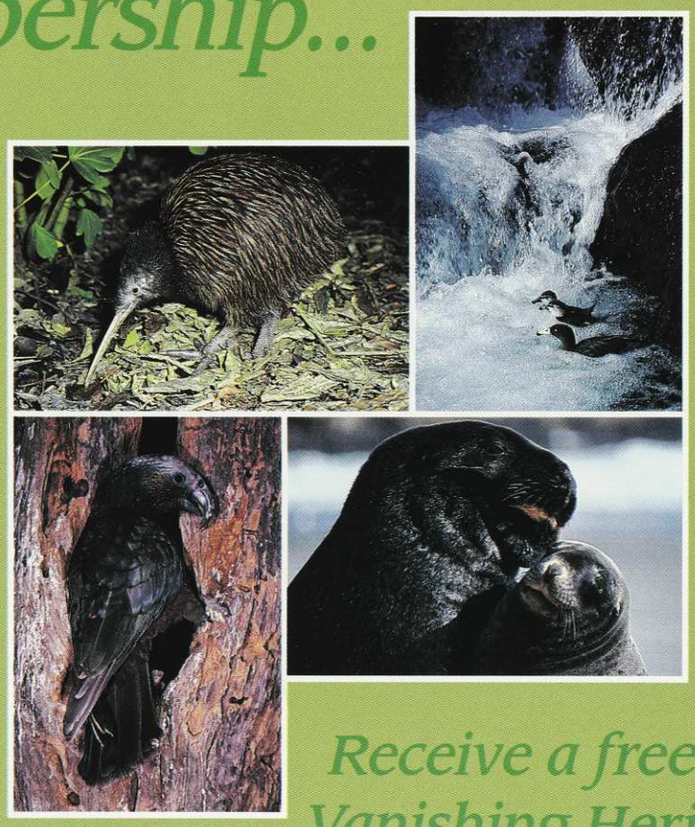
Volume 21 Number 3
August 1990

Forest & Bird

Give a Forest and Bird Gift Membership...



Receive a free set of our Vanishing Heritage poster series.

Gift forms are on the card application forms at the back of the magazine.

A Forest and Bird membership is the perfect gift for friends and relatives. Write to us now and we will include a free set of this beautiful poster series, featuring blue duck, Hooker's sealion, brown kiwi and kaka, with every gift membership you give.

And please continue to spread the word about Forest and Bird. Members are our strength. More members will help with our work to save the environment.

Present Membership: 58,000

1990 Target: 60,000

Cover: *Old Blue, the Chatham Island black robin who saved her species. In recognition of her achievement, Forest and Bird has instituted annual Old Blue awards – framed prints of the most famous robin of all – which are presented to deserving conservationists. On page 14 we publish the full account of the robin rescue story.* Photo: Don Merton

Issue Number 257
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Focus on Birds

This issue is something of a celebration of our birds; from the delights of bird watching by an enthusiast and scientist, to a recounting of some classic rare bird rescues. In this way it reflects both that enthusiasm for the outdoors and the commitment to its conservation which drives our Society.

The focus on birds is fitting this sesquicentennial year, for New Zealand is to host two major conferences of international ornithology late in 1990. The 20th International Ornithological Conference already has 1,300 people enrolled. The International Council for Bird Preservation (ICBP) will also hold its conference here at the same time. Ornithologists and bird watchers will be touring New Zealand and its sub-Antarctic islands in a programme which will increase awareness of our situation in organisations which have previously been predominately European in their outlook.

The ICBP conference is of particular interest to Forest and Bird for, officially, we constitute its New Zealand branch. The IOC conference will involve members who also belong to the Ornithological Society of New Zealand, and many have volunteered to lead field trips or help in the organisation of functions and the reception of visitors.

OSNZ represents the scientific side of ornithology, bringing together scholars and amateurs in a co-ordinated programme to find out more about our birdlife. Forest and Bird provides a further perspective: an active advocacy for wildlife and habitat which lies beyond the concerns of objective science.

Nevertheless, Forest and Bird has demonstrated a commitment to the scientific and conservation programmes for birds. Our volunteers assist with expeditions, our grants assist scientific research and our funds have helped with the purchase of key habitat, including Maud and Mangere Islands. In recent years the Society has funded bird conservation work in the South Pacific and has helped identify national parks and reserves in Fiji, including a reserve for the rare Vanua Levu silktail.

While birds feature in our Society title they do so, however, as a symbol of our much wider concern for all native wildlife – just as the name forest in our title is only a symbol for all habitats and scenery protection.

Those symbolic concerns for Forest and Bird are still sometimes misunderstood as our sole interests – "the twigs and tweets" people. Increasingly though our real job of conservation advocacy is recognised by business and government, where our lobbies on behalf of the environment have become part of the decision-making process.

Forest and Bird, nowadays, often seems a serious organisation strictly dedicated to conservation "battles". Yet it can also be a vehicle for personal discovery and enjoyment of the outdoors and nature. It was probably a bird (or animal) or a forest (or place) which first inspired each member to join the Society in support of conservation. So, in a way, this "birds issue" of the journal is a celebration of our original interests.

Gordon Ell
President

C·O·N·T·E·N·T·S

Articles

Departments

Forest & Bird is published quarterly by the Royal Forest & Bird Protection Society of New Zealand Inc.

Society's aims: to protect New Zealand's native species, natural ecosystems and landscapes and promote an appreciation of these.

The Royal Forest & Bird Protection Society is a member of the International Union for the Protection of Nature and Natural Resources (IUCN) and the International Council for Bird Preservation (ICBP).

ISSN 0015-7384

Head Office: Seventh Floor, Central House, 26 Brandon Street, Wellington.

Postal address: P.O. Box 631, Wellington

Editor: Gerard Hutching.

Registered at P.O. Headquarters Wellington as a magazine.

Design & Production: Creative Services Ltd
Typesetting: Computype Ltd
Photoprocess: Colourcraft Reprographics Ltd
Printing: Bascands; Christchurch

Advertising Manager: Jill Wood, Print Advertising, PO Box 3016, Wellington. (04) 733-010.

The Vanua Levu Silktail – Future in the Balance

AN URGENT RESCUE PACKAGE has been put together by Forest and Bird for one of the South Pacific's rarest birds in an attempt to stop yet another extinction.

Only an estimated 50 pair of Fiji's Vanua Levu silktail, an ancient member of the small monarchine flycatcher family, were thought to still exist when a survey team arrived in Fiji last December.

Discovered by science in 1873, *Lamprolia victoriae* is regarded as an isolated relic of birdlife in a category similar to the wrens, wattlebirds and thrushes of New Zealand. As yet little studied, scientists have already concluded that its loss would be a tragedy of international significance. The bird is restricted to wet tropical rainforests on Vanua Levu Island's Tunuloa Peninsula. When the team began work they knew that silktail existed only in the remnant unlogged forests – and for the past 10 years the loggers had been moving in.

The team's mission was to find out how close to extinction the flycatcher was and what could be done to save it. Survey team leader and DoC conservation officer Rick Thorpe said the bird's greatest threat was habitat destruction as the 60 percent Australian-owned Fiji Forests Industry (FFI) continues to log out native hardwoods like kauri, yaka and kaudamu for veneer processing and export.

"All the time we were surveying the peninsula the logging company was right behind us working its way through the hardwoods," says Rick.

The birds were last surveyed in 1980; since then the area had been extensively cut. The team expected to find few birds left. In this, at least, they were pleasantly surprised. During the search the team found more than 235 silktail, mostly in pairs and mostly in the company of other feeding bush birds.

Survey party members Peter Montgomery, Nigel Miller, Mika Savukaikadavu and Rick Thorpe started out trying to find as many birds as they could, but it soon became obvious that there were many more birds than expected.

"After the first week we changed the survey to a density and distribution estimate. We found out how far down the peninsula the birds were found and what forest types they preferred."

The densest populations were always found in the remnant virgin forests – those that the loggers had not yet reached. Here bird numbers were still large enough to maintain a viable population – if the logging could be stopped.

The survey was undertaken at the invitation of Fiji's Native Lands Trust Board, which wanted advice on the best way to protect what silktail remained. The survey team's recommendation, supported by Forest and Bird, was the creation of a 500 ha special purpose fauna reserve for the silktail's long-term protection.

This proposal has since been put to the trust board. Meanwhile forest company FFI has agreed to a logging moratorium while it is considered.

The Vanua Levu silktail: is time on its side? Photo: Michael Dennison

"We proposed a reserve area which contains the largest area of virgin forest left on the peninsula because the birds have a preference for untouched tropical rainforest," says Rick. "Some parts of the proposed reserve have been selectively logged, but the silktail can still use these areas provided they've not been too badly damaged.

"It was difficult to estimate the habitat needs of this almost unknown bird. We didn't know what its seasonal needs were or its mortality and recruitment rates. Because of this we designed the reserve based on our knowledge of small insectiverous birds, something we believe will be large enough for all their cyclical needs.

"Something else we don't yet know is their relationship with other birds and animals. We discovered that the silktail spent a lot of their time grouped with other insectivorous birds: we often found them by following other birds' calls. Normally we found silktail nearby, feeding and moving through the foliage.

"We still don't know how big a tract of forest these other birds need but silktail appear to have a home range. They're not territorial. We saw a number of silktail together, up to five in one place, or crossing through each other's range," Rick says.

In recommending the reserve the team also had to consider the competitive pressures conservation faced in developing countries.

"Conservation can be very difficult in a third world country because there has to be an allowance for balanced use. It's difficult when there's great pressure on the land. We realised its importance for hunting and food gathering for the mataqali (local people). Our proposal incorporates the needs of the people and the land.

"Very little of the proposed reserve would be suitable for cultivation, the mataqali would retain hunting access but logging could not be permitted."

The survey team spent seven weeks walking through the forests and studying the silktail's habits. During that time they also took the opportunity to show the locals a "passive alternative" to the one-off logging option.

"We tried to show them that simply guiding tourists through their forests could make them far more money than logging. We paid our guide $20 a day to impress them with the fact that there's money in tourism.

"Once, in the deep forest when we were really thirsty, he cut down a vine and poured out about a cup and a half of pure water for us to drink. When we were out surveying, if we stopped for a break, our guide climbed a tree and cut us some green drinking coconuts and pineapples. As we walked along he caught enough freshwater prawns for our dinner.

"They're so totally in tune with their forests, and they take their skills for granted."

Close to the resort area of Savu Savu, a protected forest area on Vanua Levu has the potential to provide international visitors with a back-to-nature experience they could find nowhere else in the world, Rick says.

Few logging operations are yet active in the proposed reserve area. However, their impact means not only the destruction of precious and diminishing flycatcher habitat. Logging access roads cut deep into the rainforest also allow access to predators like rats and mongooses.

Normally these animals confine their hunting to the forest margins, but new forest roads allow them into areas normally free of such predators.

"In the logged forests significant numbers of cats and mongooses were seen by the survey team. This compares with virgin forest where no predators, or sign of them, was seen. The exception to this was where mongooses were seen to penetrate the virgin forest up to 200 metres from a logging road," said Rick.

Despite these threats and impacts, the survey's results show that enough silktail still survive to maintain a viable population – but only if protective action is taken now.

Russell Joyce

The Birders are Coming!

AT THE END OF THIS YEAR there will be a mass migration of ornithologists, bird watchers and bird conservationists from around the world to New Zealand. The attraction is the World of Birds, three weeks of sheer heaven for bird enthusiasts.

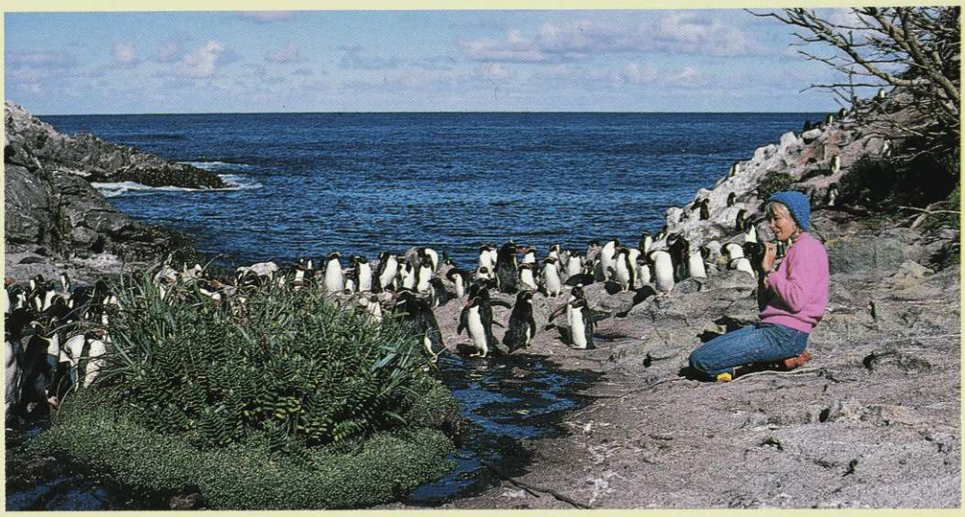
First in the feathery line-up is the 20th world conference of the International Council for Bird Preservation (ICBP), which will be held in Hamilton from 19-27 November. ICBP is the oldest international conservation organisation in the world, and was founded in 1922 with the aim of protecting wild birds and their habitats. It is a federation of 330 member organisations, including Forest and Bird, and it has representatives in 100 countries. Its headquarters are at Cambridge, in the UK, where it employs about 20 permanent staff. The Director of ICBP, Christoph Imboden, has a strong interest and fondness for New Zealand, having worked with DSIR Ecology Division and the Wildlife Service in the 1970s, before taking up his position with ICBP.

ICBP acts as a watchdog and guardian of the world's threatened bird species, and its activities include supporting about 100 conservation projects throughout the world, and providing information and advice on bird conservation to governments and decision-makers. ICBP regularly produces books and reports on global conservation issues, including the Bird Red Data Books. It also puts out a quarterly newsletter called *World Birdwatch*, which provides an international perspective on bird conservation issues in different countries.

The ICBP conference will be a mixture of workshops for various ICBP specialist groups, business meetings and symposia on issues such as conservation problems in the South Pacific, birds and tourism, conservation of biological diversity and management methods for threatened birds. Over 250 people from 50 countries have already registered for the ICBP conference.

Next in the line-up is the inaugural Pacific Festival of International Nature Films, to be held in Dunedin from 27 November to 1 December. The Festival will honour the work of natural history film makers from around the globe and will be a tribute to the splendours of the natural environment.

The next stopover on the migration route is Christchurch, where over 1,100 people from 52 countries will gather for the 20th International Ornithological Congress (IOC), from 2-9 December. The first ever IOC was held in Vienna in 1884, and since then the Congresses have provided an international forum for people involved in bird research. Each Congress is held in a different country, and is organised by a local Congress committee. Continuity between Congresses is provided by the "Committee of 100" – this committee of about 100 people is the International Ornithological Committee, and it has a permanent executive which includes Ben Bell, the Secretary-General of New Zealand's Congress.



One of the highlights of the International Ornithological Congress will be a special tour of subantarctic islands. Photo: Chris Robertson

The Ornithological Society of New Zealand and the Royal Society of New Zealand began planning for the possibility of holding an IOC in New Zealand in the mid-1980s. New Zealand won its bid at Ottawa in 1986, despite strong competition from other contenders. Since then the organisers have been hard at work planning the Congress and a plethora of associated tours, and the scientific programme has been drawn up by an international scientific committee.

The scientific programme includes 48 symposia from 240 invited speakers, contributed papers, round-table discussions and poster presentations, as well as opportunities for bird watching in and around Christchurch. There will also be an opportunity to look in at Birdpex '90, an international stamp exhibition with birds as the theme, which will be running in Christchurch at the same time.

Timed to coincide with the IOC will be the reopening of Canterbury Museum's bird hall. The bird hall is being revamped as part of extensive renovations to the museum.

To cap it all off, and to provide our overseas visitors with a chance to see New Zealand, and of course our birds, there is also a range of tours available which will give people a chance to go bird spotting from Kaitaia to Campbell Island. The highlight of the nature tours programme is a 13-day subantarctic cruise to our remote southern islands – and there is still an opportunity for Forest and Bird members to join in on this trip of a lifetime.

The World of Birds – A Southern Perspective is a uniquely kiwi approach to bird conservation and science. The close link between the ICBP conference and the IOC is a world first, and is a reflection of the strong ties between conservation and research in this country.

If you would like to find out more about the World of Birds, please contact Dr Ben Bell, World of Birds, School of Biological Sciences, Victoria University, P O Box 600, Wellington.

Alison Ballance

Whale Listening

YOU'VE HEARD of whale watching around Kaikoura; soon researchers will start to listen in on sperm whales in order to gain new insights into their behaviour, which in turn will assist their conservation.

Steve Dawson and Liz Slooten, well known for their work with Hector's dolphin, plan to track sperm whales acoustically with the use of a directional hydrophone. Kaikoura is an ideal location for the work, being one of the few sites worldwide where mature male sperm whales can be studied near the shore.

Unlike other whales, sperm whales click almost continuously while underwater, the clicks being audible up to 10 km away. Thus the whales can be studied underwater. The clicks provide a number of clues about the whales: size, gender and behaviour can be worked out from analyses of click "type" and click rate.

The novel research method should provide answers to such questions as: how many whales use Kaikoura waters, how are they distributed, how long do they stay in the area, how cohesive are their groups?

From a conservation point of view, the information will be useful in arguments over whale hunting. The International Whaling Commission moratorium on commercial whaling expires this year and member nations will again set catch limits. Because sperm whales found in New Zealand waters migrate from the Antarctic to tropical waters, any resumption of whaling outside New Zealand could affect local populations – and possibly the whale watching industry.

(Information from Cetos Research newsletter)

Good News

IT'S NOT ALL DOOM AND GLOOM out there, as the latest update from the Department of Conservation's Threatened Species Unit proves. Some recent advances include:
Mahoenui giant weta: Weta have been released into nearby DoC reserves from the main gorse-ridden weta area. Some of these weta have been seen 12 months later. Firebreaks have been created throughout the main weta area. Captive breeding has been successful (see *Forest & Bird* February 1990).
Black stilt: The total number of black stilts in the Mackenzie Basin last season was 66 black and 16 near-black hybrids, with just 8 pairs of pure black stilts. 63 eggs were artificially incubated at the new Twizel captive breeding facility to lessen the risk of egg predation. Most eggs were then returned to birds in the wild, although 13 stilts were hand reared or reared by captive pairs.
Takahe: The takahe captive rearing programme goes from strength to strength. Last summer 36 chicks were raised in the wild in the Murchisons and 17 were captive reared at Burwood Bush near Lake Te Anau. Birds raised at Burwood Bush are being released in the Glaisnock area of the Stuart Mountains and two island populations have been established on Maud and Mana Islands. The significant fact is that captive-reared birds released in the Stuart Mountains are attempting to breed. Total numbers are 260, with 180 in the Murchisons. In 1983 the birds were reduced to 120 in the wild.
Kakapo: The endangered bird with the highest profile. Two males have recently been shifted to Maud Island, in anticipation of a captive breeding programme. On Little Barrier Island kakapo are showing encouraging signs of eating exotic supplementary foods.
Chatham Island taiko: One taiko chick fledged from known burrows this season. The estimated population of this seabird is between 50 and 150.
Stitchbird: More intensive efforts will be put into establishing the Kapiti Island population, especially now that possums are no longer on the island.
Pingao: The sand-binding plants are being grown from seed and planted out in dunes. Precise distribution of pingao is being mapped on low level aerial photos. Pingao is also being planted *in situ* on marae so that cultivated plants can be used for weaving instead of being taken from the wild.

Wild Ginger

TWO SPECIES OF GINGER have become wild in New Zealand: kahili ginger *(Hedychium gardnerianum)* and yellow ginger *(Hedychium flavescens)*. Widely grown as ornamental plants, they have escaped into the wild and become a major problem.

Wild ginger smothers the forest floor, forming a dense mat of roots which is virtually impenetrable. Gradually it is creeping into our native forests. It is widespread in the Waitakere Ranges, Northland and Coromandel forests. It has started to spread south and has been spotted in the wild in Wellington, near Christchurch and on the West Coast.

The two species can be distinguished one from the other. Kahili ginger has a spike of lemon yellow flowers with red stamens. After flowering the seed capsules split to display red/orange seeds which are dispersed by birds, often into undisturbed forest. The leaves are lance shaped and smooth. Yellow ginger has cream coloured flowers and its leaves are narrower. It does not set seed.

Yellow ginger. Photo: Ewen Cameron

Eradication

Wherever possible wild ginger should be dug up, taking care to remove all the rhizomes. Do not dump the plant by the roadside or in the compost heap as the smallest rhizome will form a new plant.

For large infestations, spraying is an option. The only herbicide that works is Escort. A wetting agent called Pulse can be added to the spray mixture to help the spray adhere to the leaves. Spraying should take place only from early spring to autumn. If the stems are cut, spray may be painted on each stem and on exposed rhizomes. Spraying is effective but it can take up to 18 months for the plant to die – one application only is required.

Anne Joyce

Kahili ginger. Photo: Gareth Eyres

Kermadec Islands Marine Reserve

The spotted black grouper is extremely friendly, coming right up to divers for a tickle under the chin. Its natural curiosity would make it very vulnerable to fishing. Photo: Roger Grace

READERS with long memories might recall an article in our August 1986 magazine about a marine reserve proposal for the Kermadec Islands. Many Forest and Bird members wrote submissions to the Government supporting the reserve, but so far have seen no reserve gazetted for their efforts.

It appears that bureaucratic hiccups have been responsible for putting the proposal on hold, but now that these have been overcome the way is clear for Conservation Minister Philip Woollaston to announce the reserve.

Lying 400-530 nautical miles north-east of New Zealand, the Kermadecs comprise four islands, the largest of which is Raoul Island, approximately the size of Little Barrier Island. Subtropical waters give rise to a unique mix of warm temperature New Zealand and tropical species. Among the attractions are the huge spotted black grouper (up to 1.2 metres in length) and New Zealand's only reef-forming corals.

Once the marine reserve is gazetted, fishing will be restricted to outside the 12-mile limit. At present there is no commercial fishing in the area.

The Kermadecs are also a potential candidate for World Heritage status. The related Lord Howe Island group already has been designated a World Heritage site. However the Kermadecs can boast of a virtually untouched marine ecosystem, unlike Lord Howe Island where the spotted black grouper population has been decimated.

New Zealand's only reef-forming corals occur in the Kermadecs, reflecting the islands' tropical affinities. Photo: Roger Grace

Kokako Forest Saved

FOREST AND BIRD'S conservation advocacy recently averted the clearfelling of the most important remaining area of unprotected kokako forest.

330 ha of the Gammons Block in the Mamaku Plateau adjacent to the Kaimai Mamaku Conservation Park had been set aside during the Tasman Accord negotiations as a last resort source of tawa for Elders NZFP's Kinleith mill. Logging had commenced in the block, which is owned by Tasman Forestry.

However, letters written by Forest and Bird members along with Basil's persistent lobbying persuaded Elders NZFP to speed up their programme of substituting eucalypt for tawa. Senior Elders NZFP executive George Wheeler and Forest and Bird's Basil Graeme played a key role in achieving protection for the block.

Kokako will not be the only wildlife to benefit. The forest has been surveyed as having the highest density of North Island robin ever recorded.

Protection of the block means that for the first time this century, no areas of kokako habitat are being felled.

Gerard Hutching

Drastic Plastic

THE MUCH HERALDED ANSWER to the plastic waste problem – biodegradable or photodegradable plastic – has been given the thumbs down overseas, on the grounds that the plastic does not in reality degrade.

Composting experiments conducted in the United States suggest that even under the ideal decomposition setting of a compost heap, the kind of degradable plastic now available merely weakens, sometimes breaking into small pieces. Although the plastic changes form, most of its volume remains.

Degradable plastics were hailed as a solution to the problem of marine life being entangled in plastic six-pack holders, or ingesting plastic bags. But when supposedly biodegradable plastic bags were recently placed in lobster pots and submerged, they simply did not degrade in saltwater.

That doesn't mean to say degradable plastic is a hoax. In fact ICI has just developed the first truly degradable plastic. Instead of being derived from oil, the polymer, called PHB, is extruded from the natural excretions of bacteria. The bacteria can live on sugar so the whole process is completely renewable. The sad fact is that ICI has been unable to sell any PHB because the current price of sugar is so high. Combined with the capital costs of setting up a production plant, it couldn't hope to compete against conventional plastic.

The question of *Forest & Bird* magazine wrapping is frequently raised by readers. One option is to revert to manilla envelopes: the consequence would be a doubling in the price of despatch. However, it's questionable whether such a move would necessarily assist the environment, as brown paper is heavier and bulkier in landfills and more polluting in its manufacture than polyethylene, a non-toxic form of plastic. Contrary to accepted wisdom, paper does not break down easily in landfills, graphically demonstrated by US "garbologist" William Rathje who has discovered buried copies of newspapers printed 40 years ago that "looked so fresh you might read one over breakfast."

Books Received

Repainting the Rainbow: Ecology and Christian Living, *edited by Ray Galvin and Robin Kearns ($10, Christian Ecology Group and McLaurin Chaplaincy).* The outcome of a conference held in Auckland in April 1989, this booklet will be a useful guide to those interested in the relevance of Christianity to the environment. Writers make the case for a Christian view of the world where nature has intrinsic value, but also make the point that Christian teachings have been invoked in the past as a justification for dominion over the animals. For a copy, send $10 (inc GST and postage) to McLaurin Chapel, University of Auckland, Private Bag, Auckland.

Management of New Zealand's Natural Estate, *edited by David Norton ($23, Ecological Society, PO Box 25178, Christchurch).* These proceedings of a symposium held two years ago sum up many of the issues facing conservation managers in this country. Its audience will be mostly limited to those intimately involved in managing the natural estate, although conservationists who want to become more aware of the issues would do well to own a copy. Topics covered include thar, brown kiwi, tussock grasslands, Hector's dolphin, farming and conservation. (Can be bought direct from the Ecological Society).

Black Swans Die From Lead

AN OUTBREAK of lead-poisoning in waterfowl at the Bool Lagoon Game Reserve in south-eastern Australia stimulated a survey that revealed that about 40 to 50 percent of black swans had excessive exposure to lead. The source is believed to be spent lead shot from hunting. Although this is the first detailed report on lead poisoning and lead contamination in Australian waterfowl, it is believed similar problems exist undetected elsewhere in Australia.

The same conditions exist for poisoning waterfowl in New Zealand as in Australia, the US and UK, where testing of ducks has shown higher levels of lead. The alternative is steel shot, used extensively in the United States. There is little cost difference between lead and steel shot.

TV Remote Controls Power Guzzlers

FRIENDS OF THE EARTH (UK) have issued a warning that people should not switch their TVs off for the night with their remote control unit, but instead use the on/off switch. The reason is that the instant on/off that the remote control activates continues to use 15 watts of electricity.

FOE estimated that if half of the remote control TV sets in the UK (7 million) were being switched off in this manner, the electricity generation needed would add as much as 560 tonnes of CO2 to the atmosphere in a single night – nearly 200,000 tonnes a year.

New Zealand energy researcher Molly Melhuish has worked out that the power wastage of the remote control TV sets in New Zealand is significant. If there were 500,000 such sets in New Zealand, they have the potential to lose the equivalent generating power of a quarter of the Wanganui River flow.

World Heritage Gains New Members

THE German Democratic Republic, Malaysia and Uruguay have become parties to the World Heritage Convention.

Last Year's Fashion – Fur

CONFIRMATION that wearing fur is outmoded overseas can be found in recent statistics on the fur industry. In Britain The Hudson Bay House, the UK's major furmonger, has closed shop and retreated to Helsinki. The trade magazine *Fur Review* has ceased publication. In Finland 1000 fur factories have closed and in the Netherlands there are only 32 furriers where there were once 400. The Madison Square Garden's annual Fur Expo was cancelled for lack of interest, and one of the world's leading fashion magazines, *Mirabella,* notes: "This is not the year to flaunt fur." All good news for the world's threatened furry species, but not so good news for New Zealand's possum-besieged native forests.

Happy Earth Day

EARTH DAY leapt to the nation's attention on April 22 with many Forest and Bird members and branches taking part.

Manawatu, Southland, Mid-North and South Canterbury branches got their hands dirty cleaning up piles of rubbish from streams, estuaries and beaches, with South Canterbury branch collecting a skip full of plastics, iron and household rubbish. Tauranga branch created a 100-metre long plastic dragon which snaked its way to the Tauranga Milk Treatment Centre's plastic recycling plant.

West Coast branch members helped celebrate Earth Day by attacking old man's beard growing on the outskirts of the Barrytown Scenic Reserve.

More than 30 Kiwi Conservation Club members and families from the Te Puke branch arrived at Rotoehu Village reserve for a sausage sizzle and planted trees. The children came dressed as birds, insects and trees.

Other branches had fun while they raised awareness of environmental issues. Wellington branch held an Earth Day dance, while Auckland, Wairarapa and Lower Hutt branches organised Earth Day festivals attended by thousands of people.

And will there be an Earth Day next year or will we have to wait another 20 years? Watch this space.

Wellington conservationists celebrated Earth Day with the help of Sam Manzanza and the Tamati Brothers.

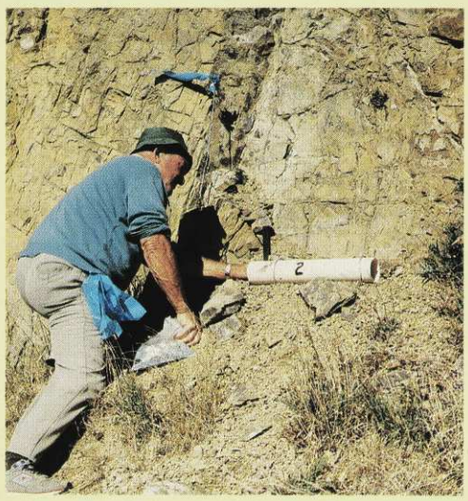
Another Rat-free Island?

SOMES ISLAND, a quarantine station situated in the middle of Wellington Harbour, may now be rat-free.

Recently a Department of Conservation rat eradication expert visited the island to assess the success or failure of recent trapping. He placed rat traps in areas where rats could be expected to be found, but caught nothing. Although bait has been taken from bait stations, it appears the culprits may be birds.

Forest and Bird Lower Hutt branch members have been active in the rat eradication work alongside the Department of Conservation and MAF island staff. The branch has also spearheaded the revegetation of the island since 1981.

Wildlife on the island includes little blue penguins, blue reef herons, variable oystercatchers, spotted shags, the rare green spotted skink, the common skink, the copper skink and the common grey gecko.



Setting a rat bait station on Somes Island. Photo: Stan Butcher

Arethusa Reserve Now Boasts Cottage

JUST NORTH OF KAITAIA lies one of the Society's newest reserves – the Arethusa Reserve, donated in 1985 by Mrs D Oxford. A dammed creek on the 14 ha property has created a lake with small islands, home to hundreds of pied and little shags, swans and pukeko. The surrounding forest – a mix of exotic and native trees – is home to hosts of fantails, silvereyes and warblers.

Members of the Far North branch have long wanted to build a cottage so that other Society members could enjoy the reserve. The dream started to become a reality in January this year with the help of $2000 saved by the branch and $10,000 donated by

the Auckland Savings Bank. Committee member and builder John Dawn directed operations and many helpers camped out on the reserve while the building was carried out.

When the lodge is completed, members will be welcome to stay at the new lodge on the reserve. Details will be published in this magazine.

Forest and Bird Auckland Environment Centre

AT LAST Forest and Bird has a home in Auckland. On the evening of May 22, about 100 people attended the opening ceremony of Forest and Bird's new Environment Centre.

Minister of the Ratana Church Rev Talbot blessed the centre and Professor John Morton spoke about the need for an Environment Centre and an increased profile for Forest and Bird.

Throughout the rest of the week, birds danced in Queen St, handing out information about Forest and Bird and inviting the public to visit the centre. The resulting media attention ensured a spate of phone calls and visits to the centre.

The centre is staffed predominantly by volunteers. Currently Val Hollard is running the shop, Anne Joyce is working fulltime on the wild ginger campaign and many other volunteers are handling information enquiries and doing office work.

Research volunteers, people willing to speak in schools, artists, photographers, we can use your skills. Please contact Northern Conservation officer Fiona Edwards at the Environment Centre, 24 Airedale St, Auckland, ph 303-3079.

From left, takahe (Fiona Edwards), kakariki (Debbie Loveridge), tui (Karlyn Koh) kokako (Anne Joyce) and kiwi (Debbie Bush) in Queen St publicising Forest and Bird's Auckland Environment Centre. Photo: Auckland Star

PM Picketed

THROUGHOUT MAY AND JUNE our Canterbury branch ensured the Prime Minister's attention was focused on native forests.

Every Saturday morning they held rallies outside Mr Palmer's electorate office in Christchurch – with good effect as the Government's recent decision has shown.

A Special Place for Birds

by Rod Hay

A MAN PHONES the talkback show just to say how much he appreciates the sparrows coming to his garden. Little children shriek with delight as the ducks in the park take pieces of bread from their outstretched fingers. Ferry passengers marvel at the grace of an albatross as its wing tip grazes the surface of the water before it effortlessly swoops up to hang in the air above the ship. A group of trampers sits entranced by the pure notes of a kokako song wafting over them from the tall rimu tree above.

From everyday encounters in the garden to the excitement of seeing and hearing a rare species, there is little doubt that birds hold a special place in many of our lives. Indeed, that special place is a part of most human cultures, from the falconers of the Middle East to the fishing communities of the South Pacific, and from the feather-bedecked Papua New Guinea highlanders to the bird-watching enthusiasts of Britain. As an ornithologist, but as a mere layman in human behaviour, perhaps I am only half qualified to judge what birds mean to us. However, like anyone, I can observe the relationships between the avian and human species and speculate on what they mean to us and the responsibilities they

Above: *Coy and seldom seen close up but filling the bush with its cries, the Rarotonga fruit dove is an endemic species which will benefit from attempts to protect habitat for other species.*
All photos Rod Hay

Left: *The cagou, an ancient endemic species only distantly related to other bird families, is the symbol of New Caledonia. Despite that, the population is a remnant of those that existed 100 years ago.*

entail.

The existence in New Zealand of the Royal Forest and Bird Protection Society is, along with that of many other similar organisations elsewhere around the world, a tribute to the importance of birds, both as conservation catalysts and as objects of interest and concern in their own right. The International Council for Bird Preservation recognises this, and uses birds as flagships for conservation programmes which often have implications much wider than just for the particular species involved.

Why the attraction?

Birds are easy to see. Is it any wonder that harpacticoid copepods, slime moulds or nematode worms have few devotees, despite the fact that there are far more species of them than there are of birds? Because they are easy to see, birds are easy to appreciate, and as a result can also tell us a lot about the state of the world around us.

The shore plover, one of those special New Zealand species, now only found on Rangitira Island in the Chathams.

Few would deny their inherent beauty – what Viscount Grey of Fallodon called "The Charm of Birds" – a myriad of colour, form and sound. In his book of the same name he wrote, "The plumage of birds, infinite in diversity and beauty: their ways on land and water, and especially their ways in the air: their residence or migration: their mating, courtship, and care of their young: the eggs, so plain or so variously marked: the nests, so curiously made, differing so much in structure and in place chosen for them: and above all, the song of birds." Look through any art gallery or picture studio to see birds as subjects for art. It is important that we don't try to disguise the aesthetic appeal of birds. It is nothing to feel ashamed of. The protection of another life-form as a "living treasure" is perhaps a greater imperative than the worshipping of our fellow humans and their artifacts.

They represent freedom. Creatures which can come and go at will, their power of flight carrying them beyond the two-dimensional existence which keeps us essentially earth-bound, cannot fail to provide inspiration about freedom and power, emotions dear to the human psyche.

What Do Birds Tell Us About The World?

They tell us a great deal, often of great practical importance to human existence. For example:

- In cultures dependent on fishing, flocks of birds are important as indicators of the whereabouts of surface-feeding pelagic fish. In eastern Polynesia, for example, the appearance at sea of noddies and boobies being harried by frigate birds leads fishers to the schools of bonito and skipjack they value so much. It is a tribute to human folly that not only are we threatening the birds by invading their breeding sites, but drift-netters are looting the sea so that they can sell the tuna back to the islanders in tins!
- Birds provided us with early warnings of the potentially catastrophic effects of over-use of some pesticides, particularly organochlorines such as DDT. Over a very short period in the 1950s and 60s, the peregrine falcon in Britain went from being common to being in dire trouble. The cause was disruption in breeding behaviour and the thinning of eggshells through pesticide contamination of their prey, particularly small seed-eating birds and medium-sized birds such as pigeons, rooks, partridges and pheasants. The chemically stable pesticide compounds were becoming concentrated as they passed on up the food chains, with the result that predators such as falcons were far more susceptible to poisoning than their prey.

  In New Zealand, despite heavy use of such pesticides in some areas, our own falcon does not seem to have suffered egg-shell thinning in the same way, simply because it is a quite sedentary species. It seldom moves into the landscapes dominated by intensive agriculture, and hence it feeds mainly on prey relatively free of pesticide residues. Ironically, our most remote race of falcons, that found on the Auckland Islands, is potentially at greater risk. These falcons feed on seabirds and are therefore at the end of much longer food chains along which residues have become more concentrated than land-based ones.
- Birds are harbingers of other environmental change. In 1984, a small but stunningly ultramarine-coloured lorikeet, the pihiti *(Vini ultramarina)*, was a common and locally adored inhabitant of the spectacular island of Ua Pou in the remote Marquesas group. Though the Marquesan birds had suffered terribly as a result of forest clearance and introduced animals, the little pihiti was not deemed to be particularly at risk. Besides, it was also found on 200 square km Nukuhiva Island and the smaller Ua Huka island, to which it had been introduced in the 1940s. By 1989, the pihiti was all but gone from Ua Pou, was exceedingly rare on Nukuhiva and numbered around 250 on Ua Huka. The reason? Locals at first thought that a cyclone was responsible and that the food supply might now be recovering. So we sought to nurture some local enthusiasm by helping return birds from Ua Huka

Opposite and below: *The thirty or so remaining kakerori in Rarotonga are subject to a major effort to protect them from predators.*

(five hours boat trip distant) but subsequently discovered that ship rats were now on the island, having arrived there since a new wharf had been built several years earlier. Re-introduction is now probably futile. Moreover, the birds of Ua Huka are also at risk if the lesson of Ua Pou, like so many islands before it, is not learned soon.

What Do We Owe The Birds?

We are in the midst of an extinction episode unparalleled in the history of the Earth. Whilst mass extinctions in the past, such as the loss of dinosaurs, were caused by natural events, the recent wave of losses is the result of our influence. It is not as yet under our control, though it should be.

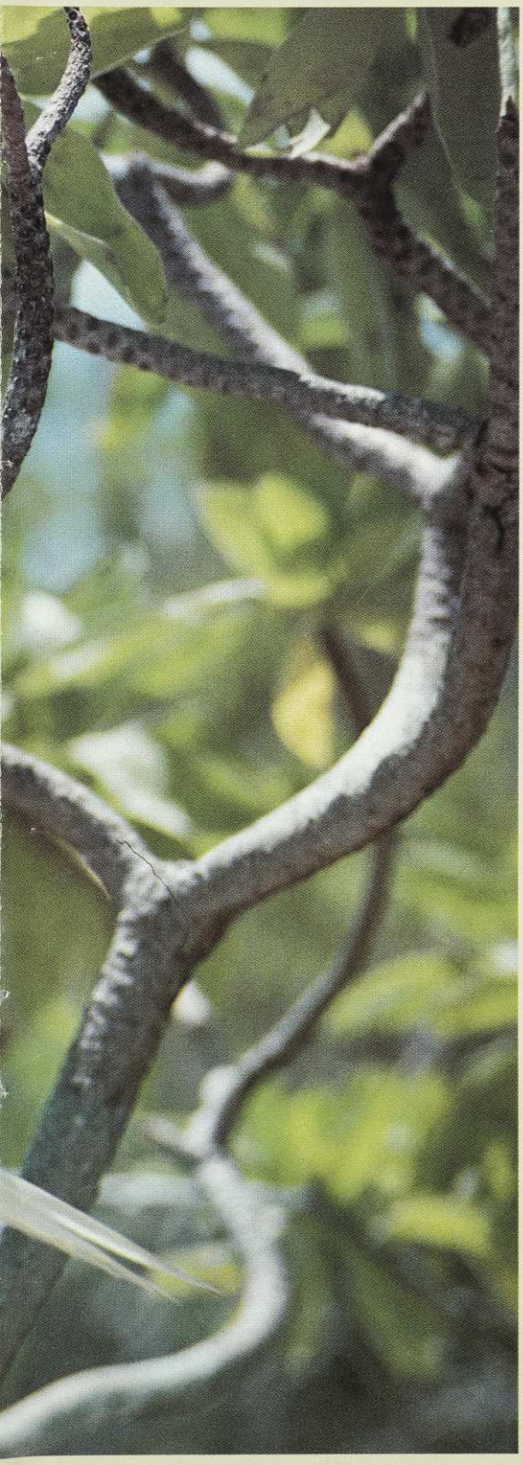
New Zealand was a land of birds. Isolated from the rest of the world's land masses since before the age of mammals, our relationship with hairy vertebrates has been a recent (though traumatic) one. Hence, although our isolation and small size renders us a country of a relatively small number of native species, the variety and uniqueness of our birds (and many of our other life forms) renders them particularly special on a global scale. The kiwi, kokako, rifleman and rock wren, kakapo, kereru, Cook's petrel, shore plover and wrybill are all part of what contribute to the Earth's biological diversity, and we owe it to the Earth to afford them a place to live.

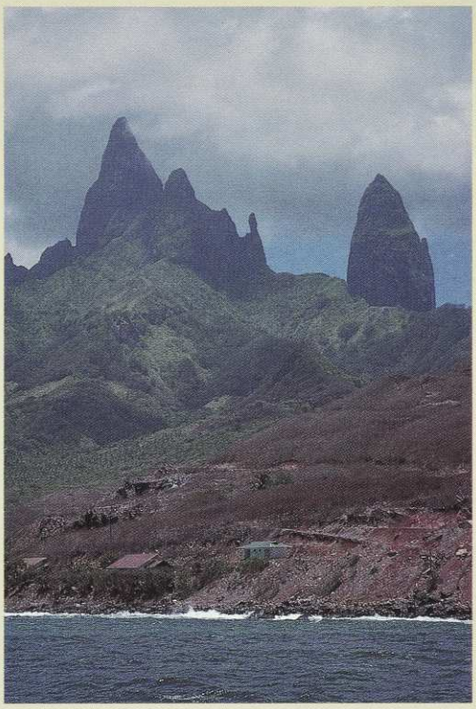
In particular, we owe something to those species which we use as a national, state or territorial symbols. The kiwi is our bird, and we proudly call ourselves kiwis, yet our treatment of the national symbol leaves a lot to be desired. We are not alone in this neglect, however. In New Caledonia, images of the cagou adorn buildings, coats of arms and tourist memorabilia, yet the birds themselves suffer from predation, hunting and loss of habitat.

That attitude need not prevail, though often it is rarity itself which results in a species being valued. Information about the 30 or so remaining kakerori *(Rarotonga flycatchers)* led to the species being adopted, for a while at least, as the symbol of the Cook Islands Conservation Service. Public awareness increased, efforts to protect the species were

stepped up, and a full recovery programme is now in full swing, with the kakerori being the centrepiece of a major park proposal which will protect other endemic species such as the Rarotonga starling and fruit dove.

We also owe something to the species themselves. Because of the size of our population and our special capacity for modifying the environment, the human species has become the *de facto* guardian of the world's wildlife. Though extinction is a natural part of the evolutionary process, species are disappearing at a rate far beyond evolution's ability to replace them. These species have just as much right to exist as we do, but their welfare and very existence is in our hands.





The rugged spires of Ua Pou Island, until recently home of the elegant pihiti or ultramarine lory. Unfortunately ship rats have invaded the island, placing a question mark over the bird's future.

Finally, we owe it to the birds to find out about them. In the Amazon, species are disappearing at a frightening rate as the rainforests are chopped down and sold for short-term profit. Though the loss of the birds is in reality a relatively minor symptom of a massive problem, it is often the first indicator that something is seriously wrong. Understanding the loss of birds enables us to tell people of the wider problem. But merely knowing is not enough. Their plight should be broadcast from the rooftops of the world!

What should we do?

- Stick up for endangered birds! They teach us a sensitivity to nature, and tell us about the consequences of our own misuse of the environment; lessons which we may not have learned without understanding the sacrifice of those species. As symbols, they also lead people into the wider conservation issues. Who knows how much influence the tiny black robin and the magnificent efforts on its behalf had on conservation awareness in general? Certainly, the Comalco "Cash for Cans" kakapo campaign illustrates how the plight of a single species can bring awareness and action on a wide front. There is a common misconception that if we put too much effort into endangered species, there will not be enough for other projects. However, the money available for endangered species is often given quite specifically and would not necessarily be available for other work. Also, the spin-offs of habitat protection or greater awareness go far beyond the welfare of the individual species concerned.

Tropical seabirds such as this red-footed booby at Tetiaroa Atoll are important guides to help local fishermen find tuna.

- Stick up for common species! There are not many birds which bear the label "pest", at least not to the extent that we could justify regarding the species as wholly undesirable. Given the recent history of our management of the Earth's living things, many of the common species may one day also be endangered unless we have respect for them and their habitats.
- Learn! Find out more about the ecology of birds, as a means of finding out more about the world's ecosystems and what our place in them should be.
- Acknowledge the cultural importance to us of birds and use them unashamedly as symbols of conservation, both for their own sake and as a means of leading people into an understanding of the wider conservation and environmental issues.
- Use our knowledge to make our lifestyles more compatible with that of the wildlife around us in order to complement the efforts we have made in protecting reserves. The challenge of conservation is far greater than just the creation and maintenance of parks and reserves.

We need to acknowledge that we are part of the natural community because, while we certainly have a great deal more influence than most other organisms on earth, we certainly do not have a great deal of control. It is time to understand what the plight of the birds is telling us, apply our knowledge and introduce some control.

Perhaps more than any other living creatures, birds touch our lives in both direct and symbolic ways. What are the qualifications to read the message they offer? Like the talkback man, the child, the ferry passenger and the trampers, all we need is to be there. In the gardens as well as in the wilderness a message about the health of the planet is there if people are given some guidance to read it. When those messengers vanish, it is our world which has diminished both aesthetically and ecologically.

Acknowledgements

Many thanks to Mike Rudge, Alison Ballance and Tony Pritchard for helpful comment on this essay.

Dr Rod Hay has worked for Forest and Bird on Kokako and South Pacific conservation. Formerly with DSIR Ecology Division, he is now working for the Department of Conservation on South Pacific bird conservation.

The Chatham Island Black Robin

How the world's most endangered bird was saved from extinction

By 1980 only five Chatham Island black robins remained. The story of the daring bid to rescue the bird from extinction is as dramatic a conservation tale as any in the world. Here Don Merton, the chief architect of the plan, gives a full account and brings readers up to date with the robins' progress.

Old Yellow (above), Old Blue's mate from 1979-83. At the time the photo was taken Old Yellow was – unbeknown to wildlife officers – the only effective breeder of the two male robins in existence. Photo: Rod Morris.

THE CHATHAM ISLAND BLACK ROBIN is endemic to that land apart – the wind-swept cluster of islands 850 km east of the South Island we refer to as the Chathams group. Once widespread on the islands, the robin together with many other native birds disappeared from the larger islands following European colonisation early last century.

Forests and scrubland were cleared, and rats and cats introduced. Seven bird species were exterminated. Miraculously however, a remnant black robin population of about 20-30 birds persisted for the subsequent 90 years in 5-7 hectares of scrub forest on top of a 200 metre sheer-sided rock stack – Little Mangere Island.

Little Mangere is rarely visited, so extremely difficult is it to climb. However, in 1938 the late Sir Charles Fleming, Alan Wutherspoon and Graeme Turbott scaled the cliffs and rediscovered the black robin there.

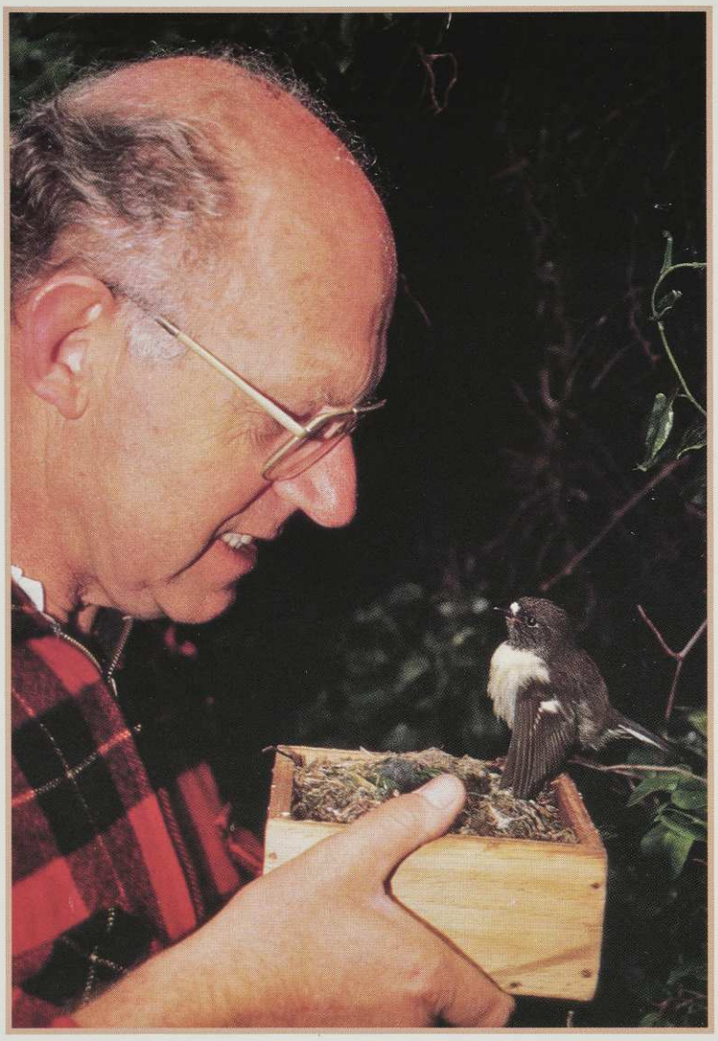
In the 1970s the woody vegetation atop Little Mangere degenerated rapidly following the clearing of a helicopter landing pad. The robin population plummeted from 18 birds in 1973 to seven (two pairs and three males) in 1976, when the Wildlife Service relocated the survivors on nearby 130 ha-Mangere Island. Prior to this 120,000 trees had been planted on Mangere to provide additional habitat for the robins and other native wildlife – a programme heavily sponsored by the Royal Forest and Bird Protection Society.

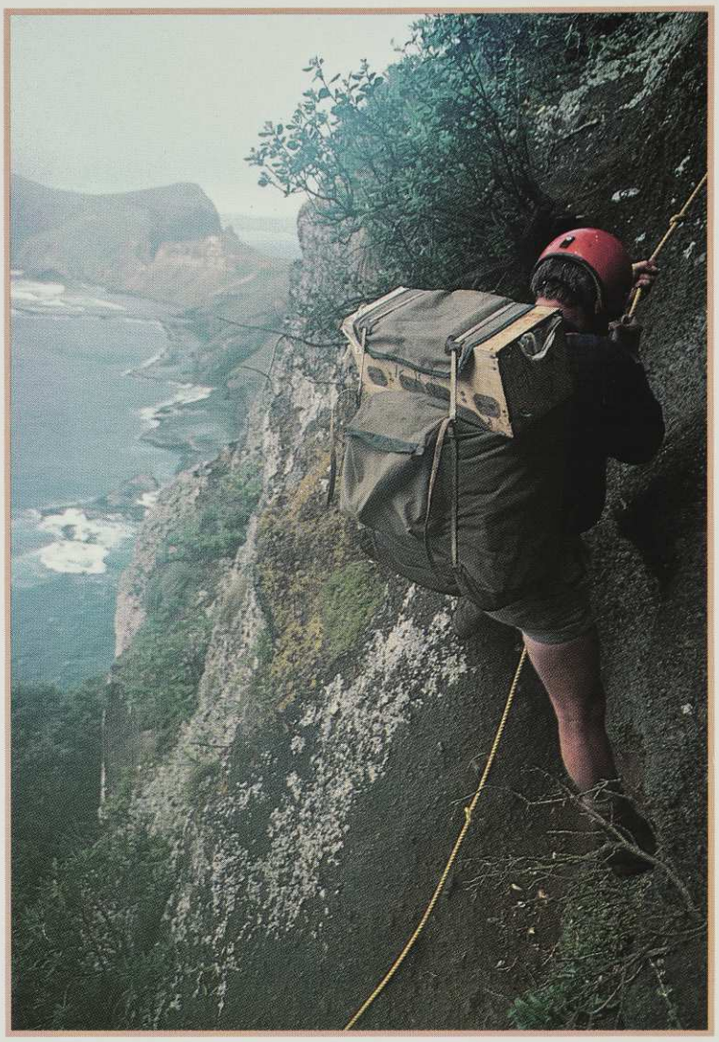
Teetered on the Brink

During the final three years on Little Mangere only one robin chick had survived to breeding age. Although chick survival improved following the transfer (5 chicks in 4 years) the skewed age-structure of the population meant that recruitment of young was offset by natural mortality of old birds. Unaided, no rapid recovery was possible and the species teetered on the brink of extinction; an urgent remedy was required.

In common with some other New Zealand endemics, black robins tend to be long lived and to have a low reproductive rate: the normal clutch size is just two eggs and a successful nesting cycle takes more than three months. Thus, the species lacks the ability to recover quickly when its population is reduced. However, because black robins are capable of renesting, their potential productivity is greater. For this reason in 1979 when the species had declined to just five birds, I proposed cross-fostering as means of capitalising upon this potential – to boost productivity and so quickly restore the population to a viable level.

Left: *Don Merton checks one of the tit foster parents.* Photo: Rick Thorpe Right: *The precipitous nature of Little Mangere Island's terrain is shown in this photo of a wildlife officer climbing down from the summit.* Photo: Rod Morris





Five birds, including *only one effective breeding pair* (Old Blue and her mate Old Yellow) existed in September 1980. However, an intense management programme developed since then resulted in a spectacular recovery to about 116 birds by early 1990. This recovery can be attributed largely, if not entirely, to innovative management which included manipulating the behaviour of both black robins and Chatham Island tits living in the wild.

This involved:

- Manipulating robin nesting cycles, and fostering eggs and young to other species, so increasing production by over 100 percent. Improved nest security virtually eliminated accidental losses during incubation and nestling periods.
- Establishing the major robin population on South East Island. This move has vastly increased the area of habitat available to the black robin, so that for the first time this century the species has sufficient space to increase and expand. (Little Mangere, where the species was confined for almost a century, and Mangere to which the depleted population of seven birds was transferred in 1976, each had about 5 ha of habitat, whereas South East Island has more than 100 ha). Survival, particularly of juveniles and unattached birds, has improved markedly since their release in 1983 on South East Island.

The result is that there is now a younger, more productive and successful breeding population.

How It Was Done

But to return to 1980....

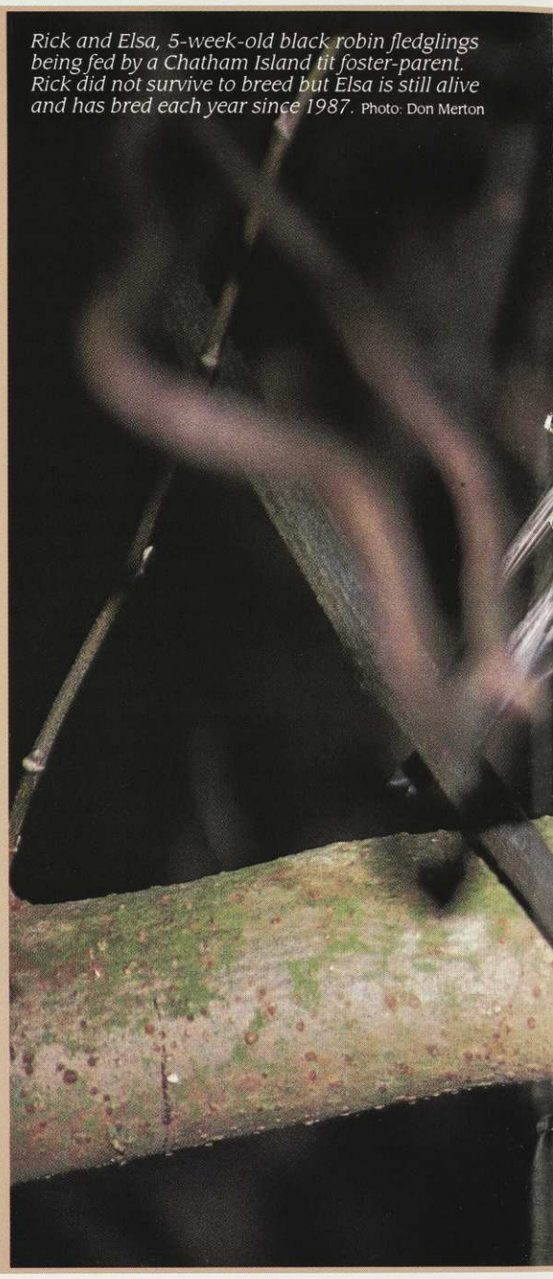
WE HAD TO FIRST quickly determine the feasibility of this daring proposal in a species whose numbers were so incredibly low. We were also mindful of the immense logistic problems associated with living and working on a small, remote island for around four months each year.

Summarised below are some immediate objectives we had to resolve in order to pioneer the cross-fostering programme which was to continue each spring and summer from 1980 to 1988:-

- obtain basic biological information for the black robin and three potential foster species;
- determine the limits of tolerance within which the robin and three potential foster species would permit us to operate;
- gauge reaction to manipulation of nest contents in donor and host species;
- gauge reaction of host and donor species to alien and artificial eggs, and clutches of different size and colour to their own;
- gauge reaction of host and donor species to reduced and increased clutch size;
- gauge reaction of host and donor species to increased and reduced incubation periods;
- gauge reaction of host and donor species to nestlings of alien species, to nestlings of differing age, and of their introduction to nests at different times of the breeding cycle;
- determine the time that embryos at various stages of development might safely remain out of incubation in the cool Chatham Islands climate;
- determine what constitutes normal incubation, brooding and nestling feeding routines in host and donor species;
- determine incubation, nestling and fledging periods of host and donor species; and
- closely observe breeding robins and up to 40 pairs of potential foster parents in order to find their nests early in the nesting cycle, log their progress, and prepare some to receive robin eggs.

We also had to develop ways of safely handling tiny fragile eggs and nestlings in and out of enclosed Chatham Island warbler

An incubator adapted as a brooder for transferring day-old robins from Mangere to South East Island. Photo: Don Merton



Rick and Elsa, 5-week-old black robin fledglings being fed by a Chatham Island tit foster-parent. Rick did not survive to breed but Elsa is still alive and has bred each year since 1987. Photo: Don Merton

nests and more open robin and Chatham Island tomtit nests. Warblers, robins, and tomtits proved to be unusually tolerant at all stages of the nesting cycle. European dunnocks, however, were prone to desertion and so were unsuitable. Robin, warbler and tit could be induced to incubate for almost twice their normal incubation periods and would accept eggs and nestlings of other small passerines. Poorly sited or insecure nests of all three species could be secured with string, or in the case of the robin and tit nests, transferred into the safety of a nest-box. It was even possible to move nests a metre or two in stages to more sheltered or accessible positions. A poorly constructed or damaged nest could even be replaced with a fresh nest.

Although warblers were able to hatch and care for robin eggs and nestlings, they proved incapable of raising robin nestlings beyond 10 days of age. It was thus a major breakthrough to discover in 1981 that tits were capable of hatching and fostering robin chicks through to independence.

Tits, however, did not occur on Mangere Island and so eggs and nestlings for fostering had to be transported 15 km by sea to South East Island. A portable incubator and brooder were developed to help transfer eggs and nestlings between the two islands. No helicopter is based in the Chatham Islands so for transport we were entirely dependent upon the few local fishermen – without their help the programme could not have taken place. At 44 degrees south the Chatham Islands are within a zone of constant strong winds – the infamous "roaring 40s" – so that any boat trip entailed days of planning to co-ordinate weather conditions, availability of a fishing boat and stage of development of eggs or nestlings. Transfers took 2-5 hours to accomplish. During the course of the cross-fostering programme approximately 40 robin eggs, 10 nestlings and 25 independent birds were transferred between the two islands – without loss.

Turning Point

In 1983 permission was granted to establish a robin population on 219 ha-South East Island where extensive areas of scrub and forest exist. Two pairs of robins were transferred to South East Island in 1983 and this event proved to be a turning point in the species recovery, for the major population is now found there. Furthermore, the need to transport eggs and birds between islands diminished.

Throughout the course of the programme, techniques and procedures have been constantly reviewed and refined, so that those used in the final years were very effective. The following is a summary of the management strategy used in the final years of the programme.

About 30 pairs of tits breeding on South East Island were managed each spring so as to ensure a continuity of secure foster nests was available throughout the robin breeding season. More advanced pairs were induced to re-nest, and those nests selected for fostering transferred into nest-boxes. Here they were more easily manipulated, and were safe from interference from other birds and adverse weather – in a species whose numbers were so critically low, survival of every egg and chick was vital.

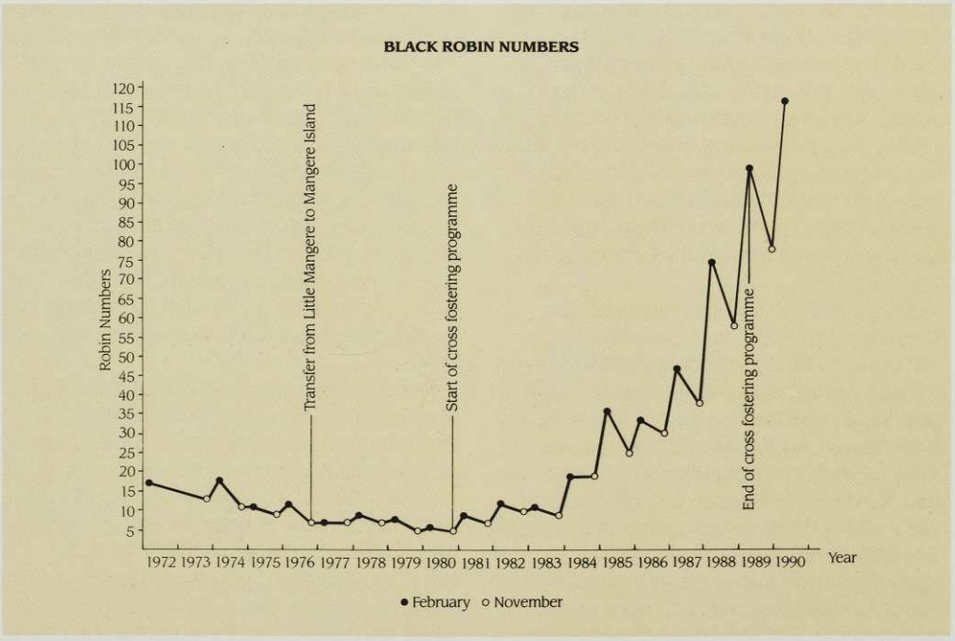
Plastic mesh with holes just large enough for tits to pass through was placed over the entrances of the nest-boxes so as to exclude white-faced storm petrels, broad-billed prions and starlings, which breed on the island in immense numbers and which otherwise enter and destroy some nests. Management of each clutch was carefully planned before it was in fact laid.

We closely watched breeding robins. Any that did not build their nests in nest-boxes were transferred into boxes during laying. First and often second clutches were removed and fostered to tits for incubation, but

third clutches were normally left with their natural parents. Where practicable the commencement of incubation in two or more "close" clutches was synchronised so as to ensure the option existed to unite and return broods of similar age to robin nests prior to fledging. As will be seen later this synchronisation in hatching times of clutches was a key element in avoiding the effects of mal-imprinting.

Tit foster-parents were observed so that any behavioural problems were identified early. For instance, for the first 2-3 days following hatching, male tits and robins feed their young while females brood almost continuously. Inexperienced males must learn to respond to the female's cue to cease feeding her and start feeding the nestlings, and often the newly-hatched young perish in the process. Thus, it was necessary to have an alternative nest on hand to which such young could, if necessary, be transferred at short notice. Such inexperienced males were subsequently "taught" to feed young nestlings through our placing week-old tit nestlings in their nests for a few days. To facilitate this a continuity of "borrow-nests" was necessary.

Although the eggs and young were well protected from the outside – from attacks by starlings for example – nestlings in particular remained vulnerable to attack from within (from nest mites or fleas), and losses occasionally occurred. To overcome this problem we fumigated and dusted nests with pyrethrum powder.



When about 15 days old, nestlings were sexed and individually colour banded, and those in tit nests were returned to robin nests where they were often united with a brood of similar age. Although broods of 4-5 young do

The black robin programme could not have been successful without the cooperation of the Chatham Island tits which fostered the black robin eggs. Conservation officer Rick Thorpe demonstrates how remarkably trusting the tits are as he moves a nest tray complete with nest and incubating tomtit from a nest-box. Photo: Don Merton

Derek Brown carries out the delicate operation of placing a black robin egg into a tit nest. Photo: Rick Thorpe

not occur naturally, robins are able to raise this number if supplementary food is provided. The fostered young were returned to robin nests prior to, or at fledging, so as to avoid imprinting problems which occurred when young were raised entirely by tits. Mal-imprinting has proved an obstacle in some cross-fostering programmes so that our development of a means of overcoming it is of some significance and may have application elsewhere.

Briefly then, the main elements of the programme were: to increase robin egg production by inducing breeding pairs to re-nest; to foster the additional robin eggs to Chatham Island tits for incubation and raising to near fledgling age; and to synchronise the time of hatching in fostered clutches so as to facilitate their return (as composite broods) to the few robin nests prior to fledgling in order to avoid mal-imprinting.

From what we know, this was the first time that cross-fostering had been used in the management of an endangered passerine (perching bird) living in the wild. As a consequence of the programme, cross-fostering, and the manipulation of breeding behaviour, are already being used with success in the management of some other endangered species in New Zealand and elsewhere.

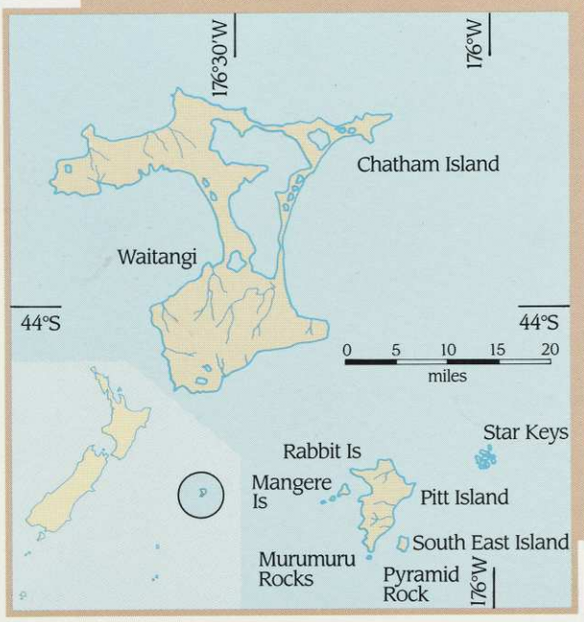
The black robin programme has been relatively inexpensive yet highly successful. Since 1980 a team of between two to four people have stayed in the field for approximately four months each spring and summer. The programme has created unprecedented interest from both within New Zealand and overseas. Its success can be attributed to the patience, perseverance, attention to detail and very high level of commitment by the small dedicated team – together with the obvious cooperation of the robins and tits, and of course more than a fair measure of good luck!

Perhaps the most remarkable feature of the black robin story however, is the incredible endurance and resilience of the birds themselves – despite intense inbreeding over a very long period. For such a tiny population to survive entirely isolated for almost a century on the windswept summit of a rock stack in mid-ocean is no mean feat of endurance. I believe that no more than 30 birds could have existed at any time on Little Mangere and the population was at a critically low level – only one or two effective breeding pairs – during the late 1970s and early 1980s. All surviving robins are descended from a single pair, Old Blue and Old Yellow. Nonetheless, there is no indication of "inbreeding depression" or "random drift" – genetic conditions which may jeopardise the survival of small isolated animal populations. The new generation of robins show no indication of genetic degeneration. They are highly productive, and fertility (about 90 percent), hatchability (83-88 percent) and recruitment to the breeding population (75 percent of young reaching independence) are surprisingly high for what must be one of the most intensely inbred wild animal populations anywhere. Adult mortality is low (21.6 percent average over the last nine years).

Most Important Character

Without doubt the most important character in the black robin drama was Old Blue, a female so named for the colour of her leg band. Old Blue started life on Little Mangere Island in about 1970, and lived for at least 13 years – more than twice the life span of almost any other robin (females average 3-4 years). In 1976 Old Blue was one of two surviving females and together with the last five males was transferred to nearby Mangere Island. Old Blue's productive life began at the incredible age of about 9 years when she mated with Old Yellow at which time she was *the only productive female!* Old Blue and her mate then bred each year until her death in

Before the last seven black robins were transferred from Little Mangere Island to adjoining Mangere Island in 1976, Mangere Island was replanted with help from Forest and Bird. The photo on the left shows the relatively barren island in 1980; by 1989 a healthy coastal forest was regenerating. In the background looms the tiny rock stack of Little Mangere Island – only home to the black robins for a century. Photos: Don Merton



late 1983 or early 1984 – and unquestionably saved their species from extinction. All surviving black robins are descended from this pair. The black robin is the only avian species living in the wild in which the identity and lineage of every individual is known and can be traced to a common ancestor.

The Future

Following the 1988/89 breeding season, 99 robins existed and since the population was believed to be sufficiently strong to continue its recovery unaided, we ceased manipulative management. Nevertheless, during the 1989/90 breeding season the population increased to around 116 birds, an increase of approximately 17 percent over the previous year! This was the proof everyone had been waiting for – that the robins could continue their historic recovery without our help.

Although manipulative management has ceased, it is desirable to re-establish the species on a major island in the Chathams group. However, because the robin is incapable of co-existing with cats or rats, the species can never be reinstated on the main Chatham Island where feral cats and two species of rats are established and eradication is not feasible. On the other hand, Pitt Island (6,270 ha), the second largest island in the group, is rat-free, and plans are already in train to eradicate its feral cat population. In a cooperative programme with Pitt Island residents the Department of Conservation intends to start this ambitious project as soon as possible for such is probably the only means by which the long term survival of the black robin and many other Chatham Island species might be assured.

The black robin's rescue has demonstrated that manipulative management of an endangered species living in the wild is practicable, and that even in the most extreme case (one remaining viable pair) recovery is possible.

Acknowledgements

The black robin could not have been saved without the extraordinary dedication and commitment of Wildlife Service – and more recently DoC – teams, which often included volunteers. Over the nine years of the intense management programme many departmental staff and volunteers have been involved. In particular I'd like to acknowledge the major contribution made by my colleagues Brian Bell, David Crouchley, Rod Morris, Allan Munn, Geordie Murman and Rick Thorpe, and of my wife Margaret for her crucial support throughout. Furthermore, success could not have been achieved without the support and cooperation of the Chatham Islands community – in particular the Pitt Islanders who provided vital transport between the islands. John and Bridget Preece and Ken and Eva Lanauze of Pitt Island deserve special mention in this context, for their outstanding support and hospitality throughout the programme. The black robin rescue has been a classic team effort.

Postscript: *A comprehensive account of the black robin history and rescue from imminent extinction is currently being written by Dave Butler (author of* Quest for the Kakapo*) and Don Merton. It is to be published as a book later this year.*

Kea
Creature of curiosity

by Kerry-Jayne Wilson

THE KEA is one of our most notorious birds. Loved by some, disliked by others, no-one is indifferent to this raucous clown of the mountains. By 1880 its intense curiosity had led this predominantly vegetarian parrot astray, and it was reputed to be a sheep killer. The truth of this has never been satisfactorily resolved, but reports are certainly much exaggerated.

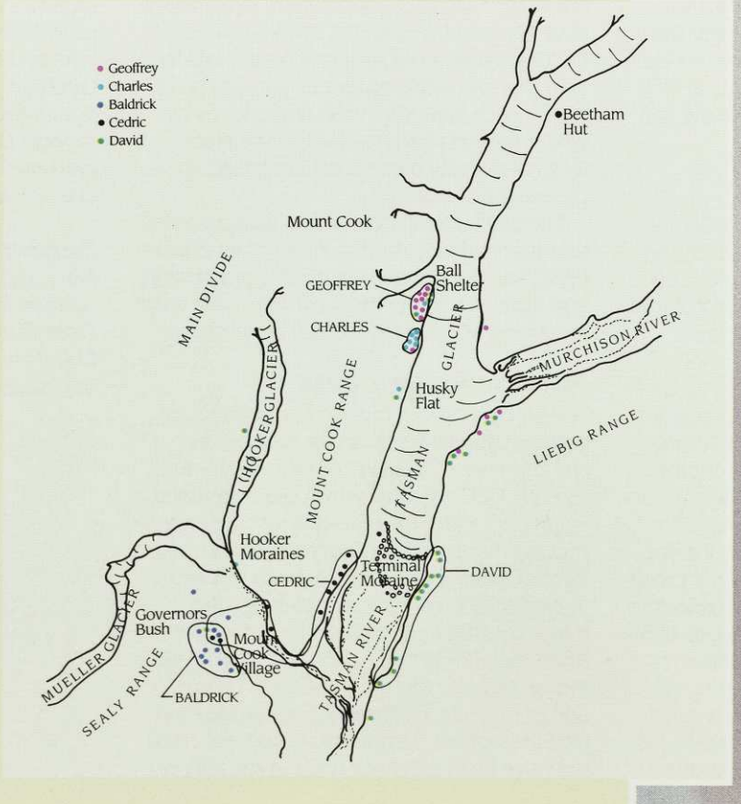
Today keas' curiosity still leads them into trouble whenever people enter their alpine domain. Modern cars with their exterior gadgetry, anything rubber or polystyrene, tents, packs, boots and food can prove irresistible to kea whose strong, manipulative bill and feet can be used to human disadvantage.

Little Known

But these all too frequent encounters with kea give a false impression of their abundance and behaviour. Away from alpine villages, skifields, huts and carparks kea are not often encountered; in fact, for a species with such a high profile, surprisingly little is known about them. In 1986 I began to study what kea do when they are not around people. Since then, with the help of assistants, we have colour-banded 91 kea at Mount Cook National Park and, using radio-packages especially designed by SIRTRACK Electronics, radio-tagged eight of these. We have also banded over 120 other kea, at Arthur's Pass and Westland National Parks and Craigieburn Forest Park.

In this article I will describe my findings on kea breeding, social habits, habitat and movements. The study will continue for at least two more years. Much is still to be discovered, and the views presented here are only preliminary. A graduate student, Ria Brejaart, has been studying the foods of kea and what they do at skifields and villages. Her work was assisted by a grant from Forest and Bird, and she will report on it in a subsequent article.

New Zealand has some unusual parrots; the giant lek-breeding kakapo, sub-antarctic parakeets and the kea, the world's only



Part of Mt Cook National Park showing the locations at which three breeding male kea (Geoffrey, Charles and Baldrick), and two presumed non-breeders (Cedric and David), have been seen or located by radio fixes. Circled are core areas which contain 70-90 percent of radio fixes.

The kea is our only native parrot which is still easily seen in the wild. However its curious nature has often been its undoing.

Photo: Nic Bishop

One of the few kea nests observed in recent times is this one in a large hollow rata tree in Arthur's Pass National Park. The chicks (inset) are visited only by the mother. No amount of pleading from hungry chicks will entice the father into the nest to feed them.
Photo: Kerry Wilson

'alpine' parrot. Kea occur only in the South Island mountains: the Southern Alps as well as most mountain ranges in Westland, Nelson and Marlborough. Although less numerous than they were 120 years ago, their overall distribution has changed little. Most likely they were formerly more evenly distributed through each mountain chain, whereas today their distribution appears to be fragmented.

They are a timberline species by preference, and apparently occur most commonly either side of that ecological boundary. At Mount Cook, Governors Bush, one of the few areas of forest, is a favoured haunt. In my main study area, the Tasman Valley, the taller and thicker the scrub, the more favoured the habitat. The steep valley sides are preferred, and kea spend little time on the valley floors. In the glacier-filled Tasman Valley the reason is obvious, but further down the valley and in the Hooker Valley, kea usually avoid the flat valley floors, even when these are well vegetated. At Craigieburn Forest Park, kea concentrate in the upper levels of the mountain beech forest and the lower slopes of the neighbouring sub-alpine herb fields, but we have seen them from mountain top to valley floor. Huts, villages and dumps readily entice kea down from their favoured haunts.

So far we have found only three nests, two at Mount Cook and one at Arthur's Pass. The Mount Cook nests are approximately 100m and 250m in altitude above the valley floor. Both are beneath prominent landmarks and command superb views of the surrounding mountains. One is in a burrow between buried rocks. The other is beneath a huge rock. In both the nest chamber is at least 1.5m from the entrance, secure from the prying eyes of researchers. The Arthur's Pass nest is in a very different situation – in a hollow rata tree well below the bush line. Both Mount Cook nests have been used by the same pairs for two and probably three years. A previous study by Dick Jackson found that kea laid eggs between July and January. I have observed five clutches of kea eggs. Hatching dates of these eggs and the dates fledglings were first seen at Mount Cook, Arthurs Pass and Craigieburn suggest that most eggs were laid in July or August, but the eggs within a single clutch could have been laid over several weeks.

The kea is usually described as an "alpine" parrot. However its favoured habitat is the timberline rather than the true alpine zone, although it ranges widely above and below this altitude. Photo: Kerry Wilson

It is difficult not to want to feed kea, so entertaining are they as they display their dexterity. However, in the interests of kea, people should refrain from feeding them: it encourages them into areas where their playfulness is ultimately unwelcome.

A kea nest, Mt Cook National Park. Photo: Kerry Wilson

Female Sole Incubator

The female does all the incubating, leaving the nest only to take food from her mate. In well over 100 hours of observation at nests, I have never seen the father enter the nest, although I have twice seen other adult males briefly enter a nest. Adult females also occasionally enter other birds' nests. Several times each day the male returns to a prominent perch, usually above the nest, and calls. The female emerges, takes food regurgitated by her mate, then quickly returns to her incubation duties. Initially this routine continues after the chicks hatch; all their food being gathered by their father, but conveyed from him to them by the mother. Once the chicks are several weeks old their demands can no longer be met solely by their father and the female begins foraging also. Even at this stage the male will not enter the nest. I once watched a male return to the nest while his mate was away foraging. He waited patiently outside for over half an hour, his frequent calls being answered by his hungry progeny. He finally gave up, left and returned with his mate an hour and a half later.

The Hooker Valley, Mt Cook National Park, typical habitat of the kea.
Photo: Kerry Wilson

Both parents take a role in post-fledging care. Although fledglings quickly learn to forage for themselves, they will beg, usually unsuccessfully from their parents, whom they usually accompany for several months.

While the nuclear family is the basic social group, kea are highly social animals and their groupings are remarkably fluid. At any time one or several of the family may be absent, or visitors, some of which are known to reside up to 5km away, may join the residents. In spring, and less often in summer, groups of kea may even visit nest sites. In August 1989 I watched a group of eight adult kea visit one nest. Led by Geoffrey, the resident male, it included David, who was radio tagged a few months later and found to spend most of his time between 7 and 13 km down valley. Also present was Elizabeth, a female radio-tagged the previous season and resident directly across the valley 2.5-5 km away. The three other banded kea had previously been seen within 3 km of the nest.

In contrast to adults, juveniles are coloured yellow around the eyes and by the beak. Within three years they change to grey.
Photo: Kerry Wilson

During each February visit to Ball shelter I have been entertained by "kea conventions" when up to 20 kea, many banded, some up to 15km away, arrive for night long revelry. The significance of this extensive socialising and its role, if any, in their mating system, feeding ecology and home range, is part of my study.

Kea are apparently non-territorial, but live in overlapping home ranges that vary considerably in size. Known breeding birds, for example Baldrick, Geoffrey and probably Charles (see the accompanying figure), seldom move more than 1.5 km from their nests. Presumed non-breeders (for example David and Cedric) are far more mobile. David had a core area covering about 6 km of valley, but he has been located at points as far apart as Hooker Moraines and Ball Shelter. Some kea begin this vagrant life early. A fledgling, apparently a son of Charles, was seen on 16 February 1990 near the village, 14 km south of his probable birthplace. Next day he was seen at Ball Shelter 1 km north of his natal nest.

At Mount Cook the greatest distance between sightings is about 25 km and movements of 10 km are not uncommon. However, Ria Brejaart has observed four of her banded kea move between Arthur's Pass and Mount Hutt, a distance of over 60 km.

While the family groups generally keep to the hills, other kea converge on skifields and villages. These 'gangs' are predominantly males of all ages, attracted by food handouts and the novelty of people with all the toys they bring with them. Having fed, usually on junk food, their curiosity leads them to explore and often damage vehicles or buildings. Sometimes these antics lead to their deaths. For the wellbeing of both kea and people, kea should not be fed and food scraps should be disposed of so that kea cannot get them.

Population Unknown

No one knows how many kea there are, and no reliable estimate is likely within the foreseeable future. The most often quoted figure is 5000, a rough estimate made by the Wildlife Service in 1986 but based on very little information. It would be more useful to establish an index that could be used to determine whether populations are increasing, declining or stable. Ria and I have tried a number of approaches to this, the most promising being the relative proportions of fledglings, immatures and adults present in late summer. We have three years' data for Mount Cook, Arthur's Pass, and Craigieburn, but this material is not yet analysed.

Kea are breeding successfully in each of the parks we have visited, but their tendency to concentrate in sites of human activity and to fly over several kilometres in large, noisy, conspicuous flocks gives a misleading impression of their abundance.

Kea appear to be less common now than they were 100 years ago throughout their range, and they are less common at Arthur's Pass than they were 20 years ago. Kea exhibit those characteristics shared by so many New Zealand species that have declined in the face of competitors, predators and habitat change: delayed maturity, not all adults breeding each year, only one clutch per season and a small clutch size. There may be only a few hundred kea in each large protected area and each of these populations may well be genetically isolated. There are probably relatively few kea living outside these protected areas. Such species may be quite safe in the short term, but in the long term their futures can be uncertain. I plan to collect blood from kea at several parks, and by comparing DNA or blood proteins assess how isolated these populations are.

One hundred years ago all New Zealand's parrots and parakeets were common, but all have declined. Today the kakapo is on the brink of extinction, on the mainland kaka are uncommon and declining, the orange-crowned parakeet is of uncertain status, red-crowned parakeets are scarce on the mainland and some island subspecies are extinct, and the yellow-crowned parakeet is now much restricted in distribution. Today, the kea is our only parrot that is readily observable at

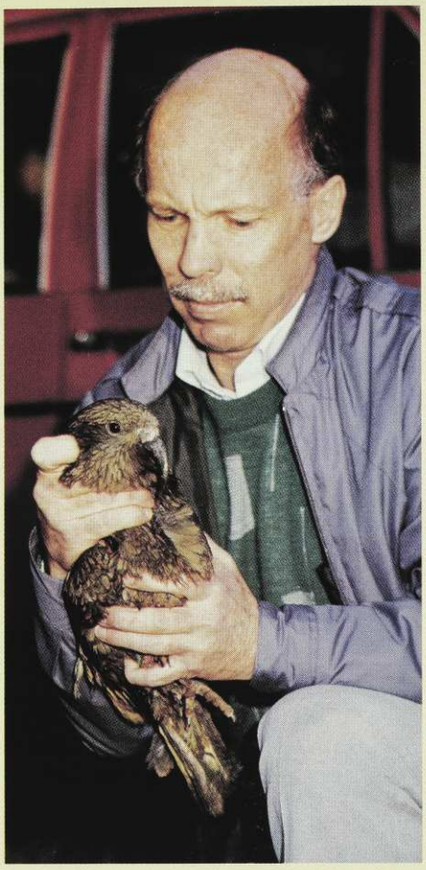
Kea Crimes

THE JUNE CASE of the "keanappers" proves just how vulnerable some of our native birds are. Kea are particularly at risk for the very reason that humans enjoy them – their engaging curiosity.

Parrots are especially under threat, as we pointed out in this magazine in February. It is estimated that a third of parrot species (103) are in sufficiently low numbers to cause concern, with a further 77 in grave danger of extinction. Poachers are hastening parrot species towards extinction: in 1986, 600,000 were traded worldwide, but only 20 percent reached their destination alive.

The kea poaching case demonstrates that the Department of Conservation must be adequately funded to counter this destructive trade; furthermore, fines must be increased to match those in Australia, where a person faces a maximum of $100,000 fine and up to five years in prison.

Gerard Hutching



DoC conservation officer Stu Moore holding one of the kea rescued from bird poachers. It was later released into the wild.
Photo: Christchurch Press

many localities on the main islands of New Zealand.

Conservation is not just a question of endangered species. New Zealand has many species that are still locally common but whose populations are small and isolated. In the face of continuing habitat loss and habitat modification, their future is uncertain. The endangered kakapo and kaka grab our attention and resources, while kea and parakeets may be sliding downhill to join them.

Long may the tranquility of the South Island mountains be shattered by the raucous screams of kea.

If you see banded kea please record location, date and colour combinations. Take care to note which leg each band is on and whether the coloured bands are above or below the metal or other colour bands. If you can read the number on the metal band this is even better. Please send sightings to Kerry Wilson, Entomology Department, Lincoln University, Canterbury.

Acknowledgements

I wish to thank the staff at Mt Cook, Arthur's Pass and Craigieburn for the help they have given. Thanks to all the people who have helped band kea or reported sightings of banded birds. Rowan Emberson, Marnie Barrell and Ria Brejaart kindly commented on this manuscript. This research has been funded by the Lincoln University Research Fund and the Department of Conservation.

Kerry-Jayne Wilson is a lecturer in ecology at Lincoln University. She is well known for her work on seals, carried out in the 1970s.

ISLANDS

Refuges for Threatened Species

Salvation for many of New Zealand's native species lies in the sanctuary of the offshore and outlying islands dotted around our shores. Dr John Craig reports on the successes and failures of island bird transfers and some of the issues involved.

TWO HUNDRED AND FIFTY PEOPLE stood around four boxes and watched 40 small birds fly to freedom on a new island.

As the birds left their travel boxes, the last was still eating – not yet realising that the door was open. The birds, oblivious to the people, eventually gathered in nearby trees, some calling to re-establish contact, others feeding immediately in their new home.

This first release of whitehead onto Tiritiri Matangi Island was just another planned transfer of one of our endemic native birds to an offshore island. Over 150 such releases have been made during the last century although the reasons, methods, success and personnel involved have varied widely.

Human colonization of New Zealand has had an enormous impact on our native fauna and flora. The extensive destruction of forest, wetlands, tussocklands and shrublands greatly reduced wildlife habitat and the plight of native birds has been compounded by the introduction of mammalian predators and herbivores. Eradication or even effective control of mammalian pests on the mainland is expensive and time consuming, and current control techniques are effective for only a short period. Island transfers are an essential safeguard against mainland extinctions. With over 700 islands around the coast we are fortunate to have a chance to retain some of our precious endangered wildlife.

Islands Important

The importance of islands for the long term conservation of our native animals was recognised at the end of the last century when a flurry of activity saw kakapo and kiwi released onto a number of islands. Government purchase of Hauturu (Little Barrier), Kapiti and Resolution Islands was an important part of this early conservation effort and Hauturu and Kapiti remain a prime part of our conservation estate. The mammoth efforts of Richard Henry on Resolution Island are known to most not for the success but for the total failure of his venture.

For the conservation of most threatened species, islands are only useful if they do not have harmful introduced mammals and are far enough offshore to preclude invasion by stoats, rats and deer. It was ignorance of these very points which caused the failure of many early bird transfers to islands. For example, early transfers of kakapo and saddleback to Hauturu and Kapiti failed because both islands already had cats and Kapiti also had Norway rats. It was the subsequent arrival of stoats that spelt doom to the hundreds of kakapo and kiwi Richard Henry had transferred to Resolution Island.

The late Gordon Williams, a director of the Wildlife Service, noted that the "salutary lesson (of choosing islands out of the swimming range of stoats) remains unforgotten and strongly influences the choice of receptor islands by Henry's successors". The unfortunate use of Maud and Motukawanui Islands for saddleback transfers and their subsequent loss to stoats suggests that the reasons for Richard Henry's failure was still not fully appreciated. The continued use of Maud Island, known to be within the swimming range of stoats, for transfers of some of our rarest animals, such as kakapo, takahe and giant weta, highlights an ongoing dilemma for wildlife managers.

Success or Failure?

Why do some releases succeed and others fail? Largely we do not know, and it is unlikely that the same factors are responsible each time. Predators are clearly responsible in the examples of saddleback declines on Kapiti, Maud and Motukawanui. Catastrophes such as cyclones soon after release can reduce numbers to very low levels as well. For example, a cyclone killed most of the first Wildlife Service release of red-crowned kakariki on Tiritiri. Similarly a few days after a subsequent release done by Auckland University, a cyclone struck and we picked up many of the new birds dead on tracks.

Competition from related species, another factor that influences the outcome of a transfer, can usually be avoided although it does present difficulties in the case of the stitchbird. There is a very marked dominance hierarchy among our three honeyeaters, and stitchbird (especially the females) are at the bottom of this pecking order. This means that establishing small numbers of stitchbirds on islands where bellbirds are already present in large numbers will be difficult. For this reason islands such as Mokoia, now that the rats have been removed and Rangitoto, once the cats, rats and stoats have been removed, may offer the best chance for future transfers of our rarest honeyeater.

People often point to the small numbers of birds relocated as a reason for transfer failure but we have few releases of small numbers that are not complicated by other variables such as predators. Anticipating problems with transfers of the few remaining black robin, Doug Flack released just five South Island robins onto Motuara and Alports Islands in the Marlborough Sounds. Both transfers were successful. The eventual transfer of the last seven black robins was also successful although it was the intensive management by Don Merton and his dedicated team that saved this species from extinction. These successful transfers of small numbers of robins contrasts with the inexplicable failure of two saddleback transfers of 29 (1968) and 30 (1985) to Fanal Island in the Far North.

Overseas work has suggested that known pairs and neighbours often establish better than a random mix of individuals. In the 1984 saddleback transfer onto Tiritiri Island, groupings of known pairs from the same area on Cuvier and hence sharing the same song were released into the same forest patch together. Most of these pair bonds remained intact during the first year and the Tiritiri population had the highest survival rate of any saddleback release. A planned trial release of pairs and unpaired saddleback onto Kapiti by Tim Lovegrove appears to have produced the reverse result with many of the pairs separating. While many factors differed between these releases, we would clearly benefit by planning future translocations as scientific trials to test the influence of numbers and sociality.

Insignificant Failures

The few failures pale into insignificance compared with the enormous numbers of successful transfers. Although North Island saddlebacks failed on Fanal Island, transfers elsewhere have been so successful that we can hardly consider North Island saddleback endangered any longer. Saddleback provide an excellent example of how continued success and the development of transfer technology has allowed increasingly bold and innovative transfers, which continue to keep New Zealand at the forefront of bird transfer work.

Between 1925 and 1950 several unsuccessful attempts were made to transfer North Island saddleback onto islands in addition to Hen. The real successes began in the 1960s when transfers were made to Whatupuke (1964), Red Mercury (1966) and then Cuvier (1968). The experience gained in the Whatupuke transfer proved invaluable when a rapid response was needed to the ship rat invasion of Big South Cape Islands. South Island saddleback were rapidly transferred to islands nearby and subsequently as far as the Marlborough Sounds.

The continued success of saddleback transfers onto kiore-only islands but their failure to increase on Kapiti led to a highly innovative programme by Tim Lovegrove. Noticing that many saddleback were lost to Norway rats and weka at roost and nest sites, Tim began a programme of providing roost and nest boxes on Kapiti. By erecting similar boxes on Kawhitihu (Stanley) Island he established a trained source population. Even this mammoth task (involving many volunteers) has failed to produce a population that can increase in the presence of rats and hopes of eventual transfers to the mainland have faded. The prospect for Kapiti populations

looks brighter as increasing successes in rodent eradication on islands (kiore off Korupuke and Raurima, Norway rats off Whale and Breaksea and mice off Mana to mention just a few) suggest that Kapiti could be rid of rodents if funds are available.

New Technologies

Transfer technologies have increased markedly in recent years.

The intensive trials of aviary holding, feeding and transfer methods requested prior to David Allen's whitehead transfer from Hauturu to Tiritiri and the provision of temporary aviaries, nest and roost boxes plus supplementary feeding for saddleback transferred to Kapiti are a vast improvement on the transfers of even the 1960s and early 1970s. Gordon Williams rightly called these and earlier attempts "marooning" as little other than selection of release sites was possible. Many early island releases were reactive attempts to save species from impending extinction but there is an increasing movement towards carefully planned transfers as part of integrated conservation management. With this change comes increasing scientific and public debate of the plethora of factors that must be considered when planning transfers.

The Conference on the Ecological Restoration of Islands held in Auckland in December 1989 brought together many of the people involved in island management and research. Advantages and disadvantages of animal and plant transfers were considered and debated. The proceedings of this conference will provide important material for future planning and discussion. One issue is the impact of transfers on existing flora and fauna. With the exception of the transfer of one lizard, one insect, and two snail species, all recorded animal transfers for conservation in New Zealand have been of birds. The increasing awareness of New Zealanders that their highly distinctive native animals include more than birds has led to questions of whether all transfers have been beneficial.

For example, many people consider the numerous transfers of weka to offshore islands as detrimental. Weka are implicated in the loss of little spotted kiwi eggs, saddleback fledglings on Kapiti and Cook's petrels on Codfish Island. They have been removed from Codfish Island in case they might harm kakapo and petrels. Most weka releases were originally to provide food for people on remote islands – conservation was not a consideration. However, the transfer of buff weka to the Chathams in 1905 has ensured the survival of that weka which subsequently disappeared from the South Island mainland.

Recently Mike Meads and Alison Ballance have suggested that saddleback introduced onto Mercury Islands and Hauturu may adversely affected the tree and giant weta populations. We can avoid similar conflicts on Maud Island by continuing to fence takahe out of sensitive areas and ensuring that saddleback are not re-released. It is important to realise that other native species have preyed on birds – the loss of Antipodes Island kakariki to tuatara predation on Stephens Island is the most obvious example.

Careful planning is the key. In the past, the least modified islands were considered the most desirable for transfers of endangered species as these were the only places which seemed to have sufficient and suitable habitat. Our increased ability to remove noxious mammals means that we can now leave our more pristine islands untouched and select some of our highly modified islands for rehabilitation and transfers. Conflicts will still arise, however, as the example of Mana Island has shown. Use of rehabilitated islands has the added advantage of allowing involvement by the public.

There is always a danger that releasing too many species onto an island will upset the existing community balance. Careful choice of species will minimise this risk and the greatest care should be taken with our least modified islands. During the last 30 years five bird species have been released on Maud Island and Hauturu, Kapiti and Tiritiri have received four species. Releases on Maud and Kapiti have met with mixed success, and it will be some time before we know the outcome of the kakapo and black petrel releases onto Hauturu. Both were laudable experiments, but given the results of transfers of shearwaters onto Bass Strait Islands we should not be too hopeful for the black petrel work.

Popular as bird transfers are, few are accompanied by as much media interest as the recent release of a kakapo on Maud Island. DoC's Darryl Eason holds the parrot while Comalco chief executive Kerry McDonald looks on.

Phenomenal Success

Tiritiri has been a phenomenal success. All four new species have bred in their first year, with two of them breeding at far higher rates than elsewhere. Brown teal have reared two broods instead of one each year, and saddlebacks have been producing up to four broods per season. Moreover, instead of producing the usual clutch of two, some birds have been laying three and four eggs. Approximately 100 young saddlebacks were fledged in the 1989/90 season; they have been astonishingly productive!

Most past island transfers have been for the protection of threatened species. This has involved no public debate and has totally excluded public involvement both during and after the transfer. There is an increasing realization that conservation is for people of both present and future generations and we can all benefit greatly by establishing wild populations of rare birds on islands accessible to the public. Tiritiri Matangi Island is the best example of this approach. Similar projects on Mana Island and Motuora (Hauraki Gulf) are planned.

The development of Tiritiri was planned to provide an open sanctuary for rare animals. Since 1984 over 180,000 trees have been planted by thousands of volunteers. These trees have grown so rapidly that birds including saddleback already live and breed in the regenerating forest. Releases have included red-crowned kakariki (4), saddleback, brown teal, whitehead (2) and in the near future will include more brown teal, plus robin, takahe and little-spotted kiwi. From a little-visited island of the 1970s (200-300 people per year), visitor numbers are growing rapidly with over 8,000 expected in 1990. Visits to witness bird releases are most popular.

Involving the public in conservation is important from the early planning phase. Many people do not see why indigenous species, especially birds, should receive so much attention as all animals including exotic species have the right to exist.

When Neil Mitchell and I suggested in 1982 that wallaby and possum should be removed from Rangitoto and Motutapu the response of some people was to release wallaby on Brown's and Great Barrier Island. Similarly when it was announced that weka would not be released on Tiritiri as they may compromise other transfers, someone put a weka on the island. These actions demonstrate that the public do have views, some strongly held, and it is important to allow full and open debate to ensure that plans include as many viewpoints as possible. I believe that present plans to remove wallaby and possum from Rangitoto and Motutapu will receive wider support if rodents, cats and mustelids are removed at the same time. Everyone should be informed that the value of these islands will be greatly enhanced by removing exotic animals to allow transfers of rare native birds such as stitchbird, saddleback, kakariki and whitehead. The public readily associate with birds so let us use them to ensure the best for both the plants and the animals!

Most of the previous transfers were initiated and carried out by staff of the Department of Conservation or its predecessor, the Wildlife Service. Names such as Brian Bell, Don Merton and Dick Veitch crop up time and time again. More recently private individuals, including Forest and Bird groups, have initiated island and mainland transfers. Bellbird, robin and brown teal transfers to Moturoa Island, and bellbirds to Waiheke and to Whangarei Heads are examples.

Island transfers of birds, which have been responsible for saving many species such as black robin and saddlebacks, have readily captured public attention. They take conservation into everyone's living room via the media, and as seen on Tiritiri Matangi are actively involving New Zealanders. As such, bird transfers are powerful weapons to counter public apathy and can with sponsorship be used to bolster New Zealand's small budget for conservation. Finally, bird transfers and associated pest eradications are responsible for an important part of New Zealand's international image in conservation.

John L. Craig is an Associate Professor in Zoology and Deputy Dean of Science at Auckland University. He teaches behaviour, ecology and conservation and is a keen advocate for more public participation and debate in conservation. His own and his graduate student research is largely on native birds and introduced mammals, especially fantail, pukeko, bellbird, tui, saddleback and kiore. He has been actively involved in the Tiritiri 'open sanctuary'. John considers himself fortunate to have been involved in three releases of red-crowned kakariki, two of brown teal, three of bellbird, plus one each of saddleback, kakapo and whitehead.

Possum Peril

by Ian James

The forests may have been protected from logging, but how can they be protected from possums? Photo: Terry Fitzgibbon

WHAT A TRAGEDY for New Zealand when possums were first introduced from Australia in 1837. Now 150 years later it is hard not to feel a sense of despair when confronting the enormity of the changes they have wrought to our native plants and animals.

Possums are most damaging to forests when their numbers reach a maximum following the colonisation of new habitat. The West Coast passed through this peak phase in the 1950s and 1960s when the central alpine valleys suffered extensive dieback of rata, kamahi, and Hall's totara. This is why such concern is being expressed at the present time for the dieback in the pohutukawa and kauri forests of Northland. When one considers that the trees in both areas have life cycles of several centuries it is obvious that the forests will take many years to stabilise.

Because the funds available for controlling possums are limited it is important that we make the best choices in protecting conservation values. We must also remember that the commitment will be ongoing for decades, or longer, unless some effective biological control becomes available.

There are only two strategies for wild animals: to eradicate or control numbers. Eradication, the most desirable and cost-effective option over the longterm, is possible only for islands where there is no chance of recolonisation. The only realistic strategy for possums on mainland New Zealand is sustained control.

Determining Priorities

The Department of Conservation (DoC) is currently rethinking its strategies for possum control. In the past the Forest Service priorities were set primarily on the degree of rata dieback in mountain valleys, and the downstream capital values believed to be at risk from induced erosion and flooding. DoC is taking a more holistic approach in that both the forest and wildlife values are considered equally.

The first stage is to identify and rank the most important conservation values. For management purposes it is better to identify a single endangered species because the success of control can then be measured directly by the response of this species. The conservation values are classified according to how vulnerable they are to possums.

Then comes the practical realities of control. What has been the history of control in the area? Is it possible to maintain possum numbers at the level required to protect the conservation value? What is the risk of recolonisation from adjacent areas? Are other damaging wild animals present and can they be controlled?

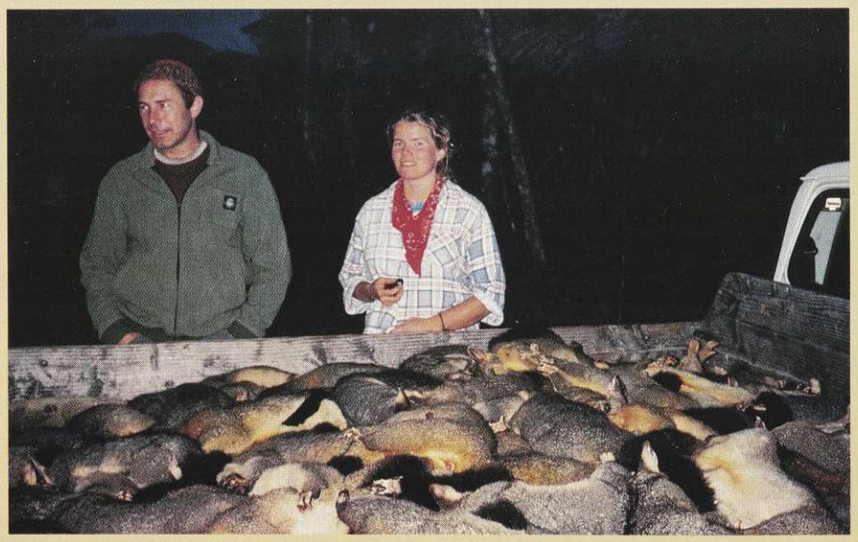
Each proposal for possum control is ranked according to the above factors and considered on equal terms with every other proposal. It is a process involving difficult choices, especially where many deserving cases will miss out through lack of funds.

Because there are many value judgements within the process, the priorities should not only be made by a few specialist people. Every interested person should have the chance to participate and are welcome to contribute their views.

On the West Coast DoC has determined that its priorities should include the Paparoa National Park. The goal is to protect magnificent northern rata trees and the unique coastal forests, and to prevent possums interfering with the nesting sites of the Westland Black Petrel.

Shifting the balance

By Forest and Bird Northern Conservation Officer Fiona Edwards



Bryan Innes and Shelley Trotter with a night's possum haul from Tangihua Forest. Photo: Fiona Edwards

PART TIME professional possum trapper Bryan Innes is not your usual bushman. Equally at home waxing poetic about human's relationship to nature as following a trapline in the forest, he is a man with a mission – to rid native forests of destructive possums, and at the same time provide employment for the people of the north.

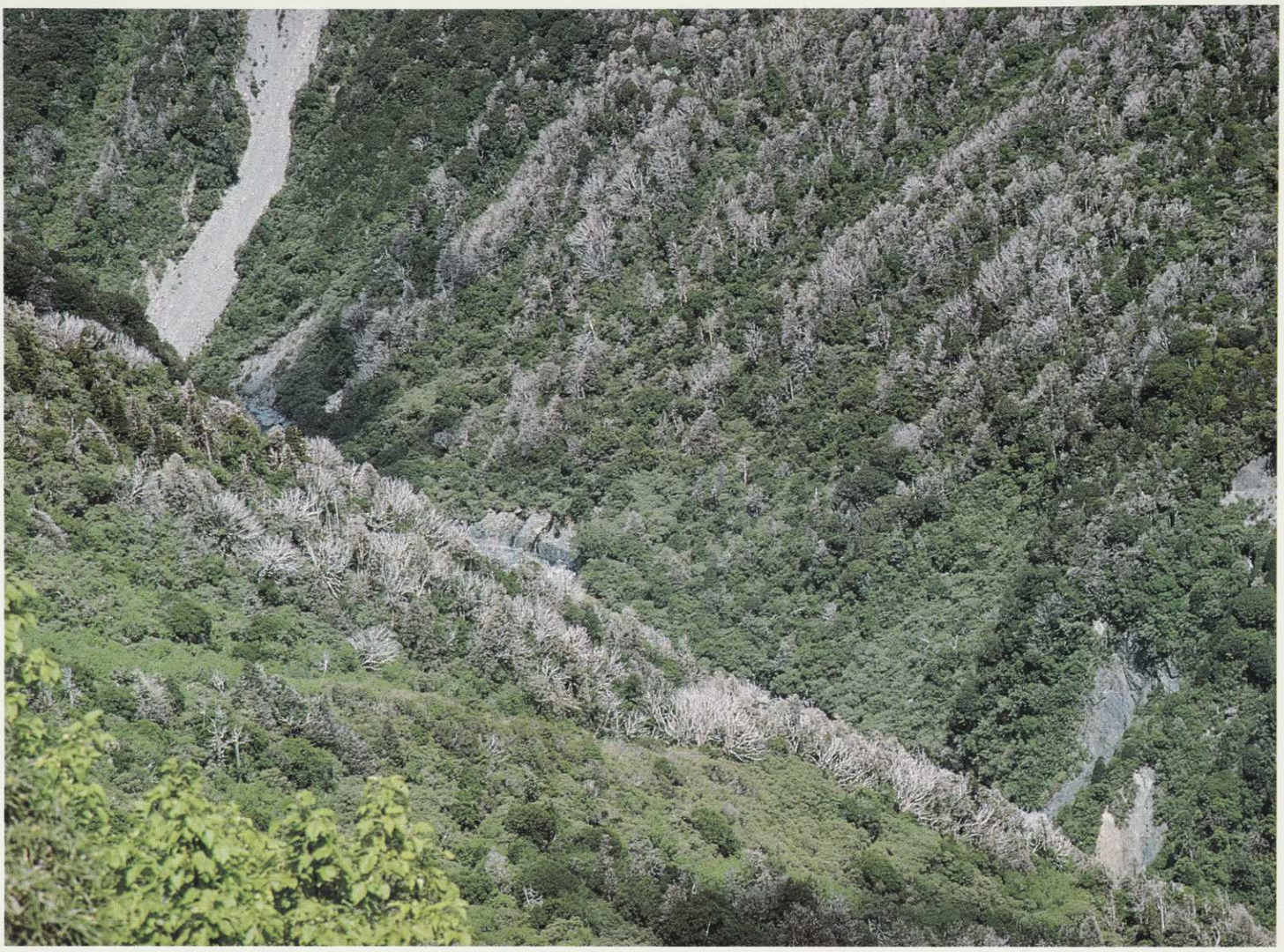
"We must learn to live with the possum – it is here to stay. We are the possum's only predator and as such we must ensure the balance which will enable our native bush to survive in something approaching its present form," Whangarei-based Bryan says.

The scope of the possum problem in the north is staggering. New Zealand-wide there are estimated to be 70 million possums. In Northland alone the population is put at around 20 million, with one of our best known forests, Waipoua – home to giant kauri such as Tane Mahuta and Te Matua Ngahere – containing an estimated 300,000 possums. Department of Conservation's John Beechman suggests there are between 5 and 10 possums per hectare.

Despite this low density, because of possums' selective eating habits the damage is dramatic. Bryan Innes puts it this way:

"Possums target their preferred or 'ice cream' species for the season such as rata or kohekohe. Like sheep which prefer sweet new grass, possums prefer new growth. After being browsed, a healthy tree will push out new growth in order to survive. This new growth attracts all the possums in the surrounding area and is heavily browsed by them.

"The result is that the poor tree has all its new growth for the entire season eaten as it is produced. The average life of the leaves on a tree is one to two



A possum population explosion occurred on the West Coast in the 1950s and 1960s. The result is the deaths of beautiful rata forests in valleys such as the Mungo, a tributary of the Hokitika River. Photo: Mike Harding

years. After two years of being subjected to intensive possum browsing, the tree's old leaves fall and the tree dies. From there the possums will move onto a neighbouring healthy tree. They work their way through an individual species, then move on to less palatable species until the forest is progressively destroyed," explains Bryan.

In his eyes, possums destroy more than just forest; they also do away with people's livelihoods. Bryan estimates that Northland's forests could attract tens of thousands of international hunting tourists a year. The attractions include pigs, goats, ducks and eels. Guided tramping and bird watching trips are other ventures which could be developed.

The action plan that he and colleagues have developed is positive, practical and achievable.

Together they have set up the New Zealand Conservancy Trust. Bryan is working on a voluntary basis to investigate forest products, establish guide cooperatives, "re-establish the place of professional hunters of goats, deer and possums, to involve people from town and countryside in shifting the balance with possums and goats more in favour of trees and birds."

During two weeks in May about 30 trappers and volunteers gathered at Tangihua Forest in an attempt to significantly reduce the possum population. Each volunteer accompanied a trapper and helped to pre-feed with peanut butter along the possum line. The following day the trappers placed cyanide bait where pre-feed had been consumed.

Dead possums were skinned or simply counted and any remaining cyanide baits were scrubbed, that is, smeared under foot into the wet ground where the moisture rendered them harmless.

During the time that the group worked at Tangihua Forest, thousands of possums were eradicated. In fact before the two weeks was up new grass was already growing on the possum runs emerging on the the surrounding farmlands.

The Trust wants to see teenage conservation clubs set up throughout the country, based in schools but whose activities would be primarily after school and during weekends. The young people would learn bush skills, forest ecology and how to eradicate weeds and pests from native forests. Club members would be taught a variety of humane trapping methods as well as safe rifle handling.

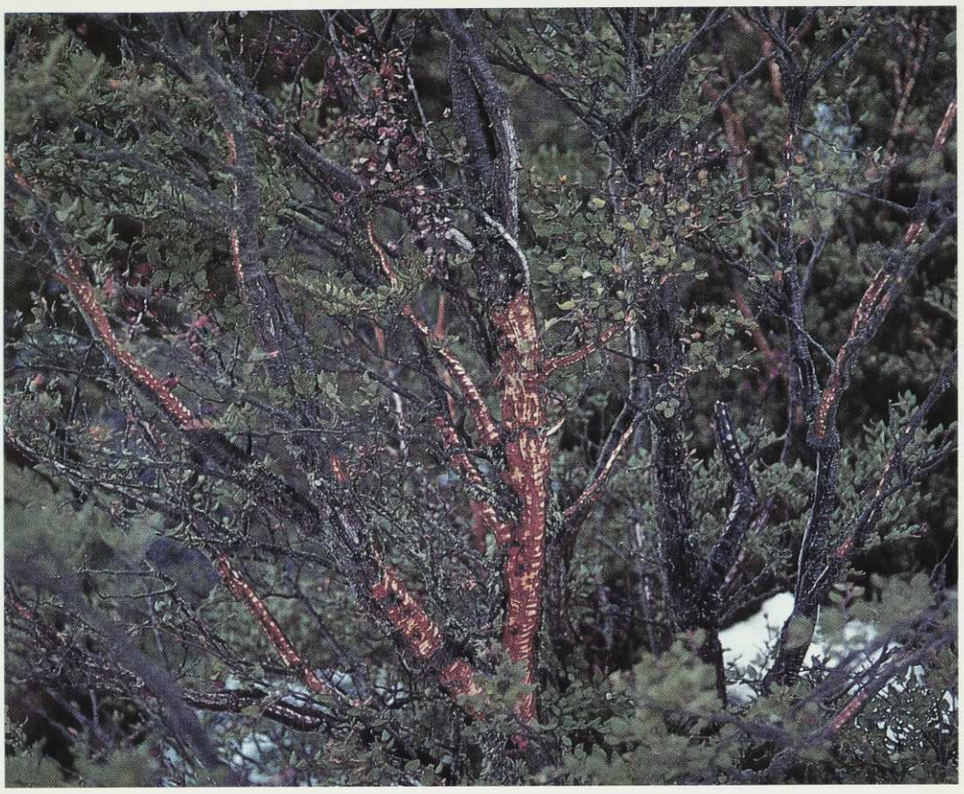
Funds to purchase equipment would come from club membership fees, or possibly corporate sponsors and the Lottery Board.

Bryan believes Northland is an ideal location from which to launch the club, with an initial aim to control possums.

In the medium term, while massive possum eradication programmes are put in place, the Trust is seeking international and domestic markets for a special possum product – leather. A trial of 200 skins have been tanned to produce a pliable, strong leather suitable for book binding or quality garments such as footwear. Samples of the leather will be flown to China to test consumer reaction.

Other possum products such as meat and petfood are currently being investigated. The Chinese have a similar bear-like animal which they are accustomed to eating. Some people find the possum smell in possum petfood offensive but cooking and masking techniques can overcome this in the manufacturing process. Possum petfood is rated highly; it gives Bryan's dogs lustrous coats and makes them thrive, he contends.

If you would like to know more about the NZ Conservancy Trust, write to Bryan Innes, PO Box 279, Whangarei, or phone (089) 482-196.



Beech is not one of the possum's preferred species. However possums are known to de-bark trees in order to mark a territory. Photo: Mike Harding

Arthur's Pass and Westland National Parks are included to protect the glorious alpine rata forests. The areas chosen within the parks are the Otira and Deception Valleys, and the Karangarua and Copland Valleys, respectively. These areas contain the last remaining unmodified rata forests in Westland.

Probably the most important priority are the South Westland forests which form part of the proposed South West New Zealand World Heritage. The southern region, where possums have not fully colonised, has outstanding wildlife values with good populations of kaka, kakariki, kiwi, and yellowheads. The area is also a stronghold for mistletoes and native fuchsia. The goal is to keep possums at very low numbers so they never cause the environmental catastrophe of peak population levels experienced further north.

Control Systems

As well as the process of choosing priorities the Department is debating whether the means of possum control should change. The present day official control method is to use large scale aerial poisoning operations with either 1080 carrots or grain baits. These operations are done on a massive scale about once every five to ten years.

One problem with aerial poisoning is that the benefit to the conservation value being protected is temporary. That is, the protection lasts for a few years after poisoning and is gradually lost as possum numbers increase again. This see-saw protection sets up a basic instability in the ecosystem which may in some cases nullify the benefits of control.

Current thinking is that a "gamekeeper" approach is preferable, where possums are controlled every year. This should produce a more stable environment for the endangered species. Previous intermittent operations required large one-off funding allocations which were not always forthcoming when needed.

Aerial 1080 Poisoning or Ground Hunters?

No conservation manager is happy to use pesticides on such a vast scale despite assurances from scientists that the dangers are minimal. Because 1080 poison is also an insecticide there are many uncertainties about its total effect on the environment. Conservation gains in controlling possums need to be balanced against the potential harmful effects of the 1080 itself.

Large-scale aerial poisoning is never popular with local possum hunters. Possum hunting has traditionally been an important source of income for many rural people. Until the collapse of the fur industry these hunters made an important contribution to national possum control.

It is my personal view that the best answer for possum control is to use rural people. In districts such as the West Coast, with high unemployment, we should use ground hunters if they are as cost-effective as aerial poisoning.

Hunting on wages is rarely cost-effective because of the high overheads of supervising and servicing people in the back country. The

The 1080 Debate

EVERYONE AGREES that possums are a nuisance. The question is how best to control them.

The Northland Conservancy of the Department of Conservation were allocated $700,000 for possum control in Waipoua Forest, and favoured the use of 1080 poison.

1080 was introduced to New Zealand in 1954 to control possums and rabbits. It is also used against wasps. There is no effective antidote against accidental poisoning, and the poison breaks down in contact with soil bacteria and therefore is biodegradable. It is not an accumulative toxin. 1080 is dropped from the air, mixed into green dyed cereal pellets about 2 cm in length and flavoured with cinnamon. More than 150 tonnes of pellets will descend on the forest, or one bait every 2-3 square metres.

Speaking for the trees: conservationist Stephen King has been raising awareness in the north abour possum damage to kauri forests. Photo: Stephen King

The Department says the use of pellets of this size, colour and smell will make them unattractive to birds, minimising the risk to brown kiwi and berry and insect-eating birds.

Bryan Innes argues that intensive trapping is better than poisoning. He believes it would take hunters 12 months to control possums in Waipoua Forest, and at a cheaper cost than the 1080 drop.

DoC respects the trappers' claims, but notes that the terrain in the 31,000 hectare forest is rugged and that tracks would have to be cut through the forest. As 10-15 percent of the forest canopy dies each year as a result of possum damage, any further delay means more dead trees.

Environmentalist and botanist Stephen King backs the use of 1080 in the North's forests. He makes a distinction between "pre-peak" and "post-peak" forests. The kauri forests are still in a pre-peak infestation phase, but within a year it could be too late, he argues.

"Do the 1080 drop first and bring in the trappers on a permanent basis afterwards," he says. He supports the use of 1080 for safeguarding such threatened species as kokako, believing that if we want to save them on the mainland there is at present little other choice.

Fiona Edwards

The Timms Trap – Possum Trapping Made Easy

Noeleen Clements and the user-friendly Timms Trap. Photos: Fiona Edwards

KILLING POSSUMS can be an unpleasant business, no matter how much one dislikes the damage they inflict on forests.

However a trap which has come on the market in recent years makes possum trapping relatively simple for the ordinary person.

Noeleen Clements is one such. A committed Forest and Bird member from Ruatangata, west of Whangarei, she is also committed to the eradication of what she describes as "furry, brown-eyed overstayers."

Last year Noeleen and husband Tony moved onto a 9-hectare property, covered with a mixture of mature bush, regenerating scrub and blackberry. They bought the block to enjoy the bush and the birds. Instead they saw the bush start to die and the birds disappear.

After witnessing totara trees debarked and their fresh shoots eaten bare, the taraire berries consumed by possums instead of pigeons, and brown kiwi evicted from their nests by squatting possums, Noeleen took action.

Armed with three Timms Traps, she has killed 300 possums in the last 12 months. Each possum is attracted to the trap by the bait placed inside the innocuous looking plastic box. Inside the trap is a simple device which quickly and effectively breaks the animal's neck once it takes the bait. The possum is killed instantly.

Noeleen then scoops the possum out and buries it. On the top she plants a native tree. "The possums had a go at my bush; now the bush can have a go at them!" she laughs.

Fiona Edwards

The result: the possum is killed instantly

Notes on Timms Traps

- Timms Traps are especially designed for trapping possums in easily accessible areas.
- Use apples as bait as possums like the smell.
- Move traps around the property and place in nesting sites such as logs, holes, dense scrub.
- If you have household pets, place pepper around the trap.
- Keep children away from the traps.
- The traps retail for around $30-$40 and can be purchased from the Department of Conservation or stock agents.

very nature of the job attracts independent and self-sufficient characters who work far better on their own, taking responsibility for themselves. Such people respond better to contracts with good rewards for performance.

DoC is trialing several alternative contract systems for employing ground hunters. These vary from a simple incentive payment to a retainer plus incentive or bonus. Already it has been found that no single contract system is best overall. Factors such as the degree of control required, and the initial density of possums, influence the cost-effectiveness of each system.

It is important to determine accurately the costs of control in simple terms, for example costs per possum and per hectare, so that the control methods can be compared and optimised. These analyses must be kept open and accountable to the public.

Possum control cannot be viewed simply in terms of conservation values. There is the economic threat they pose to our primary industries through the spread of bovine TB. On the West Coast, where MAF, Regional Council, NZ Employment, and farmers are all involved, a regional strategy must be devised to co-ordinate these different interest groups.

Conservationists have much to contribute and gain from a unified approach rather than suffer from divisive rivalry. In the longterm it could be that the need to protect our agricultural industry, and provide worthwhile employment, will supply the impetus to make real gains in protecting our environment

Ian James is a consultant to the Department of Conservation. He lives in Harihari, South Westland.

THE AHURIRI ESTUARY
The story of an urban wetland

By David Appleton

DURING THE 19TH CENTURY 3,800 ha of swamp and tidal lagoon sprawled between the embryonic Napier township and distant inland hills. Dominant in this sheet of wetlands was an expanse of tidal flood, shell-banks and islets, known to the Maori as Te Whanganui-o-Rotu, a lagoon rich in shellfish, finfish and birdlife and an important source of kai moana for the occupants of numerous surrounding villages.

However, these natural wetlands were decisively altered by the 1931 earthquake and its two-metre land upheaval, followed by the construction of a network of stopbanks and sluices that, over a period of years, helped to transform the great lagoon and its surrounding swamps into today's city suburbs, airport and pastoral flatlands. The remains of Te Whanganui-o-Rotu lagoon exist today only as scattered pockets of saline marshland, spread around the 450ha stopbank-constricted tidal estuary. This winds its way inland below the wave-cut hill faces that in earlier times stood as a barrier between the ocean's overflow and the palisaded villages of the local Kahungunu people.

Unique Resource

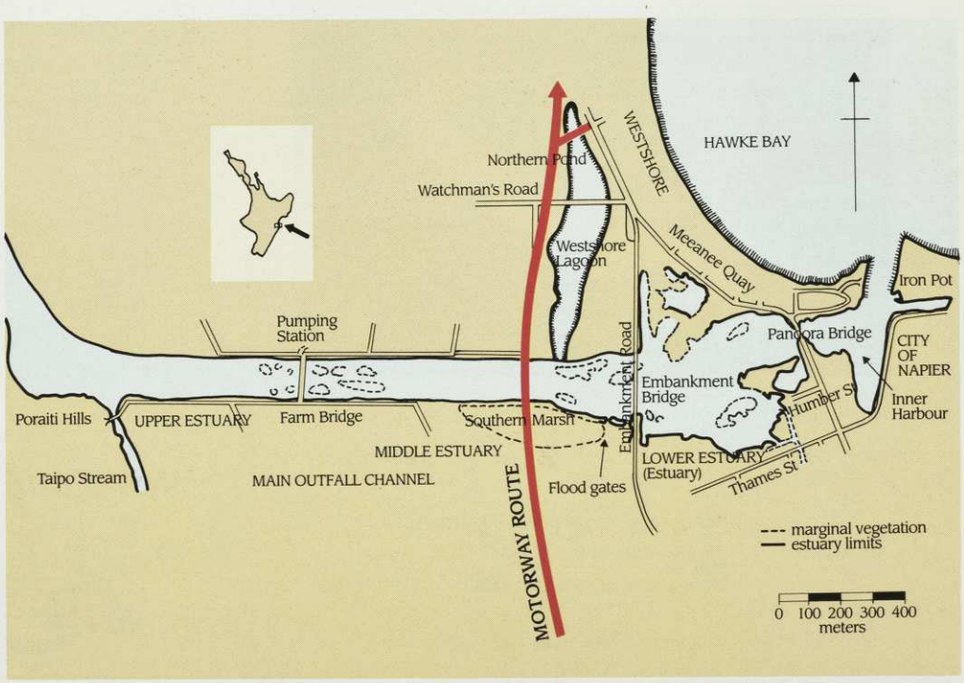
Thus, irreversible change shaped Napier and its surroundings, despite which the Ahuriri Estuary and wetlands remain a unique and valuable natural resource in Hawke's Bay. Fisheries researchers have revealed that the tidal waterway provides both breeding and feeding areas for fish species that are not present in other estuaries in Hawke's Bay. Indeed, the estuary functions as an irreplaceable food-source for shoals of immature coastal fish species such as kahawai, mullet and trevally. During summer, runnels and submerged mudflats provide a rich feeding area for myriads of tiny flat-fish, while mature flounders scour the channels for food, in company with parore and grey mullet.

Similarly, a wide variety of birds depend upon the tidal flats and saline wetlands, both as a food-source and for sheltered roosting. Flocks of summer-visiting godwits pick over the mudflats and, as the tide floods in across their feeding rounds, they rise, wheeling up and across to the nearby Southern Marsh, to alight and sleep away the high-tide hours. Rarer Arctic breeding birds occasionally drop in to join the godwits: pectoral and sharp-tailed sandpipers, stints, curlew and marsh sandpipers, and once a shy, solitary yellow-legs (*Tringa flavipes*) that had wandered over from the Americas. A pair of gull-billed terns stayed for several years while this summer two dusky-winged marsh terns (*Chlidonias leucopterus*) hawk insects, swallow-like, above the lagoons.

There are few places in New Zealand where such a variety of migratory birds can be seen. So, despite its restricted area and city-edge location, the estuary has become rather special for both local and visiting birders.

The Ahuriri Estuary is today but a shadow of its former self, having been affected by the 1931 earthquake, drainage and reclamation. The latest threat to it is from a planned motorway, destined to slice through the Northern Pond and the Southern Marsh (see map). The area in the foreground is planned to have a slip-road across it, to feed traffic from Westshore, onto the motorway. It provides a rich feeding and roosting area for ducks, black swans and some waders. During the winter, up to 40 harriers occupy a communal roost that is located in the rush beds, on the right of the "pond". The motorway is planned to run directly beside the roost site. Photo: David Appleton

During 1987 the transformation of government departments into state-owned enterprises resulted in a widespread land reallocation exercise and this eventually saw most of the estuarine waterway and some wetlands passed over to the Department of Conservation. Government activities during the past two years have accelerated plans for changes in coastal land management with local authorities clamouring for control of both estuaries and foreshores. The current picture of legislative change remains blurred as parliamentary Bills, now under consideration, would place tidal waterways under Crown title but regional authority management, with mandatory management plans to be finally approved by the Minister for Conservation; this is, however, yet to be finalised. Ex-Harbour Board-owned wetlands around the estuary remain subject to outstanding title



Small though the Ahuriri Estuary might be, it is a staging post for a number of wading and migrant birds such as knots and terek sandpipers. Photo: Brian Chudleigh

claims, lodged by the Department of Conservation. Collectively, this spate of change should eventually add up to considerable improvement on the previous multi-authority control and ownership situation.

Enhancement Begins

1989 saw the launching of the Conservation Corps and, in Napier, their work has taken the form of long-needed tree planting and landscape improvements between the lower estuary and nearby factories. At last, thanks to the Napier YMCA who organised the project, we have begun doing something to enhance the tidal waterway, instead of degrading it.

After years of planning submissions, public meetings and protests, it might seem that the days of major threats to the estuary could be drawing to a close, but this is unfortunately not so. Recently, plans for a motorway extension across the estuary have regained prominence with the route of the highway planned to cut across the Southern Marsh, so important for migratory birds, also to intrude upon the wetlands of the Wildlife Refuge. There is no indication that preservation of the estuarine environment received consideration during motorway plan drafting. Recently, with survey route marking, an environmental instigation has become essential.

Pollution is ever a threat to waterways and industries nearby the estuary have caused intermittent deterioration in estuary water quality, resulting in the death of bottom-dwelling plants and fish. It is imperative that tight pollution controls influence future planning of industries, for waste management control has been inadequate during the past.

Wetland Abuse

It would, of course, be quite reasonable to expect that an area of such outstanding natural value would enjoy protection and careful management but this has generally not been the case. Over the years a plethora of local authorities, operating under a wide variety of legislation, have interfered with the estuary and wetlands in a mostly self-serving manner. The Hawke's Bay Harbour Board, controlling much of the estuary and adjoining farmland, despite 1958 Wildlife Refuge status, filled wetlands and dredged aggregate from the tidal waterway and, in conjunction with Napier City Council, allocated wetland areas for industrial development. For many years, Napier City Council dumped domestic waste on both tidal and marshland areas.

This familiar pattern of wetland abuse continued until recent years, only slowly abating with the involvement of Ecology Action, a then-newly formed organisation that in the early 1970s battled against plans for a residential marina on part of the tidal estuary. Joined by the Napier branch of Forest and Bird, this spearhead of action against estuary degradation eventually culminated in the formation of the Ahuriri Estuary Protection Society Inc. Due to the combined efforts of these groups, local body politicians slowly came to appreciate the ecological and recreational importance of the estuary and its surroundings.

In 1979, Canterbury University studies provided data upon which future protective management could be based but the Harbour Board adhered to plans for further estuarine dredging and a museum of technology site was proposed beside a bird-rich lagoon area. Both plans generated public opposition and neither eventuated.

During the 1980s there were, however, environmentally sound projects getting underway. New city councillors proved themselves increasingly well informed on environmental matters and the 50 ha Westshore Domain became the subject of a new, comprehensive management plan that embraced development of the Domain as a wildlife refuge. New lagoon areas were excavated with the material removed being used to replenish the badly eroding Westshore beachfront. A nearby 14.5 ha lagoon, known as the North Pond, for some years allocated for "aerodrome purposes", is now to be redesignated as part of the wildlife refuge.

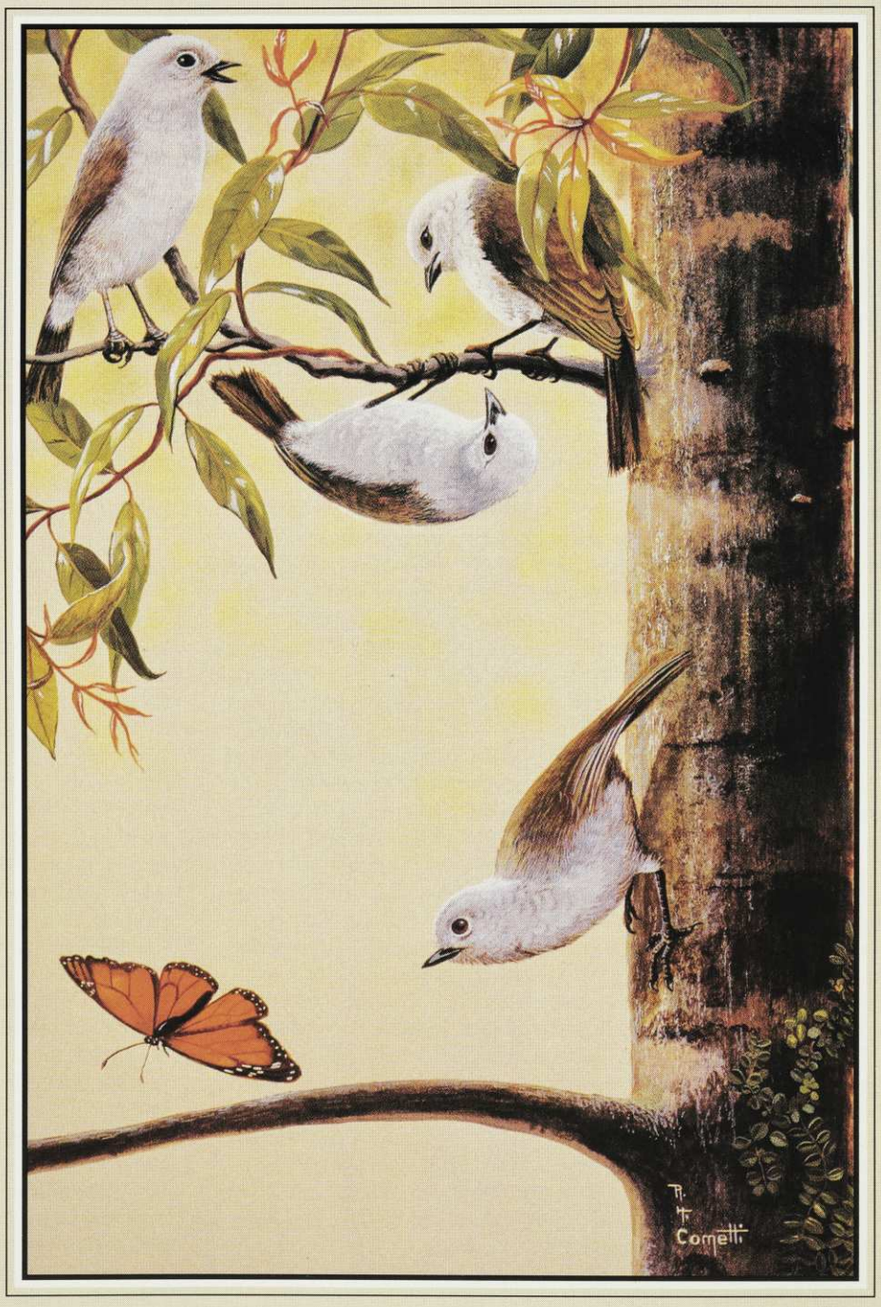
Some years ago the Napier City Council commenced a management plan for part of the estuary but this was discontinued due to lack of finance. Fortunately, the local Department of Conservation office has picked this up and is expanding the plan to cover the whole estuary and adjoining wetlands. The plan needs a long-term view, keyed to sustainable resource use, enabling restoration of degraded wetlands and protection of estuarine fish nursery and feeding habitat. Typically, facilities exist for the restoration of degraded raupo and sedge beds, both important for uncommon local bird species such as bitterns and crakes, while wetland areas need water level control regimes suited to the seasonal needs of wading birds and ducks.

With available Department of Conservation expertise, such fundamentally important factors can at last be given the attention they deserve. Adjacent to the city, the estuary caters for a wide variety of public activities such as fishing, swimming, wind-surfing, canoeing and sailing of radio-controlled model boats. With care and public co-operation the Ahuriri Estuary could become a successful example of controlled and compatible public uses, integrated into a management plan that is centred on the preservation and enhancement of a valuable wetlands ecosystem.

The Whitehead

Gregarious Bird of North Island Forests

By Brian Gill



Whiteheads foraging for insects among the branches of a tawa tree. Illustration: Ron Cometti, reproduced from the book Little Barrier Island, *with the permission of Hodder & Stoughton.*

"WHITEHEADS are versatile in their feeding and possess some of the special skills often associated with titmice (Paridae) ... of the Northern Hemisphere." So wrote John Gibb in a 1961 article, a time when so little was known about whiteheads that he had to guess their weight – "Whiteheads probably weigh about 25g." In 1983 I met Ian McLean (now of Canterbury University) and we discovered our common ambition of colour banding whiteheads on Little Barrier Island to see what we could learn about the lives of these elusive birds.

The whitehead or popokatea *(Mohoua albicilla)* occurs only in the North Island – in the South Island it is replaced by its slightly larger relative the yellowhead, and by the brown creeper which may have arisen as an alpine equivalent. On the mainland, whiteheads are largely restricted to fairly heavy bush, although in the Wellington area they move into settled areas adjacent to bush, and they have shown some ability to adapt to central North Island pine forests. Though they live in noisy groups they are not easy to see in tall, dense bush, and are not familiar birds to most of us. On the mainland north of a line from about Hamilton to Te Aroha, whiteheads died out last century, and in recent decades they disappeared from Great Barrier Island and its offlier Arid (Rakitu) Island. However, on Little Barrier Island whiteheads remain the commonest bird, and they are also common on Kapiti Island.

In 1984 and 1985 Ian and I banded nearly 180 whiteheads within a kilometre of the bunkhouse on Little Barrier Island. We were greatly assisted by Dick Veitch of the Wildlife Service, who was catching stitchbirds for transfer and whose netting teams caught many whiteheads. Each bird received a metal band and a unique combination of three plastic colour bands so that individuals could be recognised at a distance by those with the patience to follow such restless and fast moving birds. Ian concentrated on studying the breeding of whiteheads during two summers, whereas I kept long-term records of resightings. During five years I amassed some 2,000 records of individual whiteheads seen in particular grid-squares in particular months to help elucidate their population dynamics, a project sponsored by the Lottery Board. In 1986 David Allen began a study of the vocalisations of whiteheads, and two groups' use of space, for an M.Sc degree.

Sparrow-sized

Whiteheads are a little smaller than sparrows. The back, wings and tail are pale brown, and the underparts and head are white or whitish. Males are supposed to have brighter white heads than females. As we caught birds we wrote down their presumed sex, but later behavioural observations of the same individuals showed that we were often wrong – numerous dull-headed birds turned out to be males. Our measurements of birds later sexed from their behaviour showed that whiteheads weigh 12-20g with a very distinct separation of females (less than 16g) from males (16g or more). Certainly the birds with bright white heads and black legs were males, but so were many with dull heads and brown legs. It seems only the dominant breeding males have the bright colours.

Whiteheads feed mainly from leaves, twigs and branches at intermediate levels within the forest's vertical structure. They have long legs. The ratio of tarsus length to wing length is 0.40 in whiteheads compared with 0.34 in silvereyes. With their strong legs whiteheads are masters of the dense twiggy foliage in which they hunt meticulously for arthropod prey, particularly beetles, caterpillars and spiders. Like tree creepers, they easily scramble up and down vertical trunks probing the crevices for food. Like titmice and chickadees they can hang upside down if necessary, and use a foot to grasp foliage in which food is hidden. They can use a foot to pin down items while they break them apart with their beak, and they use their solid bill to prise off fragments of bark under which prey shelter. They supplement their diet with the fruits of native trees such as hangehange, puta-putaweta, mahoe and rimu.

Outside the breeding season, whiteheads forage in mixed flocks with silvereyes, grey warblers, fantails, tits, chaffinches, saddlebacks and red-crowned and yellow-crowned parakeets. Whiteheads are endemic to New Zealand at the subfamily level, so their ancestors arrived here a very long time ago. Whiteheads seem perfectly good fliers when you see them moving about within the forest, but at the edge of the bush they are reluctant to fly from tree to tree across open ground. When they do they lose height as they fly suggesting that they have started on the road to flightlessness down which many New Zealand land birds have travelled.

Communal Breeders

In his 1925 book *Bird Life on Island and Shore*, Guthrie-Smith reported his observations of whiteheads nesting on Little Barrier Island, and declared that "The particular mystery connected with the nidification of the Whitehead was the number of individuals in attendance upon a single nest." He found that "the vast proportion of Whiteheads' nests are administered by four birds, not two birds" and he wondered whether the "quartettes" comprised two pairs or a cock and three hens. In 1966, Mr Blanshard, the Little Barrier ranger, published observations that he and his daughter made near their house where they saw three adults systematically visiting a whitehead nest.

Ian McLean's observations of banded whiteheads in the first two summers soon confirmed our suspicions that the mystery at the whitehead nests was a form of what ornithologists now call communal breeding. This is a breeding system in which birds additional to the breeding pair help to feed the nestlings and fledglings. The more closely ornithologists have looked for it in the past two decades, the more examples they have found, especially in the Australasian region. Other New Zealand birds known to breed communally are the pukeko, rifleman and yellowhead.

The clutch-size of whiteheads on Little Barrier Island is small (2-4, mean 2.8) so it is likely that only one female lays and that there is only one father at each nest. Some pairs raise a brood unaided, but in most cases there are up to six other birds actively feeding the young or more loosely associated. In most cases the extra attendants at the nest are probably young from previous broods. They are helping to feed their own siblings and so propagate many of their own genes.

This was certainly the case with the group living near the bunkhouse on Little Barrier, which we monitored for four years. The breeding pair was constant throughout. One nestling survived the 1984-85 summer and this young male helped feed nestlings and fledglings the following summer, only one of which survived. In the third summer of observation, both the latter bird and the young male helped feed the breeding pair's latest progeny – their own siblings – three of which survived to the next summer.

I was able to calculate that whiteheads have an average life expectancy of about six years once independent of their parents – quite long for a small bird. The density of whiteheads in forest near the bunkhouse on Little Barrier Island is very high; perhaps 50-60 birds per hectare. Presumably there is pressure for breeding space and young birds may do best by remaining in extended families until a breeding opportunity becomes available, perhaps several years after they fledged.

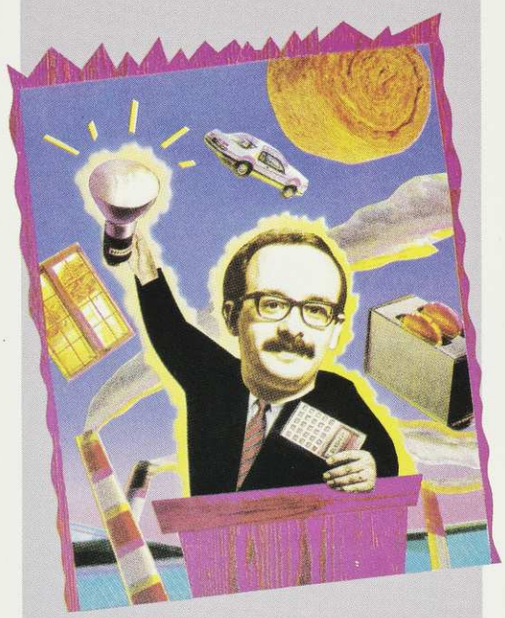
The whitehead is a host of the migratory long-tailed cuckoo, a common bird on Little Barrier Island during spring and summer. We hoped to collect information on parasitism by this species, but in the summers when Ian was closely following whitehead nests on the lower slopes near the bunkhouse, none was parasitised. Yet when he went to higher altitudes he saw several young cuckoos being raised by whiteheads. It seems the cuckoos breed only higher up the island, a phenomenon we do not understand.

Future Prospects

The yellowhead has declined alarmingly in recent decades. Whiteheads remain widespread on the North Island mainland but there is no information on precisely how well they are doing. The liberation of whiteheads on Tiritiri Matangi Island in September 1989 offers hope that a viable population can be established there enabling many more New Zealanders to meet these charming birds.

Brian Gill is Curator of Birds at the Auckland Institute and Museum.

Amory Lovins



Walking the Soft Path

by James R Udall

SITTING IN THE BACK of an auditorium, waiting to address a global-warming conference at the University of Colorado, Amory Lovins glances towards the ceiling and frowns. The man *Newsweek* once called "one of the Western world's most influential energy thinkers" has detected yet another wasteful indoor-lighting system.

Lovins pulls a calculator from his breast pocket and begins punching numbers. Soon he has computed how many kilowatts are being squandered, how many pounds of greenhouse gases are being spewed into the atmosphere to produce that power, how many thousands of dollars a lighting retrofit could save.

Modern Prometheus

At the lectern, Lovins extracts an efficient light bulb from his briefcase and plugs it in. Like a modern Prometheus, he raises the bulb and launches into his speech.

He tells his audience that the United States could run its economy on a third to a fourth as much energy as it does today, saving $300 billion annually while reducing urban smog, acid rain, and global warming. By making cost-effective efficiency investments, he says, the country could eliminate oil imports and save trillions of dollars by the year 2000 – enough to pay off the national debt.

This is easily the conference's most uplifting message yet, and the crowd – nearly pickled by doom and gloom – perks up as Lovins, his moustache and thick eyeglasses giving him a vague resemblance to Charlie Chaplin, continues his speech.

"Together, renewable energy and energy efficiency – in the form of light bulbs like these, high-mileage cars, superinsulated homes, smart electric-motor systems, advanced aircraft, high-efficency appliances, and a host of other such technologies – make it possible to meet all our energy needs without harming the climate."

Reeling off facts, figures, and asides ("In some cases efficiency is better than a free lunch; it's a lunch you're paid to eat"), Lovins keeps the audience hanging on his every word. He concludes by gently chiding the university: "It's theoretically possible to save 92 percent of all the electricity used for lighting – and this auditorium would be a good place to start."

Applause, laughter. As Lovins leaves the room, small clusters of people form to discuss his speech. Two questions hang in the air: Who is this guy? And, is his good news too good to be true?

Environmental patriarch David Brower first met Amory Lovins in 1970, after Lovins mailed him a manuscript he had written about Snowdonia National Park, Britain's second largest. Brower found the manuscript riveting, both as an ode to Snowdonia and as a jeremiad against its exploitation. "Imagining it to be the work of someone middle-aged, I was astonished to discover that Amory was only 21," he recalls.

Questioned Conventional Wisdom

Dropping out of school to take a job with Brower's organisation Friends of the Earth, Lovins expanded his studies of the energy problem. Trained as a scientist, he was comfortable, as few environmentalists are, with the topic's arcane jargon; perhaps more important, he had both the courage to question the conventional wisdom and Brower goading him on.

"My experiences in Snowdonia taught me that minerals and fossil fuels must be wrested from the earth with great violence; that their extraction, transportation, and usage all entail environmental costs," says Lovins. "But having been trained as a physicist, my initial assumption was that the best replacements for oil and gas would be the nuclear technologies."

Reading voraciously, attending seminars, playing what-if on his slide rule, Lovins discovered that nuclear power "made much less sense than I had presumed." Turning his back on such "hard" technologies, he began developing the case of an alternative energy future he called the "soft path." Soon Lovins was giving the seminars himself.

"Where most of us use 10 percent of our brainpower, Amory uses 90," Brower says. "He is extraordinarily dedicated. He's insightful, intuitive, great with numbers. He sees the linkages better than almost anybody. He's an absolute genius."

In the early 70s it was universally believed that a nation's energy consumption was the yardstick of its economic performance – hence US consumption was expected to double every 20 or 30 years. Then came the 1973 oil shock. The energy crisis was born.

It was against this backdrop that Lovins published the book that brought him to prominence, *Soft Energy Paths*. "According to conventional wisdom," he wrote, "the energy problem is how to increase energy supplies to meet projected demands. The [proposed] solution to this problem is familiar: Ever more remote and fragile places are to be ransacked, at ever greater risk and cost."

Lovins argued that a better answer was to wring more work from our energy. "We understand too little the wise use of power," he wrote. We're like somebody who can't keep the bathtub full because the water keeps running out. Before we buy a bigger water heater, we ought to get a plug."

Seminal Impact

By outlining a scenario in which the nuclear-power genie is rebottled, and oil, gas, and coal are replaced by hydropower, biomass, solar, and other sustainable-energy supplies, Lovins forever changed the context of the energy debate. Because of its seminal impact, *Soft Energy Paths*, which has been translated into eight languages, has been compared to *Silent Spring*.

The book touched off a firestorm of debate. Energy insiders vilified Lovins as a gadfly, a pie-in-the-sky dreamer, a dangerous eco-freak, a purveyor of naked nonsense, and Public Enemy Number One. Supremely, even arrogantly confident, Lovins did not mind being cast as the energy priesthood's Martin Luther. "All knowledge starts as heresy," he told his critics.

With "energy independence" as its slogan during the late 1970s, the US government was striding down the hard path. Billions were lavished on experimental technologies – synfuels, the breeder reactor, coal gasification. But as energy prices rose, Americans began buying gas-sipping cars, insulating

attics, draught proofing windows. As the consumers opted for the soft path, energy shortages were transformed into gluts, and hard-path initiatives succumbed to market forces. From 1973 to 1986, US energy usage levelled off even as the gross national product grew by 35 percent – an historic accomplishment. Lovin's energy-efficiency revolution, once derided as visionary, was coming to pass. Events were proving the heretic right.

In 1982, Amory and his wife, Hunter Lovins, a lawyer and political scientist who helped start the urban-forestry group TreePeople, established Rocky Mountain Institute. A nonprofit research and educational foundation, RMI works to "foster the efficient and sustainable use of resources as a path to global security." Half the institute's $1 million annual budget comes from providing state-of-the-art information on efficiency to energy companies, utilities, and government agencies in more than 20 countries.

The institute is housed in a building the Lovinses designed to be a model of resource efficiency. Curvilinear stone walls, reminiscent of an Anasazi cliff dwelling, flank a greenhouse (complete with iguana and banana tree) that supplies virtually all of the building's heat. Everywhere is evidence of Amory's fondness for ingenious gadgetry. Flushing the Swedish toilets requires a mere gallon of water, the shower uses water-saving technology first developed for submarines, and the refrigerator is six times as efficient as the best commercial model. Floor-to-ceiling bookcases overflow with one of the world's most comprehensive energy libraries, a note on the photocopier says that operating it doubles the building's electrical use, and the table around which the RMI staff (earnest, bluejeaned, thirtyish) gather for lunch is covered with publications ranging from the *Wall Street Journal* to the *Utne Reader*.

Frenetic Schedule

Lovins is the key synapse in a global network of energy experts, and he maintains a frenetic schedule, travelling hundreds of thousands of miles a year. In truth Lovins is a driven man. He does not vacation.

According to RMI staffers, Lovins is motivated by the intellectual's quest for truth, the ecologist's reverence for linkages, and the economist's affection for efficiency. What irks him most is the careless, unthinking way so much energy is squandered.

And yet he is no puritan. "I'm not interested in doing with less," he says. "But in doing more with less. We don't have to become vegetarians and ride bicycles to save the Earth."

Though they care deeply about the environment, the Lovinses are careful not to bill themselves as environmentalists. "It's an ambiguous term that means different things to different people," says Amory. "We generally find it more effective to frame our arguments in economic terms."

Nonetheless, RMI routinely intercedes in environmental disputes involving energy. For example, in 1985 Lovins was asked by the Conservation Law Foundation of New England to analyze the energy needs of a paper company that wanted to build a controversial hydroelectric dam on Maine's Penobscot River. Lovins discovered that improving electric-motor systems at the company's pulp mills would free up more energy than the dam could produce, at one-eighth the cost. By demonstrating that a cost-effective, practical, and environmentally benign alternative was available, Lovins played an important role in the eventual cancellation of the dam.

Two years later, Lovins critiqued a Department of the Interior report recommending that the Arctic National Wildlife Refuge be leased for oil drilling. Never one to mince words, he concluded that the department, which had failed even to mention efficiency and the role it might play in meeting the nation's energy needs, "should not shame its traditions, and expose its honest analysts to ridicule, by proceeding with this mendacious draft. It needs to be done over." Although Interior's report was never rewritten, the Sierra Club and other environmental groups have used Lovins' arguments as ammunition in their so-far-successful fight to prevent development of the refuge.

More recently, Lovins funded and helped direct an exhaustive study by RMI associates Bill Keepin and Gregory Kats that refutes the contention, fashionable among some editorial-page writers, that increasing our use of nuclear power is the best way to abate global warming. In fact, they found, improving electrical efficiency is nearly seven times more cost-effective than nuclear power for reducing carbon dioxide emissions.

Efficiency and national security are the Lovinses' bread and butter, but RMI is also active in water, agriculture and economic-renewal issues. Last March an RMI report concluded that an efficiency program could save Denver residents as much water as the proposed Two Forks Dam could provide, at one-fifth the cost. Two weeks later, Environmental Protection Agency chief William Reilly announced that he would scuttle Two Forks. Although Lovins does not claim credit for single-handedly nixing the dam, he does believe that the RMI report had some bearing on Reilly's decision. The Denver Water Board subsequently adopted an aggressive water-conservation program along the lines suggested by Lovins and his environmentalist allies.

Prophet Without Honour

Lovins now commands $6,000 a day as a consultant and recently won a $100,000 prize from the Onassis Foundation, but he was something of a prophet without honour during the Reagan years. ("No nation ever conserved itself to greatness," said the president). The irony is that Lovins' ideas have found a very receptive audience among many foreign leaders, including Soviet President Mikhail Gorbachev, several of whose top advisers maintain a relationship with Rocky Mountain Institute. One, Yevgeni Velikhov, was instrumental in the production of a 45-minute television film, *The Energy Efficiency Revolution – A Key to Perestroika*, which has been aired in the Soviet Union four times. Lovins and Velikhov are now collaborating on a book and have plans to build an international youth camp in Soviet Georgia that will be solar-heated and energy efficient.

Meanwhile, a number of recent developments have given Lovins' message new currency. By 1988 the US energy bill grew to $500 billion, with domestic oil extraction dropping and oil imports soaring. As OPEC regains its ability to put the screws on the West, some experts predict another oil crisis. At 17 million barrels a day, Americans are now burning as much oil as the Exxon Valdez spilled – every 20 minutes.

For years the public has confused efficiency with conservation, with Jimmy Carter in a sweater, with "freezing in the dark."

But efficiency does not mean curtailment or sacrifice. "Drilling for oil in our inefficient cars and buildings isn't instant or free," Lovins says. "But it's faster and much cheaper than drilling anywhere else."

It's also much better for the environment. Efficiency improvements not only reduce acid rain and urban smog, they are essential in the effort to stabilize Earth's climate – a goal that climatologist Stephen Schneider of the National Centre for Atmospheric Research believes will require cutting fossil-fuel consumption by half. "The conventional wisdom says that achieving such reductions will require draconian sacrifice," says Lovins, ever the heretic. "However, cutting carbon dioxide emissions through energy efficiency will save money and improve the quality of life here and abroad." To this end, RMI has recently begun an international outreach program to use less electricity in China, India and the Soviet Union.

As more politicians begin to understand that a sound energy policy would cause many other issues to fall into place, efficiency has gained powerful new allies. Lovins' intellectual fingerprints are all over the global-warming bills introduced by Senator Wirth and Representative Claudine Schneider (R-R.I). Even President Bush's otherwise-flawed clean-air proposal acknowledges that energy efficiency can help control acid rain.

Yet despite efficiency's abundant promise, it may take another crisis before the federal government adopts it as a national goal. "History teaches us that men and nations behave wisely once they have exhausted all other alternatives," Lovins says, quoting Israeli politician Abba Eban. "We've worked our way well down the list, but we may not be at the bottom yet."

Regardless of what happens, Amory Lovins will continue as a torchbearer for efficiency. A man with a mission, he has a consuming desire to discover elegant solutions to vexing problems, large and small.

James R Udall, is a freelance writer from Carbondale, Colorado. This article is reproduced with the kind permission of Sierra *magazine.*

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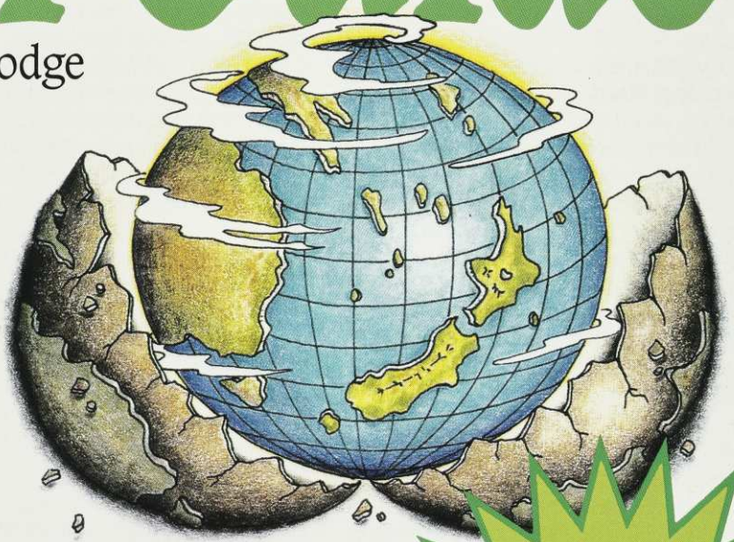
by Peter Davis and Judith Hodge



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Author Peter Davis is an environmental consultant with Eco-logic with a background in organic gardening, naturopathy and green politics. Judith Hodge is a journalist specialising in health.

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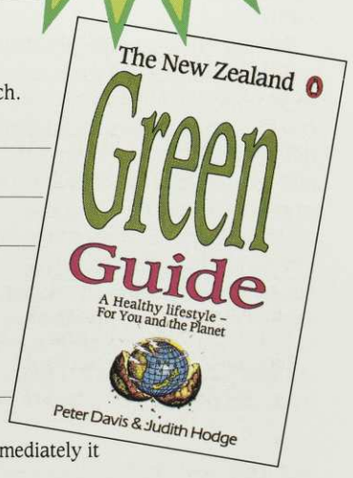
NOTE: *The New Zealand Green Guide* will not be available until October. However order now and the book will be posted to you immediately it arrives.



Annual General Meeting

The Society's 67th Annual General Meeting and Council Meeting were held in Wellington on June 23. Four new executive members were appointed: Keith Chapple from the King Country, Peter Gardner from South Otago, Gordon Stephenson from South Waikato and Judy van Rossem from Waikato.

Old Blue Awards were presented to:

Josie Driessen (South Auckland branch) for her tireless work in looking after the branch's reserves.

John Findlay (Southern Hawke's Bay), a member for 60 years, former chairman, councillor, executive member and on the local Park Board for 18 years.

Ron Freeston (Lower Hutt) who has been in charge of the Pauatahanui Reserve development since the early 1980s.

Nancy Payne (Central Auckland), long standing secretary of the branch.

Fergus Sutherland (Southland, now Otago), retiring member of the executive, former Southland chairman.

Cath Wallace, chairperson of ASOC, for her unwavering commitment to the cause of Antarctic conservation.

Retiring national secretary Joan Leckie was farewelled by retiring president Alan Mark who spoke of Joan's nine year's loyal work for the Society as national secretary, as well as her contribution as a former chairperson of the Upper Hutt branch.

In a moving speech Joan spoke of the changes to the Society and the achievements of the conservation movement during her time as secretary. She told councillors that branch members were the heart and soul of the Society. She said the next decade would be a tremendously challenging one for conservationists and called on councillors to continue with their efforts to safeguard the environment.

In recognition of the valuable work she has performed for Forest and Bird, Joan was created a Distinguished Life Member.

The Deputy Prime Minister, Helen Clark, delivered the Sanderson Memorial Address. In it she announced the Government's indigenous forest policy, including an interim ban on the export of native woodchips, and plans for sustained yield forestry.

New Society President

Mr Gordon Ell was appointed president of the Society at the June Council meeting. He replaces Dr Alan Mark who has been president of the Society for the last four years.

Gordon Ell has been vice-president of the Society since 1984 and a member of the executive since 1982. A resident of the North Shore in Auckland, he is a book consultant, TV producer and a publisher with his own publishing company Bush Press.

He is Forest and Bird's representative on the new New Zealand Conservation Authority.

New president Gordon Ell (left), past president Dr Alan Mark (right) and retiring national secretary Joan Leckie.

Subscription Rates

The subscription rates for membership of the Society have been altered slightly to cover inflation and expanded conservation campaigns. Last year the Society ran at an all time loss. Kiwi Conservation Club subscriptions remain the same.

The rates for 1990/91 are as follows:

Kiwi Conservation Club single	$10
KCC family, groups, schools	$20
Students, schools	$25
Single	$40
Family and Groups	$40
Senior (over 60)	$30
Senior family	$30
Corporate	$275
Life	$475
	(Inc GST)

Waikato Branch Conservation Grant 1990/91

Applications are invited for a $3500 grant to support a conservation project during the summer of 1990-91.

There is no restriction on the type of project as long as it helps protect NZ's plants and animals, though relevance to the Waikato-Coromandel area would be an advantage. Acceptable proposals would include fencing bush, acting as a wildlife warden, research on a conservation topic, an educational or journalistic project.

Each applicant should set out the aim of the proposal, outline of how it will be carried out, estimated cost, other sources of revenue, evidence of ability and two referees. *Applications should be sent to: Forest and Bird, Waikato branch, PO Box 11092, Hamilton.*

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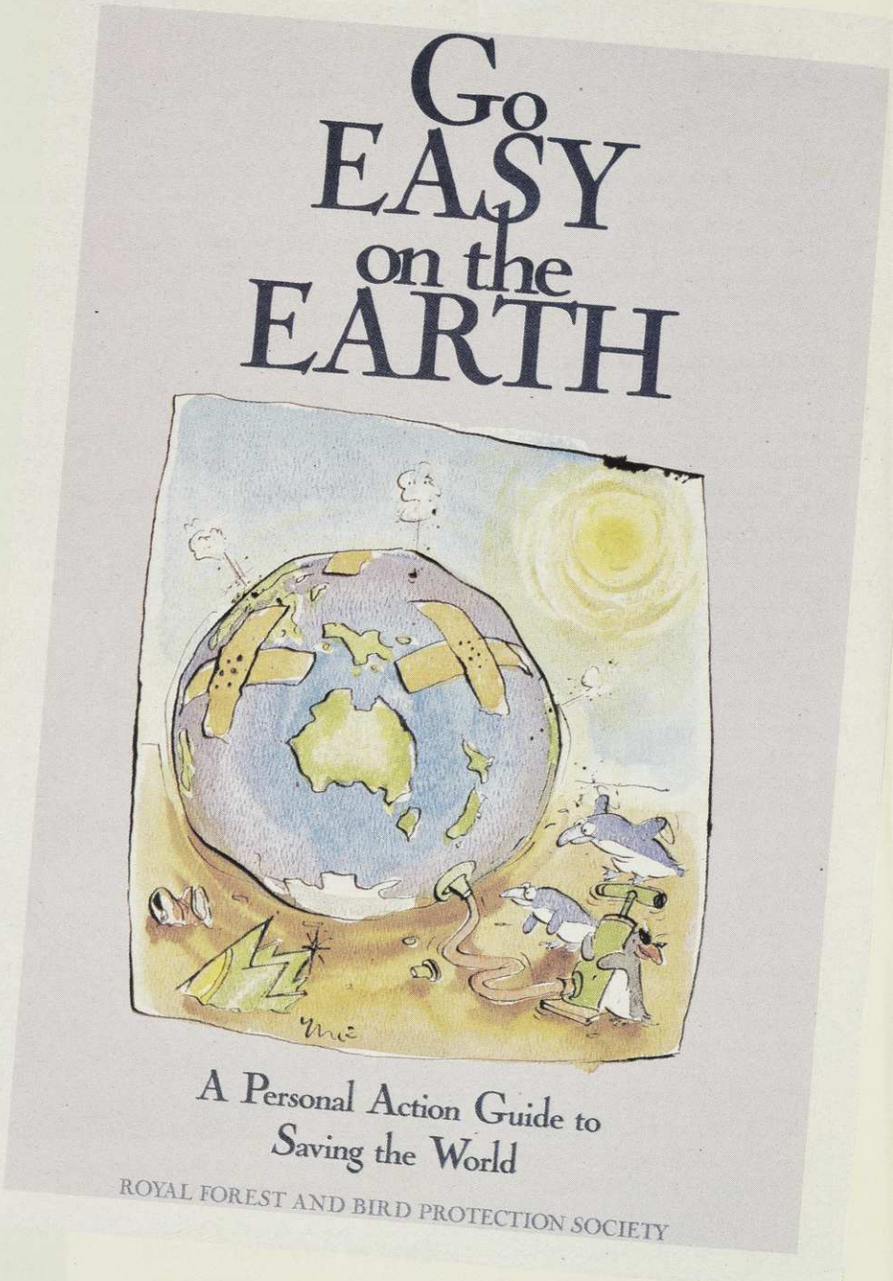

So much has been talked about being "green" in the last year that Forest and Bird decided to do something about helping people look after the environment. The result is **Go Easy On the Earth**, written by education and extension officer Andrea Lomdahl with cartoons by Mike Yule.

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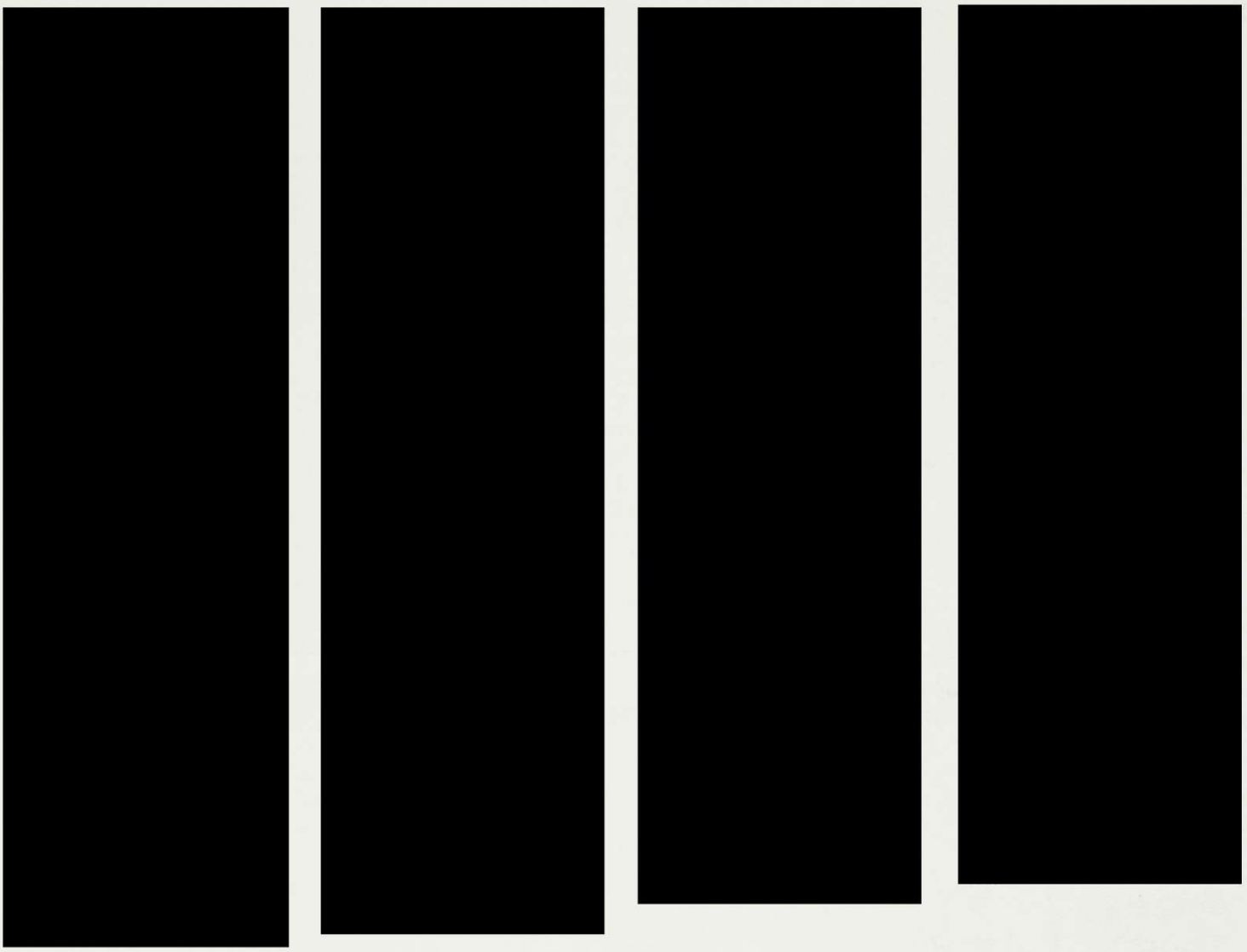

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Ruapehu Lodge, Whakapapa Village, Tongariro National Park

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.

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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.

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/- Mrs M. Tait, P.O. Box 48, Stewart Island, Telephone (021) 391-396.

William Hartree Memorial Lodge, Hawke's Bay

The lodge is situated 48km from Napier on the Puketitiri Road and 8 km 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 fully 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, Mrs Colleen MacKay, 3 Plunket Street, Tamatea, Napier, Telephone (070) 444-219.

Tautuku Lodge

Tautuku State Highway 92, South East Otago. Situated on the Royal Forest and Bird Protection Society's 550 ha Lenz Reserve 32 km south of Owaka. In a bush setting, and 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.

Tai Haruru Lodge, Piha, West Auckand

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 linen, 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, Mr D. McLean, 55a Queens Drive, Oneroa, Waiheke Island. Telephone Waiheke 6494.

Bushy Park Lodge

Kai Iwi, 24km northwest of Wanganui on sealed road off S.H.3.

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A bunkhouse for 12 is available for group bookings. It has kitchen facilities, mattresses and pillows. Toilets and showers are in the adjacent stables building.

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

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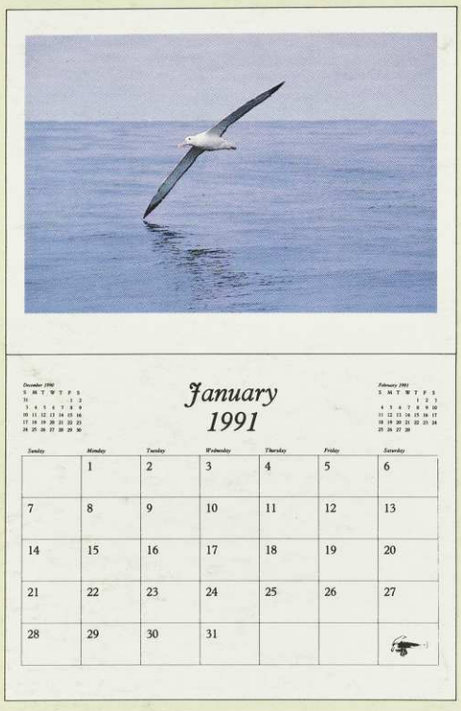

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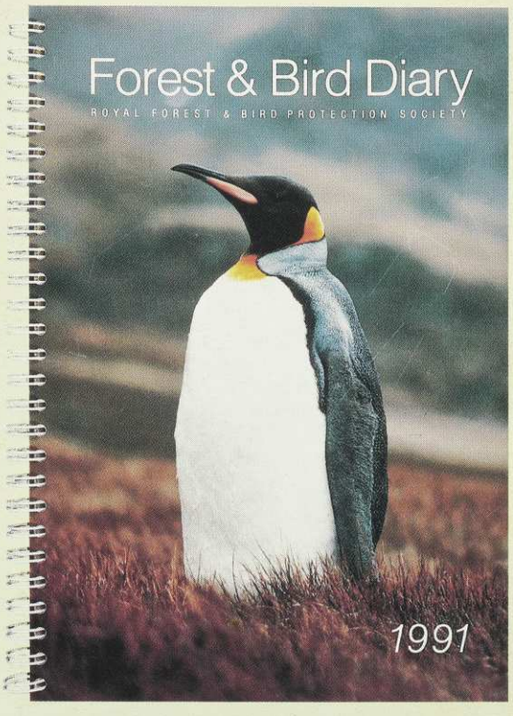

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