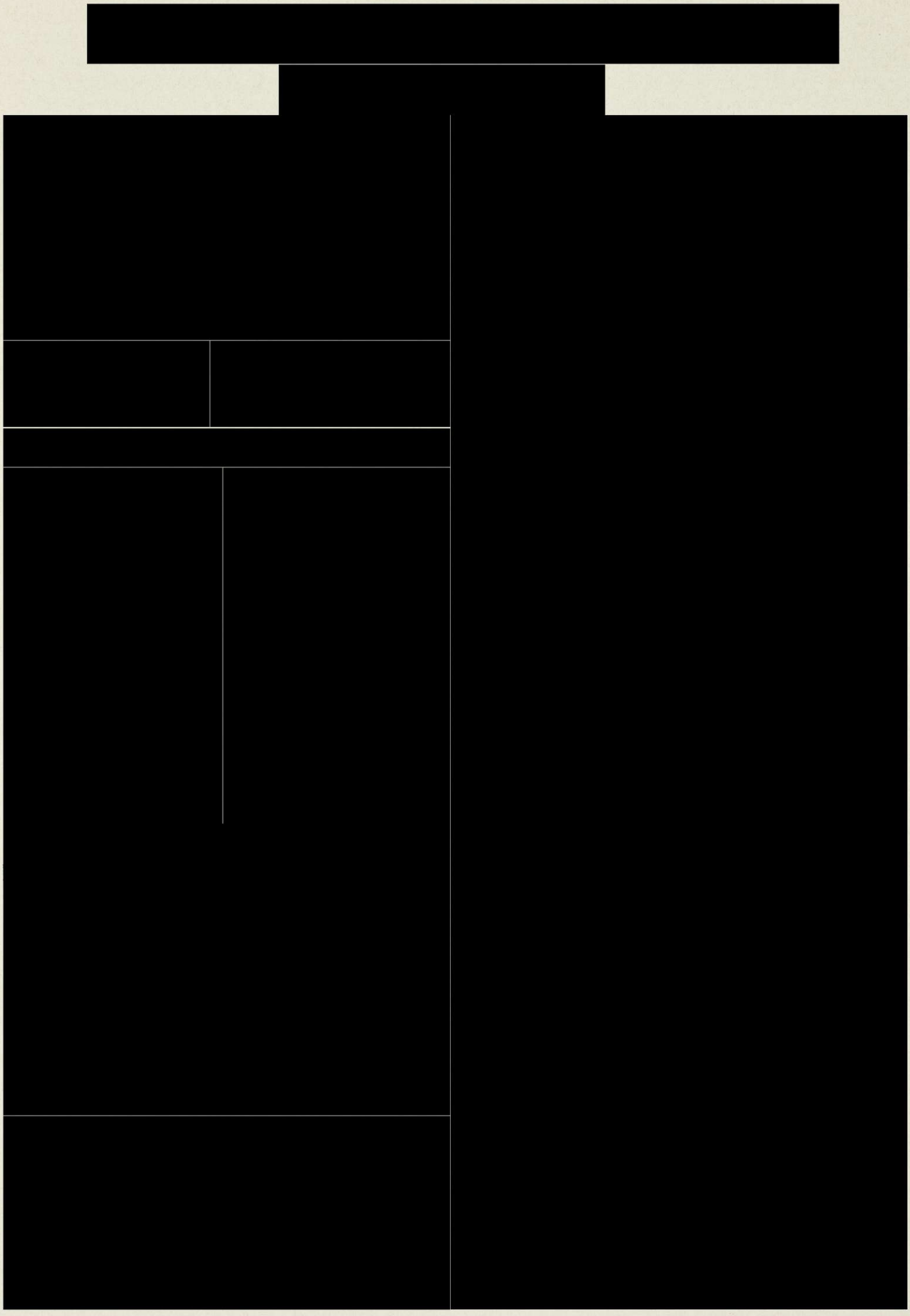
Titoki

The buds, young shoots, leaf stalks, flower panicles, and seed capsules of titoki (*Alectryon excelsus*) are covered with dense rust-coloured down. The black, shiny seeds are set in a scarlet fleshy cup and take about a year to ripen; they are much sought after by the possum.

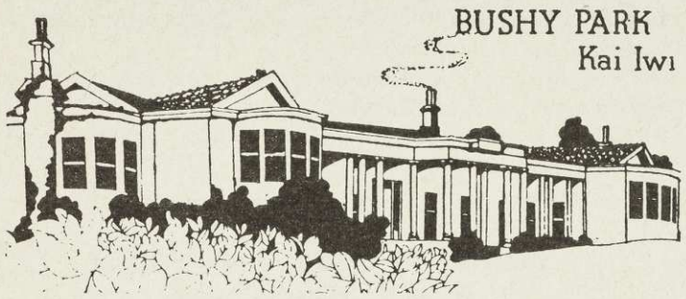
The smooth bark is a dark grey, and many trunks have elongated surface hollows.

The titoki, which reaches 15 m in height, is found in coastal and lowland forests up to an altitude of 600 m. Its timber is a light reddish brown and was used by wheelwrights for coachbuilding, bullock yokes, and tool handles.





SOCIETY'S LODGES AND HOUSES



Bushy Park, Kai Iwi

24 km north of Wanganui

Fine old homestead, lovely grounds, 89 ha of native bush.

Make your own programme.

Electric stove, hot water, and other facilities available. Bring your own rations. Bedding supplied. Linen and towels $1.50 per bed*.

Fees: Members: single, $9 per night; double $14 per night. Non-members: single, $14 per night; double, $18 per night. Children aged from 1 to 12 years, $6 per night. Day visitors, members and non-members, $1; children under 12 years, 50c; family group of two adults and children, $3.

Custodian: C/o Bushy Park Homestead, Kai Iwi, R.D.8, Wanganui. Telephone Kai Iwi 879.

The park is closed to daytime visitors on Mondays and Tuesdays.

Patoka Lodge

Hawke's Bay

The lodge is situated 48 km from Napier on the Puketitiri Road 8 km past Patoka, amid the 14-ha William Hartree Memorial Scenic Reserve. The lodge offers quiet retreat and bush walks of botanical interest. There are also many places of interest within a short distance.

The lodge has two bunkrooms, accommodating 10 people. Extra mattresses and pillows are available to sleep up to 20. The lodge has a fully equipped kitchen, including a refrigerator.

Visitors supply their own linen, pillow cases, blankets or sleeping bags, and cutlery. The nearest store is 8 km away. No animals are permitted.

An information leaflet is supplied with notice of booking. A key will be posted a week before the date booked and this is to be returned with payment after occupation.

Fees (per night): Adult members, $1.50; junior members, 75c; adult non-members, $2; junior non-members, $1.
A 50 percent deposit is required with each booking.

For information and bookings apply to: June Northe, 212 Kennedy Road, Napier. Telephone Napier 438-193.

Ruapehu Lodge

Whakapapa Village, Tongariro National Park

Ruapehu Lodge is now available for **members only**, and all bookings must be made with the Society's head office, P.O. Box 631, Wellington.

Fees: Winter season (1 June to 31 October) $7 per night
(No half price for juniors)
Summer season (1 November to 1 May) $5 per night
Children $2.50 per night

Bookings may be made 6 months in advance and must be secured by a deposit of $1 per night per member. The full amount must be paid not later than 4 weeks before occupation.

If full payment is not received by the due date, the bunks may be relet.

All refunds are subject to a $12 surcharge.

No animals or pets are allowed in the lodge or the national park.

There is no key at the lodge, but one will be posted within 10 days of booking.

No member may occupy the lodge without first booking through head office, Wellington.

Tautuku Lodge

Coastal Otago

Situated 72 km from Balclutha on State Highway 92, Tautuku Lodge on the Society's 550-ha bush-clad Lenz Reserve in coastal south-east Otago is the place for that weekend or holiday in beautiful, peaceful, unspoilt surroundings.

The reserve has interesting bush walks, and native birds are numerous. The round track is a comfortable 4 hours' walk, and as this is in its formative state, visitors are requested to keep to the marked track route.

The lodge is fully equipped and accommodates eight or nine people. It has a lounge, kitchen, two bunkrooms with innerspring mattresses and foam rubber pillows, washroom with tub, basin, and shower, and an ablution block with toilets, basins, and showers. The cooking facilities in the modern kitchen are excellent.

There is also a self-contained A-frame cabin, for two adults.

Bring with you all food supplies, bed linen, and pillow cases, blankets, towels, tea-towels, etc.

Bookings are accepted up to 9 months in advance. No refunds are made unless cancellation is advised at least 1 month before reserved occupancy.

Rates per night are: Senior members, $5; junior members, $2; senior non-members, $8; junior non-members (5-17 years of age), $3.

A deposit of 50 percent is to be made with each booking.

For free brochure and all bookings send a stamped, addressed envelope to Mrs F. C. Bennett, Papatowai, R.D. Owaka. Telephone 160M.

*All charges in these notices are subject to alteration from time to time.

(Continued on next page)

Society's lodges and houses (continued)

Turner Cottage

Stewart Island

Turner Cottage, on Stewart Island, is available for renting. The cottage, a two-roomed dwelling furnished for three people, can be obtained at a rental of $6 a day for members and $8 a day for non-members.

For details write, enclosing a stamped, addressed envelope, to:

"Turner Cottage", c/o Mrs N. Fife, P.O. Box 67, Halfmoon Bay, Stewart Island.

Tai Haruru Lodge

Piha, West Auckland

A comfortable seaside home situated in Garden Road, Piha, 38 km from central Auckland on the rugged west coast. Eight minutes' walk from the Piha store, with right-of-way access to the surf beach (patrolled in season) and close to bush reserves and walking tracks in the Waitakere Ranges.

A quiet and peaceful haven with a large sheltered garden with native trees, the lodge is fully equipped and sleeps six to eight persons in two bedrooms and an annexe. It has a large lounge with open fire, dining area, and modern kitchen.

You will need food supplies, bed linen, pillow cases, towels, and tea-towels.

Bookings are accepted up to 6 months in advance and a deposit of 25 percent is to be made with each booking.

Rates are:

Summer (mid October to Easter inclusive)

Nightly: $8 per person (children aged 1 to 12 years $4 per night).

Weekends: $32 minimum.

Weekly: $90 minimum.

Winter (after Easter to mid October)

Nightly: $6 per person (children aged 1 to 12 years $3 per night).

Weekends: $24 minimum.

Weekly: $60 minimum.

For bookings send a stamped, addressed envelope to: Mrs B. Marshall, 160 Valley Road, Henderson, Auckland 8. Telephone: 836-5859.

There is no key at the lodge. It must be collected from and returned to Mrs Marshall. A leaflet will be forwarded with the acknowledgment of booking and receipt for deposit.

Waiheke Island Cottage

Onetangi, Waiheke Island

The cottage has comfortable bunk accommodation for eight people and has electric lighting, stove, refrigerator, and hot water. Adjacent to a 49-ha wildlife reserve, it is in easy walking distance from shops and beach. It is reached by ferry from Auckland City (two or three return trips daily) and by bus or taxi from the island ferry wharf. Everything is supplied except linen and food. **No animals are permitted.**

Summer (mid-October to Easter, inclusive)

Nightly (not weekends): $2 per person per night.

Weekends: $12 minimum. More than 2 adults, $2 per person per night.

Weekly: $30 minimum. More than 2 adults, $2 per person per night.

Winter (after Easter to mid-October)

Nightly (not weekends): $1.25 per person per night.

Weekends: $12 minimum. More than 3 adults, $1.25 per person per night.

Weekly: $20 minimum. More than 2 adults, $1.25 per person per night.

Children 15 years and under: First two, half rates; others, no charge.

A deposit of 50 percent is payable on booking, the remainder before entry.

Booking Officer: Mrs R. Foley, 23 Stoddard Street, Mt Roskill, Auckland. Telephone Auckland 696-769 (evenings).

Gallery of New Zealand flora

The illustration opposite includes two New Zealand members of the Violaceae and is reproduced from *The Art Album of New Zealand Flora*, volume 1, by Mr and Mrs E. H. Featon, published by Bock and Cousins in 1889.

Fig. 1 is *Viola filicaulis* (Hook), the native violet. This little plant is distributed in the North, South, and Stewart Islands. It prefers moist places and grows from lowland to sub-alpine areas. It has no fragrance and cannot for that reason compare with the European species, but with its white flowers it has been cherished in gardens for its simple beauty and because it is noteworthy as a New Zealand member of the family.

Fig 2 is *Melicytus ramiflorus* (J. R. and G. Forster 1776), the mahoe or hinahina (whitey-wood). It is a tree up to 10 m tall with a trunk which rarely exceeds 600 mm in diameter and is much branched from the base with brittle branches. It has a soft white wood and greyish white bark.

The tree produces enormous numbers of tiny flowers of a greenish yellow colour, pictured in Fig. 3 and which are fragrant and full of nectar, so attracting tuis and bellbirds. The berries are purple and about the size of a pea, slightly sweet, but not very palatable. However, small birds love the fruit.

— *David G. Collingwood*

Gallery of New Zealand flora

A forest is more than trees

A forest, large or small, native or exotic, is home to countless varieties of plant and animal life, many of which cannot survive outside the forest environment. It protects the ground from the effects of heavy rains, which cause soil erosion, provides attractive scenic backdrops in the countryside, and gives wide scope for recreation pursuits.

This attractive insect is so named because of the way it holds its front legs while waiting for prey.

It is the only species found in New Zealand and probably came from Australia, where it is also common.

This bright-green insect feeds on other insects, mainly flies. It motionlessly adopts a praying attitude on foliage until an insect nears and then with lightning speed darts out its spined front legs to capture the prey. It also sometimes stalks its food.

The female lays her eggs on a branch or post in a soft, frothy case which soon hardens. The young mantids emerge with small wing buds which become more obvious with each skin moult. After the final moult the two pairs of wings extend completely over the abdomen. Though usually seen at rest, it is a good flyer.

New Zealand Forest Service

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