Volume 18 Number 4
November 1987

Forest & Bird

Limestone bridges, Waggon Creek.

Like many of the tributary streams which wend their way across the Paparoa limestone region, the sculpted bed of Waggon Creek provides enchantment beyond the reach of words in its continuous sequence of strange mossy shapes, delightful forest settings and typically erratic behaviour. It has a long stretch of underground flow, and about twenty other caves have been found along its banks, many containing important subfossil remains of moa bones, sharks' teeth and whale skeletons. Unfortunately, however, the limestone sections of Waggon Creek have not been included in the new Paparoa National Park, although they are still within the Tiropahi Ecological Area.

For a long term supply, New Zealand Cement Holdings have applied for a licence to mine the high quality limestone here for its Cape Foulwind works. The National Parks and Reserves Authority have agreed for the moment to compromise the park's northern boundary to exclude the parts of Waggon Creek wanted for mining. Discussions with the company are continuing and it is hoped alternative sources of limestone can be found; otherwise this tranquil scene will no longer exist.

Conservation groups are pressing to exclude mining from the following key areas: Nature, Scientific and Marine Reserves, Forest Sanctuaries, Ecological and Wilderness Areas. *Photo: Craig Potton*

Front Cover: North Island robin, captured at the instant of take off after a bath. This is just one of many outstanding photographs that Kapiti Island ranger Peter Daniel has taken of birds in flight. An article on page 21 describes how he goes about his absorbing hobby.

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Forest & Bird

Burning Issues

Governments could be regarded as both "fire fighters and fire preventers." Unfortunately, too much conservation management in the past has been about fire fighting. To its credit, the fourth Labour Government has in the conservation field attempted to prevent fires by grappling with some of the underlying structural problems fanning the flames.

Our environmental administration has been overhauled and Rogernomics has removed the subsidies which led to such wasteful activities as forest, wetland and tussockland clearance.

But the job is not yet done. Both in the short and long term, the new Minister of Conservation, Helen Clark, her associate minister Fran Wilde and the Department of Conservation have important decisions to make which will have significance for conservation.

Rescuing the beech and rimu forests of western Southland — Dean, Rowallan and Longwood — from the ravages of the Awarua chipmill and the Tuatapere sawmills should be one of the first priorities. The fate of the threatened yellowhead in this region could be sealed by the Government's decision on these forests, due March 31, 1988. Not only are the forests a vital stronghold for this dwindling species, their milling is also being carried out at a loss to the taxpayer of perhaps up to $250,000 annually.

Once these forests are set aside from such wasteful exploitation, they should be included in the proposed South-West New Zealand World Heritage area.

Forest and Bird's recent experience with the allocation of Crown land has starkly demonstrated the need for effective public input into decision making. The whole question of environmental quangos is up in the air at present; broadly the Society is keen to see such public watchdogs have power to make policy, oversee its implementation and to ensure that quango members are both adequately representative and accountable to interest groups such as our Society.

As the current gold boom puts pressure on natural areas, mining is becoming an increasingly contentious issue. A glance at a few glossy prospectuses shows the extent to which some of our key areas have been marked out for development. We must set aside certain "no go" mining areas to ensure their integrity, and the Mining Act has to be amended to strengthen its environmental controls.

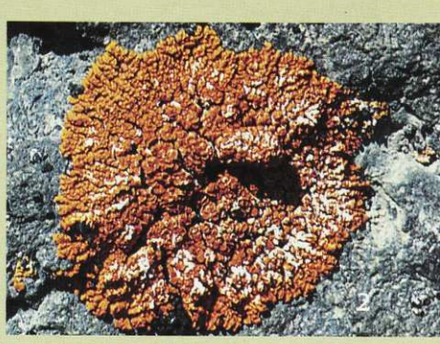
Private forest protection has been highlighted as the most important forest conservation challenge of the future. The present Government promised in its 1984 manifesto to introduce a raft of measures to protect private indigenous forests, but has in the event moved slowly. The most effective moves have been economic — removing clearance subsidies — but as a counter to this, harsh financial times have forced landowners to remove native forest in order to pay their mortgages. The Government, and the Conservation Department, must be more assertive and conducive in persuading landowners that their forests should be protected in the national interest.

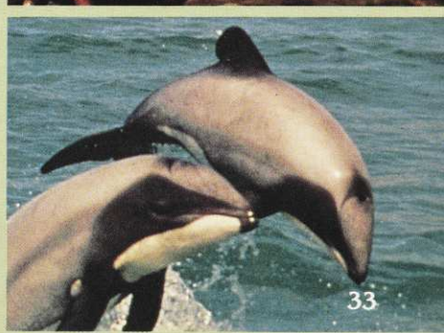
Crucial to the outcome of these issues, and to the success of the Conservation Department, is strong and effective leadership. Now that DOC is up and running, it will require clear and appropriate direction. Conservationists will be looking to the new minister and top officials in the Department for an indication that they are committed to preventing the sorts of "fires" which continue to damage the environment.

Dr Alan Mark, President

C·O·N·T·E·N·T·S

Articles





Departments

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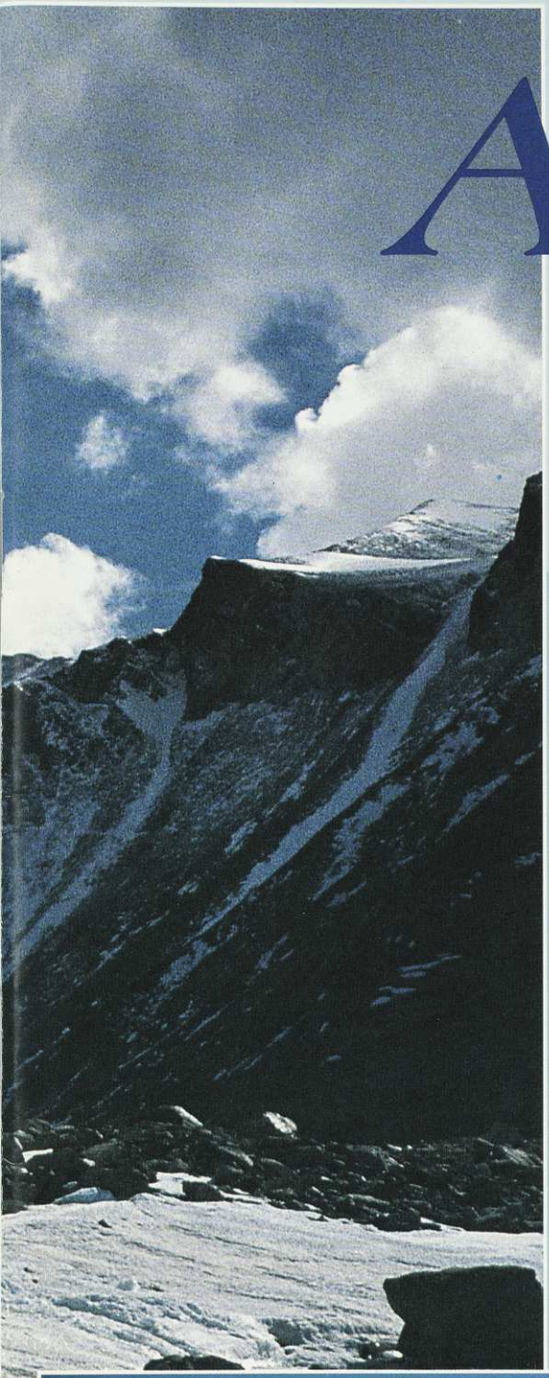
Most people conceive of Antarctica as ice (above, the ice-cliffs of the Canada Glacier, Victoria Land); and penguins (far right, Emperor penguin chicks in Victoria Land, the volcano Mt Melbourne behind). However, a fascinating world of plants and other animals also lives there.

Algae around the edge of a lake on Ross Island. *All photos: Paul Broady.*



ANTARCTICA

Terrestrial life on the desert continent

by Paul Broady

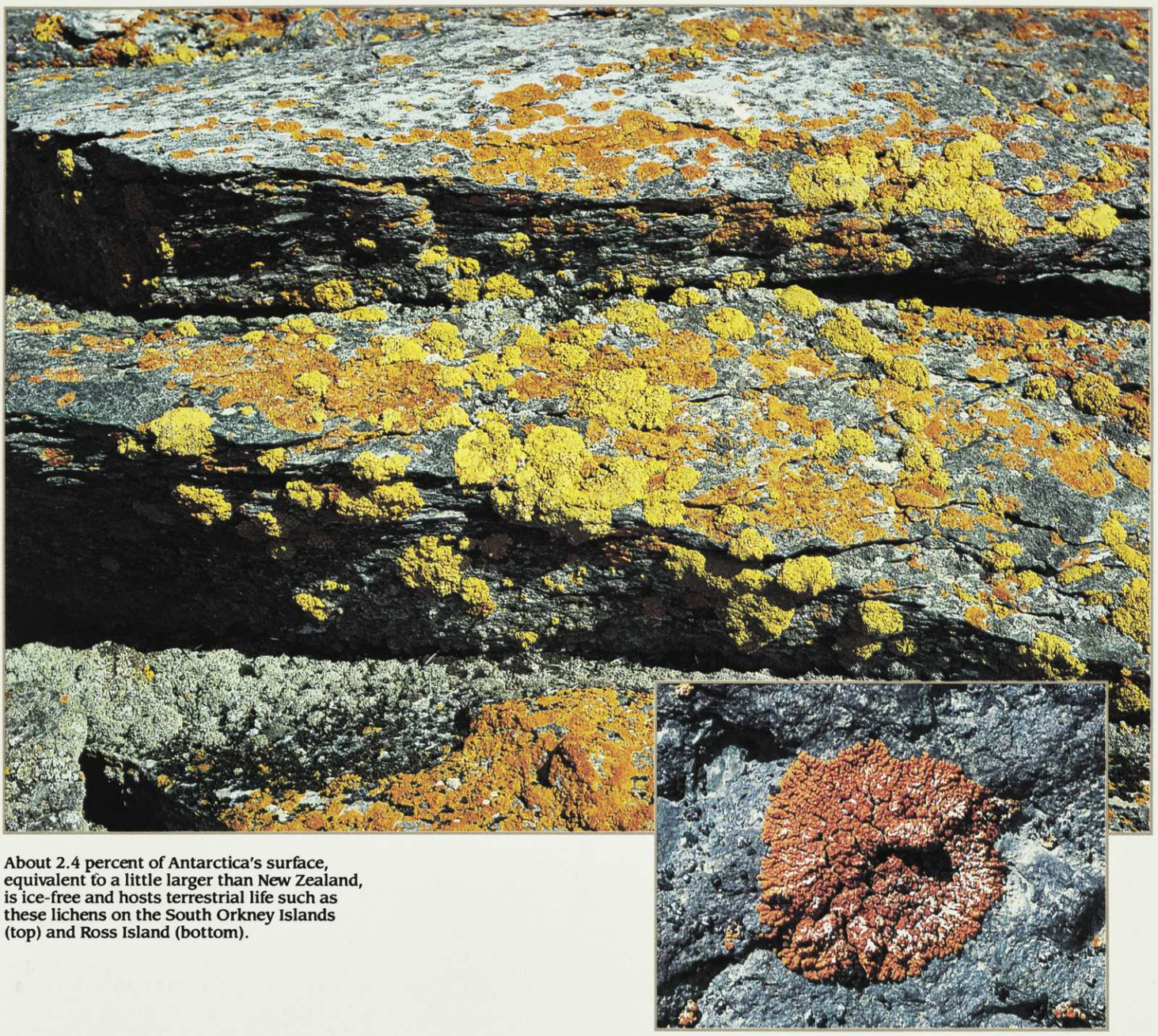
For most people, the mention of Antarctica conjures up images of huge expanses of ice and of penguins, seals and other life which abounds in the Southern Ocean. However, there is another quite different side to the region, that of the ice-free land and the animal and plant life that exists there.

During the summer, penguins and seals leave the sea for the rocky ice-free areas around the coast in order to breed and moult. Flying birds can travel a considerable distance inland to mountain ranges to rear their young on windblown rock ledges. However, all these animals depend on the oceans for their food and spend most of their lives at sea. They are all part of what is termed the "marine ecosystem".

In contrast, the "terrestrial ecosystem" contains those plants and animals which never leave the land. This life is much less abundant than that found in the oceans because it is existing in a desert. The largest animal is only a few millimetres long and the largest plant is a grass which grows as a few scattered clumps covering areas of only a few square metres in some of the most hospitable regions of an inhospitable continent. What a difference from the teeming life in the Southern Ocean!.

The "terrestrial life" exists on a mere 2.4 percent of the continent. This is the area which is free from a permanent cover of ice and snow. The total area is slightly greater than that of New Zealand. Most of this ice-free land is found around the coast, the vast majority of the centre of the continent being covered by a massive ice-cap up to four kms thick.

Despite its stark, desert-like nature the landscape in these ice-free areas is often magnificent. There are high rugged mountains and wide sweeping valleys. In some regions the valleys contain sparkling, sapphire-blue lakes or the lake waters might be hidden below a permanent cover of floating ice. Glaciers tumble down from the mountains and terminate abruptly with high, vertical ice-cliffs which are sculptured by wind, sun and meltwater.



About 2.4 percent of Antarctica's surface, equivalent to a little larger than New Zealand, is ice-free and hosts terrestrial life such as these lichens on the South Orkney Islands (top) and Ross Island (bottom).

Different World

Let us go for a wander through one of these areas and see what evidence of life we can find. Leaving our campsite we walk across an area of dry, sandy gravel and weave our way between rocks and boulders. We are not yet attuned to this new world which is so different to the one we are used to, not a sign of life can be seen, at first. Then, a few stain-like marks on the surface of a boulder catch our eye. Bending down for a closer look we see that we have found a lichen, forming a circular crust over the rock. This plant is a combination of a fungus and an alga helping one another to survive in these extremely dry conditions.

One of our companions is interested in collecting a few rocks and he strikes a boulder with a hammer to break off a fragment. To our surprise this reveals the presence of a green layer just below the rock surface. We have found millions of microscopic plants living in the minute spaces between the rock crystals. In fact these algae could be the most widespread plant life on the whole continent; hidden away until the surface rock is removed.

A gleaming white quartz stone lying on the dark surface of the sandy ground attracts our attention. Picking it up, we uncover more of the hidden life of this remarkable place. The stone is acting like a miniature greenhouse! Light can penetrate through this type of rock and underneath the stone a little water is conserved — perfect conditions for the growth of more algae!.

Peering at the green crusts with a magnifying glass, a sharp-eyed person notices some movement — animals with legs! One beast has red legs and a purple body. It is a mite less than a millimetre long browsing on the algae. A second beast is slightly longer and thinner and all of a sudden it disappears as it leaps through the air — a "springtail" or "collembolan" has just escaped!.

An Antarctic Jungle

Further down our valley there are a few small snowdrifts remaining from winter. We walk over to one of these hoping to find some larger plants where meltwater percolates over the ground. We are not disappointed as we have discovered what in Antarctic terms is a veritable jungle. But no machete is needed here as the tallest plant is a mere centimetre high. The tiny, leafy stems of mosses are packed closely together to form a few cushion-like growths. Also, on the surrounding boulders are more lichens but some of these have a bushy appearance whilst others resemble small crumpled pieces of dark paper loosely attached to the rock.

Where the ground is soaked with melt there are dark, jelly-like lumps and orange leathery sheets covering the sand. We have to use a hand-held microscope to see what is in these. Magnifying our samples by four hundred times reveals hair-like filaments. These are "blue-green algae", very primitive plants which look similar to fossils of the first plants to evolve on our planet some three thousand million years ago. And yes, there are animals living here too. A worm-like "nematode" is thrashing from side to side and a most unusual eight-legged beast

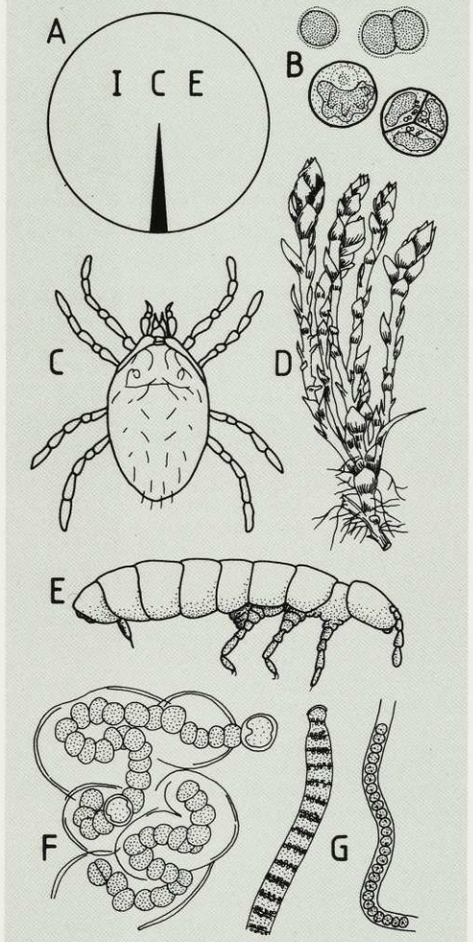
with the unlikely name "tardigrade" is crawling through the filaments using the hooked claws at the end of each leg.

The gleaming white cliffs of a glacier at the head of the valley entice us to continue our walk. When we reach this wall of ice we decide to put on our crampons and with the help of our ice-axes we climb up onto the glacier surface. We are surprised to find numerous pools of cold water, all of them with a thin layer of sand over the bottom. Here we encounter more of the jelly-like algae, actually growing on a glacier! Out with the microscope again and a quick look at a tiny specimen shows us that there are animals that can live happily even in these constantly chilly conditions. The smallest of these consist of just a single cell. They are "protozoa", which move rapidly in between the algae by thrashing their whip-like appendages. Larger, but still invisible to the unaided eye are the "rotifers", which use similar appendages attached to their heads in order to move through the water.

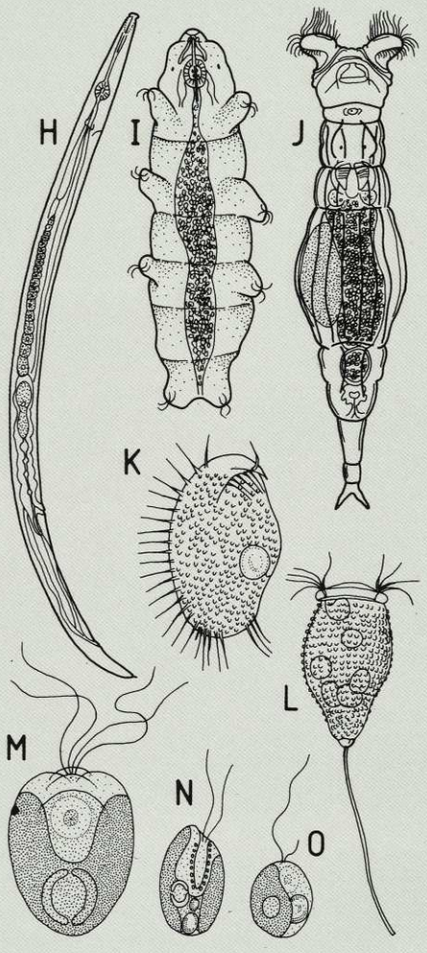
Because the sun is shining brightly there are streams of meltwater cascading over the terminal ice-cliffs. On the ground below, these merge to form quite substantial flows of water in which are the lushest growths of plants that we have yet seen. Orange sheets of algae coat stones and gravel in the bed of the stream and bright green filaments wave in the turbulent flow. We follow the stream for at least two hundred metres and there are similar growths all the way along.

The waters enter a large lake in the bottom of the valley. This is at least a kilometre long and is typical of the thousands of lakes in other ice-free areas around the continent. Only the water around the edge of the lake is free from ice, elsewhere there is a sheet of ice at least a couple of metres thick floating on the surface. Peering into the crystal clear water from the bank we can see an abundance of algae similar to those in the stream. Where some of these have washed ashore we can see that the sheets are at least ten centimetres thick, possibly the result of hundreds of years of growth! In a droplet from the lake our microscope reveals other algae swimming through the water.

We return to our camp convinced that there is far more to Antarctica than at first meets the eye. The awe-inspiring beauty of the landscape is all the more fascinating when we realise the nature of the amazing life that lives within it.



A. The area of ice-free land on the Antarctic Continent (shaded).
B. Microscopic plants, cells of algae from inside rocks (x1000).
C. A mite, a spider-like animal (x50).
D. A few leafy stems from a moss cushion (x10).
E. A springtail (x25).
F.& G. Microscopic algae from wet soil; chains of cells (x1000).



H. A worm-like nematode (x150).
I. An eight-legged tardigrade (x150).
J. A rotifer from pond water (x200).
K.& L. Single-cell animals, protozoa (x300).
M, N.& O. Microscopic algae, single cells which swim in lakes (x1000).

A Fragile Continent

These small forms of life are under increasing threat as human presence on the Continent continues to expand. Although extremely hardy in the way that they grow, and sometimes thrive, under the rigorous Antarctic conditions, in another sense they are extremely delicate due to the ease with which they are catastrophically disturbed by our activities. Damage to the fauna and flora is easily caused by building and other construction works, by vehicles, trampling of feet and even by the accumulated effects of scientific studies by successive field parties in remote regions.

The growth rates of these organisms are slow, so once damaged or removed from an area recovery would be imperceptible if it occurred at all. A major reason for concern is that this life exists on a mere 2.4 percent of the Continent and then mostly in a small percentage of this area close to the coast. It is this fraction of ice-free land which suffers the greatest human impact.

During the last decade, international interest in Antarctica has been increasing rapidly and shows no sign of diminishing. Eighteen nations now have stations which they occupy all the year round. Others are strongly interested in establishing a presence in the region or are in the process of constructing facilities. Most nations are rebuilding and expanding their bases and some are constructing new stations in ice-free areas which have previously lacked buildings of any kind. France has commenced construction of a rock-based aircraft landing strip and Australia is strongly interested in constructing another. It has been proposed that the latter could also service an hotel for tourists. Of special concern is the probability that early next year a convention will be agreed and signed by Antarctic Treaty nations which will open up the region for mineral exploration, including oil. Exploitation could be the next stage if deposits of suitable size and quality are discovered.

At present the environmental movement, led by the Antarctic and Southern Ocean Coalition, (of which Forest and Bird is a member) is lobbying vigorously for the strongest possible environmental safeguards to be written into the "Minerals Convention". However, they realize that this is very much a second best. A stronger guarantee of Antarctica being maintained as a wilderness area of global importance would be for the international acceptance of a "Conservation Regime". Under this the region would be managed for its natural values and mining activities would be excluded. Increased public support for this policy is essential now. Details of how you can help will gladly be provided if you write to ASOCNZ, P O Box 11-057, Wellington. The next year could be a critical turning point for the future of Antarctica.

Dr Paul Broady is a scientist at The Department of Plant and Microbial Sciences, Canterbury University. He has been active in Australia on Antarctic conservation issues, and continues that interest in New Zealand.

HIGH COUNTRY LANDSCAPES

Too much change, too fast.

Golden tall tussocks, the glittering twists of a braided river, horizons which stretch to shimmering mountaintops — such enduring images of the high country landscape are etched in our minds and have become valued as part of our natural heritage. In many ways this seemingly timeless landscape is changing, and not necessarily for the better. In this article consultant landscape architect, *Diane Lucas* ***of Geraldine, outlines the values of this landscape and the need to retain them.***

The high country is special to us all, not just in terms of production or recreation. Somehow we all recognise it as a significant part of our natural heritage, even many of those not fortunate to live or work in, or visit it.

What is it that creates this special character? It is, of course, the vegetation which visually sets the high country apart from other regions in New Zealand. The vegetation, in concert with the climate and the seasons, provides us with subtle textures, patterns and colours — the greys, browns, golds during the day and the purples at night. This vegetation results in a semi-wild character, which is possible because people do not appear to dominate — there is a lack of dominating developments or formal human-created patterns.

And yet intrusive developments and patterns have been created, disturbing the surface of the land and our relationship towards it.

Two impacts

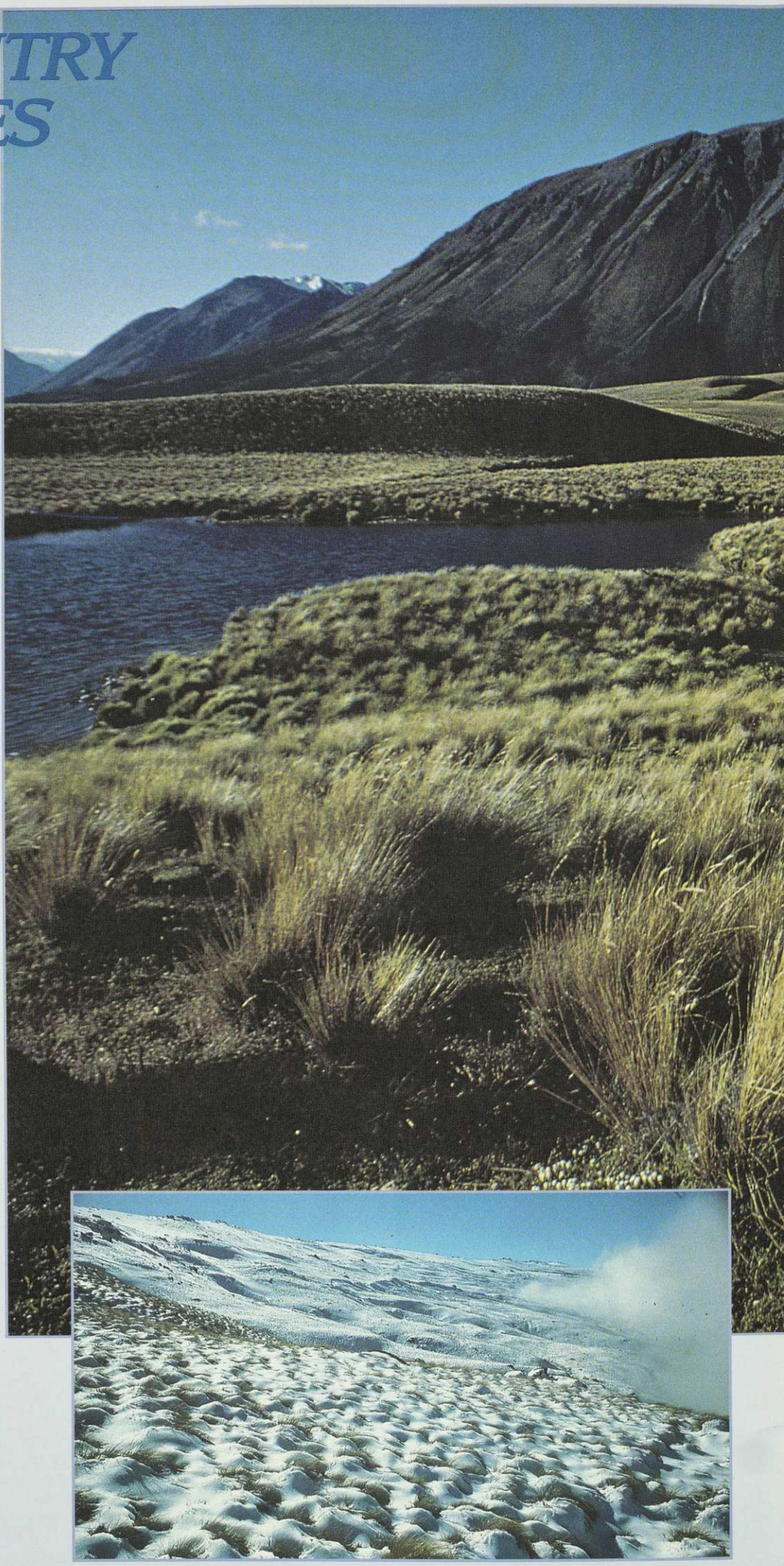
These developments have two major kinds of impact: on the one hand they provide a sharp dissonance; on the other they change the character of the high country subtly and almost imperceptibly.

The open character of the high country landscape makes it highly vulnerable to the impact of obvious insensitive developments which come in many forms: a zig-zag track over a smoothly curving ridge; a shiny shed in a dull setting; a bright square of lucerne sitting on a prominent fan; windbreaks, woodlots and wilding trees in open grassland.

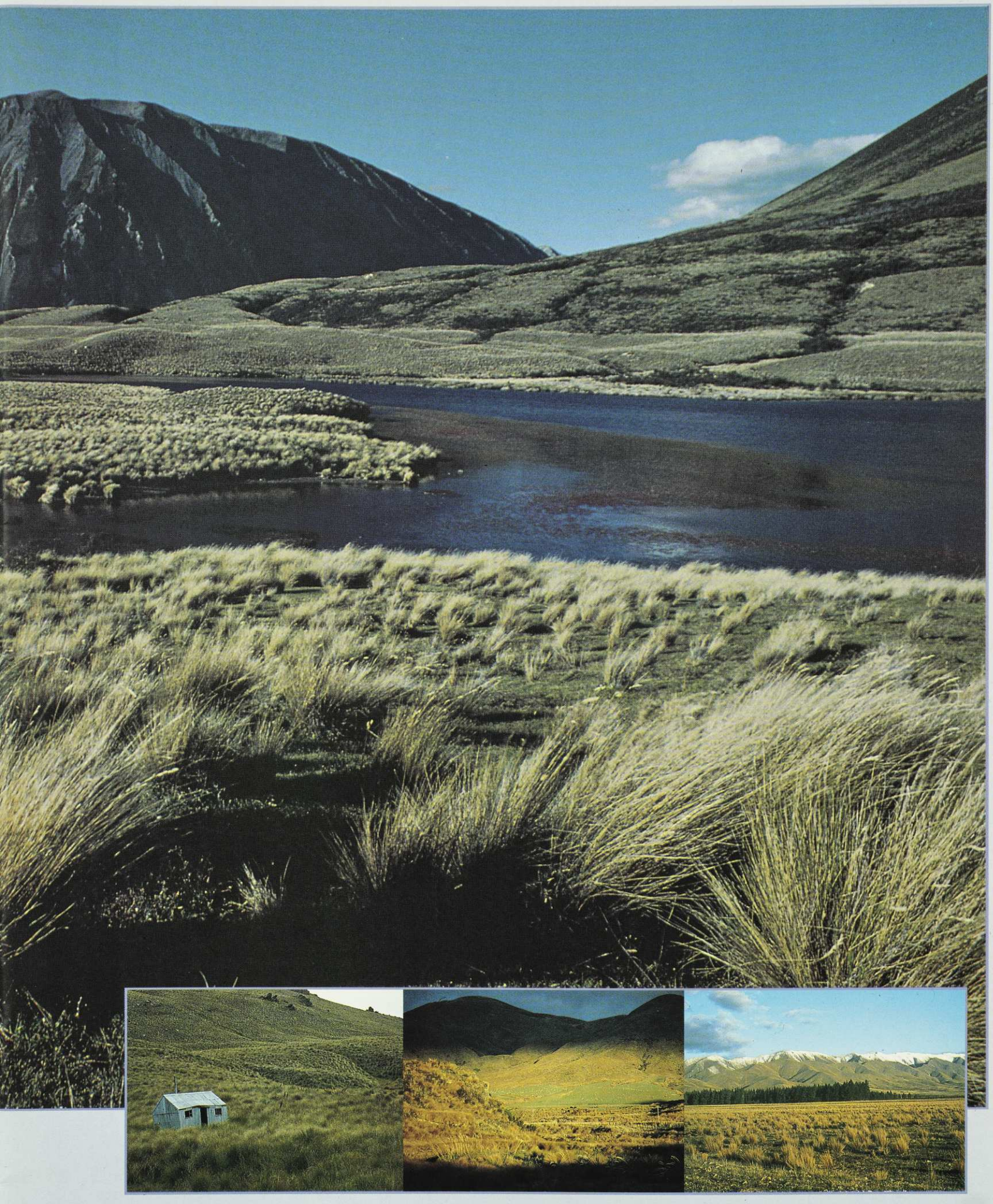
The location, type and scale of impact are all critical in fitting in a development. Often instead of becoming an achievement, it becomes an intrusion.

But the greater threats to our high country landscapes are the slow, subtle changes, changes which many closely associated with the land do not notice because they are so close to it.

Over time tussocks are replaced with other pasture species in a process traditionally referred to as "improvement" of tussock grasslands. The improvement that



In grazed areas, tussocks are significant for breaking up the snow cover, allowing stock to feed. More emphasis must be placed on the benefits of tussocks for farming.
Photo: Alan Mark.



Top: **Round Hill ponds near Lake Coleridge, a landscape that epitomises wide open spaces and freedom.** *Photo: Barney Brewster.*
Left: **Some intrusions in the tussock landscape stand out starkly. Old Man Range, Central Otago.** *Photo: Graeme Loh.* *Centre:* **The establishment of exotic pasture alters the subtle patterns, colours and textures of the landscape, as well as the ecology. Gorge Hill, Southland.** *Photo: Barney Brewster.* *Right:* **Mackenzie Basin plantings. Conifer plantings become a focus in a tussock grassland landscape, disrupting the subtleties and continuity.** *Photo: Diane Lucas.*

involves gradual loss of the tussock component sees the tawny hills changed with a new, simple green landcover that has no semi-wild or remote quality. High country lands thus developed will have a landscape character little different from much hill country and lowlands elsewhere in New Zealand.

Similarly, high country afforestation proposals seriously threaten the distinctive character of these landscapes. Even when carefully sited at the base of mountain slopes, they often disrupt the visual relationship between the slopes and the terraces, basin or valley floor below. This often separates the landscape into developed flats with the mountains merely a remote backdrop.

Continuity suffers

It is the continuity of the landscapes that suffers because of these pressures. We need overall harmony — but that does not mean no development. Often development can be carefully contained within a tussock landscape, depending on how it is sited, designed and managed.

I believe that a balance can be struck between the competing claims of soil conservation, farm production and landscape values. For example, the importance of retaining tussock grassland for sustainable farm production has never been strongly enough emphasised. We see research papers from the Ministry of Agriculture on the best ways of destroying tussock grasslands, with not a mention of their values.

Management techniques that conserve and enhance tussock cover need to be investigated for different types of tussock association. Depleted and destroyed tussock grasslands can be managed for restoration of the tussocks and associated plants. An available seed source is critical.

The range of values of tussock grasslands, and the threats to these values, have seldom been acknowledged in planning, development or management strategies. Nor have the broad landscape values been acknowledged in proposals for preservation of tussock grassland associations, such as in the PNA programme. The Environmental Council acknowledged the significance of these issues, and last year commissioned a short study aimed at defining tussock grassland landscape values. The study was undertaken by a graduate landscape architect, Michael Ashdown, under my supervision.

Although visual values are a critical component, they are not the sole basis of landscape values. The combination and interaction of the ecological, cultural, visual and economic values together constitute total landscape values. These together create the character and identity of a place. The concept of landscape implies a human response to these factors — that is, perception and recognition of the patterns. These patterns are typically expressed visually. In tussock grasslands, the main visual patterns are an open landscape dominated by landform. The more distinctive the landscape pattern, the stronger the sense of being in a particular place, and hence the stronger the area's "landscape identity". A sense of place is reinforced by your activity in, and the meaning you attach to, the landscape. This varies between people, depending on your background.

Dramatic diversity.

New Zealand is a land of dramatic landscape diversity. This quality is significant in considering tussock grasslands.

The visual subtleties of the tussock grasslands, and the low height of this form of vegetation, means that the underlying landforms, the shapes and steepness, the smoothness or roughness, etc. are all easily observed. Geological differences become a fundamental criterion in determining landscape character, and consequently landscape diversity.

From this it is possible to divide the country into landscape regions. Regions of the country where tussock grasslands are perceived to dominate vast areas were identified as individual 'tussock grassland landscape regions'. The 11 distinct regions denoted are confined to the central North Island and the dry areas east of the South Island main divide, "the high country". It is suggested that grassland conservation management and enhancement strategies be developed for each individual tussock grassland landscape region.

The report stresses the need to recognize not just the "special" landscapes, but also the "typical" as essential in the overall distinctive regional character.

This factor needs to be considered when assessing each and every development proposal or land management intensification which may have an immediate or eventual impact on a tussock grassland landscape.

Change has always been a feature of tussock grassland areas. When in tussock grasslands, we can marvel at the processes that created the landforms, and often the immense change from forest and shrubland caused by earliest inhabitants. The grasslands will, because of their ecology or our intervention, continue to change. We need to ensure that they can do this without losing their meaning for our past.

References

Lucas, Diane. "A Farm on the Right Tracks." *The Landscape* 32/33: 10-13, 1987.Swaffield, S; Lucas, D. "The High Country — Philosphical and Practical Landscape Management Issues". *The Landscape* 24: 15-17, 1985.

Copies of book: ***Tussock Grasslands, Landscape Values and Vulnerability***, by Michael Ashdown and Diane Lucas are available from Forest and Bird's Mail Order service (see catalogue).

The Ryton Station Case: Will DoC/Landcorp Partnership Work?

In March, Pinnacle Resorts Ltd announced they were investigating a major tourist development near Lake Coleridge — what has been described as Canterbury's largest tourist resort, estimated to cost about $100 million. The proposal included a new skifield in the upper Ryton basin on the Craigieburn Range.

In April a 6-km vehicle track was quickly bulldozed up the Ryton Valley to the crest of the ridge between Mt Olympus and Mt Cheeseman. A tramping party traversing this ridge met a 4WD vehicle at 1800 metres altitude. The road cuts a swathe through the tussock basin and reaches the ridgetop via a highly visible zig-zag.

Pastoral lessees require permission for track construction and in the 60's and 70's approval was given for much insensitive roading, sometimes to 1700 metres altitude, for land development. Recently commercial recreation has caused a new wave of tracking.

An official landscape policy now exists and Land Corporation must consult the Department of Conservation before issuing permits. Theoretically new roading should be both essential and of minimal impact. Unfortunately deliberate breaches still occur.

FMC enquiries established that construction had not been by Pinnacle Resorts but by the lessees of Mt Olympus Station. Their connection with the tourist company is unclear but the road is for use in skifield surveys. DoC advised that the runholder had applied for a permit and they had stipulated it must end in the valley floor until a decision had been made whether to develop the skifield. Illegal track construction pre-empted these conditions.

Landcorp, when approached was obstructive. They attempted to justify the lessee's actions and challenged interest groups' rights to object.

Officials now propose a bond of $10,000 to cover landscape and vegetation restoration should the skifield not proceed. It is doubtful if such restoration is practicable. The real question is whether DoC's recommendations on natural and landscape values will be respected by Landcorp and lessees in future.

Dave Henson, FMC

Environmental Education Appeal

The overwhelming generosity of Forest and Bird members means that the Society will soon have a fulltime education and extension officer. The response to our annual appeal exceeded expectations, with more than $30,000 in less than a month.

These are just some of the positive comments we received:.

"Many of my friends at school don't seem to care a lot about what happens to the environment. There is a great need for more young people to be involved with conservation."

"How right you are to try to interest our children and young people in our wonderful natural heritage. One feels that many of our present politicians and city-bred people are sadly divorced from contact with our priceless natural environment."

We have not been able to personally thank everyone who donated. Please accept this as our thanks for your part in helping to get this exciting project off the ground.

Rotoehu Allocation Resolved

It has been a hectic period for conservation issues in the Bay of Plenty, according to our Te Puke branch.

To everyone's relief an excellent solution was negotiated on the land allocation problem at Rotoehu, where the future of kokako was at stake. Rather than have contested pine plantations vested in the residual Lands Department with the possibility of further management complications, eastern region DoC staff and Timberlands district staff agreed to an alternative corridor proposal. This gives DoC immediate tenure and total management of 400 ha of experimental pine stands and good native forest remnants which are already being used by 15 kokako from the adjoining indigenous blocks.

John Innes from the Forest Research Institute and DoC staff are to be commended for the energy and support they have given to this in the face of strong opposition from the Forestry Corporation. Also good news is that Timberlands have made a public commitment to manage the native forest within their plantations to accommodate the important plant and birdlife there.

Environment Under-secretary Philip Woollaston recently visited the Kaimai-Mamakus to plant a tree. Standing behind him is longtime Society member Reg Janes and holding the spade is Chairperson of the Park Advisory Committee, Mrs Rosalie Smith. Mining is now shaping up to be a threat to the forests. Bay of Plenty people are watching closely the BP prospecting applications in Pureora.

Members of the Kapiti Island possum team, from left to right: Bill Collins, Bob Cairns, Geoff Alexander, Jim Oakley. Seated: Karry Brown and Marcus James.

Possums Eradicated

A magnificent sustained effort over the past few years has seen all possums exterminated off both Kapiti and Codfish Islands.

When the proposal was mooted to exterminate possums off Kapiti, the sceptics said it could never be done. However, a determined Peter Daniel, ranger on the island, and a dedicated team of trappers, including Bob Cairns and leader Geoff Alexander, proved the sceptics wrong. It's been estimated that since 1980 about 20,000 possums have been killed.

Already the effects are obvious, with trees such as kohekohe seeding for the first time in years. Previously the possums ate the green seed pods before they had a chance to mature. The resurgence of vegetation will give birdlife a boost and more endangered species will be able to be transferred to Kapiti.

Meanwhile, the end of the possums on Codfish means a fresh start for Stewart Island's beleagured kakapo population, which has been pestered by cats. The Department of Conservation has begun transferring the kakapo to Codfish in a last ditch stand to save the species.

Anti-fouling Paint Toxins

Anti-fouling paints used on thousands of New Zealand yachts are causing gross deformities in shellfish and killing shellfish spat around boat harbours — just as they have overseas.

The Ministry for the Environment's Pollution Directorate is investigating the problems caused by these paints. To date the shellfish deformities have been found in oysters at Halfmoon Bay Marina in Auckland's Tamaki River. At hearings in Kerikeri oyster farmers voiced concern about anti-fouling paints from the now-disallowed Blacksmiths Bay marina.

These paints are banned in Britain and France. A ban on all organotin anti-fouling compounds must also be implemented in New Zealand to protect our natural and commercial shell fisheries.

Books Received

Roots of Fire *by Isobel Gabites (Tongariro Natural History Society, $29.00).*
The second in a series produced by the Society, this attractive 112-page book outlines the story of the plant ecology of Tongariro National Park. An easily read, informative text, accompanied by photos from such well known photographers as Brian Enting and Craig Potton, makes this publication a fascinating botanical voyage of discovery.

The New Zealand Birdwatchers' Book, *by Brian Ellis (Reed Methuen, $26.95).*
Brian Ellis writes with a deft touch and often in a lighthearted vein ("Wellington city is a place better suited to floating a share issue than watching birds"). Describes the different New Zealand habitats and the birds found there, then which birds are seen in which regions. Maps sadly missing.

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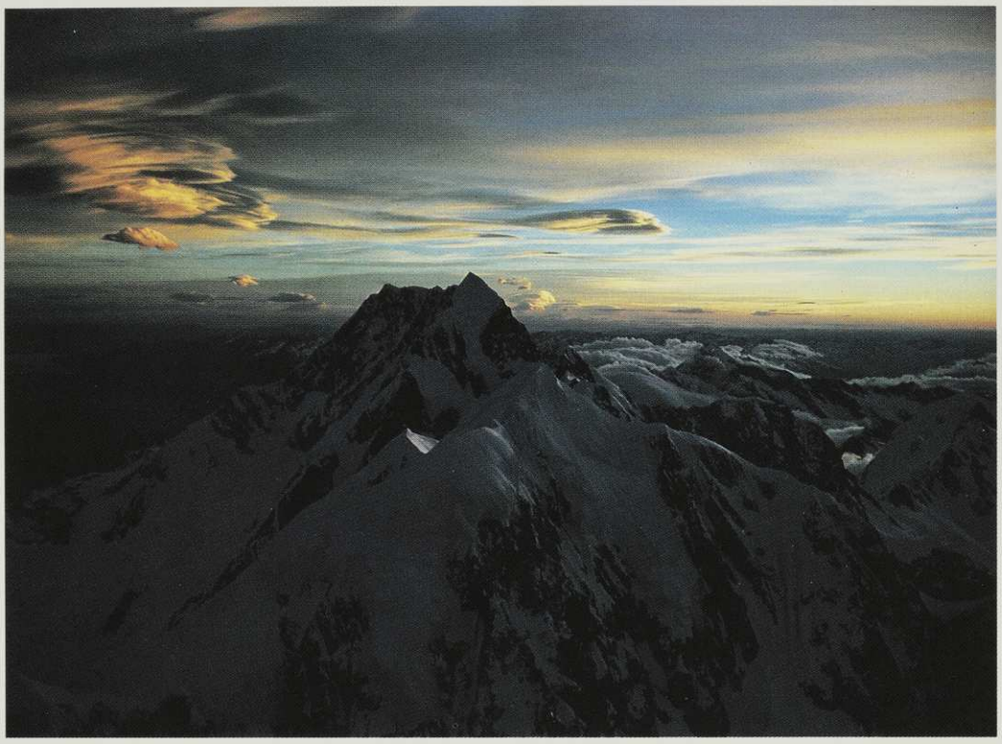

Photo: Mt Cook *Photographer: Brian Brake*

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Photo: Wynston Cooper

Sealer's Bay, Codfish Island, off Stewart Island. New Zealand's southern islands host vast numbers of oceanic and endemic land birds. Both Codfish and Snares Island buttercreeks are ratfree, but will be forever vulnerable to the potential disaster of an accidental liberation.
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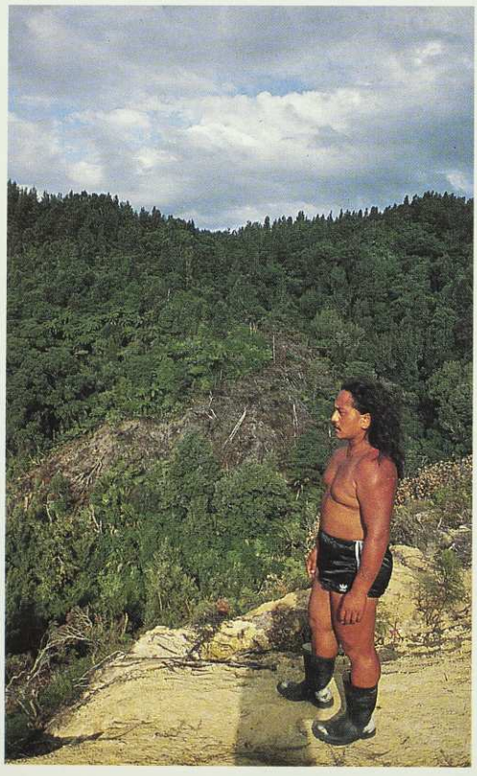
Conservation and the Human Factor

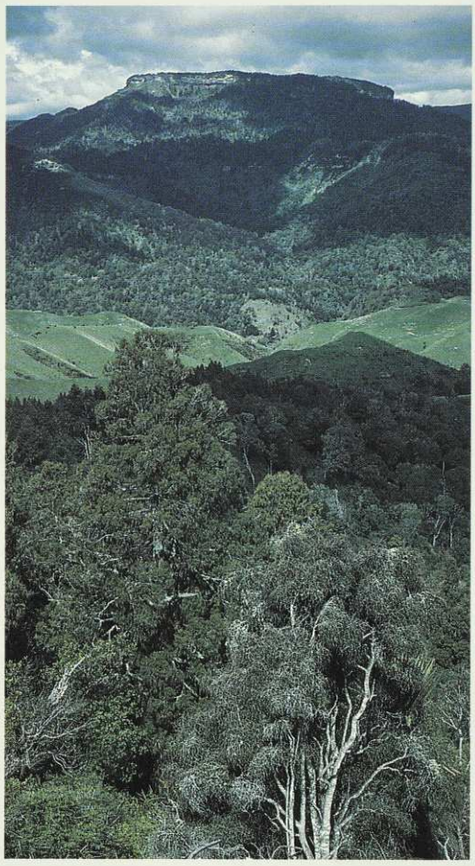
The following is an abridged version of this year's Sanderson Memorial Address delivered to the Society's Council meeting by Guy Salmon, Director of the Native Forest Action Council.

In the last fifteen years, New Zealand has moved further and faster in the field of nature conservation — especially forest conservation — than any other Western country. The intensity and energy of the conservation movement, the broad following it commands, and above all, the relative lack of serious popular opposition, compared to other countries, have been key factors. In the 1970s, conservationists ceased to be a minority tradition, and became the mainstream. I first became convinced of this when gathering signatures for the Maruia Declaration petition in 1976. Nine out of every ten people we approached would sign. With 341,160 signatures it bacame the biggest petition in New Zealand's history to that time. The huge wave of public support for our rather radical tree top protest at Pureora in 1978 was another sign that the times had changed. The decision of the Muldoon Government to set aside permanently the huge tracts of Okarito and Waikukupa forests in 1981 was an important confirmation. And much has been achieved since under the present Government.

The sense of having become a conservationist majority raised questions about our relationship to the new minorities — the forestry and timber workers, the associated towns and regions dependent on native timber milling, the users of native timber, and the owners of private forest including the Maori people.



Tame Iti, a leader of Nga Tamariki O Te Kohu, stands on the native forested mountain Taiarahia which his group successfully defended from clearance last year. A renaissance of Maori conservation traditions is now occurring. *Photo: Shane Wright*



Aorangi Mountain: The Department of Conservation has begun discussions with the Maori owners to find a way of protecting fine podocarp forest on the slopes of this sacred mountain near Taihape. This could be the beginning of a major, properly funded programme to promote forest protection on Maori land. *Photo: Graeme Loh*

Deep Ecology

These questions arose at the same time as the growth within the conservation movement of a 'deep ecology' consciousness. Deep ecology calls for a radically new aesthetic, ethical and metaphysical grasp of the human relationship to nature. Drawing on the Western Romantic tradition, the Tao and Zen traditions of the East, tribal cultures like the American Indians, and philosophers such as Spinoza and Whitehead, thinkers of the deep ecology school have sought a renewed reverence for things natural, and a more humble place for humans in the natural world. This also means new personal lifestyles. Dismissed as "shallow ecology" is the idea that the earth exists for the benefit of humans or even for our so-called 'responsible stewardship' through management and engineering.

I believe there is much in deep ecology thinking that is exciting and valuable and there is no doubt it will become far more dominant in Western conservation thinking in the future. But it needs to be integrated with a wider philosophy about what it means to be human. In its more simplified political manifestations, deep ecology presents certain dangers. The characterising of humans as 'just another species' with no special right to rule the rest of creation can lead to an inadequate response to the human factor which is central to the resolution of almost every conservation issue. The deep ecology slogan of 'no compromise in defence of mother earth' is a formula that would deny the conservation movement any meaningful dialogue with the people affected by our campaigning.

There have been strong arguments within the conservation movement on these issues for some years. But these arguments have not been publicly visible, at least until the recent signing of the West Coast Accord led to the setting up of the Beech Action Committee, admittedly a very small group. The unity we have in New Zealand is a different situation from that in some other Pacific rim countries where splits have weakened the conservation movement, and deep ecology activists have polarized elements of the popular culture into strong opposition to environmentalism, setting the cause back a long way.

The mainstream conservation movement in New Zealand has consistently integrated human concerns into its advocacy. Ways to maintain employment or create alternative employment have always been to the fore in our forest protection proposals and, inadequately at first but more consistently in recent years, there has been direct dialogue and involvement with people affected by

The free operation of market forces resulted in this woodchip logging above Marlborough's picturesque Pelorus River. This block was bought by a Timaru businessman who stripped off the forest and pocketed the proceeds before abandoning the land. *Photo: Guy Salmon*

our proposals. The most remarkable exercise of this kind was last year's Blakeley Committee which, over a period of months, generated an agreed resolution to the long-standing conflict of forest conservation and forest industry employment on the West Coast. Our commitment to that process and its outcome was, I believe, important.

Similarly, there has been a willingness by conservationists to recognise the wishes of those New Zealanders who want to use the native timbers of their own country in their homes. In the Crown land allocation process most conservationists have accepted that areas for the sustained yield production of rimu, the beeches and kauri should be set aside. These areas also serve a long term aim of deflecting future pressures for native timber to be extracted from Department of Conservation lands.

Private Forests

In these and other ways, the New Zealand conservation movement has been acknowledging that democracy is more than a simple majoritarianism, that the values and aspirations of all sectors of the community must be addressed and understood. The next challenge is to address the question of native forest on private and Maori land, on the basis of a full understanding of the human and cultural values (both Maori and Pakeha) of land ownership. This issue is going to be the big one for the period immediately ahead.

More than half the potentially exploitable native forest in the North Island is in private (especially Maori) ownership. Many rare and valuable types of native forest, especially those of coastal and lowland areas, are found only on private land. But these private forests are fast disappearing. For example, in Northland, where only 10 percent of the original forest cover survives, mostly in private ownership, a recent survey revealed that 13,000 ha was lost over the five years to 1983. If destruction continues at this rate, all the private native forest in Northland will have gone by early next century.

The pace of destruction is even greater where the forest industry has concentrated its pine planting expansions, notably in the Bay of Plenty and Hawkes Bay, and where its woodchip mills are chipping up native forests for the Japanese export trade, notably in Nelson and Southland. Native woodchip exports have expanded more than threefold since 1982. The native log export trade to Taiwan, which has been permitted to spring up just in the last year, is a new and powerful force for native forest destruction.

The pace of destruction is alarming. Complete removal of the longstanding controls over the export of native timber is now being contemplated by the Government. If no other means are put in place to effectively protect the remaining native forest, it is obvious what will happen: the rate of forest clearance in New Zealand will surge up to levels not seen since last century. It will be the final boom and bust, squandering in a few short years an inheritance that most New Zealanders already know we do not want to lose. Yet, in the new atmosphere of the more market economy, will we as a nation be prepared to intervene?

The instinctive conservationist answer has been to look to the Town and Country Planning Act as an instrument to give expression to community values on private land. Yet my experience of the real inherent failings of this legislation, and my discussions with farmers and with Maori landowners, leads me to doubt that a strengthening of the Planning Act to protect private forest can be developed as the main line of attack on the problem of private forests clearance. Perhaps the most important consideration is the commitment in the Treaty of Waitangi of tino Rangatiratanga or the right of chieftainship by the Maori people over their lands, forests and fisheries. We need to devise policy instruments which respect that, and which can command a broad consensus as to the methods by which private forest logging can be controlled.

Initial Steps

Some initial steps are apparent. First, there must be proper funding for the Protected Natural Areas Programme, under which outstanding last examples of fast-disappearing habitat types are identified, and then acquired or leased for reserve purposes. Forest and Bird and NFAC branches have a major role to play here. Increased central government funding for the PNA programme is going to be difficult to obtain because of the priority which the Government must place on reducing the fiscal deficit. A major avenue for funding of the PNA Programme is through the Department of Conservation reallocating its own priorities within the budget it already has. Because DoC uses a bottom-up budgeting process the key people who can initiate change in the balance within the budget are the regional managers. Locally-based conservation groups are well placed to educate DoC's regional managers on the importance of PNA in their region, and to influence them to accord it a higher priority in their budgets.

As a second major step, local body rating should be reformed so that land not being used for productive or residential purposes, and therefore not using local body services, is not liable for rating. At present, the burdens of unpaid rates are driving many reluctant Maori landowners into the arms of forestry companies. This dilemma is a direct cause of most forest clearance on Maori land.

I believe there is a good case for a special Maori-controlled institution to be established and funded to promote conservation on Maori lands, especially by facilitating land exchanges and cross leasing so that Maori groups are able to have continuing involvement in the land-related decisions that have an important place in the traditional culture. The Nga Whenua Rahui proposal, put forward by the Taitokerau people, needs our active support.

It is unfortunately a fact that the financial resources available to secure the protection of native forests on private land will not be sufficient in the forseeable future to protect more than a small proportion of the total. The balance of the forest will remain in the marketplace. The use of a fiscal incentive to secure voluntary compliance with a managed approach to forestry is our best present hope of retaining a native forest cover in these areas for the future.

Conservationists must express the strongest possible concerns about what is currently happening to private forests in this country. We must at the same time establish a close dialogue with landowning interests including Maori landowners, and commit ourselves to finding a creative solution that recognises their mana whenua. By about the middle of next century, Maori people may be expected to represent about the same proportion of the total population of New Zealand as the tangata whenua of Fiji did at the time of their recent coup. We Pakeha are a small white people with a Western heritage in a remote corner of the South Pacific. We must recognise that, like the native plants and animals of these islands, our sense of belonging and commitment is to the Pacific. It follows that our relationship with the Maori people is going to be vital to the future of this country. We do not need to put Maori culture on a pedestal, but we do need to adapt our national culture and institutions to acknowledge the Maori way and Maori values. Our commitments under the Treaty of Waitangi must be fundamental to everything we do. In the conservation movement, we need to remember this, and to reach out and establish a fuller and richer encounter with Maoridom. We can work with Maori people on issues like rating and Nga Whenua Rahui, and on other environmental issues close to the heart of the Maori community such as the coastline and the purity of our rivers. A major commitment to a closer relationship with the Maori community is, then, vitally important for conservationists in New Zealand today.

That brings me back to my questions about the deep ecology perspective. We in New Zealand are in a sense ahead of most Western countries in the statutory recognition that we have already given — in the National Parks Act, Environment Act, and Conservation Act — to the idea that nature has intrinsic values which we have a responsibility to safeguard. Yet the idea of upholding intrinsic values in nature is, by itself, inadequate to reflect the new environmental consciousness. We must integrate humans into our perspective more fully by suggesting that self-respect, self-realisation and happiness can only be achieved in a full sense if we treat natural systems and creatures as worthy of respect for what they are, and not merely as instruments. In this sense our relationships with nature must model our best ideals of the other relationships which humans can have. Deep ecology would then spring not only from a love of nature and the wild, but also from our own enlightened understanding of what it is to live a good life.

Honeydew

Life blood of South Island Beech Forests

by Henrik Moller, Kay Clapperton, Peter Gaze, Graham Sandlant, Bruce Thomas and Jocelyn Tilley

Honeydew is the name given to the carpets of shimmering silver drops that clothe the trunks of beech trees. It is formed from sugary sap bled from within the trees by tiny scale insects. Native birds and introduced insects compete to sip the energy-rich drops, thus forming a crucial link in a complex web of life within South Island beech forests. In this article a DSIR Ecology Division research team outlines the influence of honeydew and wasps on our native trees and animals.

Buried in the bark of South Island beech trees lives a fascinating native insect, the honeydew beech scale insect. It has long piercing mouth-parts which slowly draw off sap from the sugar vessels (phloem cells) of the tree. A hollow white thread, which hangs from the capsule of the scale insect, is a waxy extension of its intestine. This "anal tube" is the insect's plumbing system, draining its wastes and unused sap to the outside. The scale insect uses only some of the sap it takes from the tree, and the rest passes through to accumulate as sugary drops on the tip of the anal tube. We call these drops "honeydew" because they taste sweet and shimmer like dew.

Honeydew-infested trees are black because a sooty mould (a type of fungus) lives on the sugar of the honeydew drops that have been blown or washed onto tree trunks. The sooty mould in turn provides a moist and energy-rich substrate for the many insects which live within it.

The spread of wasps may have seen a corresponding decline in the numbers of honeydew eaters such as tui (pictured), bellbird and kaka. The kaka studied in one area have not bred for three years, possibly because the birds are lacking the energy they need for breeding which they usually derive from honeydew. *Photo: Rod Hay.* *Inset:* **What we see when walking through the forest — drops of sweet tasting honeydew at the end of the insect's white anal tube.** *Photo: B Thomas.*

Friend or foe of the tree?

Many people believe that beech scale insects kill their host trees because they bleed them of their sugar. Certainly, you can find dead trees which are black and knobbled from previous infestations of the scale insect. However, the growth and seeding of trees may not always depend on the amount of sugar they have; the availability of nitrogen-rich nutrients may be more important. Overseas research has shown that honeydew dripping onto the ground probably nourishes the soil bacteria, some of which fix nitrogen from the air. More nitrogen compounds may be formed amongst the roots of infested trees, which absorb them for their own growth. Scale insects could therefore indirectly be conferring a net benefit to their host tree.

Honeydew as Food

The drops of honeydew have a high sugar content, and are an important energy source for a variety of animals living in the forest. Nectar-feeding birds, such as the tui, bellbird, kaka, and silvereye, take honeydew drops in the same way as they harvest nectar from flowers. The drops are taken to a lesser extent by a variety of other birds — even by seed eaters such as chaffinches. Lizards have also been seen feeding on honeydew.

The importance of honeydew to nectar-feeding birds is shown by the many tui and bellbirds which flock to patches of beech forest in winter from nearby pine plantations where honeydew does not occur. More birds are found in forests with more honeydew. Because the drops are rich in energy, the birds can fuel-up quickly in the short days of winter to survive the long, cold nights.

As well as sipping the drops, kaka eat the insects living in the bark and in the sooty mould on trees. These insects, together with the sooty mould and its associated sugar, are eaten also by kea, possums, rats, and even sheep.

There are many more insects on honeydew-infested trees than on nearby uninfested trees. Ants are particularly common, but small beetles, flies, bumble-bees, and particularly honey bees and wasps abound. On hot sunny days you not only smell the sweet heady scent as you approach a tree heavily infested with honeydew — you can also hear it buzzing with bees and wasps collecting drops.

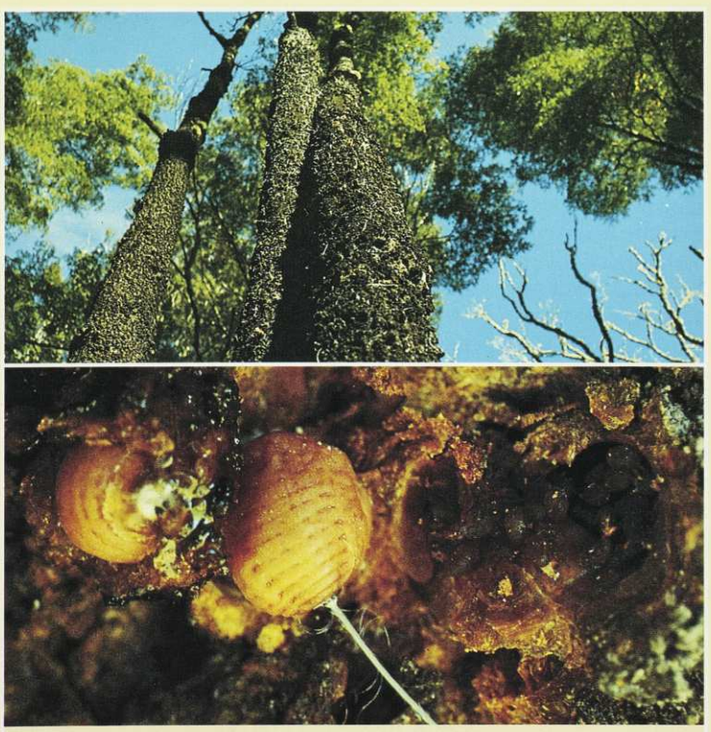
Wasps, the new invaders

An important newcomer to the New Zealand forest is the wasp. The German wasp has been in New Zealand since the 1940s, and reached the South Island honeydew forests by the mid-1950s. In the late 1970s a second wasp species, the common wasp, was found to be present also. Common wasps have now spread throughout most of the bottom half of the North Island and the top two-thirds of the South Island (Fig. 1). Of the honeydew forests, only those of the

One of the villains of the piece? Since the 1950s wasps have been a nuisance both in the wild and in populated areas. *Photo: G Harrison. Inset:* **The large number of wasps seen suggest they must strongly reduce the number of native insects, such as cicadas.** *Photo: B Thomas*

West Coast and northwest Nelson have not yet been colonised by common wasps. This year, German wasps were more abundant in this uncolonised area than they were in areas with both species. The most likely explanation is that common wasps have not yet reached this last corner of the country and when they do, German wasps will decline because of competition with the new species. Despite this, there were many more wasps in honeydew forests this year, which suggests that the new species is adding to the total numbers of wasps in our forests. In Europe, good years for German wasps are also good years for common wasps. If the relationship is similar in New Zealand, these first-year results from our study will indicate the relative abundance of the two species in years to come.

Wasps have become so numerous that they are now by far the greatest harvesters of honeydew drops in summer and autumn in Nelson forests. One tree in our study area near Nelson had 360 wasps per square metre of trunk — the equivalent of about 500 wasps crawling over an average sized door! Wasp numbers fluctuate so much that we do not yet know if these are typical or exceptional densities. We found many more drops, much bigger drops, and drops with higher sugar concentration on tree trunks that we had covered with mesh screens to prevent wasps from taking the honeydew. Because wasps removed drops soon after they began to reform, the drops remained small and had a low sugar concentration. This meant that bees and birds had to lap up many more drops to get enough energy. In the months when wasps were most numerous, the task became so unrewarding



Top: **The question of whether scale insects — which create honeydew — benefit trees or not is a complex one to answer. In some ways they do since their honeydew nourishes the soil bacteria, but they may also kill host trees, such as the one on the left.** *Photo: G Harrison. Bottom:* **Feeding on the sap of the tree, the honeydew beech scale insect passes unused sap and wastes out through this hollow white thread.** *Photo: G Harrison.*

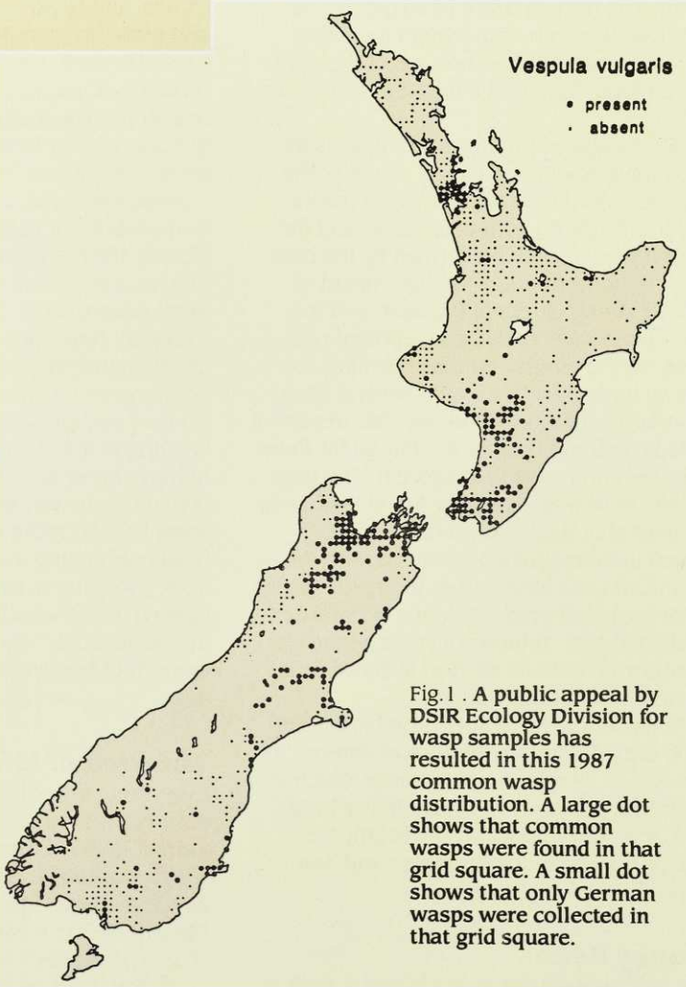


Fig.1 . **A public appeal by DSIR Ecology Division for wasp samples has resulted in this 1987 common wasp distribution. A large dot shows that common wasps were found in that grid square. A small dot shows that only German wasps were collected in that grid square.**

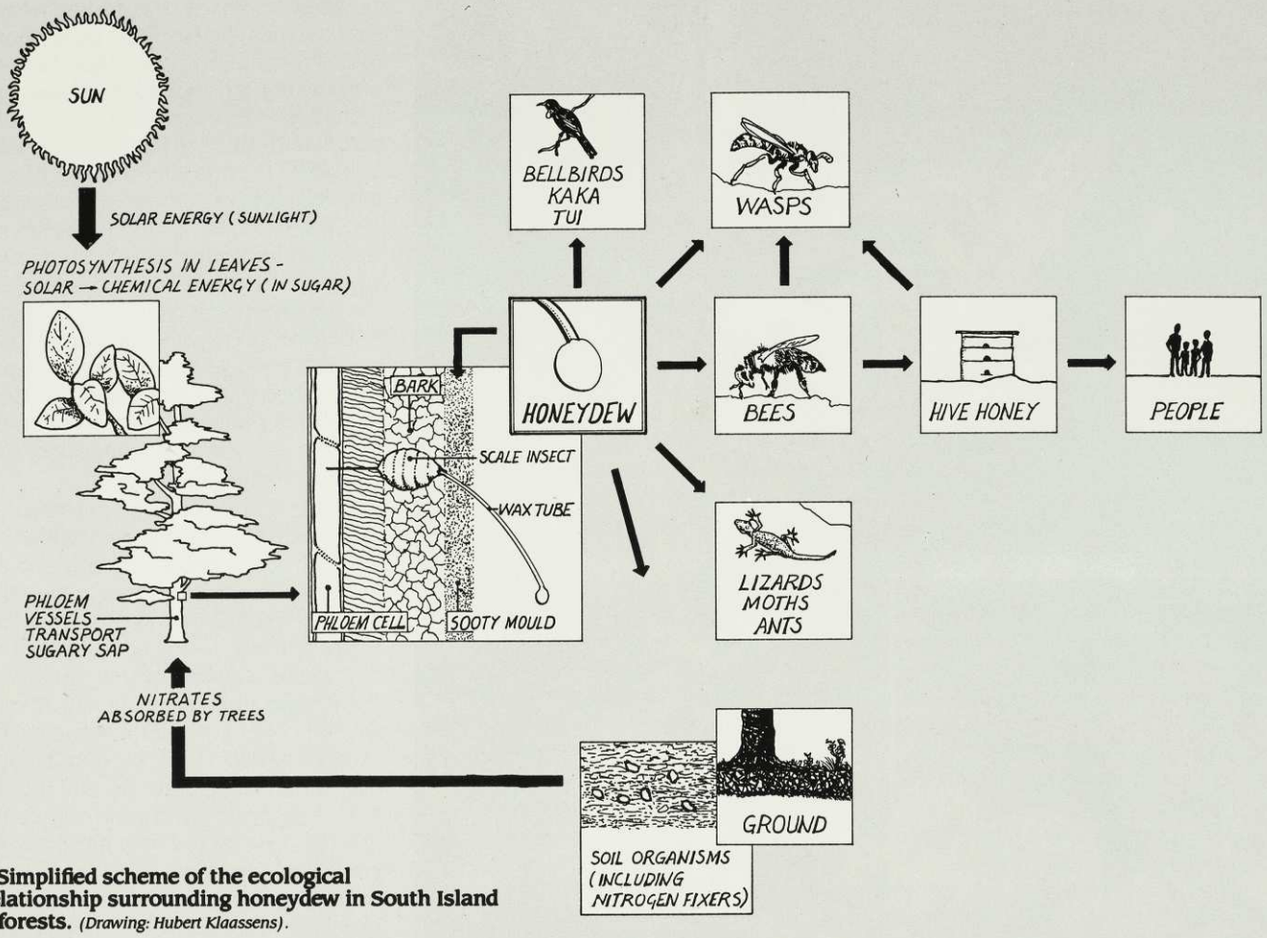


Fig.2 . Simplified scheme of the ecological interrelationship surrounding honeydew in South Island beech forests. *(Drawing: Hubert Klaassens).*

that the bees and the birds gave up gathering honeydew altogether. Our bird banding programme showed that many bellbirds and tui left our study area, at least temporarily. The next step will be to determine whether they can find enough food elsewhere to survive this shortage of their preferred food, honeydew, in late summer and autumn.

Wasps also kill many native insects to feed their developing larvae. Some of the insects would have been eaten by insect-feeding birds, so both these birds and the nectar feeders may be harmed by the competition for their food. We have heard of wasps killing chicks in the nest, and this has also occasionally been reported overseas, so the wasps could be harming our native birds directly as well. Several ecologists have mentioned the possible impact of wasps on bird populations, but so far there has been no research to prove it. The huge densities of wasps that we found lead us to suspect that their impact has been very much underestimated so far. As with the introduced mammals before them, the wasps have further altered a balance of nature established over millions of years where our plants and animals evolved in the absence of new ecological invaders.

Scientists of the DSIR Entomology Division are attempting "biological control" of the wasps by releasing a parasite which attacks the pupae of the wasp. In the long run, this may impose a new balance as wasps decline to low numbers and have less effect on our forests.

Honey Bees

Another introduced insect in our forests is the honey bee. Honeydew is the main substance in beech forests which bees use to make honey. Wild bees living in the forest build their honeycombs in hollow tree trunks, and beekeepers are putting more and more hives in the honeydew forests because the dark, strongly flavoured honey made from honeydew fetches a good price in Europe. The main commercial harvesting of honeydew by beekeepers is in the foothill forests of the Southern Alps in Canterbury.

Beekeepers pay a small levy to the Forest Corporation for using forestry roads when placing the managed hives. The honey bees, oblivious to recent restructuring of government departments, fly across the boundary to collect honeydew from patches of beech forests administered by the Department of Conservation within the mosaic of the Forest Corporation's plantation forests. Beekeeping in forests is a huge potential money earner for beekeepers and for the owners of the forests — it is claimed by some that far more money can be made from beekeeping in our native forests than from chopping them down. Research is now needed to see whether keeping extra bees in forests would significantly reduce the amount of honeydew left for native animals.

The Web of Life

Everything in ecological communities is potentially interconnected, and no plant or animal lives in isolation from other organisms sharing its community. The honeydew is a crucial link in a complex web of life within South Island beech forests (Fig.2). The beech scale insect takes its food from the tree. The tree loses some energy in the form of sugar, but may gain nitrogen; the sooty mould is nourished from honeydew drops spread on the tree trunk by rain and wind; the wasps, the bees, the birds, and other animals lap up honeydew for food; and the beech scale insect may even benefit from the increased flow of sap through it when the drops are harvested by these animals.

These complex relationships are important for the health of the forest and its inhabitants, but they are not yet fully understood. Unfortunately, cuts in government funding are now forcing DSIR Ecology Division to scale down the study of honeydew despite its economic importance and its value for conservation. The Department of Conservation has partly come to the rescue by contracting our research focusing on the impacts of wasps on endemic insects and birds.

The native species of our forests have co-evolved over millions of years and have adapted to depend upon each other. Recently, humans have cut down much of the honeydew forest, and have introduced new species which may compete with native species for honeydew. The most recent newcomers are the wasps, which probably also greatly reduce the number of native insects in our forests. This has altered the balance of nature – as yet we do not quite know how dramatically, but studies are urgently needed to find out.

Further Information

A 24-minute VHS video on DSIR Ecology Division's study of honeydew and its use by birds and insects is available from the Publications Officer, Science Information Publishing Centre, PO Box 9741, Wellington (cost $50 incl. GST).

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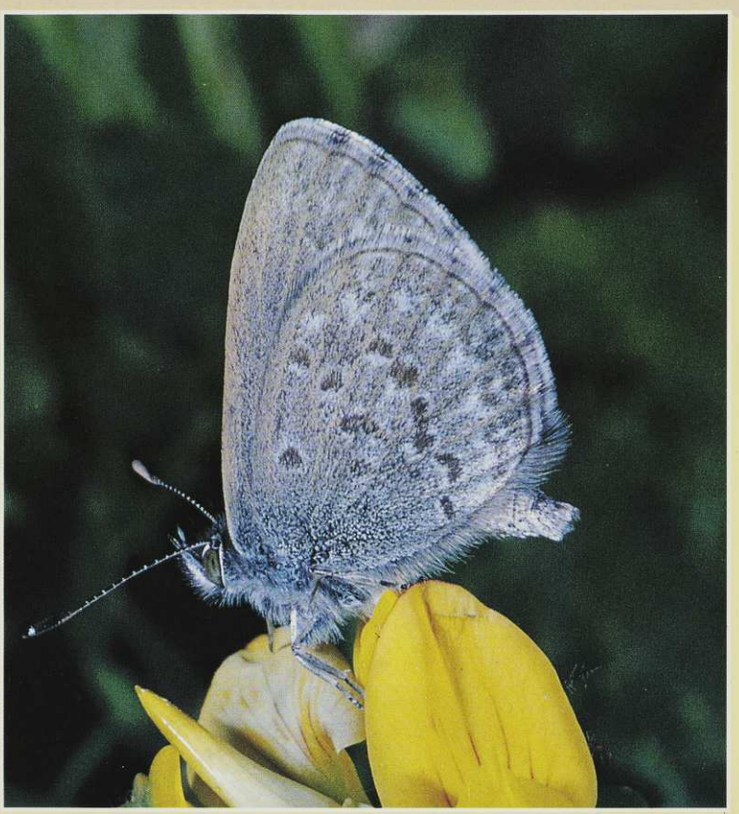


How can the two blue butterflies found in New Zealand be distinguished? The answer is "not easily"; but the diagnostic features are on the underside of the hindwings i.e. the part that shows when they are feeding or resting. On the left is the endemic southern blue (*Zizina oxleyi*) from central Otago, with a dark, heavily outlined zig-zag band across the wing. On the right the widespread common blue (*Z. labradus*), also found in Australia, which has no obvious band and rather more diffuse colouring. Note also the strongly banded fringe of hairs around the wings in the endemic species.

Being hybridised into oblivion by an invading, closely related species is probably not very common but is a recognised evolutionary pathway. Victoria University scientist Dr George Gibbs has been studying the fate of the native southern blue butterfly, which, like the black stilt, is being swamped by an aggressive trans-Tasman invader.

Next time you stop by the roadside in the Mackenzie Basin, spare a thought for the little blue butterflies dancing among the stones and dry summer vegetation. This butterfly, one of our smallest, could possibly be facing oblivion by hybridisation with an Australian immigrant species along the same lines as the black stilts which share their habitat. The similarity of their predicament is striking but the blues still have a long time ahead of them before they could be called threatened. This article briefly compares some parallel features of stilts and blue butterflies and attempts to trace the historical events that have led to the present state of affairs with the butterflies.

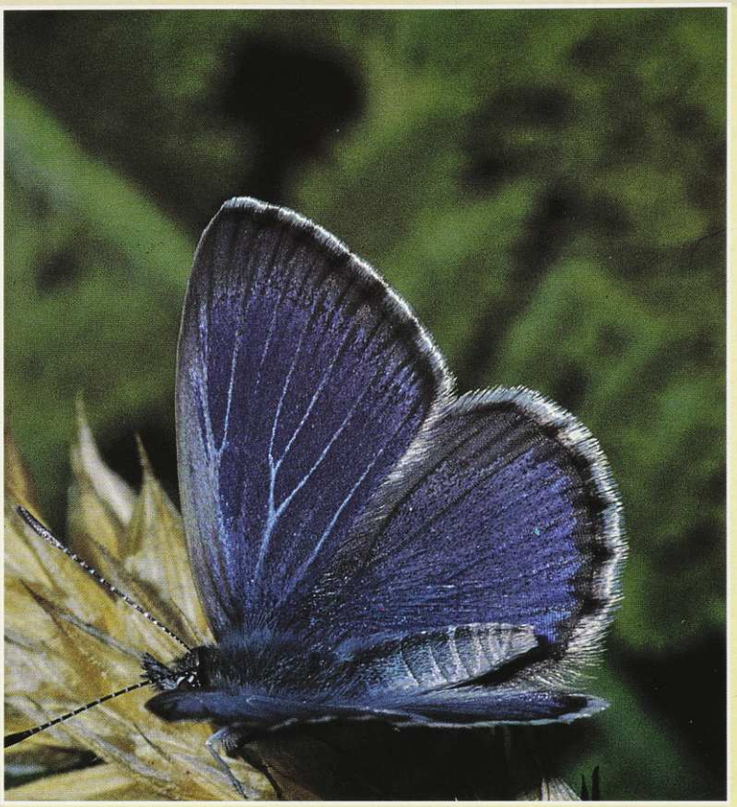
Species or subspecies?

Black stilts and native "southern blue" butterflies share the open river valleys of the Mackenzie Basin. Both are very much like their invading Australian counterparts (the pied stilt and "common blue" respectively) to the extent that competent taxonomists may argue over whether the endemic New Zealand entity should be called a species or subspecies.

Nevertheless they are sufficiently distinct to be recognisable by colour and/or behavioural and structural differences from their Australian relatives and are uniquely New Zealand. Hybrids are readily formed in each case with the Australian relative and can be differentiated from either parent type by colour pattern. Both have widespread near relatives distributed beyond New Zealand and Australia to include Malaysia, India and Africa. In both cases we have difficulty tracing the historical events that led up to their present predicament. The period 1850-1870 could have been a critical one for both the stilts and the blue butterfly.

The mid-1800s were pioneering times — for natural history discoveries and for agriculture. Both are linked in our story. If we research the records of our museums and early zoological literature, we can find reference to the existence of the endemic black stilt (in 1840) and the endemic southern blue butterfly (in 1859). In each case

l y B l u e s



The upper surfaces of the wings are bright lilac blue in the male, edged with dark grey. Apart from the banding on the fringes, the two species are not readily separated in this view. Wingspan is about 20-25 mm. Note the absence of any discrete black spots on the upper surface, distinguishing these from the copper butterflies.

mention of a second species, with an Australian distribution, does not come until some years later (1869 for the pied stilt and 1878 for the common blue). Does this imply that the more widely dispersed Australian species had just arrived in New Zealand, or had it previously been overlooked? We cannot be sure. Like fossil discoveries, the first record simply means that the animal was there but it tells nothing about when it arrived.

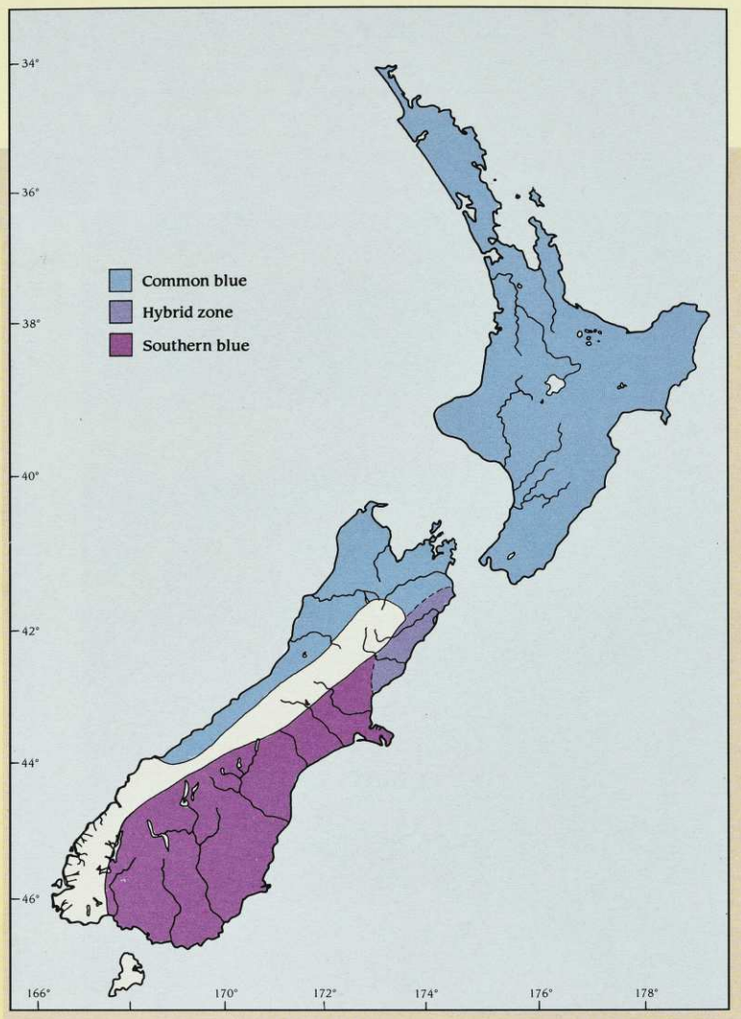
No butterflies reported

However, with our present knowledge of blues and their status as our most common butterflies both inland and on the coast, it comes as a surprise that no blue butterflies (of either species) were reported from New Zealand until nearly 100 years had elapsed since the date of the first butterfly discoveries (Cook's Endeavour voyage, 1769-70). At the time when the southern blue (*Zizina oxleyi*) was described from a specimen taken (we think) in Nelson, no fewer than six kinds of butterfly, including red and yellow admirals, the tussock and two coppers, were known from this country.

Why did blues, especially the common blue, get overlooked for so long?

The probable answer is that they were nowhere near as common nor as widely distributed as they are today. For the explanation of this we can turn to what was happening as European farming got underway. Flocks of sheep were spreading across the land occupying the open, non-forested area. Major forest clearance came later but during the early sheep-farming phase the spread of domestic grazing animals must have been accompanied by the spread of exotic pasture grasses and clovers. Our records are not at all clear on exactly when the different pasture species were introduced but it was the clovers that affected the blue butterflies. Today it is these ubiquitous pasture legumes that serve as larval foodplants for both species of blue butterfly, hence accounting for their common status. In the past, before these plants were introduced, it was unlikely that any native foodplant was suitable for the common blue but we do know that the endemic southern blue larvae can feed on native broom (Carmichaelia spp.). Thus in pre-European New Zealand the southern blue was restricted to open habitats with native brooms whereas the common blue was unlikely to have occurred at all.

The present situation is that the common blue *(Zizina labradus)* is abundant throughout the North Island in exotic grasslands. It prefers mosaics of grass and shingle and its larval foodplants are introduced clovers, trefoils and lucerne. In the South Island it is limited to the Nelson area, northern Marlborough and the West Coast. Our endemic southern blue occurs through the drier regions of Canterbury and Otago, becoming scarce in the far south. Its favourite haunts are stony lakeshores and riverbeds where it is associated with Fescue grassland and matagouri communities. Larvae are normally found on clovers. The two species hybridise extensively where their populations meet in Marlborough and



Females are grey on the upper surface with just a dusting of blue scales towards the base of the wings. They feed at many kinds of flowering herbs. *Inset:* **A larva of the common blue. In spite of their abundance, the caterpillars are seldom seen because they keep amongst clover leaves close to the ground. They have an extremely thick skin which is thought to protect them from the jaws of marauding ants. The skin exudes droplets of a liquid which is attractive to ants and many of the caterpillars of overseas blue butterflies are dependent on ants for part of their lives (not so in New Zealand).** *All photos George Gibbs.*

north Canterbury.

To reconstruct the history of these blue butterflies I am suggesting that unprecedented modification of the New Zealand landscape that began in the mid-1800s extended foodplants and habitat of both these butterflies, bringing them into close association for the first time. I am hypothesising that hyridisation may have occurred where they met and that the outcome of their meeting in most places was deleterious to the endemic blue, leaving behind the more successful common blue, or perhaps hybrid populations in which common blue genes predominated. The net effect of this disruption was the shrinking of territory held by the endemic species as the rapidly expanding common blue took over the North Island and much of the South Island.

There is evidence that the southern blue was previously more widespread than it is today. For instance G.V. Hudson collected it in the Nelson district prior to 1898 but it has not been found there recently. In my own experience, I have seen the southern blue disappear from the Waiho Gorge river flats below the Franz Josef Glacier over a five year period in the 1980s and in the North Island there are earlier records of *oxleyi*-type individuals from the volcanic plateau and Hawke's Bay.

This scenario poses many questions, some of which we cannot answer with any confidence. An interesting one is how the common Australian butterfly came to be on the spot when this new opportunity arose. I have suggested that it was unlikely to have been present before European settlement simply because it had no known foodplant here but it is conceivable that it existed somewhere and fed upon a native legume.

Perhaps it was shipped across the Tasman Sea amongst stock food (it is, after all, Australia's most common grassland butterfly), or perhaps it was windblown. History is unlikely to give us these answers now. The important point is its ability to intergrade with the southern blue and possibly threaten its very existence — and here the situation resembles the black and pied stilts where again we are hazy about the early stages of the process.

Many questions of interest to evolutionists and conservationists arise from this survey of the blue butterflies. Is the species replacement hypothesis an appropriate one? Has it reached a stable equilibrium or will it continue to engulf the southern blue entirely? Is the New Zealand common blue identical with the Australian one or has hybridisation produced a different form? Is the altered habitat the prime cause? Should we humans intervene? Would such a course of action indeed by possible? These questions are capable of being researched with the blue butterflies and may have implications for other wildlife issues in this country.

Dr George Gibbs is a senior lecturer in entomology at Victoria University and is the author of a book New Zealand Butterflies.

Birds on the Wing

By Peter Daniel

Pigeon leaving kowhai tree. Flash at 1/4000 sec. 100 ASA 120 film.

How does one go about photographing native birds in flight? I asked myself this question over and over during our first few years on Kapiti Island.

If I could do it, not only would it be exceptionally rewarding for me, but other people could see the beauty of our birds in action, and maybe their interest in and love of them would be enhanced.

If people see any object as one of great beauty, then it becomes indelibly printed in their minds as something to be treasured. This was the kind of image of our native birds that I set out to capture. Living here on the island, I occasionally got quick glimpses of beautiful colours and forms that, I realised, the human eye was too slow to register properly. Thinking about this made me realise that the birds themselves would be able to see all this beauty, hence one of the reasons that most birds within a species display to one another.

Photography has been a serious hobby for me for nearly 30 years. After we moved to Kapiti in mid-1976, I soon realised the tremendous possibilities. My early attempts

Weka triggering micro-switch by stepping on branch. Flashes at 1/10,000 sec. 400 ASA 120 film.

Kaka just touching down. Flashes at 1

were comparatively crude, but as time went by I became more discriminating. Between 1981 and 1985 I went through the phase of photographing birds at the nest from a hide. This was very satisfying at first, but I was still not doing what I really dreamed of, i.e. catching the birds in action.

Then during 1985 I bought second-hand a large powerful flash unit with a revolutionary facility called power-ratio, which made it possible to reduce the flash duration. I soon realised that with this function, especially if I used a couple more flash units with the same capability, I might freeze the movement. More pocket money, mine and my wife's, was used to buy another flash. I discovered that an older flash could be converted to power-ratio with an appropriate module, so I bought this too.

I was successful at my first attempt, though I must admit to having used 12 rolls of Kodachrome 25 and 64. I used a standard lens and all three flashes set on 1/5000 sec. Two exposures of kakas in flight were successful. For me it was a dream come true.

000 sec. 100 ASA 120 c. 100 ASA 120 film.

Kakariki leaping off branch. Flashes at 1/10,000 sec. 400 ASA 120 film.

Since then I have progressed to a 6 x 7 cm medium format camera. To fit the whole of a flying bird within the frame of the negative, its image should be small relative to the size of the negative. If the image is very small, however, it will not enlarge satisfactorily. The answer is to increase the size of the negative relative to the image of the bird, i.e. use a larger format. I do my own colour printing, and it is a pleasure to enlarge from 6 x 7 negatives.

I now have a remote set-up which needs tending two or three times a day, but triggers when a bird lands on a perch.

The set-up consists of an infra-red transmitter on a tripod, connected by a 5-metre cable to a micro-switch which is triggered when the perch is depressed. There is a slight delay, so the bird is normally photographed as it flies off. The transmitter is aimed at the receiver on the camera, thus activating the shutter, power winder and one flash unit attached to the camera. The other two flashes are activated by the first flash via slave units.

Doing my own colour enlarging (up to size

Male bellbird taking off. Flashes at 1/10,000 sec. 100 ASA 120 film.

40 x 50 cm) has heightened by awareness of what sort of negative or positive is required to make a good print.

In spite of a big outlay on equipment and materials, years of practice and using up all of my spare time, approximately 98 percent of my exposed negatives are failures. I would strongly advise anyone contemplating doing the same thing to save up and buy adequate supplies of film. If you are mean with your film, forget about trying this sort of technique.

When I photograph birds, I do so without damaging the surroundings. This means that, instead of breaking off a branch which is in the way, I either move the camera or temporarily tie back the branch with string. This applies to small branches as well as big ones. There are people who have actually threatened species in other countries in their total obsession with getting a good photograph.

When a hide is set up in the trees, no nails are used. A platform is tied to trunks and branches with rope and the hide is placed on top of this. A ladder is used for access. I repeat, no nails are used at all.

Peter Daniel has been the Kapiti Island ranger since 1976. Prior to that he and his wife Linda lived on Fiordland's remote Puysegur Lighthouse and on Stephen's Island.

Rubbishing the ocean

The problem of plastic debris

by Dr Martin Cawthorn

The whale, a juvenile minke, died soon after it was found stranded on the coast of Palliser Bay, east of Wellington. Despite repeated efforts by locals and Ministry of Agriculture staff to return it to the safety of deep water, the distressed whale could not be rescued.

When I conducted a post-mortem of the thin and emaciated whale I found a polythene bag stuck in its oesophagus. Minke whales are known to be attracted to ships at sea and this curiosity may, in part, be responsible for the reports of them eating plastic debris thrown from fishing boats.

Again at Cape Palliser a fur seal was seen with plastic strapping stuck around its neck. It had apparently picked up the loop when young and, as it grew, the 'collar' tightened, gradually cutting through the fur, skin and blubber, until it was scraping against the muscle tissue underneath. The young animal was emaciated and in poor condition.

Such sad occurrences are a telling testament to the effect that one of the so-called benefits of the modern age — plastic — is having upon the environment, especially the marine environment.

It appears in a variety of forms — from virgin plastic granules, polythene films and bags, detergent and other containers, chunks of polystyrene, lost or discarded monofilament and polypropylene fishing nets and floats, to synthetic strappings and ropes.

A single species, the North Pacific fur seal, is estimated to be losing as many as 50,000 animals a year through being entangled in such rubbish. Anywhere between 300,000 and 700,000 seabirds a year are being killed.

The tide of plastic garbage began to surge just after World War II, and the boom in commercial fishing since the 1960s has seen more and more gear either abandoned or lost. Packaging of all sorts is plastic and popular both because of its durability and low cost. For example, the cost of manilla envelopes is almost twice as high as polythene.

Staggering figures

Worldwide, the figures are staggering. In 1975 alone, the world's fishing fleet is estimated to have dumped about 23,600 tonnes of synthetic packaging bands and material as well as 135,400 tonnes of plastic fishing gear into the sea (National Academy of Sciences 1975). It is not just the fishing industry which is at fault. As much as 6.5 million tonnes of solid waste comes from the world's merchant fleets.

Wellingtonian Margaret Cochran created this colourful "environmental sculpture" when she came across a quantity of debris near Makara, west of Wellington. The collection resulted from a beach comb of just a hundred metres or so. Mana and Kapiti Islands in the background. *Photo: Margaret Cochran.*

The above figures do not include the rubbish dumped by the world's navies or pleasure craft.

The best evidence of the plastics pollution problem can be found in the North Pacific. There, each night, Japanese, Taiwanese and Korean fishermen set out their thirteen-km-long, eight-metre-deep nets, with weights at the bottom and floats at the top. In all, the night's work stretches 32,000 km of invisible curtains of net. Each morning, when the nets are retrieved, an average of 16 km of netting escapes detection. These nets are worth thousands of dollars and represent a major financial setback should they be lost. Such 'ghost' nets are a hazard not only to marine mammals but also to ships at sea. Ironically, ten times more northern fur seals are killed each year in the nets than are killed in the hunts opposed by animal-rights groups.

Terns and other small migratory birds have been found with virgin plastic granules in their guts. It is thought they pick these up in mistake for food found at the sea surface. It has been estimated that more than 1000 tonnes of similar granules or pellets are scattered along New Zealand's coasts.

While plastic pollution is obviously a greater problem elsewhere, nevertheless it has been responsible for a number of unpleasant incidents here — not to mention the unsightliness of our coastlines littered with such material.

The following are just a few examples of incidents I have observed or have had reported to me.

Seals

The first record of an entangled fur seal was made in 1975, and collared animals have been sighted regularly since then.

Polypropylene strapping was first introduced into New Zealand in 1969. This tough, buoyant material is generally coloured light blue and is fastened around a package either by heat sealing or with a mechanical metal crimp. It appears to be common practice at sea to slip the loop of strapping off the end of the package rather than cut if free, and the loop is then cast overboard along with other ship's garbage.

Unfortunately for their own safety, marine mammals are both irrepressibly playful and curious. Fur seals are attracted to floating debris and will dive and roll about in it as they do when swimming in kelp. When playing with rings of plastic strapping they can readily slip their heads through the loop as the lie of the fur allows the ring to pass unimpeded around the neck. However, the long guard hairs, like barbs, prevent the loop being slipped off.

Recently two fur seals at Cape Palliser, three at Open Bay Islands in Jacksons Bay, one at Kaikoura and one at Taiaroa Heads were seen with plastic strapping around their necks. Unless entangled seals can either free themselves or else be freed of similar tight collars, they will most likely die a slow death from strangulation, starvation, drowning or infection.

One of the most chilling prospects is that when an entangled seal dies and decomposes, the indestructible strapping band that contributed to its death is free to be picked up by any other seal, with the same

It is estimated that anywhere between 300,000 and 700,000 seabirds are killed a year because of plastic garbage. This black-backed gull died from starvation after becoming stuck on a "six-pack" holder.

ghastly consequences.

Seals and sea lions have been observed from Campbell Island and the Auckland Islands to as far north as Banks Peninsula with lengths of netting about their necks. At the Auckland Islands, a young sea lion was spotted with about three metres of monofilament line and swivels, thought to be from a squid jigger, wrapped so tightly around its neck that the skin and subcutaneous tissues were severed.

Anecdotal evidence from the United States is gruesome. "I observed a sea lion with a net fragment so deep in its tissues that the net had cut through skin, blubber, and muscle and had actually cut open the trachea," Rich Tinney of the Centre for Environmental Education told a congressional committee. "The animal was incapable of diving for food because water would enter its throat through the opening cut by the net."

Whales and Dolphins

Whales and dolphins have frequently become entangled in large set nets, but not in New Zealand because of the absence of this type of fishing here. However, the extensive use of floating synthetic buoylines on rock lobster pots and deep sea nets has resulted in the fouling of at least two whales in recent times.

In 1979 an orca was discovered by fishermen in a distressed state entangled in ropes and floats in the eastern Bay of Plenty.

The marine environment is not the only one to suffer from the effects of petroleum-based products. Tongariro High School students recently held a "nylon-a-thon" during which they recovered 3.6 km of fishing line nylon from rivers around their region. Their efforts raised $200 which was donated to the Society.

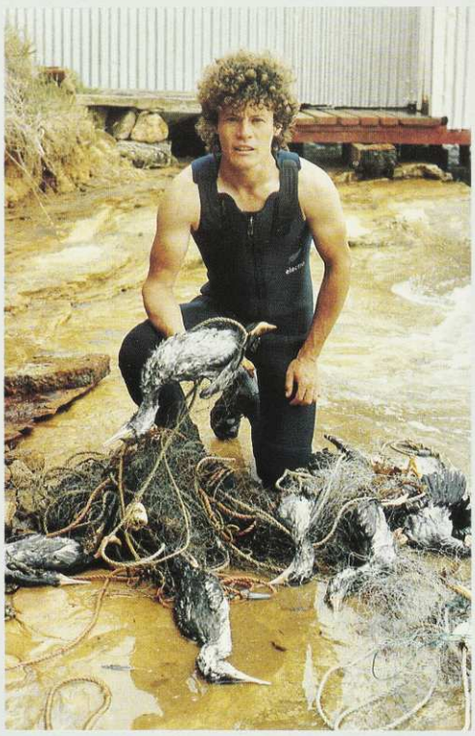
In February 1984 a 10-metre juvenile male southern right whale became stranded just north of Banks Peninsula. It died soon after stranding and was found to have a long length of prolypropylene rope, with a small polystyrene buoy attached, wrapped around its tail. The rope had cut 20 cm into the leading edges of both flukes.

Around Banks Peninsula, gill netting is known to kill approximately 10–15 percent of the local Hector's dolphin population a year (see "The Down Under Dolphin" article page 30 this issue).

Turtles

Although turtles are uncommon visitors to New Zealand, they are not rare.

In the summer of 1979-80 six leatherback turtles reached the country, one of which beached itself near Whakatane. Soon after coming ashore the turtle died and a post mortem revealed the oesophagus packed with polythene bread bags. It is thought that turtles regularly mistake the bags for their favourite food, jellyfish.



Forest and Bird executive member, Graeme Loh, found 14 drowned spotted shags recently caught in a set net in Otago Harbour. If the fully protected birds had been shot the culprit could have been prosecuted, but as the law stands it is not illegal to leave such lethal unattended set nets.

No simple solutions

There are no simple solutions to the problem. However, a start has been made. In November 1984 a workshop on the fate and impact of marine debris was held in Honolulu and attracted participants from New Zealand, the United States, Japan, China, Canada and West Germany.

One approach is to work through the International Convention for the Prevention of Pollution from Ships (MARPOL). It contains a provision that prohibits "the disposal into the sea of all plastics, including but not limited to synthetic fishing nets and plastic garbage bags".

This has not yet come into force as only 27 nations have ratified it. However, it is not expected to take long before it becomes enforceable.

The Cape Palliser seal colony and a seal with plastic strapping around its neck.
Photo. Mike Price, MAF.

In the United States a host of environmental groups have formed an association called the Entanglement Network, which sends out a newsletter and coordinates pressure groups to deal with the problem.

Of course, laws can only accomplish so much. In the final analysis, responsible housekeeping by everyone is the only way to avoid unnecessary death to wildlife, not only in New Zealand but throughout the world.

Martin Cawthorn is a biologist who has had extensive experience in New Zealand's outlying islands and has represented New Zealand on the Scientific Committee of the International Whaling Commission. Formerly with Fisheries Research Division, he now works for the Department of Conservation, which has undertaken responsibility for marine mammals.

More garbage than fish?

Marine researchers estimate that the amount of garbage placed in the oceans each year now outweighs the fish harvest by three to one. Much of the trash consists of plastic which will not rot.

The accumulation of plastic is already a hazard to marine life and the problem is getting worse. The state of California may soon take steps to ensure plastic containers are biodegradable.

One bill now before the state legislature calls for a survey by public bodies to determine the extent of damage. They will also be asked to make recommendations on the clean up of coastal waters.

Legislation has been introduced in the US Congress seeking better control over the disposal of plastics at sea. The measure would cut future dumping but not reduce existing plastic waste.

From *Fishing News International*, June 1987.

View from Cupola Basin Track, Nelson Lakes National Park: One of the many attractive photographs in the book

"LANDSCAPE IMPRESSIONS: A guide to Photographic Illustration", by David E. Harding.

Available from all good bookshops. Softcover, $39.95; Hardcover, $47.95.

TIRI TIRI MATANGI

by Mike Lee

··· putting it all back together ···

It has always been my personal belief that one of the strongest driving forces in a conservationist is a feeling of quiet anger; a quiet anger at the years of destruction inflicted upon our country's environment for quick profit and because of a tragic determination by European settlers to remould this land into the image and likeness of parts of the Northern Hemisphere.

Today one can travel through miles and miles of many parts of New Zealand and view a landscape almost entirely dominated by exotic flora and fauna. For the environmentalist this can sometimes be very frustrating — at least that's the way it is with me.

How very satisfying it is therefore to be involved in a project in which one can, with a spade and one's own pair of hands, help repair and put back together an island forest environment the way nature originally designed it.

This satisfying, even therapeutic, feeling of helping to heal the land perhaps explains the remarkable public success which is the Tiritiri Matangi revegetation project.

Literally thousands of people from all walks of life have enjoyed the Tiri experience and contributed to the project in many different ways. Credit must go first however to the Hauraki Gulf Maritime Park Board which in 1971 had the foresight to remove stock from the island in order to allow Tiri to regenerate into native forest.

Tiri History

Tiritiri Matangi (its name means "moving in the wind") comprises 220 hectares and lies 20 km northeast of Auckland and 4.5 km east of the Whangaparaoa Peninsula.

As one of the hundreds of islands great and small which make up the New Zealand archipelago, Tiri's story is a microcosm of New Zealand's history.

12,000 years ago Tiritiri Matangi was a range of rolling hills standing out on a great wooded plain which is now the Hauraki Gulf.

With the ending of the last great Ice Age and the melting of the polar ice-caps the rising Pacific Ocean rolled in over the great plain, drowning it and forming the islands of the Hauraki Gulf.

Around 900 AD far ranging sea rovers from tropical Polynesia first discovered these islands and not long after this Tiri first felt the tread of human footsteps. The Kawerau tribe who claim descent from their ancestral canoe Te Waka Tu Whenua have had an association with Tiri which stretches far back into the mists of time.

According to historian and ethnologist Dr David Simmons the Kawerau would have originally used Tiri as a seasonal station — a vital component in their semi-nomadic economy. According to tribal tradition gathered by Simmons Tiri was known as "he motu tohu hau" — literally "an island which indicates the weather". An ancient fisherman's tradition stated that if the island was seen to be above the horizon the weather outlook was good, if the island was seen to be below the horizon the weather outlook was bad.

For hundreds of years the Kawerau people occupied much of the Auckland region north of the Waitemata but their territory became gradually reduced by the southward movement of the Ngati Whatua and the expansion into the Hauraki Gulf of the powerful Tainui people, notably Ngati Paoa.

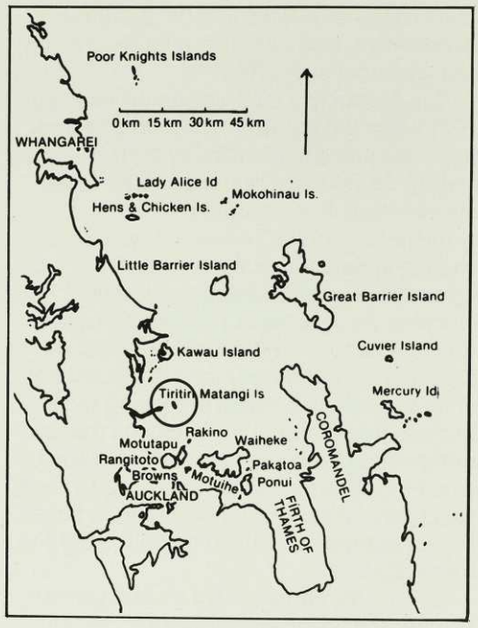
As time passed settlement on Tiri became more and more intensive (today there are at least 26 identified archaeological sites on the island) and by around 1700 a sub-tribe of Kawerau, Ngati Poataniwha were in permanent occupation with a fighting Pa named Tiritiri Matangi on the northwest coast. By this time Ngati Paoa also had a Pa on the island named Papakura located about a mile further along the coast.

Perhaps because of the pressure of population on natural resources fighting broke out between the two tribes, and Kawerau with the aid of the powerful Wai o Hua people from Tamaki eventually expelled Ngati Paoa and destroyed Papakura Pa. In the late 18th century war returned to the region when Ngapuhi from the Bay of Islands began raiding southwards.

In 1821, led by Hongi Hika and armed with muskets, the northerners brought devastation to much of northern New Zealand.

Lighthouse Established

Tiritiri Matangi lying across the sea approaches to the inner gulf, Tamaki Peninisula and the Thames, (Waihou), was



extremely vulnerable to such attack and Kawerau were forced to abandon their island and flee to the hinterland. However, it was not to Ngapuhi that Kawerau lost their island but to the Pakeha. Tiri was an attractive proposition for grazing and the settler government wanted the island as a site for a lighthouse to guard the approaches to the burgeoning port of Auckland. In 1841 the Crown purchased the whole Mahurangi block from Ngati Paoa. The Kawerau disputed the sale, which the Government claimed included Tiri but which Kawerau maintained did not. Indeed the island is not specified in the Deed of Purchase and does not appear in the two sketch maps of the blook drawn up at the time of purchase. Regardless of all this, in 1863 materials for a lighthouse were ordered from Britain and in 1865 the lighthouse became operational.

In 1867 Matini Murupaenga on behalf of the Kawerau tribe appealed to the Native Land Court to confirm Kawerau's legal title to their ancestral island. By this time the lighthouse was already built and despite Kawerau's strong case the claim was thrown out, thus terminating Kawerau's one thousand-year association with Tiritiri Matangi.

Throughout the present century Tiri became renowned for its lighthouse, for many

Top: **About 90 percent of Tiritiri Matangi was pasture before the revegetation project began. Since the early 1980s, 100,000 trees have been planted. The photo shows the island's lighthouse, once the most powerful in the Southern Hemisphere.** *Photo: Murray Douglas.*
Bottom: **Endangered species such as the North Island saddleback have been reintroduced on Tiri. There is potential for others such as the little spotted kiwi (*inset*) to be located there too.** *Photos: DoC.*

North Shore Branch and Tiri

The North Shore branch of the Forest and Bird Society has taken a keen interest in the replanting scheme and as they have no reserves of their own have "adopted" Tiritiri Matangi. Members have made monthly trips through the winter months for several years and some have stayed for extended periods to help with large projects such as building a reservoir dam and working on the house conversions.

Until recently the only accommodation on Tiritiri Matangi was an old University hut and a small bach. With the wind down of the P.E.P. schemes one of the two families left the island and their home has been converted into a bunk house. Some money for this was supplied by the University and the Hauraki Maritime Park Board but the project ground to a halt when partially completed because of lack of finance.

To celebrate twenty five years of Forest and Bird on the North Shore an appeal to members was launched to raise the necessary $5000 which with subsidies completed the house. Comfortable accommodation is now provided for 18 people.

Bookings must be made with the ranger to stay there.

years the most powerful in the Southern Hemisphere, and less known for its grazing and repeated burn-offs.

This destructive land-use finally ended in 1971 when the Hauraki Gulf Maritime Park Board assumed responsibility for the island and the enlightened policy of native forest regeneration was instituted.

By the late 1970s, however, it was becoming apparent that a thick barrier of rank grass, bracken and compacted soil was blocking the process of natural regeneration. It was about this time that Auckland University ornithologist John Craig and botanist Neil Mitchell began proposing the idea of mass tree-planting to accelerate the natural process. Craig and Mitchell also advocated the-then radical idea of using Tiri as a sanctuary for rare native bird species but at the same time retaining the public's right to free access.

In 1979 they brought out a management plan for the island and soon after the Hauraki Gulf Maritime Park Board set up an environmental consultancy group which came to be known as the "Tiritiri Matangi Committee". This committee built on the ideas embodied in the management plan and produced some of its own.

Open Sanctuary

In 1982 Sir Peter Scott, son of the famous Antarctic explorer Captain Robert Falcon Scott, was in New Zealand to look at suitable projects for the World Wildlife Fund to support. The Tiritiri Matangi project caught his imagination and it was Scott who first coined the now popular term "open sanctuary" in reference to the island. At Scott's direction World Wildlife Fund set up a fundraising committee and over $40,000 was quickly raised by public subscription. With a two-to-one government subsidy this grew to near $150,000 — enough to get the project up and running.

The hard toil necessary to turn drawing board plans into reality was undertaken on Tiri by landscape architect Mike Cole and Tiri's park ranger (and last lighthouse keeper) Ray Walter.

In 1983 a large shadehouse complex was completed and Cole and Walter began the process of germinating seeds gathered from the island's remnant native bush.

Interestingly Tiri, unlike its surrounding region, grew no kauri. Instead the island was clothed in a rich mosaic of northern broadleaf coastal forest dominated by pohutukawa, kohekohe, puriri, karaka and taraire.

In all 29 different species were propagated including half a dozen from Little Barrier Island (Hauturu). These latter such as toropapa, taurepo and native fuscia are nectar and berry producing shrubs which were considered an essential additional food source for the prospective population of stitchbirds.

By autumn 1984 30,000 young trees standing out in their Canadian plastic root-trainers were awaiting planting.

The main worry now for project organisers was how to get all these trees into the ground. PEP schemes were proposed but the difficulty in housing and feeding the required small army of workers made the idea impractical. It became clear then that the project would stand or fall on long term voluntary labour — something which had never been tried on such a large scale before.

Forest and Bird volunteers planting trees. *Photo: Louise Stevens.*

In May 1984 two launch loads of Waiheke Forest and Bird members made a stormy crossing to Tiri. Despite high winds and torrential rain (1.9 inches) the volunteers managed to plant two thousand trees.

The revegetation of Tiri was underway.

Mass Awareness

In May this year I visited the island once again with a party of Waiheke tree-planters. Unlike our first visit three years ago the weather was kind and after sedately planting our quota of 500 trees we were taken on a tour of the island by Ray Walter.

Ray, a bluff former seafarer, has been sole manager of the project on Tiri for the past two years.

His popular daily reports on Auckland's Radio Pacific (weather, fishing and latest news on the Tiri project) played no small part in gaining the mass awareness and support which has made the project such a success. Indeed any tourist entrepreneur would be envious of Ray's engagement book. Trips to the island are now limited to three per week and are booked solid for a year ahead by a remarkable variety of clubs, schools and service organisations.

A typical page in Ray's diary shows bookings for North Shore Forest and Bird (keen supporters from the start), the sixth and seventh form, Otamatea College, and an over-sixties group from the Hibiscus Coast Horticultural Society.

With an enthusiastic labour force and an excellent growth rate (believed to have been boosted by the higher than average summer rainfall for the projects first three years and the handful of urea/osmocote fertiliser mixture planted with each tree) the project is now two years ahead of schedule.

This year the 100,000th tree will be planted and it is estimated that only three more years of intensive planting is required before the project begins to wind down and the revegetation of the neighbouring rodent-free Motuora (79 ha) begins.

Even at this stage of its development the Tiritiri Matangi 'Open Sanctuary' boasts some remarkable features, such as the bird release programme.

Thriving kakariki

This began more or less accidentally in 1974 when a cargo of aviary-bred red-crowned parakeets, kakariki, were released on the island after weather conditions made a landing on their original destination of Cuvier Island impossible.

On Tiri the kakariki have thrived and large chattering flocks of the little green and red parrot move from valley to valley secure from the predators which have nearly wiped them out on the mainland.

In February 1984 22 North Island saddlebacks, tieke, including six known breeding pairs were released on Tiri. This ancient New Zealand wattle-bird, a cousin of the extinct huia, has itself fought back from the brink of extinction and now the Tiri population is estimated to be over sixty. Its distinctive call can now be heard echoing all over the island. With the aid of a tape-recorder the inquisitive bird can be "called" into view — its striking jet-black and orange plumage recall an old Aotearoa nearly lost. At this stage 30 different bird species nest on Tiri and a further 11 species visit. Other birds planned for relocation to the island are the little spotted kiwi, (from Kapiti Island), the brown teal, whitehead, stitchbird and perhaps even the takahe.

The translocations of these birds still await approval from government wildlife authorities but there is a strong feeling amongst Tiri project supporters that vital decisions on matters such as bird liberations which have been delayed for many months should be made soon if the project is to maintain its momentum.

The Open Sanctuary has also become a focus for scientific research and interesting information on the island's natural history is coming to light. Scientist Mary Roberts is carrying out research on internal parasites in the island's large population of native rat, kiore which is another creature virtually extinct on mainland New Zealand. Though the kiore has been in New Zealand for over

a thousand years, its internal parasites reveal organisms related to Filariasis (Elephantiasis) confirming its tropical oceanic origins.

Though much of the island was subjected to repeated burn-offs some valleys of remnant forest dominated by pohutukawa survived.

Some of these are enormous — one old giant was considered to be the largest living example of its genre. After a recent storm this old giant virtually collapsed under its own weight with a massive branch tearing itself off from the trunk. The tree was thought to be a couple of hundred years old but when Neil Mitchell cut open the detached branch to confirm this he was startled to detect from growth rings that the branch was at least 700 years old — giving the tree itself an estimated age of between 1000 to 1200 years.

Even more interestingly the growth rings revealed a sudden pause in the tree's growth pattern lasting about 100 years.

Fisherman Bay, where 200 penguins come to nest. *Photo: Gordon Ell.*

This 100-year period coincided with the years of bush clearances and burn-offs.

Had the venerable old giant gone into some form of shock as the forest surrounding it was destroyed in the infernos?.

The grand finale of any Tiri visit is the walk from the lighthouse/nursery complex to the wharf through what is known as "Wattle Track". This area of regenerating bush dominated by the Australian wattle supports an amazing amount of bird life during this tree's lengthy flowering period. If you have walked through the remaining great forests on the mainland and reflected upon their almost eerie silence the absolute din of chiming bellbirds in the wattles is a revelation. This area is important also for the island's tuis and saddlebacks.

Tiri's bellbirds are another interesting feature of this remarkable island. Extinct in most of northern New Zealand for much of this century, the birds survived only on some of the most isolated outer Gulf islands and for some strange reason on Tiritiri Matangi. That such a small patch of what can only be described as "scrub" can support so much birdlife is a stark reminder of the lethal damage done to this country's wildlife by introduced predators.

Nevertheless, the resounding success of the Tiritiri Matangi 'Open Sanctuary' has proved that the tide of destruction can be halted and indeed in some circumstances rolled back.

Mike Lee is past chairman of Forest and Bird's Waiheke Section.

THE DOWN UNDER DOLPHIN

by Stephen Dawson and Elisabeth Slooten

The world's whales, dolphins and porpoises, 76 species in all, comprise some of the most fascinating animals on the planet. Shaped by a need to move in a viscous environment they all are similarly streamlined, but there are awesome differences in scale. Female blue whales, usually a little larger than the males, reach over 90 feet long, and are without doubt the largest animals ever to have lived on Earth. At the other end of the scale is Hector's dolphin (*Cephalorhynchus hectori*). Adult Hector's dolphins, usually less than four and a half feet long, are the world's smallest oceanic dolphins.

Most dolphins are capable of travelling large distances, and are widely distributed. Bottlenose dolphins, the species endeared to us through the television series "Flipper", occur in every ocean. Hector's dolphin is one of the exceptions to this rule. The fascinating Cephalorhynchus genus comprises four species of small dolphins, each with a very limited distribution and endemic to a different temperate coastal region in the Southern Hemisphere. Hector's dolphin, named in honour of early New Zealand natural historian and surveyor Sir James Hector, is now one of the better known of this genus. We have been privileged to closely study this species, which is the only dolphin found solely within New Zealand waters.

A survey of their distribution and abundance was the first step in a four-year study of Hector's dolphin, and resulted in a total population estimate of 3000-4000 individuals. This is an extremely low figure for a marine mammal, and underscores the urgent need to discover more about the biology of this species. Several cetacean species listed as endangered number considerably more. Although sobering, the figure of 3000-4000 individuals has little meaning by itself. Some mammals, mice for example, could recover relatively easily from such a small population size, whereas elephants and others would face certain extinction. Having estimated the distribution and abundance of Hector's dolphins, a comprehensive study of their social organization, reproductive biology and feeding ecology is now crucial to assess whether the species is as threatened as the population estimate would suggest.

For the second phase of the study, we are working from a base on Banks Peninsula. Elisabeth is studying the behaviour and ecology of Hector's dolphins while Steve is concentrating on their sounds and acoustic behaviour. The integrated approach to animal behaviour, co-ordinating both the acoustic and visual signals may provide unique insights into the mysteries of the social organisation, reproductive biology and conservation requirements of this remarkable dolphin.

Behaviour

To enable behavioural study our first task was to work out the behavioural repertoire of Hector's dolphins. The list of observed behaviours grew steadily during the first summer and winter of the study, and has now reached the stage where only extremely rare behaviours could be still missing. The dolphins show a wide range of behaviours including a number of different postures, gentle and occasionally aggressive body contacts, bubble blowing, leaping, lobtailing, "spyhopping", surfing and playing with pieces of seaweed and other objects.

Aggression in Hector's dolphins is rare, and it appears that direct approaches, displacements and open-mouth displays usually avert more obvious aggression such as biting, forceful body contact, and hitting with the tail. Aggression is always one-way. We have yet to see an aggressive display that develops into a fight, where the recipient of a bite turns and retaliates against the original aggressor.

While lobtailing, a dolphin hits the tail flat onto the water surface while swimming either normal way up or upside down. This movement is vigorous, makes a lot of noise and splash, and is usually repeated several times. Commonly seen in many dolphin species, lobtailing is thought to indicate excitement and in some situations possibly annoyance, usually in a social context — we have never seen lobtailing from a lone dolphin. During upside-down lobtailing (the most common type) it is usually possible to sex the individual, and, interestingly, virtually all of the Hector's dolphins we have observed doing this have been males.

Unlike Dusky and Spinner dolphins, Hector's dolphins are not known for their spectacular acrobatics, but they do jump. When moving at speed, especially while bowriding or "racing" boats, they often make low, arching leaps, while at other times their jumps are usually more vertical. Almost invariably they re-enter the water head first, cleanly, with little splash. Only rarely do jumping Hector's dolphins fall back into the water on their sides, although when this type of jump occurs it is usually repeated many times, always falling back on the same side. These "noisy", repeated jumps may have social importance, but we get the impression that the dolphin may be "itching" itself. Most have tiny flattened whale lice scattered over their skin. These forage on the perpetually sloughing outer skin layer and although they appear to do no damage, probably cause some annoyance. Fastened on to the skin with tiny hooked claws, some of the lice may be dislodged by sudden, vigorous splashes.

Some types of jumps are clearly social, and often one individual leaping seems to trigger others to follow suit. A disproportionate number of leaps are of two dolphins at a time, usually one leaping just a fraction of a second later than the other. This suggests either that the same stimulus causes both dolphins to leap, or that the leaping dolphin stimulates others nearby to doing likewise. Either way, we have found leaping is more common during courtship and other close social situations — such as just after two groups have come together. In fact, the meeting of two or more groups of Hector's dolphins tends to cause a marked increase in activity in general.

Group Associations

In regions where they are relatively common, it is usual to find several groups of Hector's dolphins in close proximity, say within an area of half to one nautical mile in diameter. Individual groups usually consist of two to eight dolphins, but there may be 50 or even a hundred dolphins in the general area.

When a boat appears on the scene, or when one of the small groups starts to feed, often they will be joined by other groups. This is particularly obvious when the interactions of boats and dolphins are observed from a clifftop vantage point. The mingling of individuals from previously separate groups almost always results in a marked increase in activity. Individual dolphins closely approach one another more frequently, sometimes groups of three to five individuals mingle very closely for several minutes, frequently touching. Jumping, lobtailing, bubble-blowing, body contacts, and displacements all are more common when two or more groups have just come together, beyond what would be expected from the simple increase in number of dolphins present.

Such group mingling invites a whole range of intriguing questions regarding which is "the group". Are the smaller units stable, perhaps family groups; or is it the larger aggregations which are of most biological importance, with the composition of

Top: **A Hector's dolphin underwater in good visibility, a rare combination.** *Photo: Liz Slooten.* *Inset:* **Two Hector's dolphins leap inside Banks Peninsula's Akaroa Harbour.** *Photo: Steve Dawson.* *Bottom:* **One of the local favorites, nicknamed "Rooster" because of his unusually shaped dorsal fin. The camera's databack has imprinted the date on the picture — databacks are an invaluable aid in photo-ID studies.** *Photo: Steve Dawson.*

Hector's dolphin mother and her newborn calf. The youngster is about three weeks old. *Photo: Steve Dawson.*

the smaller groups changing from day to day? Do males and females form separate groups? Our observations are helping to answer these questions, and an ongoing photographic-identification programme is the key to it. Individuals can be recognised from photographs taken from the boat, making it possible to follow the movements and associations of individual dolphins. Observations on shorter-term group movements from clifftop observation sites help complete the picture. Most groups are of mixed sexes and sizes, and the only sexual segregation we see occurs only occasionally, in groups which are comprised mostly of mothers and young calves. As to the stability of groups, it appears that the small groups are quite flexible, but we need more data to be sure.

Reproduction

Newborn dolphins start to appear in the late spring month of November, and births occur over about three months into March. The newborns are 60-75cm long, about half the length of the mother, and are a darker grey than the adults. A series of light bands overlies the darker pigmentation which fades over the months following birth. Six months after birth the grey has faded to the adult hue, and the bands have disappeared. In the weeks following birth the calf is usually seen in very close proximity to its mother, almost as if they were glued together. As time passes the calf becomes more independent, and by six months is supplementing its mother's milk with solid food such as squid.

Sounds

Our work with the sounds of this animal is in its early days, but we now have many tapes awaiting detailed analysis. Unlike other dolphins they make very few sounds that are audible to us, and make none of the squeals and whistle noises so often heard from Bottlenose dolphins. Most of the sound we have analysed so far have been sequences of high frequency clicks, each click around 1/5000th of a second long, and extending far beyond the range of human hearing. Our ears have a range of 20Hz to 20,000Hz when we are young, and this response declines with increasing age. Most of the energy in Hector's dolphin clicks is concentrated around 128,000Hz.

Very sophisticated equipment is required to record these high frequencies. Sounds are picked up by a tiny high-frequency hydrophone (underwater microphone), boosted by a special amplifier and then fed into a tape recorder that gobbles tape at five feet per second. By comparison a standard cassette recorder uses tape at 1.875 inches per second. A commentary of the behaviour of the dolphins is recorded on another of the recorder's four channels.

The short clicks are used in echolocation, that is, the dolphins emit a click and listen for the returning echo. From the time delay of the echo, they can tell how far away the object is. This is the principle behind all sonar (Sound Navigation and Ranging) systems. Hector's dolphins apparently do not emit another click until the echo of the first is received, thus as a dolphin approaches an object the click rate increases as the dolphin gets closer. Dolphins can discriminate between similar objects using echolocation, although precisely how they do it is not yet understood. Just what other information a dolphin can gain from the echoes is poorly know, and their significance to communication between individuals is the stuff of further study.

The Future for Hector's dolphins

The threats to the continued survival of Hector's dolphins are several. Probably the greatest threat is from accidental entanglement in coastal gill nets. Made from nylon monofilament, the nets seem to be invisible to the dolphin's sonar. One navigational blunder and they are snagged, unable to reverse out. Caught with net around the snout, flippers and dorsal fins, they panic and drown. Gill netting around New Zealand is currently declining, but in the Banks Peninsula area kills between 10-15 percent of the local Hector's dolphin population each year. That "incidental" kill is probably worst around Banks Peninsula where dolphins and gill netting combine to disastrous effect.

There are natural predators also. Seven-Gill sharks are known predators, one caught recently had a whole dolphin head in its stomach, and five others caught the same day revealed dolphin remains also. Local fishermen claim to have found similar dolphin remains in blue sharks. Both these sharks are seasonally very abundant off parts of the New Zealand coast.

As everywhere there are sublethal factors that may influence the dolphins. Like many countries, New Zealand's coastal fish resources have been overfished and the stocks of some species appear to be severely depleted. While it is not possible to assess whether this depletion limits Hector's dolphin populations, it would be difficult to argue that the dolphins remain unaffected. Also unassessed as to their importance are the contaminants that are routinely found in samples of Hector's dolphin tissue. In general, heavy metal levels are low, but the levels of DDT and PCB contamination gives cause for concern.

Now is the time to act before Hector's dolphin crosses the unseen boundary between threatened and endangered. Conservation should perhaps be seen not as the preservation of endangered species (though that is obviously important) but as the prevention of species becoming endangered. Most conservation action taken on rare species seems analogous to parking an ambulance at the bottom of a cliff. What we are trying to do here is to fence off the cliff.

Acknowledgements

A study like this is not possible without financial support. We are very grateful for grants from the Royal Forest and Bird Protection Society, the New Zealand Lottery Board, Project Jonah (NZ), World Wide Fund for Nature (NZ), Cetacean Society International, Pacific Whale Foundation, IBM (NZ), Oceans Society (NZ), and New Zealand Underwater Association. Neptune Aquasuits, Hutchwilco, and Neill, Cropper and Co., sponsored their equipment for the study. Racal Electronics, Bruel and Kjaer, David Reid Electronics, Tait Electronics and Anthoni Computer Automations Consulting Ltd have generously lent equipment for our use.

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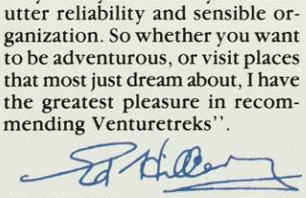

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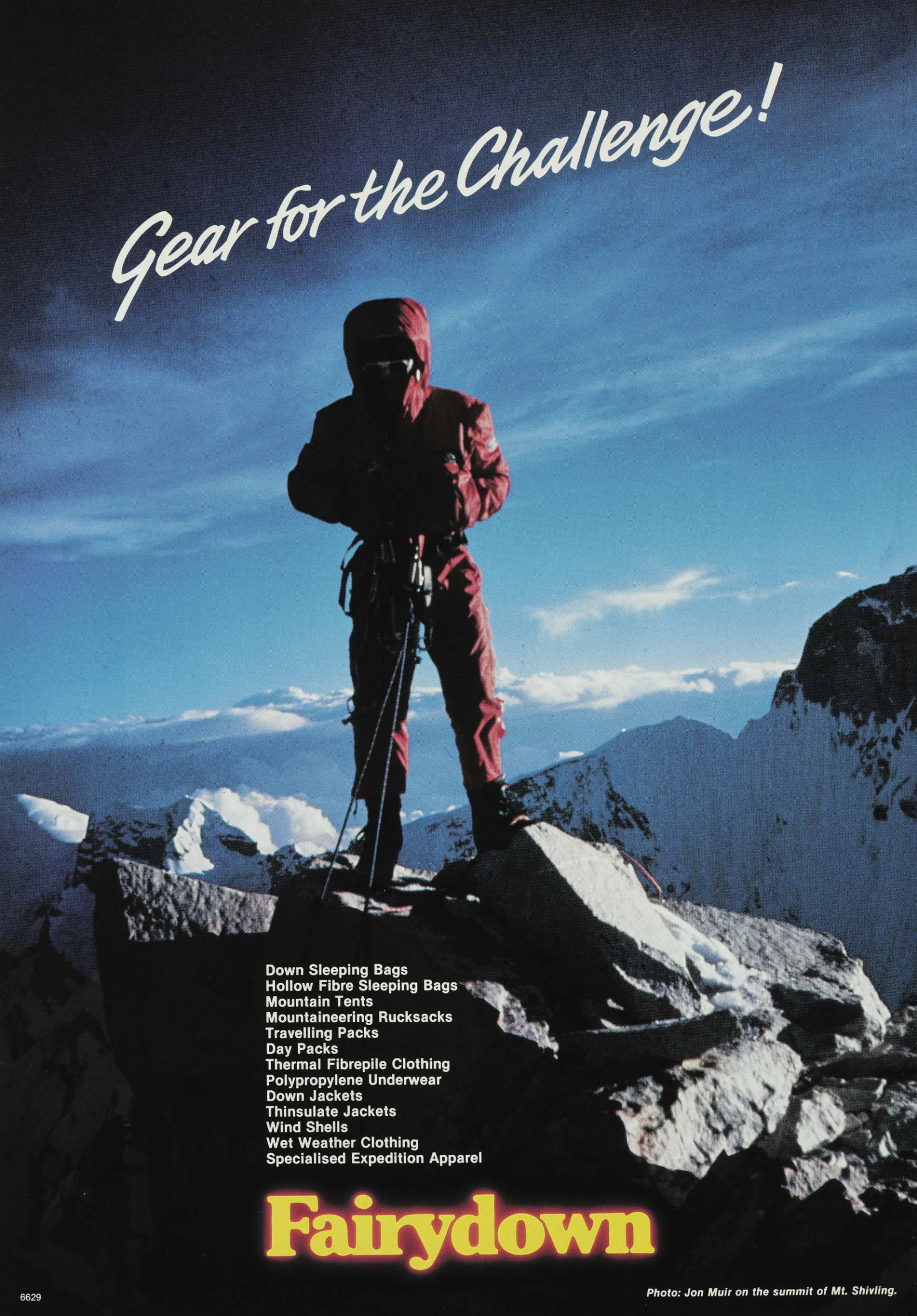
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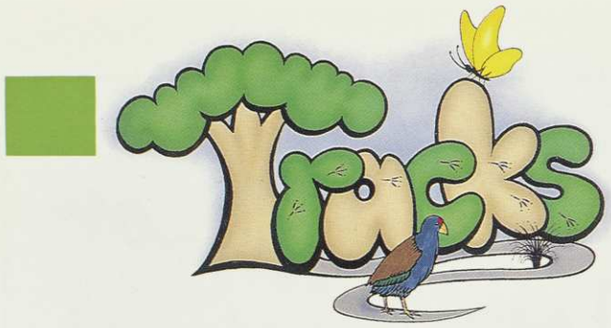


Congratulations to Thomas McBride of Timaru for winning our bat competition featured in the May journal. Several readers have questioned the article about the bat colony in a Geraldine church. We came across the story in a National Museum newsletter, but it seems it was incorrect. We apologise.

This month we take a look a how seeds travel. Plants use various methods to ensure their seeds don't just drop close by them. Wind, water and animals can help and so too can vehicles. Or plants may merely rely on their own devices, such as shooting out their seeds.

I hope you enjoy helping Kiwi sort out in the competition below how those seedy suitcases are going to travel.

Terry Fitzgibbon

The luscious looking seeds of kohuhu provide a feast for birds who carry them to new places where this hardy and attractive tree can grow.

Plants have many ways of moving from one place to another. The most frequent carrier is the wind. You will have seen the seeds of dandelions floating by with their little parachutes of silver hairs. Fluffy parachutes are also used for spreading the seeds of thistles, Maori jasmine and mountain daisies.

Instead of hairs, some plants, mostly trees, have developed seeds with wings. The wings of sycamore seeds work rather like the propellors of an aeroplane. The seed capsules spin round and round in the wind.

The feather-light heads of beach plants such as spinifex grass are sent helter-skelter in the wind, the seeds dropping as the plant's heads roll across the sand. On riverflats the native dock can also tumble long distances, scattering seeds as it goes.

Other seeds become airborne because they are so small. Tiny orchid seeds are so light they are simply blown about like dust. The dust-like spores of ferns also drift in the wind. Even the seeds of big manuka and rata trees are easily blown around.

Raindrops can help spread plants. The egg-like spores of birds-nest fungi are usually splashed away by raindrops. Rain-fed rivers can start the journeys of fallen seeds such as kowhai. However, they are usually caught up in the roots and branches along the banks of our lakes and rivers.

We generally think floods are all bad news. Sometimes though, a big flood can provide the chance for seeds to find the right spot to grow again.

Some plants are spread by animals. Seeds like hookgrass simply cling to an animal's coat or your socks as you pass by. Later the seeds are brushed off in the undergrowth. You have probably experienced the problem of removing "stowaways" like bidi-bids which have hooked into your clothing. There are 32 species of hookgrass and 15 species of piripiri (bidi-bid) in New Zealand. Before the arrival of humans and their animals, these plants must have been spread by flightless birds such as moas, kiwis and wekas.

Ever since New Zealand was first inhabited people have also helped seeds travel. The Maori planted karaka near their pa for food and to attract pigeons. We now plant an enormous variety of seeds in all sorts of places either for the beauty or usefulness of the plant which grows from them.

The seeds of plants such as rushes have a sticky coating. This causes them to become attached to the feet of cattle, car tyres and especially bird feathers. Ducks are probably responsible for the rapid and widespread introduction of exotic rushes to swamps throughout New Zealand.

Other birds are great seed carriers too. Pigeons and tuis are attracted to the brightly coloured fleshy berries of miro, rimu and kahikatea. The juicy outer part of the berry is digested by the bird. The hard central seed is either spat out by the bird or is passed right through it. Bird droppings anchor the seeds where they fall. The droppings also provide the right supply of water and manure for the seeds to grow in.

Some plants use a kind of explosion to spread their seeds. Many of you would have heard the snap, crackle n' pop of broom pods on a hot summer's day. Inside the pods are thin cells which contain the seeds. These cells dry and expand more quickly than the outer thick skin of the pods. The pods eventually spring open to scatter the seed in all directions. Other plants such as our three native violets use the same method to disperse their seeds.

QUESTIONS FOR DISCUSSION....

1. Name some other ways that plants can travel.

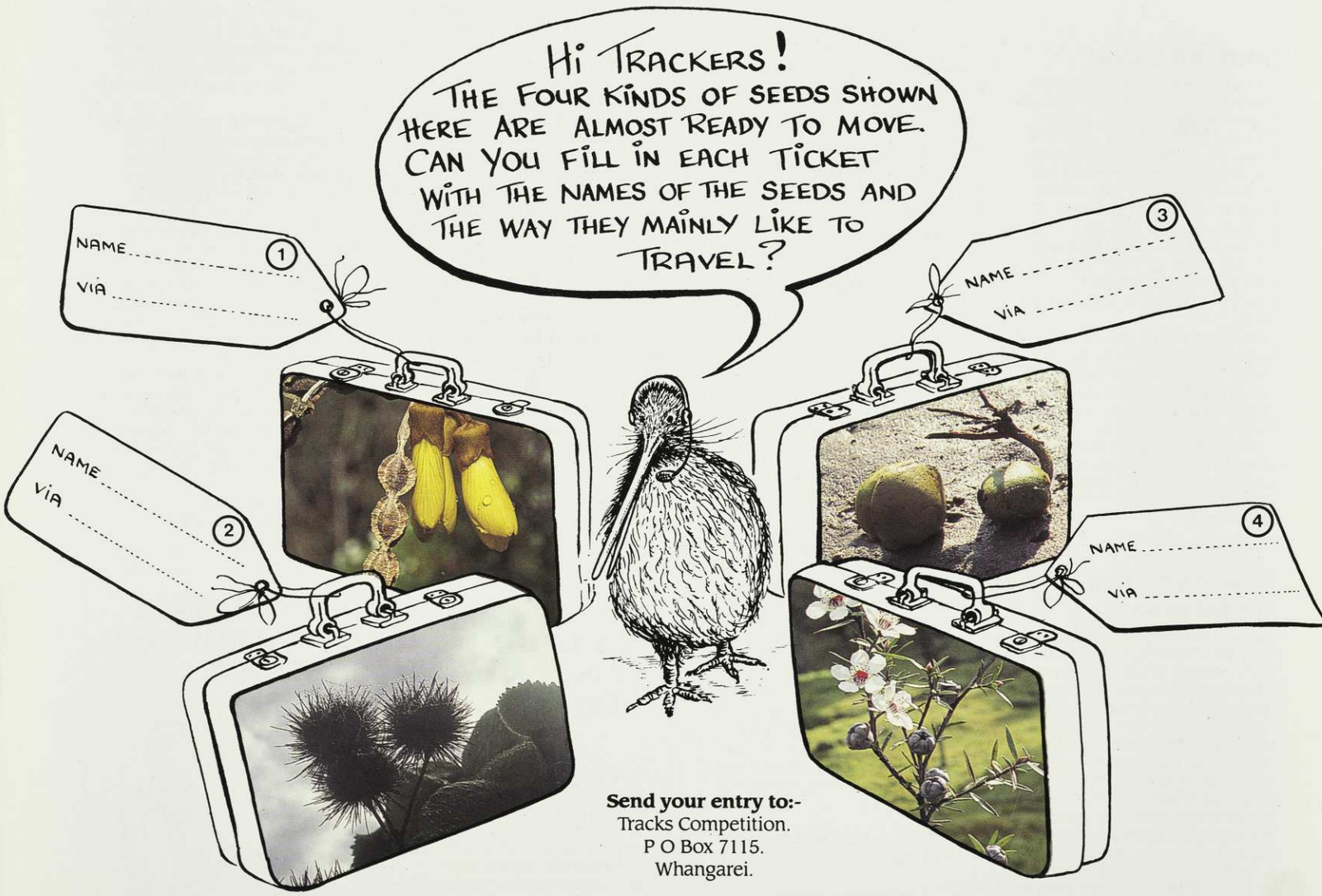
2. Name other plants which use the methods described above for spreading their seeds.

3. What's the name of the big, tough, Pacific water-borne seed which contains tasty white flesh often used in cooking?.

THINGS YOU CAN DO....

Each time you go for a forest walk keep a lookout for seed-bearing plants. Record the time of year and how they spread. If it is damp underfoot, try scraping the dirt from your shoes into a mixture of sand and peat-moss. Place in a shallow tray and cover with plastic or glass. You will be surprised how many plants grow from this. See how many you can name.

SEED TRAVEL COMPETITION



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Write for futher details to Kevin Smith, P O Box 57, Harihari, South Westland. Ph: Harihari 33-090.

Summer Camp

The Lower Hutt branch summer camp out is to be held at the Boys Brigade campsite, Wainuiomata, between January 5–14, 1988. For $5 per head per night members and their families can camp out on this 240-ha site, with ample space for talks and meetings. Local branches will host an interesting programme of day trips and evening talks. Members will be able to select the period over which they intend to stay at the camp.

We hope family groups from all over the country will be able to share some of the summer activities in the Wellington region — there will be room for caravans, camper vans and tents.

Those interested in attending should send a stamped, self-addressed envelope to the Secretary, Lower Hutt Branch PO Box 31097, Lower Hutt.

Women In The Wilderness

Pip Lynch is involved with a group who are collecting information about women in New Zealand's wilderness areas. Pip and her colleagues wish to write about New Zealand women who have spent a large part of their lives working in, living in, or studying our remote back country areas, and they wish to include Maori, Pakeha, young, not-so-young, past and present personalities. Their list of potential subjects so far includes geologists, botanists, marine scientists, horse trekkers, travellers, hunters, farmers, miners, sailors, photographers, mountaineers and swimmers!

Please send ideas and information about women you know of who should be included to:-

Pip Lynch,
297 Pinehill Road,
Dunedin.

Golden Bay Summer Gathering.

Based at Collingwood Area School, offering marae-style accommodation or camping in school grounds (limited commercial accommodation also available). 5-11 January. Cost per person $280 covers accommodation, food, transport (but not from Nelson).

Contact: Julia McLintock, (054) 77-214, 18 Cherry Ave, Stoke, Nelson.

Obituary : Sir Charles Fleming

Sir Charles died suddenly, aged 71, on 11 September 1987, and conservation, international sciences, the Society and legions of friends mourn his absence.

One of that small company of internationally eminent New Zealanders, Sir Charles was always a generous friend and supporter of the Society, just as he gave his support to so many individuals, groups and causes. In his particular fields of palaeontology and ornithology Sir Charles pioneered in New Zealand and his contributions to biogeography, in which he brought together many of his scientific interests, were most original and provocative. Others will write of his major scientific work and of his promotion of the Royal Society of New Zealand of which he was President from 1962 to 1966. His KBE, awarded in 1977 for his contribution to science in New Zealand, was the most public honour but throughout his career he attracted high scientific honours from the world centres of learning culminating in fellowship of the Royal Society (London), that most prestigious of awards.

Many in the Society will remember Sir Charles for his enthusiasm for and knowledge of ornithology, an interest originally stimulated by Dick Sibson at Kings College. Bird watching trips with Sir Charles were a delight. Energy, precise information, humour, and that great curiosity which marks all naturalists were abundant. And the evening sessions accompanied by a medicinal whisky were a feast. Anecdotes from around the world and extraordinary catholic tastes in science and familiarity with its practitioners made evenings in the field, most often on islands, one of this life's most civilised experiences.

In all his work Sir Charles was unaffected by the position or power of others. The idea, the experience of the moment was the thing and it didn't matter who you were, you were accorded the honour of his interest, help and support. So many of us have been thus rewarded and helped in our careers and always without any fuss.

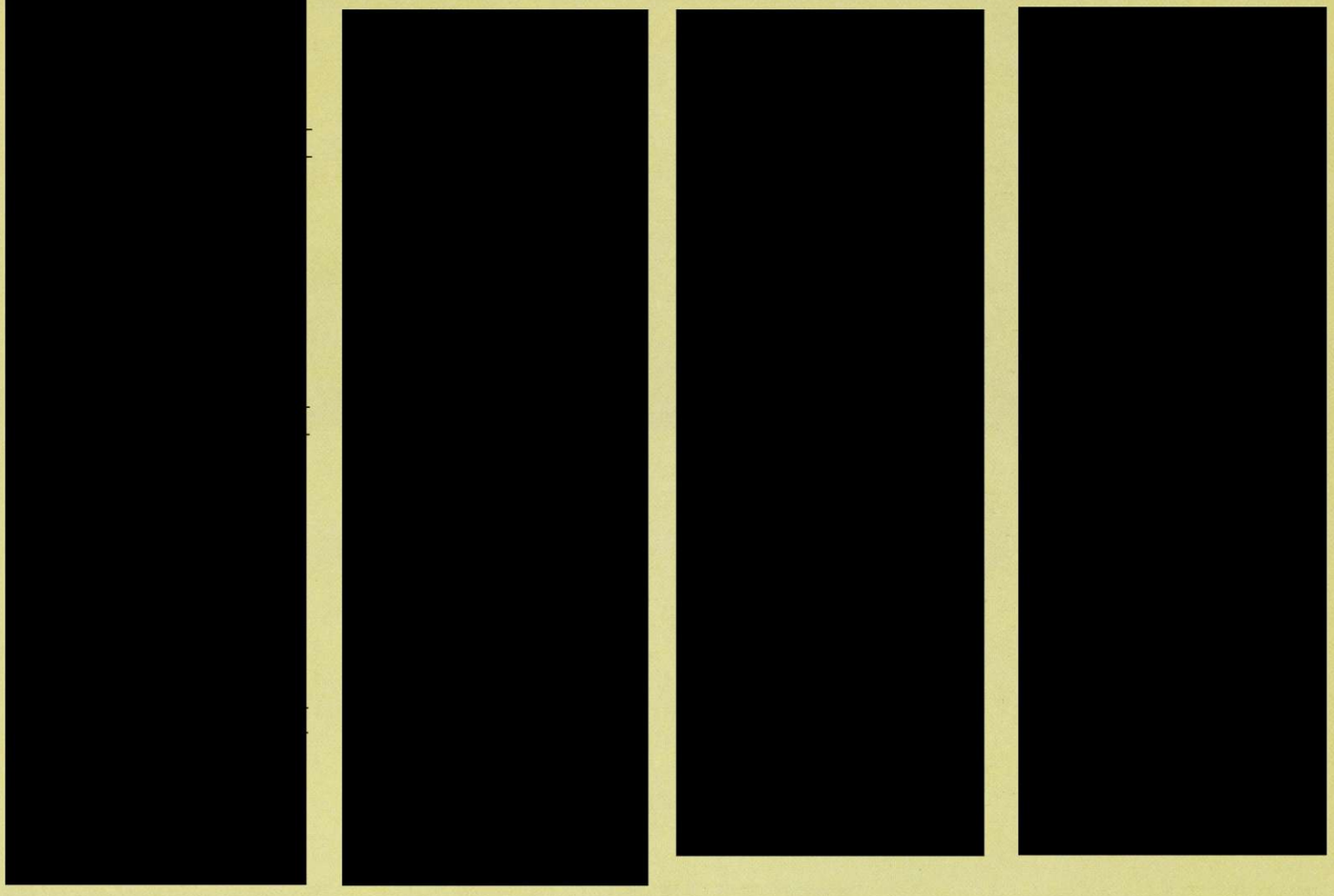
Then there was Sir Charles' legendary correspondence: with so many people, in so many places, on so many topics, and so energetically. We shall all look forward to the publication of a selection of that correspondence, a rich vein of discovery.

Sir Charles' support for the Society and for conservation during those turbulent days from 1978 through to the early 1980s was one of the pivots about which the Society turned. Speaking on those harsh public platforms around the country about Pureora, Whirinaki and other issues of the time, Sir Charles made a major contribution. As a member of the Society's Executive during the period under the presidency of Tony Ellis when so much redirection occurred Sir Charles gave of his time and energy in what he knew to be a good cause.

His support for environmental reorganisation was equally unstinting. At the environmental forum in 1985 his impassioned concluding speech brought the old legislative chamber in Parliament to its feet. "New Zealanders have no confidence in the record or promises of the developer departments. Please let us have a nature conservancy holding those lands we rank as precious for all New Zealanders. If you do, this green dot can die happy."

I believe that Sir Charles died happy. Our sympathy goes out to his wife Peg, and his daughters and their families. New Zealand has lost a great man and so many of us have lost a dear friend.

Dr Alan Edmonds,
former Society President.



SOCIETY'S LODGES AND HOUSES

Bushy Park Lodge

Kai Iwi, 24km north of Wanganui on sealed road.

Historic homestead, fine grounds and view. 89 ha of virgin bush with tracks and trees identified.

Accommodation: for 15 in six bedrooms, single and double beds, electric blankets, heater and vanity units. Sleeps 24 with mattresses. Bedding, linen and towels supplied. Showers, drying cupboard, kitchen with electric stoves, refrigerator, deep freeze, cutlery and crockery. Bring own rations. Milk may be ordered.

Fees: (House Guests) Members $20 single, $25 double, Non-members $25 single, $30 double. Children 6-12 $8. (Day Visitors) All adults $2, children 5-15 $1, Family $3 or $5. Closed to day visitors but not House Guests Mon & Tues except holiday periods.

Bookings and Information Leaflet: Custodian, Bushy Park Lodge, Kai Iwi, RD8 Wanganui. Telephone Kai Iwi 879. STD (064) 29-879.

Okarito Beach NFAC Cottage

Sleeps 4–6 in basic but comfortable facilities, water, wood stove, 2 rooms. Sited in historic township, coastal and bush walks, Okarito lagoon, Westland National Park and glaciers. $4 per person per night. Bookings: Bill Minehan, Private Bag, Hokitika, Ph 734 Whataroa.

William Hartree Memorial Lodge, Hawke's Bay

The lodge is situated 48km from Napier on the Puketitiri Road and 8km past Patoka, amid the 14ha William Hartree Memorial Scenic Reserve.

The Lodge accommodates 10 people. Extra mattresses and pillows are available to sleep up to 20. The lodge has a full equipped kitchen, including refrigerator.

Visitors supply their own linen and cutlery. The nearest store is 8km away. No animals are permitted.

For rates send a stamped addressed envelope to the Booking Officer, June Norther, 212 Kennedy Road, Napier, Telephone Napier 438 193.

Ruapehu Lodge, Whakapapa Village, Tongariro National Park

Set in a privileged position within the National Park this lodge is available for MEMBERS ONLY, and is an ideal location for tramping, skiing, botanising and exploring.

The comfortable lodge holds 32 people in four bunk rooms, and provides all facilities. You need bring only food and bedding. Private parties are restricted to 10 members.

Bookings and enquiries should be made from P O Box 631, Wellington (04) 728-154. The lodge is very popular, and bookings may be made six months in advance, if secured with a 20% deposit. The rates are reasonable, and fluctuate seasonally.

Full payment is required four weeks prior to occupation, after which time there is no refund for cancellation.

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 ten days before occupancy. No member may occupy the lodge without first booking through Head Office, Wellington.

Tautuku Lodge, Coastal Otago

Tautuku Highway 92, South East Otago. Situated on the Royal Forest and Bird Protection Society's 550ha Lenz Reserve 32km south of Owaka. In a bush setting and with many lovely beaches nearby providing a wonderful base for exploring the Catlins. 3 well appointed buildings, the Lodge, the Coutts cabin and an A frame sleep 10, 5 and 2 respectively.

Information and rates on application to the caretaker: Miss M. Roy, Papatowai, Owaka, R.D.2. Phone (0299) 58–024. Stamped addressed envelope with inquiries please.

Turner Cottage, Stewart Island

Turner Cottage, is on Stewart Island and is a two-roomed dwelling furnished for three people.

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 seaside home situated in Garden Road, Piha, 38km from central Auckland. Eight minutes' walk from the Piha store, with right-of-way access to the surfbeach and close to bush reserves and walking tracks in the Waitakere Ranges.

The lodge is fully equipped and sleeps six to eight persons. It has a large lounge with open fire, dining area, and modern kitchen.

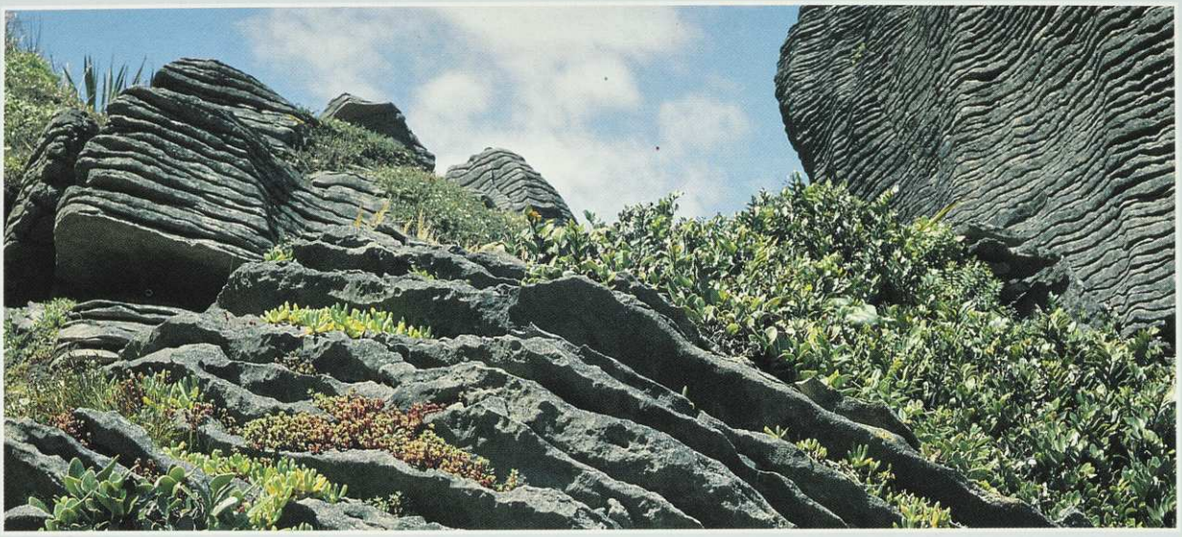
You will need food supplies, bed line, towels, and tea-towels.

Different rates apply for winter and summer, for rates send a stamped, addressed envelope to the Booking Officer, Mrs B. Marshall, 160 Valley Road, Henderson, Auckland. Telephone 836-5859.

Waiheke Island Cottage, Onetangi, Waiheke Island

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

Different rates apply for winter and summer. For rates send an addressed envelope to the Booking Officer, Mrs R. Foley, 23 Stoddard Street, Mt Roskill, Auckland. Telephone Auckland 696-769 (evenings).



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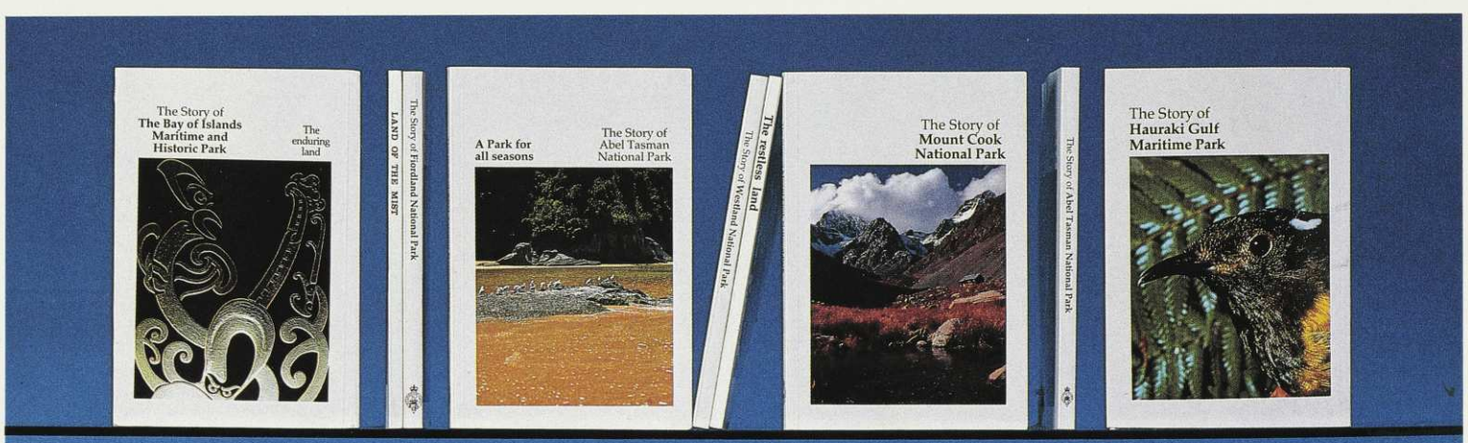

If you can't decide where to spend your holidays, try browsing through the National Parks handbooks.

They'll lure you into an extraordinary natural world that's *Yours To Enjoy*

These and many other publications are available from Department of Conservation Visitor Centres or 'Publications Sales', P.O. Box 10.420, Wellington.

CONSERVATION

Subject and Author Index

THIS BIRD NEEDS PROTECTION

Photo by courtesy of Conservation Department

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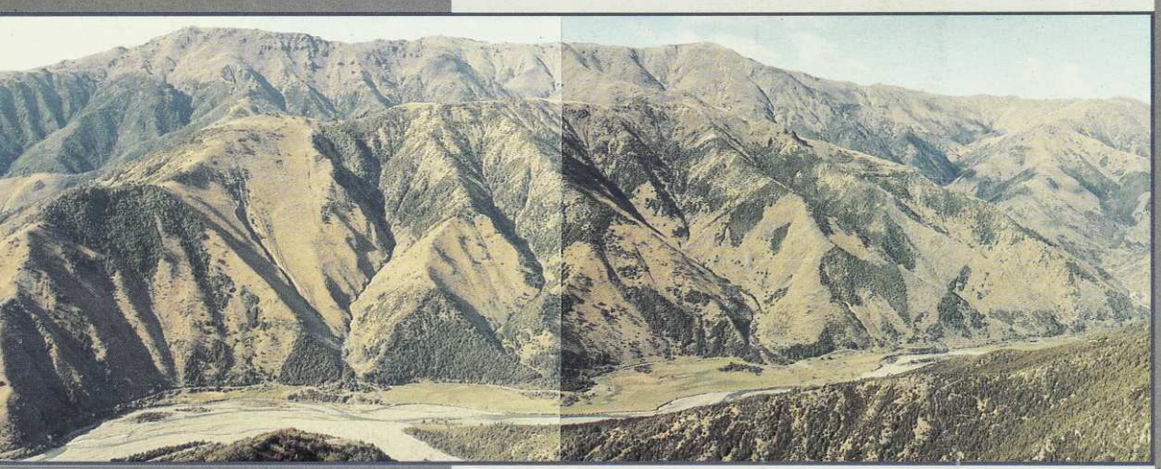
NP 204

The 20,850-ha Crown Land farm block of Glazebrook has a similar history to that of Molesworth Station, also in Inland Marlborough. Both were taken over by the Crown earlier this century to rescue them from the ravages of poor management. The important difference between the two is that Molesworth is definitely to remain in Crown ownership, while more than 4000 ha of Glazebrook – some of which is in the photo – could be owned by Landcorp. Farming on such eroded land is against Government policy; the Society believes it should remain in Crown ownership.



Near Napier parts of the upper Ahuriri Estuary and adjacent saltmarshes have also been allocated to Landcorp, despite their obvious importance to conservation. These coastal wetlands should remain in Crown ownership under Conservation Department stewardship.