Volume 15 Number 2

Forest & Bird

May 1984

XENICUS LONGIPES (♂ et ♀)
XENICUS GILVIVENTRIS (♂ et ♀)

Xenicus longipes (The Bush Wren), *Male* and Female.
Xenicus gilviventris (The Rock Wren), Male and Female.

This is a plate from the Society's forthcoming Facsimile of the 1873 edition of *The History of the Birds of New Zealand* by Walter Lawry Buller.

The Facsimile is now being printed and founder subscribers will receive their copies shortly. See the article on Buller on page 7.

Issue Number 232

May 1984
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Cover: Mount Sefton and the Douglas Glacier, Westland National Park. Himalayan tahr reached plague proportions and devastated alpine vegetation in this remote and spectacular valley until controlled by commercial helicopter hunting in the late 1960s (see article page 2).
Photograph G. McSweeney

Journal of the Royal Forest & Bird Protection Society of New Zealand Inc.

ISSN 0015—7384

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

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

Postal address: P. O. Box 631, Wellington.

Editor: David G. Collingwood

Recommended price $4.00

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

Design and typesetting by Bryce Francis Ltd and printed in association with Commercial Print Ltd.

Forest & Bird

Editorial

I would like to say thank you. This is the last editorial I shall write for *Forest & Bird* as President of our Society. During my term of eight years much has happened. Some of it by conflict, but most by agreement, negotiation and understanding. The Society has by structure and inclination been loathe to commit itself to petitions and court cases, but has willingly initiated or joined in the battle when nought else availed. The forests of the West Coast and Central North Island were the battlefields. The conflict is probably not yet over. I would particularly like to thank our allies, the smaller conservation groups, the staunch members of our Executive, Council and our Society at large. I would also like to thank those who often unwittingly found themselves our adversaries. They included Ministers of the Crown, Government Departments, sawmillers and in some cases local communities. In my experience these people often had great sympathy for our aims. Problems were accentuated by timing and inability to find means to a common end. Fortunately in some cases solutions have been arrived at that have taken the heat out of the debate and provided a sound base for the protection of our natural environment.

On the other hand very substantial advances and progress in furthering the great ideals of our Society have been made by softer approaches. By this I mean by submissions, negotiations, discussions and the marshalling of public opinion by education and encouragement. The soft approach as I call it takes an immense amount of time and effort in research, publicity and organisation. For me it is the much preferred option. So it is to those who have participated in this way that I offer especial thanks. To the persuaders and the persuaded. Conservation's friends are everywhere, some are in unlikely places. It is quite impossible for me to list them all. So I trust that those of you who read this will readily recognise who you are.

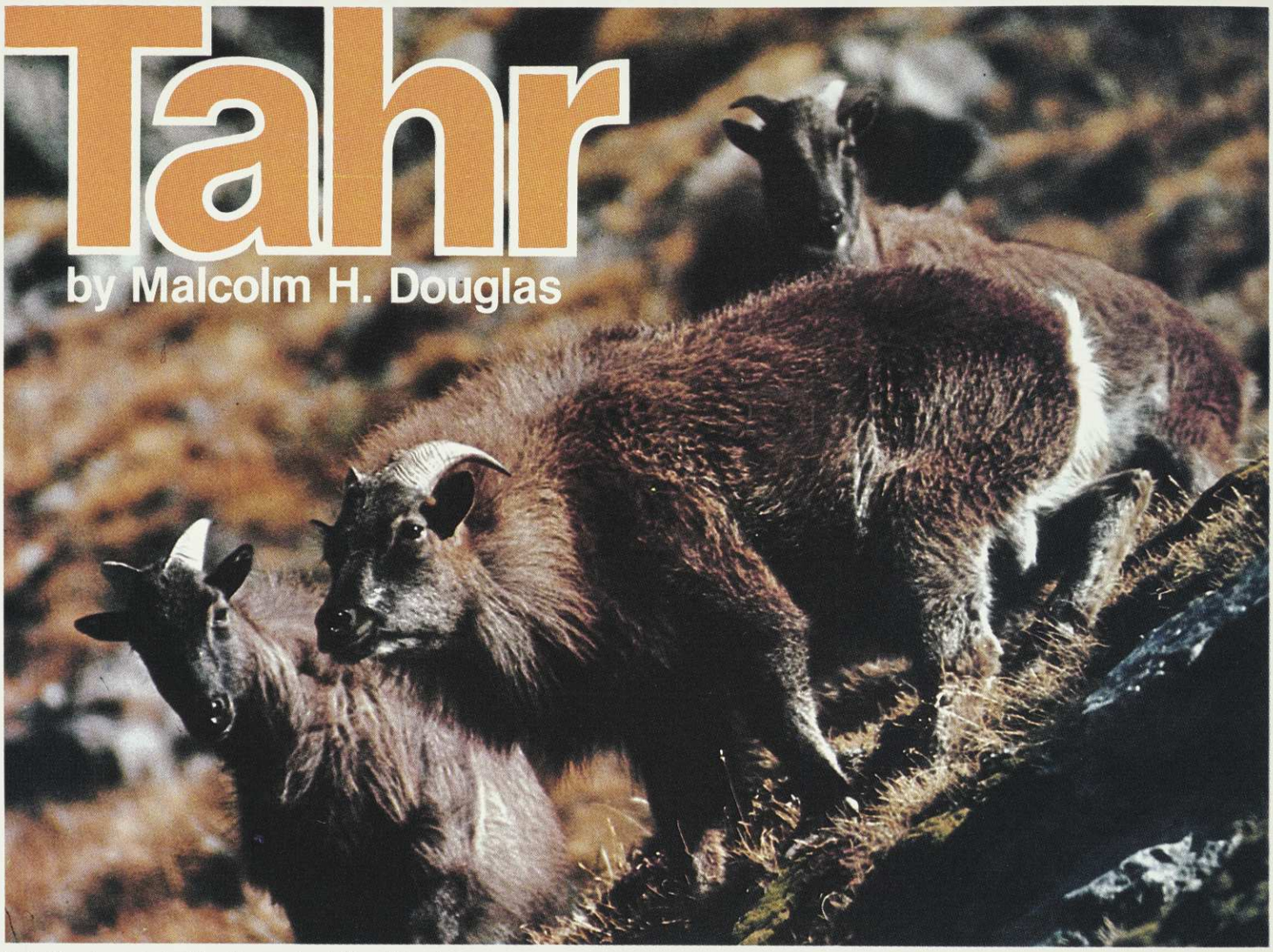
On a personal note I would like to take the risk of picking out those upon whom I have most relied and who have unstintingly helped me. First I would like to thank my two predecessors, Roy Nelson and John Jerram. Each in his own special way deserves the warmest gratitude of all of us. All past and present staff, Executive and Council members would be deservedly named but I mention those who helped me most in recent times. I wish to thank Alan Edmonds, David Underwood, John Morton and Charles Fleming.

I hope that all of you who have laboured will see the positive fruits of your efforts. The Society membership has increased dramatically in the past ten years from 14,500 to just over 40,000. We have established strong and abiding working relationships with other conservation groups. Regular meetings with Government Ministers and agencies will I hope continue and provide ready means of progress. For all this I am grateful.

A. A. T. Ellis, Q.C. President

The warning whistle for the Himalayan Tahr

by Malcolm H. Douglas



Bull Himalayan tahr (*Hemitragus jemlahicus*) in winter coat. Photograph: G. Roberts, NZ Forest Service

The tahr is a Himalayan mountain goat. In its native habitat, tahr use a range of vegetation types from broad leaved forests to alpine meadows between 2500–4400 m. Their favoured habitat is grass covered cliffs with patches of forest (Schaller 1973).

Three females and two males which came from the Duke of Bedford's Woburn Park Zoo in Britain were released in 1904 at Governors Bush close to the Hermitage, Mount Cook National Park. By 1919 a further 15 animals had been released to encourage the herd establishment.

Five Himalayan tahr presented to New Zealand in 1904 were liberated near Mount Cook. The conditions on the rangelands suited them. The vegetation, which had evolved in the absence of herbivores, except for birds and insects, provided good grazing. Herds of 50 to 70 in number were noticed in a very short time (Graham 1965).

Today the breeding population is present throughout the South Island Main Divide headwaters from near the Haast Pass in the south to near the Arthurs Pass National Park boundary in the north. Tahr also occupy the major lateral ranges from Lake Ohau to the Rakaia. The area of known tahr breeding distribution is about 4400km². (See Figure 1.)

In 1930 Government protection for the breeding herds of deer, chamois and tahr was lifted. By 1936, the annual report by the Department of Internal Affairs indicates increasing concern regarding tahr and the report states: "Their great fecundity and absence of natural enemies, however, had resulted in an entire absence of a natural balance with food supplies being arrived at, with the result that the country occupied by them had become denuded of vegetation to almost indescribable extent." But also in 1936 Government action had begun and the first control operation against tahr reported a kill of 2765.

Today 80 years after liberation, it is a moot point whether a tahr population can be tolerated on our high mountain lands.

Biology

Biological studies have been aided by horn growth rings being laid down each winter of life, other than the first, thereby allowing an accurate aging of the population (Caughley 1965). Only 3 percent of the female population is older than 12 years and the oldest female recorded is 18 years.

Life expectancy at birth is 3.5 years, with a high but variable juvenile death rate. When studying the poisoning of tahr in the Dobson River Valley, it was calculated by Caughley that a kill greater than 20 percent each year was required to overcome the natural annual increment to the population (Douglas 1967).

Mating takes place in April and the kids are born in December with normally only one kid per nanny. Although the females' weight rarely exceeds 55kg, mature bulls can weigh up to 136kg.

Tahr have a well developed sense of smell and hearing, but usually rely on their exceptional eyesight for protection.

Habits and habitat

Tahr habitat is the aipine grassland and fellfields, and the scrub zone above the bushline.

Most tahr are found 1370–1670m but range between 900–2000m (Caughley 1970a).

In the winter the animals are inclined to drop to lower altitudes and remain on sunny vegetated cliff faces or become resident in the scrub zone. Daily feeding is concentrated on snow free plants on the nearby ridges and faces.

In good weather, and favourable snow

conditions, the tahr herd has an altitudinal rhythm, moving upwards at daybreak, browsing as they go. Eventually they rest to ruminate and sleep on snow, rock ledges or ridge tops, often well above the vegetation limits. In mid afternoon, the herd will descend to feed.

There are two observable groupings within the herd. The basic unit is the family group of a nanny and her last offspring, while the second grouping is an association of these families. These associations, which appear flexible, aggregate to form the herd.

Although the males generally separate from the herds in spring and do not re-unite until mating the following autumn, they spend the winter and early spring together with the nanny-kid association.

Observation of tahr herd behaviour suggests herds remain in a specific area, and only the younger animals and unattached bulls wander away from their home range. The exception to this behaviour would seem to occur when herds are pushed into unoccupied areas due to shooting. As a result migration is probably hastened in many instances.

In 1965, in the Upper Rangitata Catchment I found the small Carneys Creek to contain 710 tahr in an area of about 2200ha. The two largest herds contained 69 and 62 animals and half the herds had more than 30 animals. Following helicopter hunting and meat shooting the numbers have been drastically reduced. A recount in 1977 gave a population of only 48 tahr — a 93% reduction. The largest herd was only 7 animals. (Tustin and Challies, 1978.) In the Mount Cook National Park, between 1956 and 1976, about 20,800 tahr were killed. In the first 25 years of Government control operations up to 1961 24,000 tahr were killed, but between 1971 and 1976 an estimated 36,000 tahr were shot, principally for the export game meat market. (Tustin 1980.)

Grazing behaviour and vegetation damage

Tahr graze the alpine grasslands and scrub zones. Their grazing of snow-bare areas in winter, or tracking in the scrub, kills the snowgrass and scrub species.

The first major biological study of tahr was undertaken by J. A. Anderson and J. B. Henderson of the New Zealand Deer Stalkers Association Research Group in 1961.

Anderson and Henderson drew attention to the localised tahr damage to vegetation which results from restricted animal movement after times of heavy snowfalls.

"Under these conditions the animals 'work' small patches of snow utilising any vegetable material uncovered. Such patches are easily discernible following the thaw and require considerable time to revegetate. The big snow tussock grass is most vulnerable to this type of usage and seldom recovers."

Hugh Wilson, writing in his book on the "Vegetation of the Mount Cook National

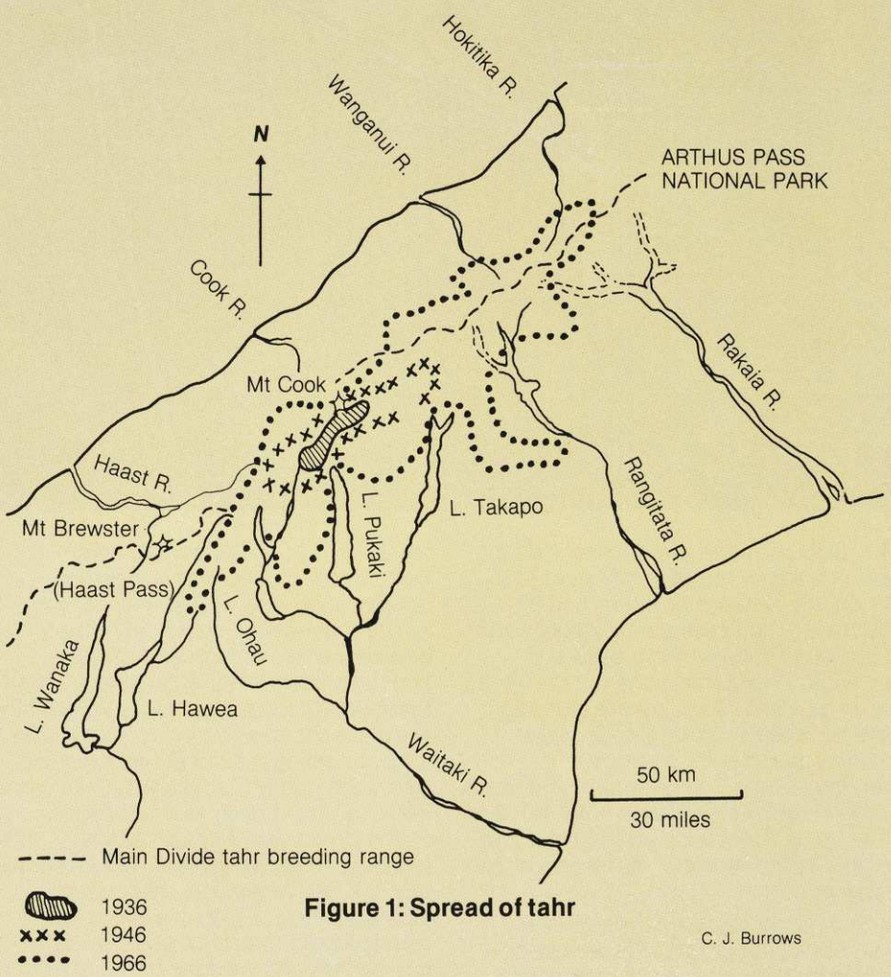
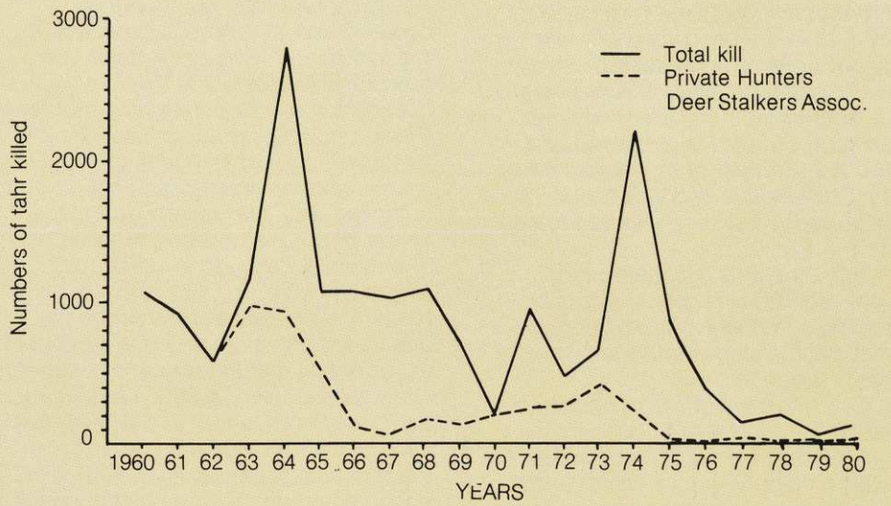


Figure 1: Spread of tahr

C. J. Burrows

Figure 2: Mount Cook National Park Tahr Control



Tahr control in the Mount Cook National Park, showing the total number of animals killed (17,926) compared to the kill by the Deer Stalkers' Association and private hunters (7,054) for the years ended 31 March 1960 until 31 March 1980. (The total kill figure is affected by the extent of control exercised by the Forest Service. For the control years ended 1960, 1961, 1962 and 1970 there were no control operations, and for 1972 and 1973 operations were limited to the burn area on the Liebig Range.)

Tahr herd. Rangitata River. When tahr camp together they can eat out most vegetation at the camping sites.
Photograph: G. Roberts, NZ Forest Service

Park", discusses the effect of tahr on the vegetation within the park. He quotes in part "on the extreme northern end of Sealy Range, scrub on steep, rocky north-facing slopes is heavily browsed and battered and concentrations of tahr were seen on all visits. Such severe damage was more often encountered in upper sub-alpine shrublands. In places turpentine scrub (*Dracophyllum uniflorum*) is completely defoliated and often killed in a band up to 100m wide visible from afar as a grey stripe between scrub and alpine grassland."

At the animal camps extreme local damage to alpine grasslands was also recorded by Wilson — small areas 10 metres or so, within which the palatable species are grazed towards extinction while leaving the surrounding grasslands untouched. Stumps of snow tussock are left dead and rotting.

Dr P. Wardle of Botany Division, DSIR, reported to the Westland National Park Board that in the headwaters of the Karangarua River in Westland, extreme damage to vegetation was noted where there were large numbers of tahr. He noted scarcely a trace remained of a former dense cover of mid-ribbed snow grass (*Chionachloa pallens*), broad leaved snow grass (*C. flavescens*) and turpentine scrub.

"Almost the only evidence of the original vegetation is rotting sticks of turpentine scrub which have been washed off the slopes into rock water courses" (Wardle 1969).

Dr C. J. Burrows of the University of Canterbury, reported his observations from the Rangitata catchment, where he considered tahr a serious threat to the alpine and sub-alpine vegetation. He reported severe damage in the alpine grassland zone, and on steep bluffs where almost all plants have been eaten down to ground level in areas up to 20 metres or more in diameter (Burrows 1974).

The botanists Burrows, Wardle and Wilson and the NZ Deer Stalkers research study of Anderson and Henderson, all describe vegetation deterioration and alteration.

The most conspicuous difference between areas of high and low tahr populations was in the density of snow tussocks (*Chionochloa* spp.). Where tahr were absent snow tussocks formed an almost continuous cover, while where tahr were numerous, the tussocks were invariably scattered and uncommon.

The presence of dead stumps of snow tussocks in these depleted areas showed tussock had previously been more abundant. The depleted areas were usually dominated by a turf of blue tussock (*Poa colensoi*).

Dr A. F. Mark at Otago University, studying narrow leaved snow tussock found clipping of the tussock altered the normal pattern of growth and that increasing numbers of tillers failed to recover each year from this treatment. He concluded that the severe deterioration of tussock vigour which follows annual reclipping shows this snow tussock is ill-adapted to tolerate severe grazing for any particular length of time (Mark 1965). Other snow tussocks can be expected to react in a similar way. The severe and maintained grazing of tahr on snow grasses, particularly during the winter period, will cause the same action. The tussock declines in vigour and eventually dies.

Many New Zealand plants are ill-adapted for grazing, and the vegetation associations can be dramatically altered when this occurs. Specific plants suffer extremely from tahr. For example, the yellow-flowered alpine buttercup (*Ranunculus godleyanus*) is likely to become an endangered plant if animal numbers persist.

Grazing and Erosion

Tahr have induced dramatic changes in vegetation, with concurrent soil erosion and debris movement. On the West Coast with its high rainfall, the naturally higher fertility alpine soils derived from schist

By the 1960s tahr numbers were so high that they had devastated alpine vegetation through the Southern Alps.
Top: **Severe grazing by tahr of snow grass on steep slopes Dobson River Mackenzie Basin 1964.**
Above: **Death of the *Dracophyllum* scrub belt caused by tahr. Carneys Creek Rangitata River.** Photographs: M. H. Douglas

***Ranunculus godleyanus*. This large buttercup grows on screes and bluffs in the high Southern Alps only between Arthurs Pass and Mt Cook. It has been so devastated by tahr and chamois grazing that it is listed as vulnerable in the New Zealand Red Data book. Unlike the tahr, this species is found nowhere else in the world. Godley's buttercup has recovered well in the last 10 years since tahr numbers have been dramatically reduced by helicopter hunting.**
Photograph: G. McSweeney

assist a vegetation recovery when the tahr are removed. Dr Wardle comments that *Chionochloa pallens* is beginning to return onto an area in the Karangarua and Douglas River headwaters which formerly had high numbers of tahr.

The eastern watersheds, particularly in the greywacke zone, are geologically less stable. They have been subjected to severe faulting and crushing which makes them susceptible to erosion if put under stress. The soils derived from the greywacke have low natural fertility which retards the vigour of recolonising plants following erosion. The physical differences between the western and eastern watersheds are highlighted by the more rapid recovery of erosion scars on the west of the divide; but rainfall will also have an effect. Vegetation recovery from grazing is slower on the drier eastern side.

Future dispersal

There is concern about the future dispersal of tahr.

Anderson and Henderson, writing on tahr dispersal, suggest tahr will colonise the Waimakariri River catchment and country north, but consider the extensive low heavily bushed country to the south, at Haast Pass, will form a natural barrier for some time.

Caughley came to similar conclusions on northward dispersal in that the Spenser Mountains are good tahr country, and eventually the north-west Nelson inland and the seaward Kaikoura ranges would be colonised. To the south, Caughley postulated that tahr, after crossing the Haast Valley, would disperse down the high country through the areas which are predominately within the Mt Aspiring and Fiordland National Parks. (Caughley 1970b)

The Forest Service recognises with concern the possibility of future dispersal and places a high importance on population control operations to prevent this.

Many foot hunters have observed how tahr will ascend to the ridge top when disturbed and "disappear" into the adjoining catchment. My conclusion is that shooting can aid dispersal, and herds which are retained for sporting purposes will always provide a nucleus for further dispersal.

Helicopter hunting — the only effective Tahr control

Populations of tahr are not in the best management interests of the land. Tustin (1980) suggests the present New Zealand tahr population is about 6000 ± 2000, and this population appears to sustain a harvest of 1–2000 tahr shot annually. The implication is that without this harvest the population will rapidly build up again.

With helicopter hunting, tahr can be held at extremely low numbers and for the reasons outlined this is required. Tahr control is not a question of weekend shoot-ups by sportsmen. The Mount Cook National Park control figures show that large tahr numbers existed in the park and show the extent sportsmen have contributed to tahr population control (Fig 2). The steep, rugged terrain that tahr occupy presents considerable difficulties to the foot hunter. The recreational hunter, to be rewarded for the toils and dangers of tahr hunting, requires a common population of tahr. Due to the habitat, and the gregarious nature of the animal, this population is too high for the preservation of the vegetation. There can be no compromise. Tahr control is difficult and hazardous: it is a question of a planned South Island policy to hold the population at very low levels. Most importantly, control measures must prevent any extension in the range of tahr.

Tahr give a warning whistle when disturbed. Their warning whistle has sounded in the New Zealand alps for 80 years. New Zealanders must choose between the survival of alpine plant associations and species, the retention of the mountain landscapes, soil and watershed protection and preservation, or a stalking sport for the very few.

Acknowledgement
This is an amended version of an article published in the *Journal of Tussock Grasslands and Mountain Lands Institute — Review No 35*, 1977.

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Editor's note:
The modern nomenclature is '*tahr*' not '*thar*' as previously.

WHAT FUTURE FOR WILD TAHR IN NEW ZEALAND?

The liberation of introduced animals has created havoc amongst our native plants and animals. Strenuous efforts continue to keep our offshore islands free of many of these alien invaders. On the mainland, elimination of introduced animals is generally considered impossible and they are either controlled by poisons and hunting (rabbits, deer, possums) or regulated by natural factors (rats, stoats).

The Himalayan tahr may be the exception. It may be possible to exterminate them in the wild with a concerted effort and a strong political will. The species would still survive. In addition to populations of tahr through its natural range in the Himalayas, tahr are wild in South Africa and Argentina and are also common in zoos and game parks where they breed well in captivity. Unlike the tahr, New Zealand's alpine vegetation is unique to this country and deserves maximum protection from the devastating effects of this animal.

On 18 August 1983, the Minister of Forests, Mr Elworthy, imposed a one year tahr commercial hunting ban. The ban followed determined pressure from the small group of hunters who still want to retain tahr herds to hunt. These hunters are also pressing hard for a recreational hunting area to be established for tahr in the mid-Southern Alps. The ban was also in response to Forest Service concerns that the decline in annual tahr commercial kill numbers to about 300–400 a year meant tahr extermination was a possibility. Forest Service now wants to study the distribution and density of tahr and considers that the ban may need to last even longer than one year.

Our Society has expressed the following concerns about the commercial hunting ban.

☐ The ban will remove the only effective means of controlling tahr at no expense to the taxpayer.

☐ The ban indicates a relaxation in Government and Forest Service determination to control this highly damaging introduced animal.

☐ The ban applies to both Mt Cook and Westland National Parks and there has been no prior consultation with the appropriate Park Boards and the National Parks and Reserves Authority which control these Parks (as required under the National Parks Act 1980 and Wild Animal Control Act 1977). Although the Forest Service intends monitoring and if necessary introducing tahr control operations in Mt Cook National Park during the ban, no similar provision was made for the important Westland National Park.

At its February 1984 meeting the National Parks and Reserves Authority expressed its concern that it had not been consulted prior to the imposition of the commercial hunting ban and endorsed our Society's concerns about the effects of the ban on Westland National Park. This resulted recently in the Forest Service including Westland National Park within its monitoring and control operations.

Our Society is working closely with deerstalkers on a range of issues throughout New Zealand. Most prominently, we are working together to safeguard natural and recreational values in the South Island's pastoral lease lands. The preferred habitat of deer and chamois in forest and shrublands, comparitively inaccessible to helicopter hunting, means that these animals will always be available for the enjoyment of the recreational hunter and this is accepted in our Society's 1980 Indigenous Forest Policy.

However, in the case of the tahr are individual groups interests eclipsed by the national interest? Should the Himalayan tahr be allowed to remain in the vulnerable alpine regions of the Southern Alps or should every possible effort now be made to remove these animals from the wild?

Gerry McSweeney
National Conservation Officer

Breeding populations of tahr exist from near Arthurs Pass south to Mt Brewster shown here above the Haast Pass. However unless control measures are maintained tahr could spread south through Mt Aspiring and Fiordland National Parks.
Photograph: G. McSweeney

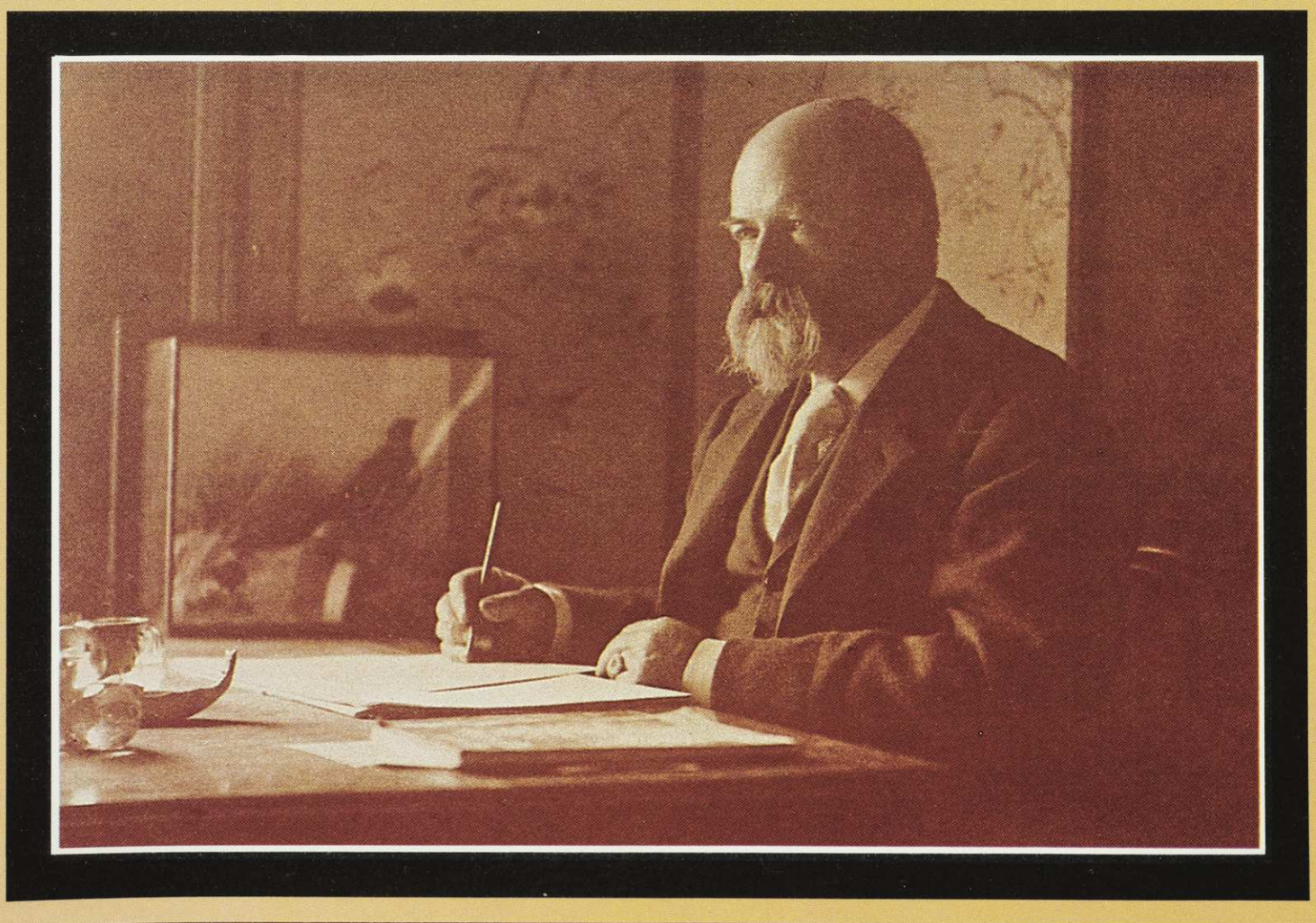
The History of the Birds of New Zealand

TO MARK its 60th anniversary the Society has produced a facsimile of Walter Lawry Buller's *A History of the Birds of New Zealand*, first published in 1873. In this book Buller gave the first, and still one of the finest, comprehensive accounts of New Zealand's bird life.

The original edition of Buller's *Birds* is now a rare book preserved in libraries around the world; the facsimile will make its descriptions of bird life over a hundred years ago, and its beautiful coloured illustrations, more accessible. Buller wrote three large bird books, in 1873, 1888 and 1905. The last was written as a 'supplement' to the 1888 edition, which is the most familiar; its illustrations in particular have long provided the standard images of New Zealand's best known birds. Buller rose to fame and fortune by his efforts in science and law; these books were his greatest achievement.

Walter Lawry Buller was a remarkable man, in many ways epitomising the Victorian era which his life spanned: energetic, confident and enterprising. He was born in 1838 at Pakanae, near Opononi, and grew up on his father's mission station at Tangiteroria (between Dargaville and Whangarei). By the time he finished his education at the newly founded Wesleyan College in Auckland he was already notable both for his precocious ability and for his interest in natural history, which in those times meant not only observing but also collecting specimens of birds and insects. After leaving school he worked for a time in a bank, then in 1855 moved to Wellington where he was appointed official interpreter of Maori in the Magistrate's Court — a humble beginning to a successful legal career.

In 1862 Buller was appointed Resident Magistrate for the Manawatu, moving to Wanganui in 1866 (magistrates then were not required to have any legal training). During this time he also began working toward a boyhood ambition: to produce a grand illustrated volume on the birds of New Zealand. In 1862 he wrote to a friend: "at present every spare moment is devoted to the preparation of a 'New Zealand Ornithological Manual' which I have promised Sir George [Grey] to have ready for the press in the course of two months . . . He has also very liberally offered to get a thousand pounds or more



Photograph Miss G. Buller

subscribed by his friends at home towards the publication of my larger work on the 'Birds of New Zealand' so I am now pushing on with that also".

The smaller 'Manual' did not proceed quite as planned. Instead, he was invited to write an 'Essay on the Ornithology of New Zealand' for the New Zealand Exhibition to be held in Dunedin in 1865. This was a key step in Buller's scientific career for it established his position in New Zealand as the recognised authority on birds. His essay was awarded a silver medal at the exhibition and printed in pamphlet form by the Exhibition Commissioners, then reprinted in the first volume of the Transactions of the New Zealand Institute. Buller sent copies to influential scientists in London, who circulated it further. Otto Finsch of Bremen translated the entire essay and reprinted it with his own comments in the *German Ornithological Journal*. Buller in turn had Finsch's comments translated and published them with his own rejoinders in the Transactions of the New Zealand Institute. Thus Buller made his entry into the international scientific fraternity.

Through the 1860s he continued to work at his book in his spare time, amassing bird specimens and details of life histories from a network of collectors and informants all over New Zealand. He had now decided that such a book should be published in London and illustrated by the most eminent natural history artists of the day, so in 1867 he applied to the Government for assistance in the project. Eventually in 1871, despite some opposition in Parliament, he was granted 18 months paid leave plus his passage to London in order to publish his book. There he was also to act as secretary to Dr Featherston, the Agent-General (the equivalent of today's N.Z. High Commissioner in London). He also received a £300 grant in aid of publication and in return transferred his bird collection to the Colonial Museum and later provided the Government with 25 copies of his book. Many of these are still to be found in N.Z.'s older public libraries.

In London, Buller set to work with his usual vigour. He worked hard at preparing his book for publication and soliciting more subscriptions (at three guineas) to add to those he had been collecting in New Zealand. Even the reclusive Charles Darwin subscribed. At the same time he not only carried out many duties for Featherston, but also entered himself as a student at one of the Inns of Court to study law. On top of all this he enjoyed the London social life with his wife. They dined with nobility and were even presented to the Queen.

Buller published his book by parts; the first appeared in March 1872. But when his leave expired neither the book nor his law studies were finished, so he applied for a further year. This began a tug-of-war between Buller and Featherston in London stretching his paid leave there as long as possible, and the Colonial Secretary in Wellington trying to bring him back. Eventually he was forced to resign his New Zealand magistrate's position but he continued as Featherston's secretary. Publication of *A History of the Birds of New Zealand* was completed in March 1873, but he was not called to the bar until June 1874; the Bullers sailed for New Zealand a few weeks later.

A History of the Birds of New Zealand stands as Buller's finest achievement — his masterpiece. Even today it remains an important source of information, especially on the species then still present but now extinct or nearly so. The illustrations, by the specialist bird artist J. G. Keulemans have a style and charm that is still appealing. They were printed by lithography and then coloured by hand, a laborious method of print-making which flowered briefly in the 19th century. Keulemans did a painting as a pattern for each plate, and sketched it with crayon on lithographic stone. This was used to print the outline of the illustration which then went to a team of colourists who, copying Keulemans' pattern, painted each one with water colours. Keulemans received £2 for each of the 35 plates and the colourists about the same amount per hundred copies; 500 copies of the book were produced.

Buller listed an impressive collection of qualifications after his name on the title page, headed by a doctorate of science, which he had obtained with Otto Finsch's assistance from Tubingen University in Germany on the basis of his Dunedin Exhibition essay. He did not rest after finishing his book, but continued to produce a stream of papers for the scientific journals. In 1879, in recognition of his work in ornithology, he was elected a Fellow of the Royal Society of London — then and now a mark of the highest scientific eminence, the 'blue riband of science' as Buller called it. The newspapers congratulated 'the first scientific man, born and educated in any of the colonies, who has received this distinction'.

Nor had he been idle in other spheres. On his return to New Zealand in 1874, the newly qualified barrister made use of his knowledge of Maori and quickly established himself in the intricate but profitable business of Maori land law. He was so successful that after little more than ten years he was able to retire. He sailed again for London as one of the New Zealand Commissioners for the great Colonial and Indian Exhibition of 1886 and helped set up the New Zealand court there. Subsequently he was knighted KCMG for his services at the Exhibition — again the first New Zealand-born person to receive this honour.

Also in London he set about publishing a new edition of his book. He had been working on this for some years and had already collected several hundred subscriptions (at ten guineas this time). Publication was completed in 1888 and reviewers of the time considered the new work (in two volumes, in larger format than before and with more illustrations) as even better than the earlier edition. Keulemans' paintings this time were reproduced by the new process of colour lithography and are familiar images to this day, having been reprinted and copied endlessly in books, calendars, stationery, posters, cards etc. To my eye, they are inferior to the hand-coloured lithographs of the 1873 edition, which are generally more lifelike, more spontaneous in their execution and more subtle in their colouring, but perhaps the second edition plates have suffered from over-exposure.

Buller returned to New Zealand in 1890 but in 1898, after the death of his wife, and other setbacks, he left the country for the last time. In England, though his health was failing, he published his final *Supplement to the Birds of New Zealand*, again illustrated by Keulemans. Publication was not long completed when he died in July 1906 at his daughter's home in Hampshire.

Walter Buller was too ambitious, successful and controversial to be widely liked in his own time. Much has changed since then. The controversies have been forgotten, while the land he knew has been greatly modified, but despite the pessimism of Buller and his contemporaries, most of the birds still survive. At the end of a career of documenting their decline towards apparently inevitable extinction, Buller supported the earliest conservation efforts and the establishment of island sanctuaries. Today he is remembered for his books, and for his birds — particularly Buller's Mollymawk and Shearwater, the Black-billed Gull (*Larus bulleri*) and the Stewart Island Kiwi (*Apteryx australis lawryi*), living memorials to his name.

This account of Buller's life was drawn from published articles, Buller's books and some of his letters, now held in the Alexander Turnbull Library. The author has been researching Buller's life and work for several years and would appreciate hearing of any further information, letters, photographs, etc. Please write to P.O. Box 6, Onewhero, New Zealand.

— by Ross Galbreath

'Crunch' now 3 years old. Hatched by Chatham Island warblers and raised by robins.

Society members will have a special interest in this black robin update article, and the effort to save this little bird from extinction.

After all, the Society's assistance in the purchase of Mangere Island in 1966 and the later supply of 120,000 *Olearia traversii* seedlings which were planted on the island to make a new safe habitat for the birds, was support help gladly given. The Wildlife Service in this most important rescue work is congratulated on the success that seems to attend the efforts after all these years. *Editor.*

Black Robin Update

Allan Munn Wildlife Service

Following the most successful breeding season ever recorded, the Wildlife Service believes the black robin 'crisis' has passed and the birds are well on the road to recovery. From a total population of five in 1980, including only one successful breeding pair, the population now stands at twenty.

The black robin's 1983/84 breeding season marked the fourth year since the Wildlife Service's cross-fostering programme began and was critical — another bad year like the previous breeding season would have put the programme back to where it was when we started.

After the first two seasons which were largely experimental, and the disappointing 1982/83 season, it was with high hopes and an underlying optimism that we packed our supplies and headed for the Chathams in October.

We left Wellington knowing that down in the Chathams we had several things in our favour:

- The black robin/Chatham Island tit cross-fostering technique on South East Island had been perfected over the past three years.
- As a result of efforts in previous years we now had a much younger breeding stock.
- It was probable that the season would begin with three, possibly four, breeding pairs (in previous years there had been only one successful breeding pair and last year, although the season started with two pairs, one female died part-way through the period).
- The second black robin population on South East Island (c. 100 ha of habitat) had a far greater capacity for expansion than the remaining population on Mangere Island (4.2 ha of habitat) ...

With these thoughts in mind we arrived at Mangere and South East Islands eager to find out just how many black robins had survived the winter, which birds had paired and what stage they were at with breeding.

We found nine robins still alive. The pair that had been transferred to South East Island in January 1983, 'Crunch' and 'Ngaio', were active and before long 'Ngaio' was seen carrying a feather — a sure sign of nest building. We could find no sign, however, of the male of the second pair transferred to the island last June. 'Margaret', the female of the second pair was, therefore, without a mate and did not breed.

On Mangere Island two pairs were preparing to breed. One pair were young birds that had not bred before and the other were the established pair — the male 'Yellow' and 'Old Blue', the latter now being at least 13 years old. Two lone females on the island took the total number of birds to nine.

On the surface, it appeared we had not achieved much since 1980 when

there were only five birds, all on Mangere Island. We had, in fact, lost a little ground since October 1982 when the number of birds had climbed to ten. However, there was no time for pessimism and with Don Merton at the helm, we began the task of locating Chatham Island tit nests ready for the job of cross-fostering. We had no idea of the great breeding season which lay ahead.

Our plan was to induce the black robins to lay three clutches of eggs by removing their first two clutches and placing them in the nests of Chatham Island tits. We would then leave the robins to raise their own third clutches.

The season was an outstanding success and several 'firsts' were achieved:

- The first black robin hatched and reared by Chatham Island tits paired and bred successfully.
- Four three-egg clutches were recorded. No three-egg clutches have been known before and remarkably one female laid three 3-egg clutches.
- It was the first time a one-year-old bird had been recorded breeding. Black robins do not normally breed until their second year but this season an 11-month-old female mated successfully with an older male.

By the end of the season the robins had laid a total of 22 eggs. Of these, 17 hatched and 13 chicks fledged (i.e. left the nest). Of these fledglings, 11 survived to independence. The black robin population now stands at twenty. Had we not intervened in the nesting cycle, no more than 4–5 chicks could have been expected this season. There were no losses this season that could be attributed to genetic degeneration. The eggs and young lost were the results of

♀ tit sitting tight.

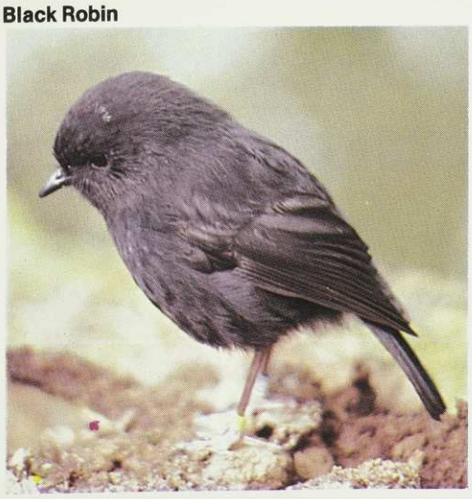
Placing eggs in transfer box.

Nest boxes placed in the forest provide safe nest sites for the robins when used.

South East Island — new haven for black robins.

Female Chatham Island tit — the successful foster parent.

Black Robin



accidents — generally petrels crashing into foster nests at night.

We now have 11 males and 9 females — eight birds on Mangere Island and twelve on South East Island. 'Old Blue' has been virtually the only successful breeder since 1979 and of the twenty robins alive, she is mother of six and grandmother of eleven. In spite of close in-breeding this year by her offspring, all young are vigorous and healthy and the fertility of the 'new generation' of robins has been faultless.

With the establishment of a population on South East Island the robins for the first time in the last 100 years have enough space to expand and recover. The head count is now the highest ever recorded since actual numbers have been known. When the Wildlife Service began its research/conservation efforts on Little Mangere Island in 1970, the highest count was 18 birds.

While the prospects for the robin's survival and recovery have never appeared brighter, the bird's future is not entirely assured. The black robin has persisted at a low population level for almost a century and at a critically low level for the past decade. This long history of close inbreeding could cause genetic problems although this now seems unlikely.

It is possible that some black robins will die during the winter as this period is a testing time for all birds. The Wildlife Service will continue its cross-fostering programme next season (October-January) but believes the end of intensive management of the birds is in sight. With another good breeding season next year, who knows?

And 'Old Blue'? She's been retired from breeding and transferred to South East Island where she has earned the respected title — 'Grandmother'.

Forest & Bird SUMMER CAMP

Kauaeranga, Coromandel
30 January–5 February 1984

by Olga Zeinert Member

The Coromandel Branch were the hosts at this year's National Camp, held at the Kauaeranga Christian Camp about 5kms from Thames. 78 members attended, coming from as far as Auckland in the north, and from Dunedin to the south. The accommodation was in bunkrooms with the dining-cum-meeting hall situated in the middle. A few campers tented and there were two caravans.

Chris Cooke, chairman of the Coromandel Branch, was Camp Director, ably assisted by Peter MacMillan as Trips co-ordinator, and other members of his committee. On arrival, we "checked in" and on completing the necessary registration, each camper was given a name tag, made in genuine kauri by one of the committee. As the theme of the camp was "the kauri", this was most appropriate. Lex and Lyn Greenhalgh were in charge of the catering, and amply provided for our inner needs.

Monday evening. Our programme began with a welcome address by Councillor C. L. Robertson on behalf of the Thames Borough Council. Following this, Chris Cooke introduced Mr John Carter, one of the two Forest Rangers responsible for the Coromandel State Forest Park, who spoke on many aspects and issues connected with his work. Exotic logging, now almost completed, planting of kauri seedlings raised at Sweetwaters Nurseries in Northland. the control of noxious animals (both goats and opossum), the Coromandel Management Plan currently under review with the Forest Advisory Board and the threat caused by the presence of the Crusader Mining Co. Refreshments and general discussion brought the first night to a close.

Tuesday. Some gentle showers during the night and the morning dawned rather damp, but by 9 am the clouds began to lift and two bus loads went on their way, one to Piranui Trail, and the other up the coast to Waiomu Valley and a stand of kauris. I chose the latter. Leader was Wally Gilmer, and two members of the local branch, Edith Geddes and Dorothy, who were able to supply botanical and local knowledge along the track. Five stalwarts, including two women, parted company from the main group to do an 8 hour hike to Boom's Flat, (but took 12 hours) they were amply rewarded with magnificent scenery.

Birds seen: bellbirds, tuis, silver-eyes, kingfisher, grey-warblers, shags, terns, kaka. It was a great joy to see so many kauris in various stages of growth. The trip up the valley was very interesting and included six crossings of the stream.

Evening programme. A welcome on behalf of the Christian Camp community by Mr Greenhalgh, who spoke on his work with young people. Then followed an illustrated talk on the Coromandel coastline, off-shore islands, and the interior by Doug Johansen.

Wednesday. Fine and clear after more showers during the night. Two trips were scheduled. One: The Coromandel coast, stopping at the Tararu Arts Centre, and a visit to meet Rei Hamon and see his creative art work. Lead by Tai Turoa. Two: Kauaeranga Valley, with Guy Alack. I chose trip two and as we wound around and further up the valley, many panoramic views were seen. One of much interest, was a cutting through the hillside on the valley opposite, the site of an old tram-line, where some of the trestles were still standing. Our destination was the swing-bridge across the river to view the distant Billygoat Falls, and see the natural regeneration of the kauri forest. Returning, we visited the Kauaeranga Education Camp, a centre run primarily for the use of student groups, scouts, etc, where we were shown the water-wheel which generated the lighting power for the buildings. Also, to the delight of the botanists, a large patch of *Fuchsia procumbens* in flower. Lunch was had at Hofmann's Pool, and several members enjoyed a swim in the cool clear waters. A short nature walk along the bank revealed many young kauris, and an orchid, *Dendrobium cunninghamii* in flower. Then we visited the Forest Service Information Centre, with its instructive displays, old photographs of mining, gum-digging and logging and other artifacts.

Evening. The speaker was Mr Gary Taylor, of the Environmental Defence Society, assisted by Mr Clive Monds. He spoke on the mining prospecting being done on the eastern coast of the peninsula, with particular reference to the Crusader Mineral Mining Co which has a licence to mine underground near Waiomu. The Society feels that careful consideration must be given to the Mining Act and its Amendment of 1981 before any further mining is considered. The danger from stream pollution, "acid rain" falling,, and erosion from excavations, could seriously affect our forests. Much interested discussion followed. Mr Jim Cureen brought the evening to a close by showing his slides of Antarctica, where he had spent six months with a work party assisting the Australian and New Zealand Contingent working on animal and scientific surveys.

Birds heard during the night: morepork.

Thursday. Trip one: Coromandel Coast; two: Kauaeranga Valley; three: Broken-hills Goldmine. Leader Doug Johansen. This trip I chose, partly nostalgia, for an uncle had mined on the West Coast after World War I. We travelled in cars through Kopu and towards Pauanui, and met up with our leader. From the roadside, Doug carefully pointed out the plan of our ascent, and sites of various workings, long since demolished. Then we began the climb up the hill face, and were able to see in place

Campers relax at a barbecue tea in the campsite grounds.

the line of Kauri seedlings planted by the Forest Service, some now over a metre high, and looking very healthy. One rare tree seen, was *Dacrydium kirkii*, just commencing its adult foliage.

Just before reaching the mine entrance, we descended into an old crater, now overgrown with grasses and shrubs, and were fortunate to hear the call of the shy fernbird. Doug had provided us with hard hats, so entering the mine shaft was no problem. Before long we were able to see the glow-worms above our heads, and see the rocky cavernous chambers, opening before us. At an old well shaft, leading to an opening far below, Doug demonstrated the distance by heaving a rock downwards, and by counting seconds (varied, 17 to 20) we could hear it banging and thumping its way to the bottom. Lunch was had by the river, where we were joined by tuis and bellbirds and rosellas. Doug introduced to our diet: totara berries, curled fern-fronds, and delicious billy tea. On the return, we visited the site of some old batteries, and some remains of early miner's dwellings. Along the bush walk, there were masses of *Dawsonia superba*, almost 60cm high.

In the evening the judging of the Moira Cox Memorial Slide Competition, and the Society's Bird Slide Competition took place. The standard of photography was very high. Following this, a film from the National Film Library, on the Kauri was shown, a very moving and historical documentary.

Friday. Trip one: Firth of Thames and seabirds; two Waiomu Valley.

On this particular day several of us played "wag" and went into Thames, for my part, I visited the local Thames Museum in the old Methodist Church which held much of the area's early history.

Evening. Mrs Mary Barry and Rod Aldridge, from Tauranga spoke on the Kaimai-Mamaku State Forest Management Plan covering the past 10 years of struggle to obtain protection for the narrow strip of remaining forest separating the cultivated area of the Bay of Plenty, from the de-forested expanse of the Waikato. Moisture is retained in the mosses covering the forest floor, and should the forest be removed, agricultural "drought" could follow. Also discussed, was the Government's Kauri Policy Plan, and members were urged to have their submissions on this important issue sent to the Conservator of Forests by the end of February. Interested discussion and questions followed.

Saturday, our last day of trips. After breakfast, the Camp photograph was taken by George Braithwaite.

Trip one: Dickie's Flat and Waitawheta; two: Firth of Thames and the Mangatangi Dam.

There was a slight drizzle, which soon cleared. The journey to the mud-flats, presented a contrast in scenery to that of previous days. The chairman of the Miranda Trust had already set up his telescope, and we had fine views of many waders, godwits, pied oystercatchers, gulls, terns, wrybills, knots, pied stilts, shags and white-fronted heron, some of the godwits were developing breeding plumage. We also watched a skylark descend gently to her nest on the field beside the bus, and swallows flying to and fro. Lunch stop was made at Waharau Reserve with a short nature walk afterwards, mostly ferns, some fine specimens of *C. medullaris* and *C. dealbata*. Then on to Mangatangi to view the large earth dam constructed for the Auckland Region. This man-made dam was about 3m below normal level. From the look-out we could see a fine stand of kauri planted about 60–70 years ago.

In the evening, campers combined to produce a concert of great enthusiasm, and variety, to bring the week to a very happy conclusion.

Campers cross the Kauaeranga River to reach views of the Billy Goat Falls.

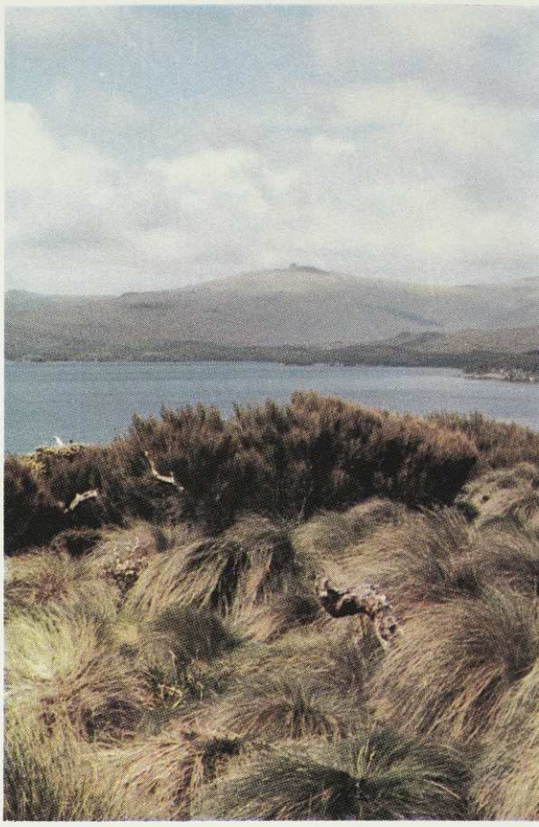
The working model of a ricker dam by Park HQ. When the gate was released, the built-up water carried the Kauri logs downstream.

Inside the Broken Hill Goldmine, Doug Johansen describes features.

Photographs by George Braithwaite

THE AUCKLAND ISLANDS VISITED

by Audrey Eagle



It was a privilege to visit the Auckland Islands and also an adventure which was faced with some trepidation. Everything we had read implied the worst: "vile weather . . . bleak climate, strong westerly winds, rainfall spread over 300 days a year". We hadn't expected that our six days were to be sunny and calm with only one wet morning.

Alex Black's *Acheron* of Dunedin was chartered, and skippered by him with a crew of three, his wife Colleen, son Sandy and Naomi Peterson, former mate on the *Spirit of Adventure*. The *Acheron* was to become our floating hotel, as sleeping ashore is not permitted. The 23m long vessel was comfortably filled by fourteen people, so it is amazing to think that Captain Cook's *Endeavour* was only 9m longer and yet held 94 men and all their stores for a long voyage.

Pauline Mayhill of Hamilton arranged the trip. The party of ten consisted mostly of Waikato members of Forest and Bird and the Ornithological Society. Two were members of the Conchologist Society. The party was comprised of Pauline, Keith and Peter Mayhill, Peggie Jenner, Bryony Macmillan, Mercia Barnes, Jim Gaulstone, Ron Sinclair, Audrey Marriott and myself. Our purpose was to learn more about land snails, birds, plants and also to satisfy a desire to see the Auckland Islands from a conservation point of view.

The Department of Lands and Survey had issued permits for landing and also permits to Pauline Mayhill and Jim Gaulstone for collecting land snails for the National Museum; to Bryony Macmillan of Botany Division, DSIR for collecting samples of *Acaenas* (bidibidi) needed for her study of this genus; and to me for collecting a leaf and a flower from *Stilbocarpa*, gentian, *Anisotome* and two species of *Pleurophyllum*, all of which I wanted to paint.

December 2. We left Dunedin on the thirty-six hour passage which, as we neared the Auckland Islands, became quite lively and we were grateful to arrive in the calm waters of Erebus Cove where we spent the first day. Having avoided the solitary Hooker's sea-lion (*Phocarctos hookeri*) that was guarding the small beach, we visited the graveyard that once formed part of the Enderby Settlement. To see "Died of Starvation" on a gravestone as almost a first impression of the Auckland Islands which remained in my thoughts throughout our wanderings and at each place we visited I wondered how one could survive there. The sea-lion had followed us and chased us from our contemplation of the cemetery so we turned our attention to the forest.

Typical lowland Auckland Island forest is made up of southern rata, (*Metrosideros umbellata*), many of which have liverwort and moss covered, prostrate trunks from which grow a thicket of branches, inanga (*Dracophyllum longifolium*) with trunks up to 10m in height and haumakaroa (*Pseudopanax simplex*). Weeping matipo (*Myrsine divaricata*) and hipiro (*Coprosma foetidissima*) were the understorey and always present was the fern *Polystichum vestitum*, ideally suited to the conditions, growing very large and often with trunks a metre in height.

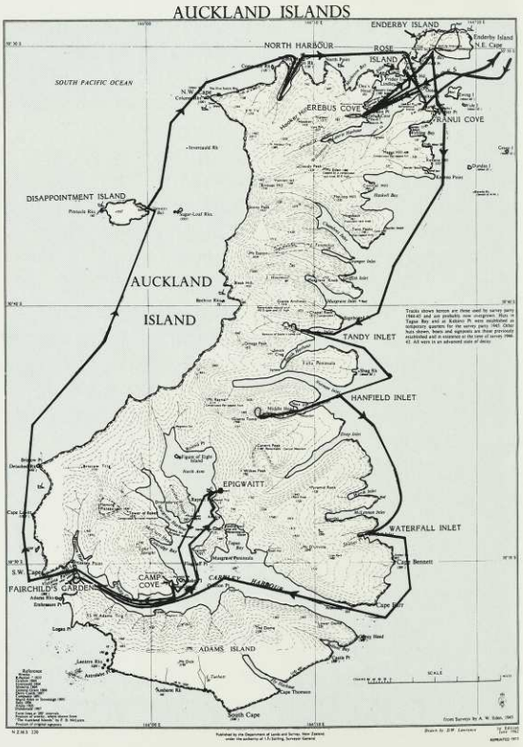
At a higher level (about 50m) the rata becomes scrubby and ends. The main species then are the matipo, inanga and cottonwood (*Cassinia vauvilliersii*) which in some places form an almost impenetrable barrier.

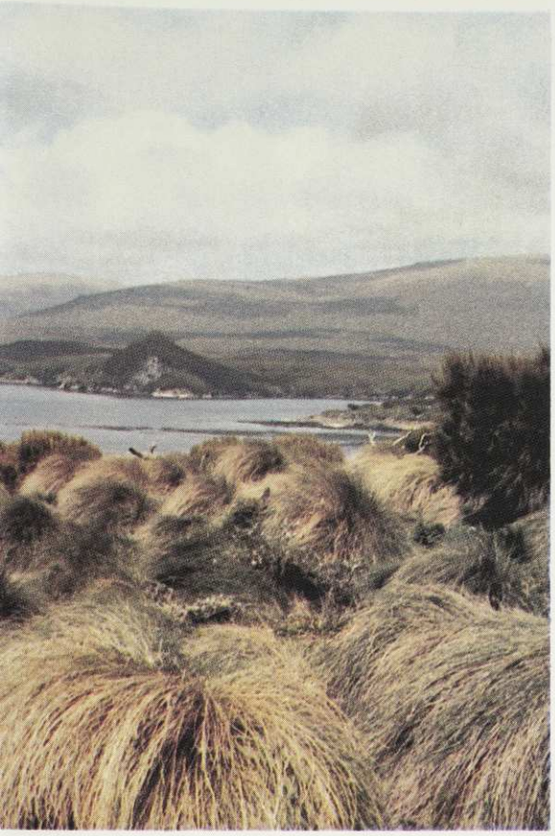
Above the scrub belt tussocks take over and, on wet summit ridges, mosses, liverworts, lichens and sedges grow, and in drier areas, dwarf alpine plants. But we never had time to scramble up to the higher tops and see these plants at close quarters.

December 5. Was to Enderby Island where on landing we were face to face with some of the seventy-four impressive male sea-lions that were on guard along the sandy beach. There were no females present for them to fight over so they mainly ignored each other and us.

The majestic and well-named royal albatrosses (*Diomedea epomophora*) were sitting on eggs, unperturbed by the clicking of cameras. The first plant excitement was a host of golden-flowered *Bulbinella rosii* covering several hectares. On Enderby Island most of the herbs have been eaten flat to the ground by the hungry cattle and rabbits so it is fortunate that *Bulbinella* is unpalatable to them. Other spectacular herbs have gone, or like *Anisotome latifolia* a few plants cling to cliff edges out of reach of the browsing animals. *Anisotome* belongs to the carrot family and the root was one of the survival foods of the castaways.

All the birds gave us great joy; yellow-eyed penguins (*Megadyptes antipodes*) marching inland, one being seen on a nest with a chick. Auckland Island shag





Auckland Island from Rose Island

(*Phalacrocorax colensoi*) colonies, some members of which came and gawked at the humans feeding; banded dotterel (*Charadrius bicinctus*) on the higher land and both red-crowned parakeets (*Cyanoramphus novaezelandiae*) and New Zealand pipits (*Anthus novaeseelandiae*) were finding something to eat on the chewed-down ground cover near the shore. For the birds and animals to accept us, unafraid, as part of the natural scene was a precious experience.

December 6. The morning was spent at Tandy Inlet where we were hoping to climb to Chapel Rock (31m) to look for snails and to see what plants were growing there. But apart from speeding up through occasional patches of snow-grass and inanga, progress through the scrub was painfully slow and everyone finally gave up the struggle. The coastal edge was more rewarding where a single plant of a beautiful deep-blue forget-me-not was seen *Myosotis capitata*, with flower heads about 5cm across. Bellbirds (*Anthornis melanura*) were numerous, both young and mature birds delighting the ears of the listeners.

Our afternoon stop was at Hanfield Inlet where we saw several specimens of the tree fern (*Cyathea smithii*). Tree ferns occur in only a few sheltered places in the Auckland Islands and the most southerly in the world were found by Dr Eric Godley in 1969 growing in Waterfall Inlet, 11km to the south of Hanfield Inlet.

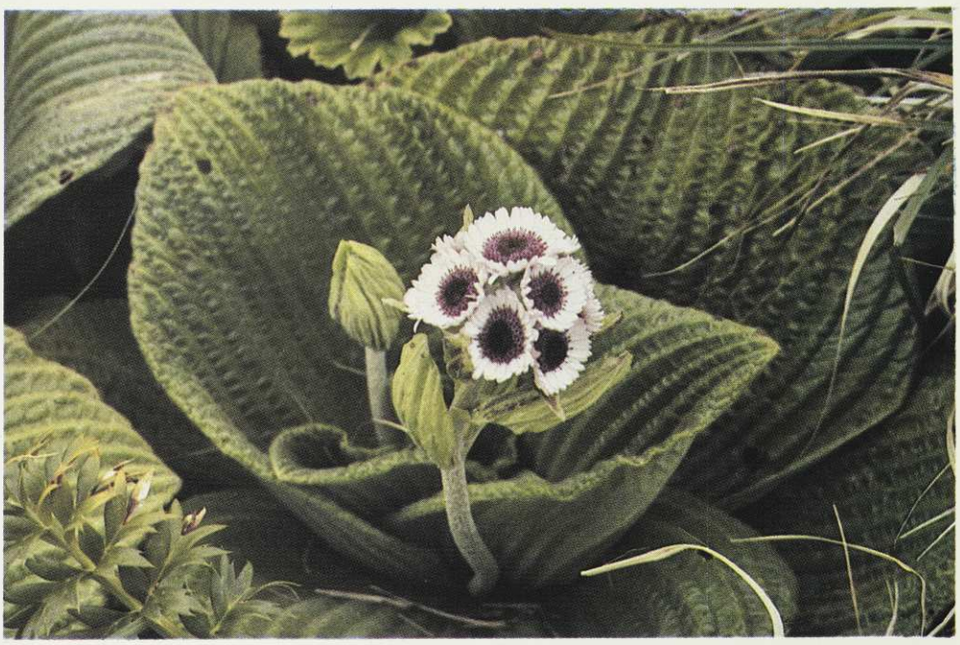
We scrambled around a cliff edge to see *Stilbocarpa polaris* growing in a spot accessible to pigs. It is a handsome plant with deeply ribbed leaves up to 45cm across.

That night we anchored in Waterfall Inlet where we spent an hour or so ashore before our evening meal. We were more often than not on sea-lion tracks, with their distinctive smell, and this time we used them to pass through the band of shoulder high silvery-yellow grasses near the shore. There was always the anxiety of a sudden meeting with one of these enormous beasts in a restricted spot, and here we saw one, resting, that had presumably been wounded in a fight.

In the adjoining rata forest a tomtit (*Petroica macrocephala*) with a white breast was feeding two yellow-breasted young. It had a raised "crest" which may have been to make it look bigger and so frighten us off but his top-knot did not produce the same effect as that caused by the sudden roar of a sea-lion.

December 7. This was to be an important day so we left our anchorage at 6am and headed up Carnley Harbour for Fairchild's Garden on Adams Island. Here a special

***Myosotis capitata*, Tandy Island**



***Pleurophyllum speciosum*, Fairchild's Garden, Adams Island**

***Bulbinella rosii*, Enderby Island**

permit is required for landing as there are no introduced animals or plants on this island, so boots and clothing had to be checked for any seeds before going ashore.

We climbed up a steep rocky watercourse through the usual coastal belt of *Hebe elliptica* which withstands, undamaged, the salt-laden winds. We then passed through a belt of stunted rata, inanga and matipo at the edge of which a sub-antarctic snipe (*Coenocorypha aucklandica*) appeared from almost under my feet. Its long beak made up nearly a quarter of its 23cm length.

Then came the cherished moment of standing on the edge of a vast meadow of large-leaved tropical looking plants. The large leaves were perfect, not tattered by the strong winds the region is noted for. They belonged to two species of *Pleurophyllum*, *P. speciosum* which has white to mauve ray-florets on its large daisy flower-heads and *P. criniferum* which has dark maroon flower-heads without ray-florets. We were fortunate to see some flowers on these beautiful plants as we were slightly early for the main flowering season.

Two other large and spectacular plants were fully out; *Stilbocarpa polaris* with yellow flowers and *Anisotome latifolia* with mauve flowers. On a smaller scale were the 12cm high *Gentiana concinna* with reddish-purple flowers and again we met the bright blue forget-me-not.

To see an island of native plants completely unaltered by humans is a privilege granted to few.

As well as the interesting plants, we saw twenty or so wandering albatross chicks (*Diomedea exulans*) their heads raised above the snow-grass to look at us. One was being fed and others were exercising their long wings. Light mantled sooty albatrosses (*Phoebetria palpebrata*) were resting on the cotula sward. We saw the occasional giant petrel chick (*Macronectes giganteus*) like a soccer ball of grey down, and also saw swimming amongst the swooshing kelp, an Auckland Island flightless duck (*Anas aucklandica*).

We were fortunate to have Colleen Black as our guide on these occasions for as well as being a qualified skipper and an excellent caterer, she was very knowledgeable about the plants.

Still in Carnley Harbour we sailed to Epigwaitt where we saw the few remaining timbers of the *Grafton* which was wrecked in 1864 and also the remains of the cottage built by the survivors of the wreck.

That evening we anchored at Camp Cove. After our evening meal we walked up the

***Pleurophyllum criniferum*, Fairchild's Garden**

Shy mollymawks, Disappointment Island

Fur seal, Disappointment Island

***Gentiana concinna*, Fairchild's Garden**

track formed by members of the 1972/73 Scientific Expedition which had been based here. This track was one of the few on the islands.

The very wet conditions in this area are ideal for mosses, liverworts, and filmy ferns, of which there was a great variety. The evenings were so light in this latitude at 10pm that we were able to see the filmy ferns well enough to identify them, even in the darkness of the bush.

December 8. The weather was once again kind to us and as there were no strong winds an early start was made to pass through Victoria Passage, the narrow channel between Adams Island and Monumental Island and through which flow strong tidal eddies. The *Acheron* then turned north along the western side of Auckland Island. The cliffs here were steep and forbidding and were the cause of several wrecks including that of the *General Grant* in 1866.

As with Adams Island a special permit was required to land on Disappointment Island, an island which more often than not is surrounded by such a heavy swell that landing is impossible.

This was the first time specialists in land snails had visited this island to collect specimens. Incidentally, 5mm diameter would be a large snail and excitement can run high on the finding of a species even 1mm in diameter.

It was a great thrill to grab the swirling kelp, pull oneself up on to a ledge of rock, and actually stand on Disappointment Island. How different was our reaction to that of the sixteen survivors of the *Dundonald* in 1907 who thought that they were on the main island where there were food depots, only to find that they were on a small treeless island. They managed to survive there for five months in grass-covered holes in the perpetually wet peat. Eventually some made it to the main island in a coracle made of hebe branches covered in sealskin and brought rescue to their comrades.

Disappointment Island, like Adams Island, is unique in that there are no introduced animals or plants. 60,000 birds, the world's largest population of albatross, breed here. This particular species being called the shy or white-capped mollymawks (*Diomedea cauta*) they were sitting on eggs as were the rockhopper penguins (*Eudyptes crestatus*). Petrel burrows were numerous their occupants not being seen, but heard, muttering below ground, sub-antarctic snipe and Auckland Island flightless duck were scurrying about in the undergrowth.

Southern skuas (*Catharacta lonnbergi*) were sitting on vantage points ready to seize an unwary bird's egg. Some of the discarded penguin eggs, I noticed, had holes in them.

For me the highlight of this whole wonderful Auckland Island experience was the hour I spent with a fur seal (*Arctocephalus forsteri*). Over a period of half an hour I slowly crawled along a rocky ledge until I was lying less than a metre away from it and then together we contemplated the heaving sea with the occasional sideways glance at each other.

Many of the lovely plants seen in Fairchild's Garden were flowering here also but the blue-flowered *Hebe benthamii* which wasn't seen in flower in Fairchild's Garden, and which only grows in the sub-antarctic islands, had two blossoms remaining giving just a

***Anisotome latifolia*, Fairchild's Garden**

hint of its attractiveness. The first land snail seen on Disappointment Island was found crawling up the tripod of my camera while photographing this flower!

On our way to North Harbour we passed Beacon Rock where cape pigeons (*Daption capensis*) were nesting. We saw three goats and several sea-lions on the shore and when we landed and crossed the beach we were surprised to find that these sea-lions could lift their immense weight on to their flippers and chase us at such speed that we had to run fast, intimidating us further with large wide-open mouths and loud roars.

The bush here was eaten out by the goats, the inanga only surviving where it was a perching plant on the rata.

That night we again anchored in Erebus Cove, having circumnavigated Auckland Island thanks to the wonderful weather and the enthusiasm of Alex Black who wanted us to have as complete a picture of the islands as possible.

Rock-hopper penguin, Rose Island

December 9. Rose Island was visited in the morning. We had hoped to see the beautiful light mantled sooty albatrosses nesting, but were too early and some birds were seen in courting displays. A colony of about forty giant petrel chicks were found, some covered in grey down and others able to run around.

Peggie Jenner had an unusual experience as protector to a future relentless hunter, when a skua chick which was being harried by black-backed gulls (*Larus dominicanus*) ran to her for protection.

On a windswept cliff-top where the vegetation was eaten flat to the ground, rabbits being present on this island, I saw gentians (*Gentiana cerina var. cerina*) covering an area of about 100m² their heads bobbing in the breeze, some white, some red and some white with red stripes.

The smooth even outline of rata was a feature of much of the coastline and later when in flower would be a dazzling display. Only on Rose Island did we see one of these trees in flower. A tomtit was also seen being very bold hopping about on the swirling kelp and eating minute insects.

Our next stop was at Ranui Cove where there had been a lookout station during World War II, the buildings were still intact. We went to the lookout point and trig (76m) to have our final look at the Auckland Islands, the view the Coast Watchers would have been so familiar with, and that evening we headed out for Dunedin.

The wonderful birds, animals and plants indigenous to the Auckland Islands are dependent on man's care, understanding and goodwill for their survival and need all the protection that can be given. We New Zealanders are responsible to the world for their survival.

Photographs: with exception of *Myosotis capitata* by Ron Sinclair and Auckland Island from Rose Island by Keith Mayhill, all by Audrey Eagle

***Stilbocarpus polaris*, Disappointment Island**

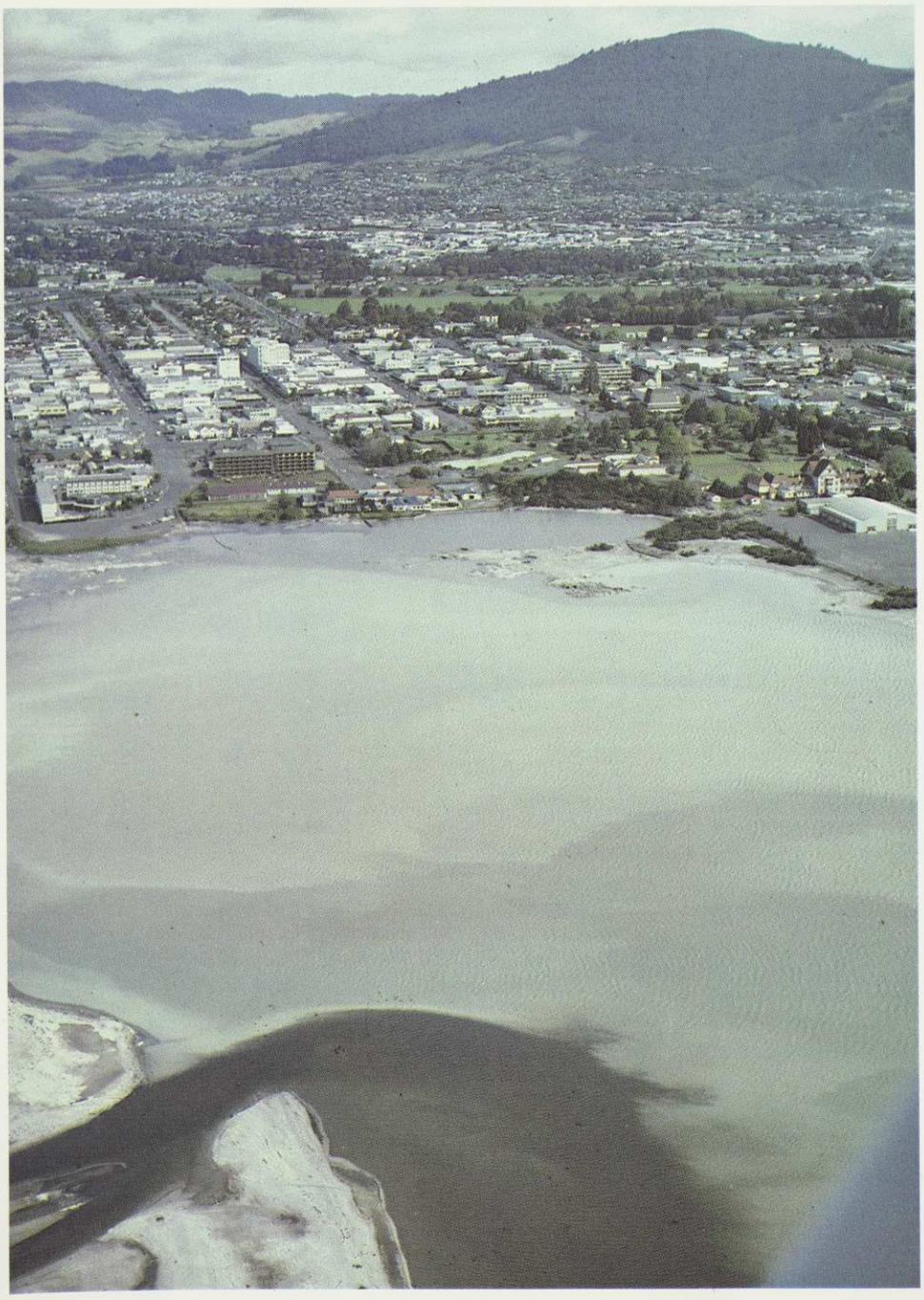
Hooker's sealion, North Harbour

Sulphur Bay

A THERMALLY HEATED WILDLIFE AREA

By
John Innes
Regional Representative,
OSNZ — Volcanic Plateau
and
Graeme Taylor
Zoology Department,
University of Canterbury

Much of the water in Sulphur Bay, Lake Rotorua, is devoid of aquatic plants and animals. Why then, do the majority of New Zealand's little black shags nest here? What brings black-billed gulls 1,000km north of their normal South Island braided river nesting habitat, to raise chicks on a steamy silica spit a few hundred metres from downtown Rotorua? Why do dabchick, pied stilt and welcome swallow gather here in large numbers each winter?



Mount Ngongotaha and Rotorua city from atop the Puarenga Stream mouth. Gull breeding sanctuary in centre.

Inhospitable bay?

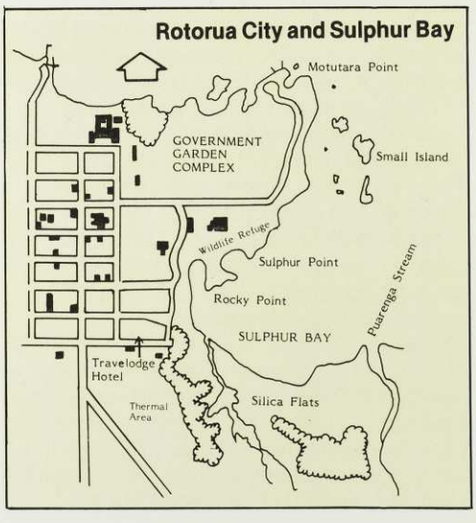
Looking at the Bay itself does not immediately answer the questions. It is the most southern bay of Lake Rotorua and measures 1,300m by about 750m. Adjacent ground includes the well known Government Gardens complex; the large Travelodge hotel, and extensive natural silica flats with an intact manuka frontage as old as Rotorua city itself and now uncommon on the lake edge. The Puarenga Stream, which drains the Whakarewarewa Thermal Reserve, flows in from the south. However, the Puarenga does not supply the thermal odours and suspensions which gave the Bay its name. These discharge directly into the Bay from an active thermal field under and adjacent to the lake water. The water is warm; it is murky, sulphurous, low in oxygen and shallow. You can walk across most of the Bay, which alarms tourists at the Travelodge! The water is quite acid — as low as pH 3.5 in places — and we often see gulls with feet like blackbirds because the webs of their feet have not withstood years in the acid water.

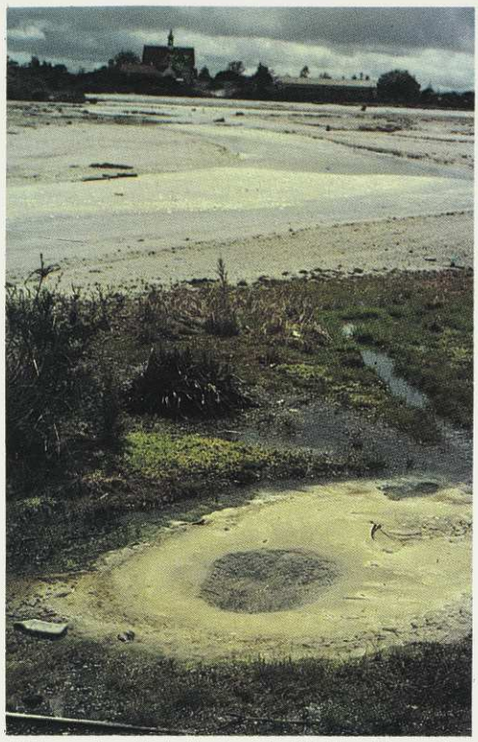
The bottom is covered with fine mud near the thermal discharges and fine quartz sand further away from them which contain the only abundant insect group — midge larvae. There are no lakeweeds in the sulphurous part of the Bay.

Sanctuary and refuge

Sulphur Bay was declared a game reserve in 1904, for "native and imported game, primarily ducks". The breeding area for red-billed and black-billed gulls at Sulphur Point, and its surroundings have been a Wildlife Sanctuary since 1964 and special permission is needed from the Wildlife Service to go there. The water of the Bay has been a Wildlife Refuge since 1967.

We have records of 62 species of bird from the area of which 45 are native. Some visitors are rare vagrants; others are present all year round in constant numbers while more still are periodic users, either





A thermal oasis in the banded dotterel breeding habitat behind the Travelodge Hotel.

coming in the spring and summer to breed or in late summer/autumn to moult or wait out the winter.

The summer breeders

Nationally significant colonies of red-billed and black-billed gulls and little black shag occur in Sulphur Bay. Also, the banded dotterels which nest on the silica flats behind the Travelodge Hotel are special for the Rotorua region.

Red-billed gulls:

Red-billed gulls are common coastal breeders throughout New Zealand but there are few inland breeding colonies. They have been known to nest in Sulphur Bay since at least 1939–40, and their numbers on the Sanctuary colony have steadily increased — from 27 nests in 1945 to 150 pairs in 1956/57, to 400 pairs in 1961/62 to about 1,000 nests in the 1982/83 and 1983/84 seasons. First eggs are laid in early October and the usual clutch is two. The red-billed gulls prefer to nest on the rocky edges of the colony, while the top flat section is used by black-billed gulls.

Red-billed chicks fledge in about five weeks. The foods we've observed them regurgitate include dragonfly larvae, beetles, bullies and smelt. The adults rarely feed in the sulphurous water, but a common sight is several hundred red-bills wheeling and diving for smelt in a line along the margin between the sulphurous water of the bay and the cleaner water of the open lake. Smelt spawn mostly in the spring and early summer in Lake Rotorua. Dr Peter Mylchrest, Fisheries scientist in Rotorua, has suggested to us that smelt may be rendered groggy by the sulphurous water in the Bay, which could explain why the gulls constantly work the mix-zone.

Chicks fledge steadily from about mid-December to mid-February. Except for the odd chick that falls into a steaming hole, the nesting birds don't seem to be affected by the thermal nature of their colony. From the time they leave the Sanctuary the newly flying gulls can be seen wherever the adults feed and roost. This includes the local rubbish tip — 10km away — and nearby parks, especially the Rotorua Lakefront where tourists, children and birdwatchers can all get very close to them.

One day in late February or early March, the entire colony will vacate as you enter. The intense site attachment shown during breeding is finished, and another season is over. Some gulls always remain during winter but banding has shown that some fly to Maketu, a Bay of Plenty beach. This year we have put orange bands on the legs of over 300 red-billed gull young to improve our knowledge of their movements.

Black-billed gulls:

If the red-billed colony can be called "unusual", then the black-billed gulls are extraordinary. O'Donnell and Moore (1983) grouped this endemic species with the wrybill plover and black-fronted tern as having ". . . specific adaptations for breeding and feeding on riverbeds". Although it sometimes breeds in association with red-billed gulls in the South Island, it is typically a South Island braided river breeder. Other North Island colonies — some recently discovered — also exist, but the Rotorua breeding population is largest.

Black-bills have bred here since the early 1930s and perhaps longer, but their numbers on the Sanctuary are declining. In 1951/52, they outnumbered red-bills three to one (Black, 1954). In 1961/62, they just held their majority, having 460 nests to 400 of red-bills (Reid and Reid, 1965). In 1982/83, only 310 pairs built nests, compared to about 1,000 pairs of red-bills; the number had dropped further to 230 pairs during the 1983/84 season.

This species commences nesting three weeks later than the red-billed gull and deserts three weeks earlier. Their rapid synchronised breeding is one of several behaviours adapting them to the flood-prone South Island riverbeds. In the South Island, the gulls lay "almost as soon as a nesting site is secured", and "the adults and young move away from the nests within a few days of hatching of the eggs . . ." (Beer, 1966). There is already evidence that the Rotorua black-bills are learning new ways, more in keeping with a stable colony site that isn't washed away with each flood. At Rotorua, many gulls are on the colony two months before first eggs are laid, and the chicks don't leave the site until they are almost ready to fly. However the nesting period is the same length — about 10 weeks.

Few black-bills are seen around town where their red-billed cousins are scrounging food, and we have never seen them at the rubbish tip. They feed on pasture around Rotorua or on lakes in the region.

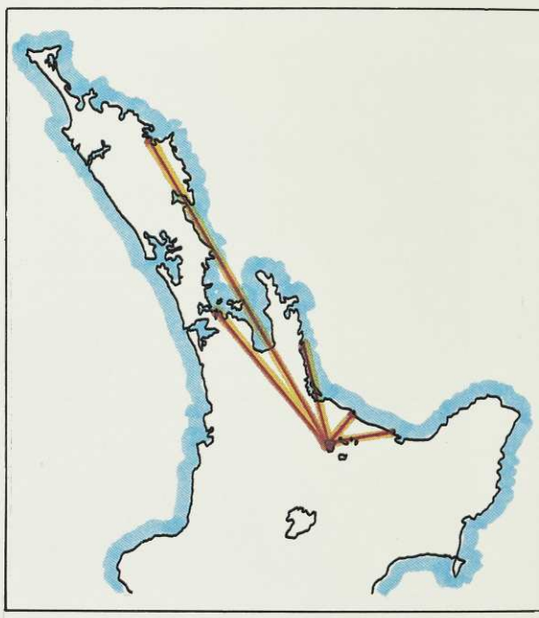
Winter movements of the black-billed gulls which breed at Rotorua are a mystery. It is likely that many go to the Firth of Thames, although this has yet to be proven. Some remain in the Bay of Plenty. Birds banded on the Sanctuary have been seen on Lakes Rotoehu and Taupo in winter. Fifty Sulphur Bay black-bills were banded with orange leg bands this year to find out the movements of the birds.

Little black shags:

Six years ago, no little black shags nested in Sulphur Bay. In 1982/83 there were 980 nests crammed onto the small Island off Motutara Point — most of the New Zealand population. Until recently little was known about the species in New Zealand. A few little blacks arrive from their wintering grounds in September, but most appear in early October. First eggs appeared in mid-October in 1982/83 but the next year not until 4 December. Incubation takes 26–28 days and the usual clutch is four eggs. Chicks are ugly but lovable! At fifteen days the chicks can be banded and are fully fledged within seven weeks. Juveniles are distinctively brown-plumaged.

As with the gulls, these shags don't feed in the sulphurous water. Hundreds of them fly to the northern bays of Lake Rotorua daily to dive for smelt. Their feeding is characteristic — hunting in groups, they herd smelt ahead of them by diving repeatedly in front of each other to reach the small fish.

Little black shags banded in Rotorua in the 1982/83 season have been seen or captured in winter at Bay of Plenty beaches; at Oputere on the east coast of the Coromandel Peninsula; near Panmure and on the Waitemata Harbour in



Movements of young little black shags banded in Rotorua.

Auckland, and much further north, near Kerikeri.

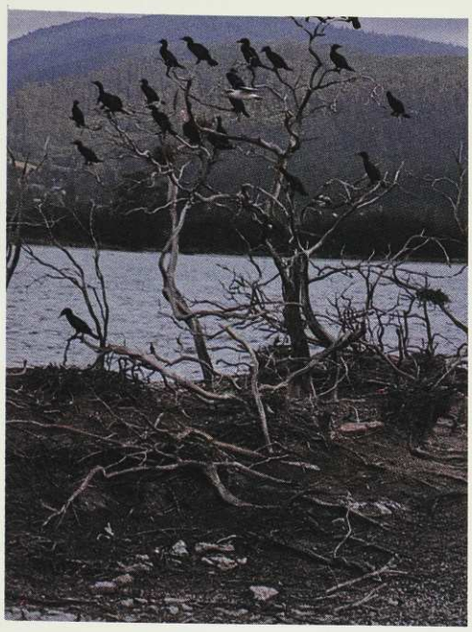
In the 1983/84 season only 300 shags nested on the small island. Red leg bands have been put on 160 young to identify them more clearly as being Rotorua-born.

Meanwhile the few trees — old manuka — on the island are long dead. But it doesn't matter, since 90% of the nests are on the ground.

Banded dotterel:

Banded dotterel are rare in the Rotorua Lakes district. Ten pairs still nest atop Mt Tarawera, in scattered localities and despite the airstrip there. The only other known breeding site is on the thermal silica flats of Sulphur Bay between the Travelodge Hotel and the Puarenga stream mouth. The dotterels breed there from August to February, then depart until June or July. In 1982/83 up to 12 were present and four pairs nested. Seven chicks hatched with probably four fledging.

The biggest threats to the continued survival of these banded dotterels are motorbikes and "development". Many people see the flats as unproductive



Little black shags on their breeding island.

wasteland, which needs to be developed for tourism or commerce. Every summer evening and weekend motorbikes scream up and down the sand and mud. The dotterels fly unnoticed ahead of the bikes, their *chip-chip* call warning chicks to keep their heads down. Unfortunately their breeding area is outside the Wildlife Refuge.

The overwinterers

The New Zealand dabchick population in the Bay shows a strong seasonal trend. Flocks form in autumn and disperse during the spring. Few remain in high summer. In 1982 the winter flock peaked at 95, while in 1983 about 70 birds used the Bay. The estimated population of this endemic bird in New Zealand (and therefore in the world) is 1,150–1,400 birds (B. Heather, 1978, *OSNZ News No 8*). Sulphur Bay therefore supports at least 5% of the total population in winter, and ranks as a wetland of international importance under IUCN criteria (any area which supports more than 1% of the world population). Dabchick feed along the zone between the Puarenga Stream and Ngapuna Stream currents, and in the evening — when the lake is more peaceful — move out towards Hinemoa Point.

Pied stilts feed, roost and breed around the bay shoreline, mainly at the Puarenga Stream mouth and on the Travelodge flats. A large flock (170 in February 1983) forms after the breeding season in late summer. This declines in autumn, possibly as birds move down to the Bay of Plenty coast. Numbers build up again in May as duckshooters take to our wetlands, and most of this flock disperses in July to farm ponds and lakes in the region to breed.

Welcome swallow are virtually absent from October to February but appear in large numbers in May. In June 1983, over 700 were estimated to be hawking up and down the thermal Puarenga Stream at its mouth. They remain until August. It seems probable that in summer they breed in farm buildings, near ponds and on bridges within 10–15km of Rotorua. They use the bay over the winter period probably because its warmth supplements their body heat and it contains a ready winter food supply of midges.

Regulars, moulters and shelterers

Other regular users of the bay include black swan, paradise duck, mallard, scaup, grey teal, black-backed gull and Caspian tern. Numbers of waterfowl, especially paradise duck, shoveller, grey teal, mallard and grey duck are highest after breeding, in January and on into autumn. Presumably the bay provides peace for moulting, but few breed there.

Other birds present at different times are little shag, large black shag (up to 60 in December/January, after breeding) and white-faced heron.

What of the future?

The questions posed in the introduction to this article still need an answer. For the banded dotterel, gulls, pied stilts and other species which breed and feed here, Sulphur Bay provides a large, sheltered, flat surface close to a lake. This habitat type is regionally rare. The black-billed and red-billed gulls and little black shags which have large breeding colonies here mostly feed outside the Bay, and certainly feed outside the thermal section of it.

For all species, freedom from disturbance is a key factor. The bay isn't popular with tourists or anglers, and few visitors walk on the thermal flats.

However tourist interests are keen to make use of the area but for the wrong reasons. A hovercraft company is now considering starting an "airport to accommodation" service, actually running the noisy machine out of the water within 30m of where red-billed and black-billed gulls and banded dotterel nested this year. A jet helicopter also takes sightseers over the bay from vacant land within 200m of the Puarenga Flats. Roosting gulls take to the air as the machine covers the bay. Red-billed and black-backed gulls are good adapters, but we do wonder at the decline of black-billed gulls on the Sulphur Point Sanctuary. This year a colony of black-bills at the nearby tranquil Lake Rerewhakaaitu fledged over 200 chicks, about four times the chick production at the Sanctuary. Perhaps they're telling us something?

We think there is excellent potential for developing the Sulphur Bay refuge for better viewing by the public, but on foot, not from a hovercraft or helicopter! Unfortunately the message does not yet seem to have reached many tourist operators that bird watching is a very popular activity worldwide. Natural history and activity tourism are the major growth area of tourism in New Zealand today. However it is essential that we safeguard the attractions the visitors come to see.

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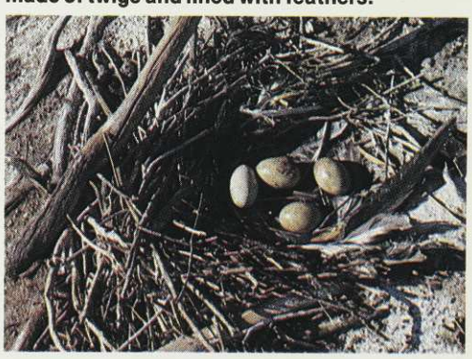
Editor's Note: Any readers who sight any of the banded birds described in this article may wish to contact: John Innes, Loop Road, Lake Okareka, Rotorua with their sightings.

Colour banded red-billed gull chick, with adult, Sulphur Bay.

Little black shag nest — a robust structure made of twigs and lined with feathers.



25 day old little black shag.

Photographs John Innes

Whirinaki

A FOREST STILL AT RISK

by John Morton

When logging is halted in Whirinaki — as it must soon be — that great forest will offer an interesting section of history. It will show us stage by stage, each of man's pretensions at timber extraction: and how each was improved and refined or then abandoned altogether, as environmental conscience and public pressure got stronger.

With a certain time lag, Forest Service have been gaining in conscience too: so that native timber extraction has got more and more expensive per unit, as the demand has become less and less.

Whirinaki will show how timber extraction went on even when it ceased to be economic: and why it took Forest Service so long to stop exploiting the forest, long after this had become pointless, whether for the economy, for timber supply or for employment.

It will illustrate how, far more than being a rational animal, we are still a rationalising one.

Stage One:
Felling and burning of native forests

The first attacks on our native forests, a century and more ago, were by cutting and burning to get fields and pastures. There was not much thought for the timber itself, which was burned or used as corner posts. Whirinaki escaped much of **Stage One**. Though Maoris had cleared patches in it for over six centuries, it was to the white man a remote and bush-sick country, with a bad winter and long unwanted for farming.

Stage Two:
Indiscriminate logging

It could wait for **Stage Two**, that began here with the 1930s: indiscriminate logging for total extraction of prime podocarps. Rimu, totara and matai (with also kahikatea and miro) were at Whirinaki the finest and tallest and densest in the world. Precious bits of this lowland forest are still left, on the rich lowland alluvium of volcanic ash in the fertile Whirinaki Basin.

Native timbers were cheap and could be used for anything. Before the Kaingaroa pines had matured, rimu logs and some totara went to the mill at Minginui, for the cheap supply of the New Zealand building and joining industry.

Whirinaki has big salients of pine today that were planted after natives had been clear felled. A few people knew and lamented all this, but contracts for indigenous logs had been let by Government; and — even to Forest and Bird — before the 1970s, it seemed this was something that had always been, and would go on being, give or take a patch or two of reserve.

Stage Three:
Maintaining a forest cover

Real conscience about New Zealand's indigenous forests was first aroused only in the '70s, notably by the Moyle proposals for clear-felling of South Island beech for chipping and pulping. Royal Forest and Bird became active at a new level, and membership climbed. Beech Forest Action Committee was born in Nelson.

A few radicals began asking why native forests had to be felled at all. Was not the success story of pine-planting from the 1930s on, about to change our whole basis of production and export forestry?

But not even conservationists — as a whole — were yet thinking of total indigenous protection. Progress to **Stage Three** went only as far as the Government's new indigenous forest policy, announced after the Forestry Conference of 1974–75. Clear-felling — at least in virgin forests was to stop, though

subject to numerous exceptions on economic and regional employment grounds.

In Whirinaki it did stop, while Pureora, with its endangered kokako, was put under a logging moratorium.

The new dispensation was to be 'selection logging' for what was called 'sustained yield management', allowing the increment by regeneration and growth each year to replace that year's cut. The yield from Whirinaki was to be lowered to only 5,000m³ annually from 1984; though rather more is currently taken, mainly from the Easter wind-throw of 1982.

Selection logging varies hugely in its impact. North Whirinaki in the mid '70s saw some horrid examples of it, which the Forest Service is today ashamed of. There were also disastrous experiments in Westland — proclaimed in their day as the new step forward — where, after five years' windthrow from root and canopy damage, the forests had to be clearfelled. Wind was blowing down 40% more than the projected growth increment.

In the North Island, at both Tihoi and Whirinaki, logging trials were adversely reported on, and the technique thrown into doubt, by the Service's own Forest Research Institute.

Today, Forest Service is claiming to have improved its selection logging, by the use of smaller and less damaging tractors. But periodic logging, at volumes of up to 30%, repeated after 30 years is still the policy for Whirinaki under the 1981 Management Plan. The corridors are to be planted with young rimu that it is hoped will regenerate in the light-gaps left by logging. The greater part of the rich, dense lowland forest is still regarded as merchantable. Only small fractions have been placed in reserves.

The great defect shown in sustained yield management is that it is unlikely to work, at all events, because of the unbalanced age structures of these ancient forests. The oldest trees alive today go back to the legendary First Canoe, coeval with Richard Coeur de Lion. Trees of middle age at Whirinaki date from the Wars of the Roses.

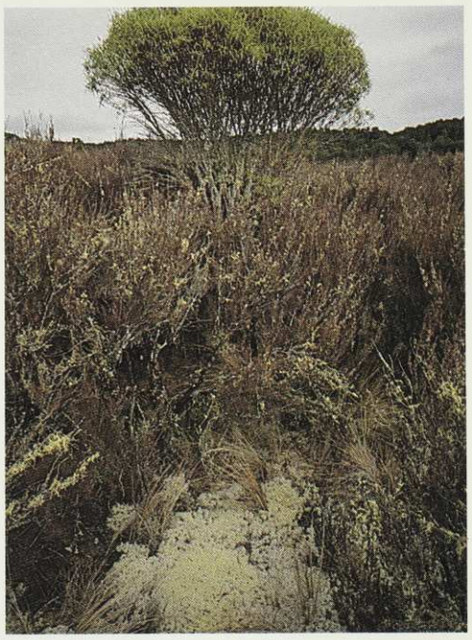
Over the last 200 years, there has been a regeneration gap that no amount of planting will effectively close. Unlike a pine forest or a fishery, where sustained yield management is easy enough, the time-spans at Whirinaki are beyond human policy or manipulation.

The Forest Service are fond of pointing to logging with regeneration planting as an enlightened procedure to restore forests where the giant trees are declining, dying and falling down. But with each entry for another selection, more of the superb canopy trees will be lost, until only a low adolescent profile remains: a giant forest no more, but a managed plantation like one of the projected Northland forests of sub-mature kauri.

If the podocarp giants were really in decline, we might have little choice — on those sites — but to watch them go, cherishing them meanwhile for perhaps the century or more most of them would still be with us. There would be the poignancy of knowing they wouldn't always be there. But still — with nature's long and mysterious providence — more would appear somewhere else, in a forest that is a changing mosaic in space and time.

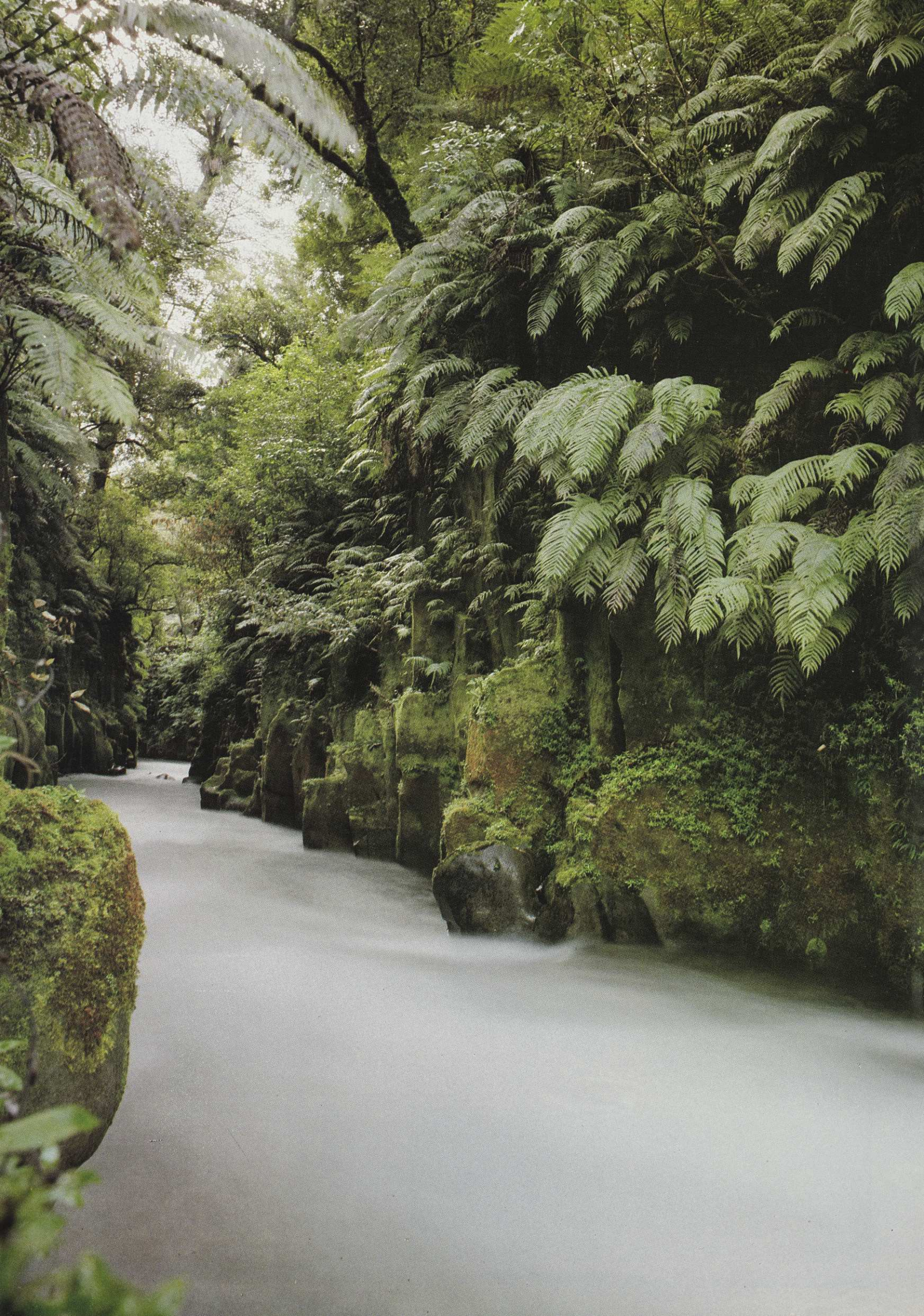
Forest Service's dogma is that today's giant podocarps are a first generation, after the last Taupo eruption (1800 B.P.), and are now in decline. They attempt to justify this from Professor McKelvey's pioneering studies of podocarp succession. Properly interpreted, there need be no argument with his findings, as Dr John Ogden has tried to show in a forthcoming chapter on the history and ecology of Whirinaki. He has shown how complex the facts are, and how much is still unknown. But what we do know, or can reliably surmise, gives no support to the Service's official theory and practice.

Above all, replanting in selection lines seems highly unlikely to bring back a forest



A small glade of pure matai astride a stream near the Otupaka frost flat.

A koromiko stands above the red-brown Dracophyllum and cream coral lichen on the Waione frost flat.



Rather is it a public relations response to immense disquiet. Replanting is hazardous and expensive on logged corridors. The place for it will be on open, clear-felled areas, as the Native Forests Restoration Trust is using at Pureora. This won't bring back a giant forest for many centuries. But it can atone for some of our ruthless past, and tell us a lot about the growth and succession of the podocarp species.

Stage Four:
Salvage logging and its problems

If selection logging has been the third stage, Forest Service at Whirinaki are showing signs of moving to **Stage Four**. Since the windthrow of Easter 1982, they have been getting most of their timber by Salvage Logging, pulling out trees already fallen and accessible from the tributaries of the whole complex of forest roads.

There are strong reasons why dead or senescent trees shouldn't be taken out at all. Kaka and kakariki (yellow-crowned parakeets) rely for food on insect larvae in old trees. Like our two rare New Zealand bats at Whirinaki, they nest on wood-powder in holes of old trees. Such trees are integral to the habitat, and rich sites for epiphytes. When they fall, their nutrients go back to the soil. Constant threat of intrusion for log salvage violates the whole ethos of a sanctuary. In Whirinaki, one of the great forests of the world, today's need is to get rid of the pretensions and obsessions of commercial management altogether. It is man — not opossums or deer — that has been Whirinaki's worst enemy, and his continued exploitation must stop. There would be plenty that Forest Service could still do well, properly set up on real environmental goals.

Salvage logging — we are being told today — could be refined to the point where machinery is dropped in by helicopter and logs taken out the same way. High economic cost, and low return for rimu, with the difficulty of the canopy and terrain, make helicopter logging unviable at Whirinaki. At least where it is being threatened in Northland, there could be developed a prestigious demand for high-priced kauri, whatever the host of other objections to logging.

But at Whirinaki, not only would selection logging be unavailing to save the forest (if it could truly be said to be 'falling down'). Its economic basis has been questioned from within the Service itself. In short, no one really believes it is needed.

The 1979 campaign for Whirinaki was bedevilled by two sorts of fears among the local people: First, there was the spectre of loss of employment with the threat to close the Minginui saw-mill. Second, the proposal — at that time — to add lowland Whirinaki to the Urewera National Park, threatened the leisure-style and livelihood based on deer-culling, opossum-trapping and pig-hunting.

These fears were played upon by Government during the campaign; and conservationists are still resented and unwelcome at Minginui.

Today, neither the threat to jobs or life-style exists, as most of the locals will concede. The present campaign to stop logging would have that one objective alone. With the forest safe for the future, all the other options could come up for discussion, hopefully with full local participation, particularly of the Maoris.

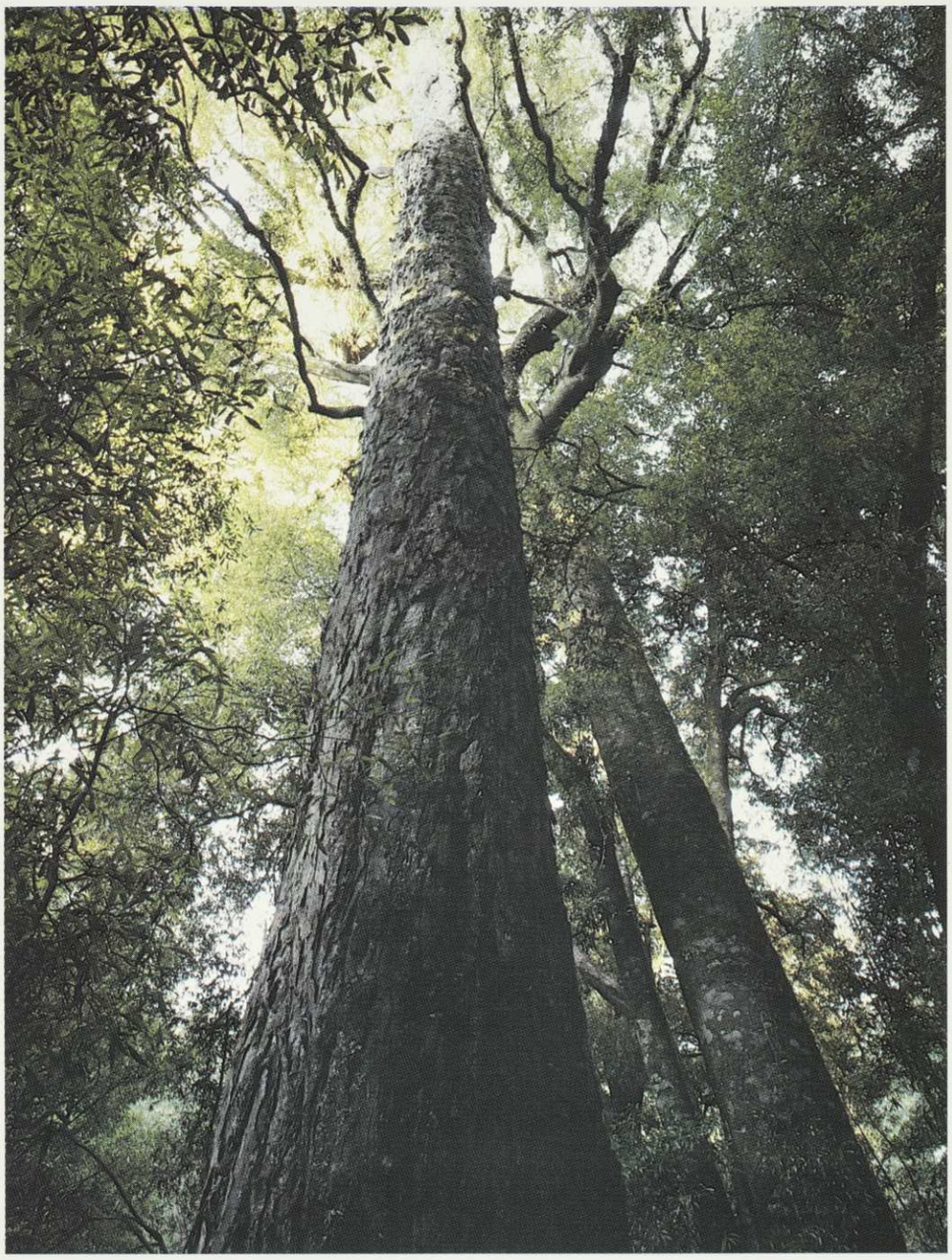
Permanent protection for use and enjoyment

The foremost option could be tourism, with experience ranging from education to enjoyment of wilderness, in one of the greatest natural communities on earth. Potential employment opportunities could be enormous with a centre conveniently close both to Rotorua and Taupo. Tourism of this kind is already developing in the forest. It could be immensely enriched with ecological and educational input. The small village could have a renaissance in its way comparable with today's holiday centre of Ohakune.

Forest Service people could still be employed, entrained not to exploitation but conservation. Instead of road-building, there would be track and path maintenance. The planting programme would be enhanced, not in logging corridors but on clear spaces.

At the Minginui sawmill, employment would continue, using pine logs from Kaingaroa, that even today amount to nine-tenths of the mill supply. The consortium of three companies that formed Minginui Sawmills Ltd in 1975, were well aware of

The Whirinaki river flows through the Te Whaiti-nui-a-Tou canyon at the start of the Whirinaki river track.



A rimu thrusting through the tawa subcanopy in the Oriuwaka Ecological Reserve.

this trend. They continued their investment undaunted, including re-equipment with machines to handle uniform sized exotic logs. Today's log supply agreement with the Government allows complete substitution of exotic logs at one month's notice without compensation. If this should happen, the Mill manager has made it clear the Mill will not close. Secure employment will be offered well into the 1990's, or as long as the company finds it viable to operate from Minginui.

What of the indigenous timber need today? Demand for native woods is declining annually. Under the Indigenous Policy, Government undertook to limit or stop their export, a policy that the present Minister, Jonathan Elworthy, is threatening to change.

At one time native timbers were abundant, and could be used — and wasted —for almost anything. Heart rimu was the ordinary building timber traditionally called for. Totara had wide use in joinery, and is now substituted by aluminium. Matai was for flooring. Kahikatea substained the dairy industry with aroma-free butter-boxes until World War II. Today, though giant kahikatea is probably rarer than kauri, it is being wasted.

Indigenous hardwoods were traditionally disdained. Most puriri or taraire was wasted or used for posts. Tawa is today in some demand for turning and furniture-making. But it is a lovely, sub-canopy tree that must not be further imperilled. Exotic eucalypts grow faster and are fine substitutes.

Peter Tapsell MP has been claiming a need for a totara supply for Maori carving and crafts. To obtain this from ecological reserves and forest sanctuaries would be wrong and un-necessary. Enough totara for all craft use is currently being wasted or burned, from Maori or private-owned bush being felled for forestry leases, in Northland and other parts of the North Island.

The Arahaki lagoon in flood with its tall stands of pure kahikatea in the background.

Government persistence

With all the real arguments for indigenous logging gone (timber supply, economic and employment) the operation could today seem pointless. Why are Government persisting with it so stubbornly?

The first reason is probably the most human and least rational of all: government inertia, unwilling to concede anything more to those troublesome and persistent campaign people condescendingly labelled 'greenies'. A year ago the counter conservation movement looked like rearing its head in some force. But New Zealand Futures has already fallen back. Sustained by its expensive lawyers and public relations men, there were two things it couldn't manage to buy; the research and campaigning flair, and the sacrificial support so freely given to the conservation movement.

Second, Whirinaki has its immense and — it now seems — improvident forest roading system put in over 20 years, and still increasing. Having built it, the pressures are to get some return from it by logging. Forest Service have been reluctant to talk about roading. Asked under the Official Information Act about its length and cost, the Conservator of Forests at Rotorua claimed they had no detailed roading map, and that the information we required would take three man days at a cost to us of $460! We obtained much of what we wanted the same day by a phone call to the Minister for the Environment, who had just had it passed across by the Forest Service!

This showed 350km of logging roads in total: the distance from Christchurch to Dunedin, or Wellington to New Plymouth. 50 more km are envisaged and this year's vote contains $20,000 for a further 2 kilometres and $15,000 for road maintenance.

Last, there is probably one reason for logging, not — in itself — disreputable. This is the pride of professional foresters in a craft of management that there is not much scope left for. Whirinaki — they believe — could provide experience in indigenous management, even though other managed forests have tended to blow down. However understandable, their aspiration is today uneconomic, and would be a continuing threat to Whirinaki forest. It would be sustained yield management not for a forest or an economy, but to sustain forest managers!

To cherish and preserve

Whirinaki Forest has only to be seen, in its density and diversity, its grandeur and uniqueness, to realise how much better it could be used. As soon as all logging stops, the other great options can come up for discussion. The foremost could be tourism: from biological education to experience of wilderness: or just to walk through the forest to sense its wonder and glory.

This is one of the special places where — set against our long exploitative past — claims for multiple use will no longer stand up. Our mission here must be to cherish and preserve.

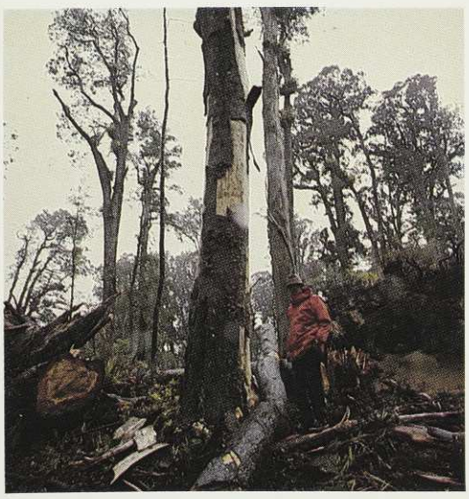
The political means exist to do so. Our North Island State-owned indigenous forests could be saved by administrative fiat this month: with the economic and social consequences hardly noticed.

But — finally — what a strange economic procedure we have been accustomed to apply to such fine forests over the years. All social and non-marketable values are assessed — it would seem — at zero; and until it can be shown that preservation involves no economic cost (in jobs, timber or exports), it will be resisted!

Yet the social value of Whirinaki is high, increasing, even if not calculable, so long as public appreciation grows, and our virgin podocarp forests continue to shrink.

By this measure, the future will judge our actions on Whirinaki; and they will take a poor view of our 'Economics', in going on mutilating it, so thoughtlessly and so long.

Later this year the book *To save a forest — Whirinaki* will be published. It contains outstanding photographs of Whirinaki forest and a lively and detailed text by John Morton.



John Morton surveying the double tragedy that befell a dense podocarp stand. First selectively logged, then vulnerable and exposed, destroyed by the Easter storm of 1982.

A remnant stand of dense totara on the edge of the now clear felled Mangawiri basin.

Photograph N.Z. Wildlife Service

GIANT WETAS

New Zealand wetas are a group of fearsome looking insects distantly related to crickets and grasshoppers. They range in all sizes from spindly cave wetas to the larger bush wetas and at the heavy end of the range are the giant wetas.

Giant wetas are brown, with large heads and an aggressive appearance which belies their peaceful docile nature. If really worried to extraction they have been known to nip, otherwise they are more interested making for cover. They are too heavy to hop like the Bush and other wetas and just walk on all sixes wherever they go.

One weta, *Deinacrida rugosa* (the corrugated backed one) is a giant weta of the genus, *Deinacrida* in which there are six species, all giants and all in New Zealand. *D. rugosa* can grow to 75-77mm long and is endangered. It lives on the ground under forest duff or stones on Mana Island, Stephens Island and lately on Maud Island in the Marlborough Sounds where it was recently most successfully introduced. *Deinacrida rugosa* is thus a giant weta of the Cook Strait and mid New Zealand region.

Giant wetas prefer bush edge habitat among low scrub and muehlenbeckia and are solitary in nature. The females lay their eggs on the ground through a long rearward projecting scimitar like ovipositor. Unfortunately the tuataras of Stephens Island gobble up the females when they are exposed and immobilised, when laying their eggs and this has been going on for centuries, nevertheless *Deinacrida rugosa* has survived. However, with no such danger on Maud Island they have really expanded in numbers since introduction.

The giant wetas differ from all the other wetas because they have a life cycle of just over two years! Once they have mated and laid their eggs they die! Other wetas live for 12 to 14 years.

Deinacrida rugosa, in particular, is so docile that it does not even go in for fearsome displays as does the bush weta, it seems to have lost the aggressive instinct. 'In fact, it makes a very nice piece of meat for a predator.' M. Meads (*pers. comm*).

Giant wetas are not poisonous — they have no poison glands. They are such engaging insects that at least one has been made into a household pet in the past and pattered about a living room. They have six legs like other insects, but no wings and are among the largest insects in the world. *Deinacrida heteracantha*, which is pictured here, is 9.5cm long, is the heaviest insect in the world and at 78g weighs the same as the average song thrush! It lives in the North of New Zealand and on the Barrier Islands.

They are primarily vegetarian and have harriers and moreporks as main predators and of course the rats, wild cats and other introduced horrors for our wetas' life.

Wetas are considered to represent a very ancient group of insects and have not changed much from their ancestors whose fossil remains dating back 190 million years were discovered in Queensland in Triassic strata.

The fact that New Zealand has been isolated for so many millions of years probably accounts for the large number of endemic weta species that we now have in New Zealand.

So have a thought for the giant weta a unique and ancient New Zealander, now hard pressed for survival. Recognize that it just wants to munch away at leaves and threaten no one in its short little life.

DAVID G. COLLINGWOOD

THIS BIRD NEEDS PROTECTION

Photo by courtesy of N.Z. WILDLIFE SERVICE.

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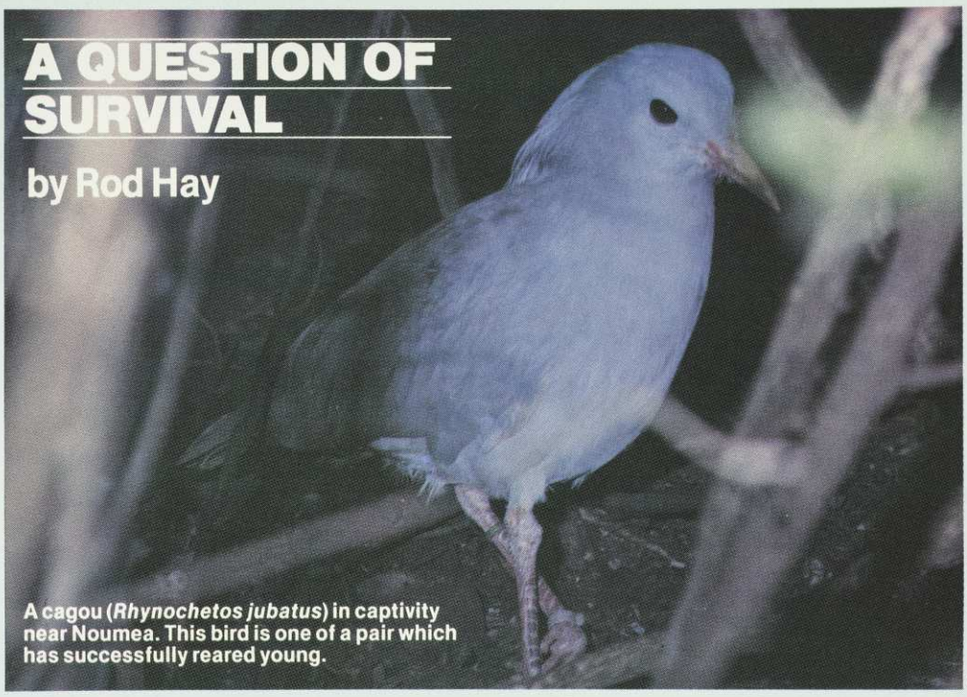
THE CAGOU

A QUESTION OF SURVIVAL

by Rod Hay

In remote mountain valleys of New Caledonia, small numbers of cagou (kagu), the flightless bird that is the symbol of that territory, stalk the forest floor in search of invertebrate food. Their continued survival is not assured, but it is subject to the attention of a few dedicated workers.



A cagou (*Rhynochetos jubatus*) in captivity near Noumea. This bird is one of a pair which has successfully reared young.

Photograph Rod Hay

Even here in the tropics, the dawn air imparted a chill to bare arms and legs as we waited, seemingly vainly for sound of the bird we had come to find. As the colours of day began to paint the sky, a dawn chorus of many small birds began to piece itself together. Dominated by *Meliphagids*, the grey cheeked honeyeater, the barred honeyeater, the New Caledonian friarbird and the occasional clicking calls of the giant crow honeyeater, the sound became almost deafening. Finally, once the sun had begun to graze the ridgetops, a loud rhythmical yodelling or baying came from across the valley. This sound was joined by others until nearly a dozen cagous were whooping and yelping in a cacophony most unbirdlike in nature.

The family *Rhynochetidae* consists of the single species *Rhynochetos jubatus*, which is confined to the main island of New Caledonia, La Grande Terre. Though recent subfossil discoveries on Isle des Pins suggest a broader distribution previously, the cagou has no close relatives anywhere in the world, with the possible exception of the enigmatic but extinct *Aptornis* of New Zealand. It thus comprises an endemic family of very uncertain affinities but perhaps with some connection with the herons and the rails. It is little wonder that eminent ornithologist, Ernst Mayr, proclaimed it as one of the most peculiar birds of the South West Pacific region.

While they are large (adults weigh approximately one kilogram and stand up to 500mm tall), cagous are very rarely seen in the wild, being identified usually by the brief bouts of raucous dawn calling or as the occasional prey of over-zealous pig dogs. The bird presents a strange appearance, ghost-grey plumage in stark contrast to the cryptic tones of flightless birds with which we are more familiar. Perhaps the most conspicuous feature is the long crest of pale grey feathers which is erected in display. The wings, while not used for flight, have an impressive barring of white, black and brown when also held out in display.

For a sad comment on human attitude to wildlife, we only need to make a cursory survey of national or territorial symbols around the world to see symbols of rarity and abuse. Just as the bald eagle in North America, the condor in South America and our own kiwi have suffered, the cagou's survival is precarious and in the face of human induced hazards. Restricted now to certain isolated parts and with numbers uncertain (they are very difficult to census), the species suffers a variety of threats.

Dogs used for pig hunting are known to catch adult cagous, wild cats are equally dangerous and pigs, known to prey on adult petrels, probably also compete for *Placostylus* snails and other invertebrate food. The ship rat (*Rattus rattus*), is also common in New Caledonian forests and is a likely predator of eggs and chicks of the ground-nesting cagou. Despite this onslaught of predators, the species has survived until now, so perhaps the greatest threat is the continual erosion of available habitat. During the nickel boom between 1970 and 1980, open-cast mining laid waste to vast areas of the country and this has consorted with an increased human population pressure and accessibility to place the species under further stress.

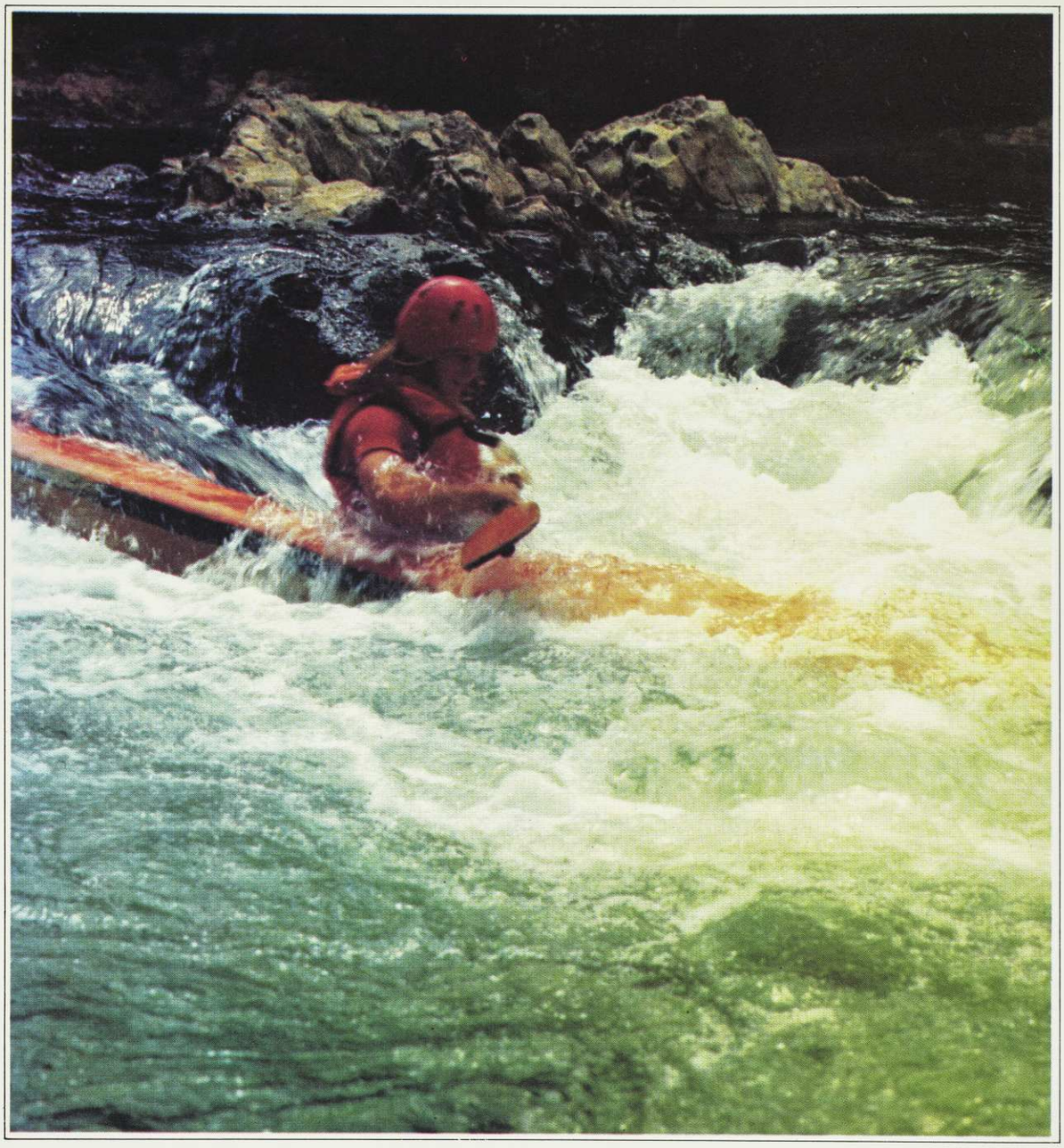
What is being done to give the cagou a fair chance? Firstly, the establishment of a network of territorial parks and botanical reserves is some assurance that habitat remains. Much of this is dangerously accessible to hunters, but at least one area, le Parc Territorial de la Riviere Bleue, contains several thousand hectares of cagou habitat and is remote enough to allow greater protection. Even there, however, the building of a hydro village in the middle of the park has recently been narrowly averted. The second approach to conservation of the species is a captive breeding programme. The Service des Eaux et Forets and the Societe d'Ornithologie Neo-Caledonienne have established large aviaries in the Parc Forestier near Noumea where several pairs of cagou are kept. Remarkably, the birds become very tame and approachable when in captivity and successful nesting there has resulted in the raising of nearly twenty juveniles since the programme began in the late 1970s. This result is in marked contrast to the complete failure of attempts to breed this species in zoos elsewhere in the world.

The ultimate aim of the captive breeding programme is to supplement the wild population with mature birds, capable of fending for themselves. Responsible for much of this operation is Yves Letocart, ranger responsible for the Riviere Bleue park and co-author with Francis Hannecart of a recent two volume book on the birds of New Caledonia. Yves has constructed a large "pre-release hostel" in the park, where captive-reared birds practise fending for themselves before liberation.

While these birds may be an important supplement to a dwindling wild population, it is important to know something of their chances of survival. For a species which is difficult to observe as this one, radio tracking of individuals may provide the only reliable data. With this in mind, Messrs Letocart and Hannecart have recently been touring New Zealand, hosted by Royal Forest and Bird, Wildlife Service, Forest Service, DSIR and the Department of Lands and Survey to study radio tracking and wildlife survey techniques, and general aspects of nature conservation.

If the cagou is to continue to survive, then we need more accurate information on the size and distribution of the population and the factors affecting it. This should involve the establishment of a trained survey team and support for the tracking study already planned. The International Council for Bird Preservation is raising funds for these projects and is grateful for the support of Royal Forest and Bird in helping to assess bird conservation needs in the southwest Pacific.

SHELL IN NEW ZEALAND



Shell continues its support of youth groups, including the Outward Bound School at Anakiwa.

Business must achieve its economic objectives in order to survive and to grow; but its survival is dependent on its acceptability to society and its environment. Shell, recognising its responsibilities as a corporate citizen within the community, continues to expand its contribution in areas devoted to; preserving the environment, fostering youth development in sports and the performing arts, in all areas that develop the talents and resources of New Zealand for the benefit of all New Zealanders.

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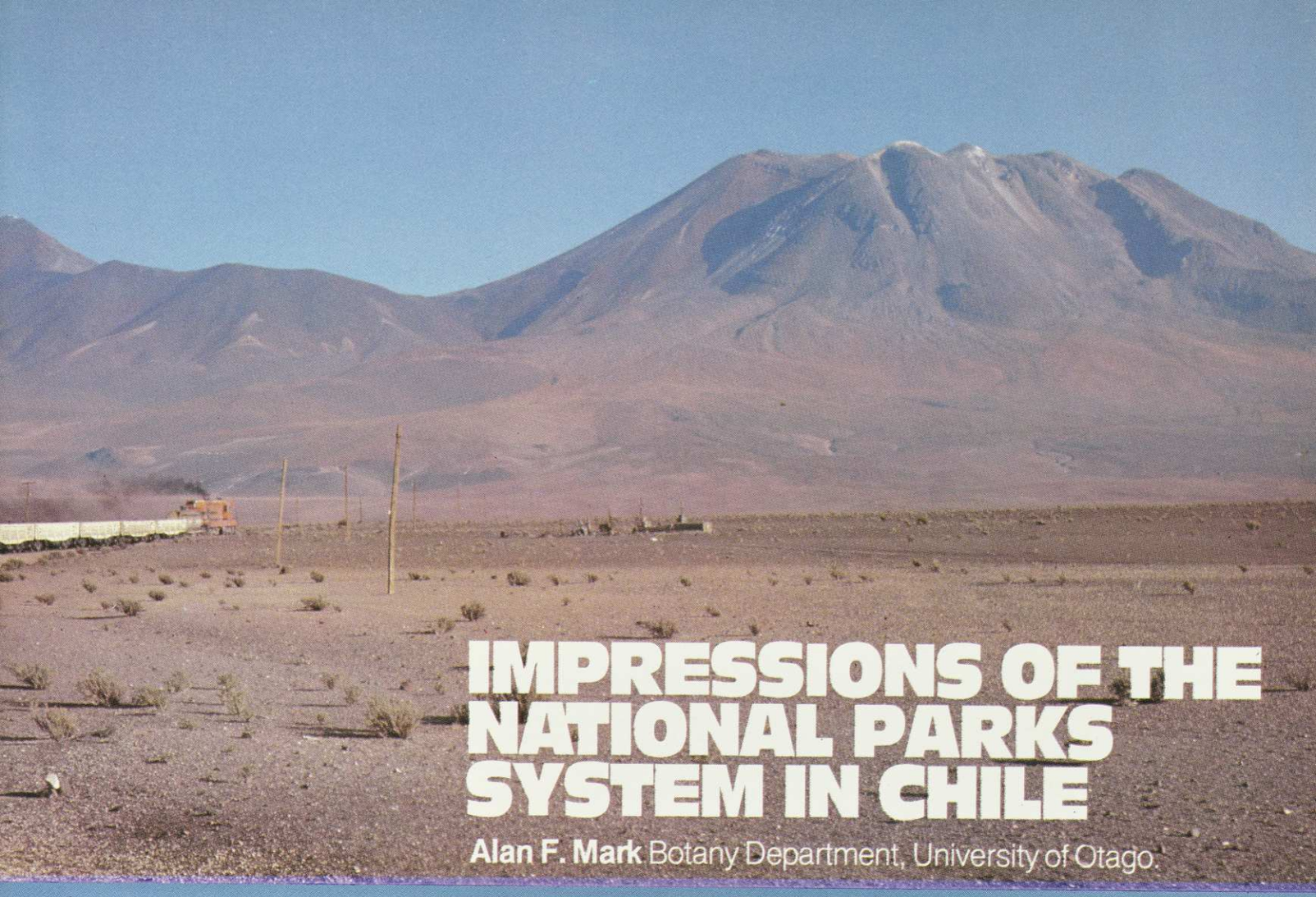


IMPRESSIONS OF THE NATIONAL PARKS SYSTEM IN CHILE

Alan F. Mark Botany Department, University of Otago.

Approaching the small Chilean township of San Pedro (3,233m — centre of picture) on the western flank of the Andes at latitude 22°N. Desert with scattered shrubs in the foreground merges into desert grassland on the lower slopes of the volcanic cone of Cerro Inacaliri (5,626m).

A seven-month refresher leave from the University of Otago was sufficient to cover the full growing season in the interior of Alaska, as well as two months in South America where, in the southern regions, there are some striking similarities with the landscape, vegetation and flora of New Zealand.

Anyone concerned with the need for reservation of an adequately representative range of indigenous ecosystems could not fail to be impressed with the achievements in both Alaska and Chile (unfortunately I cannot comment on Argentina as, along with other New Zealanders, I was classed as *persona-non-gratia* and denied entry).

Legislation as recent as 1980 (Alaska National Interest Lands Conservation Act) added very substantially to federal reservations in Alaska where 13 National Parks and Reserves now occupy 13.6% of this huge state (1,524,671km²) while 16 National Wildlife Reserves account for another 20.3% of the state's area. These two categories together, provide an area almost twice the size of New Zealand that has been set aside by statute for its national heritage values. But that is another story and one that has received considerable publicity to date in conservation circles.

Chile's National Parks

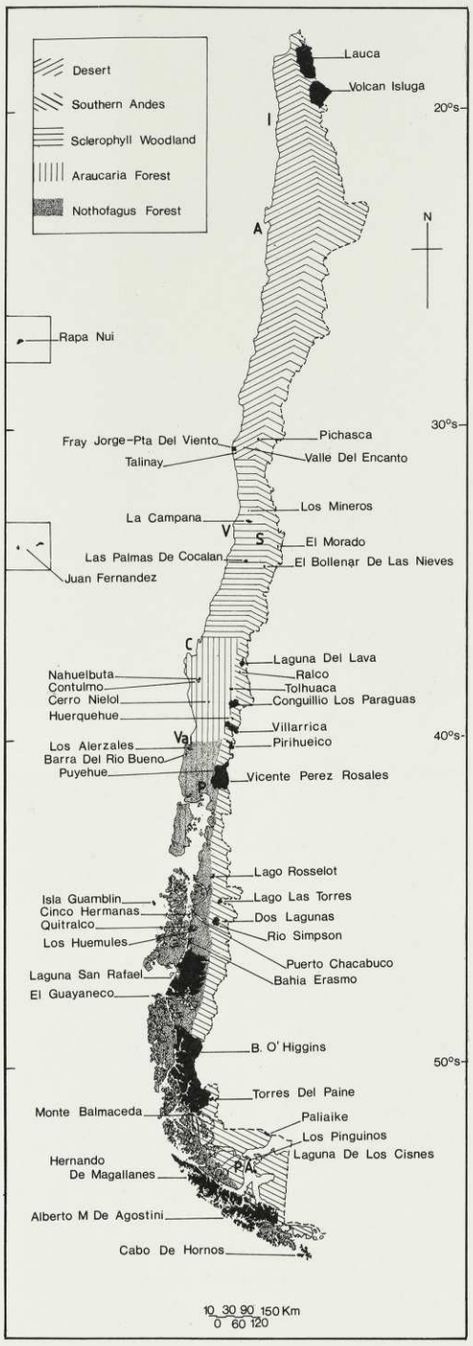
More surprising to me was the large number and extent of national parks in the Republic of Chile which generally has received scant publicity here. Not only is the number and total area of national parks in Chile most impressive but the degree to which they represent the natural landscapes and ecological diversity of the country provides, I believe, an important lesson for us in New Zealand by highlighting probably the major deficiency in the national park and reserve system.

A country about three times the population, the area (756,946km² vs 269,060km²), and the length of New Zealand, Chile extends from tropical

Table 1
Number of Chilean National Parks in nine size categories.

Note: information on only 45 of the 48 parks is available. Values for the ten New Zealand National Parks are given for comparison.

Area (ha)	<100	<1,000	<5,000	<10,000	<50,000	<100,000	<500,000	<1,000,000	>1,000,000
Chile	5	5	6	5	12	2	5	3	2
N.Z.	0	0	0	0	2	4	3	0	1



Map of the Republic of Chile showing location and approximate sizes of the 48 national parks in relation to the general pattern of vegetation. Cities are shown as follows: I = Iquique, A = Antofagasta, V = Valparaiso, S = Santiago, C = Concepcion, Va = Valdivia, P = Puerto Montt, PA = Punta Arenas.

coastal desert at 17°20'S latitude to subantarctic forests, shrublands and moorlands at 56°S, with the high cordillera of the Andes running the full length and its crest forming the country's eastern border. Chile contains 48 national parks (see map) compared with our 10. The Chilean parque nacionales range widely in size; from less than 100ha to 1,761,000ha with 20 being less than 10,000ha, a size that is generally considered minimal for national parks in New Zealand. Two of the Chilean parque nacionales exceed the 1,212,000ha of Fiordland National Park — Parque Nacional Laguna San Rafael (1,350,123ha) and Parque Nacional Bernardo O'Higgins (1,761,000ha). The Chilean national parks cover some 9.4% of the country's total land area compared with 8.1% for New Zealand, but, more important perhaps than this feature, is the degree to which they represent the range of natural ecosystems.

A typical view of the Atacama desert from near Calama (22°30'S) some 130km inland at about 2,400m elevation with a small patch of scrub in a moist hollow (left foreground) and the smoke, dust and slag heap from a nitrate mine obvious in the distance.

The coast of Easter Island or Rapa Nui, 3,700km west of mainland Chile, showing some of the gigantic carved statues of volcanic stone up to 10m tall that are mounted on a massive stone wall to face inland and fronted with stepped stone platforms. They are the central feature of the 7800ha Parque Nacional Rapa Nui.

The undoubtedly high tourist potential of the country, particularly the lakes district, seems to be barely tapped or promoted, despite modern, efficient and relatively cheap surface transport systems.

Although only eight of the 48 Chilean national parks were actually visited, a broad vegetation map of Chile, considered in conjunction with the location of each park, gives a reasonable indication of the main ecosystems they contain. This will be briefly considered in sequence from north to south.

In the far north of the country, north of latitude 20°S and extending to the crest of the Andes at over 5,000m elevation, along the border with Bolivia, are two large national parks in the high desert grassland of the puna where the endangered camelid, the vicuna, highly prized throughout the world for its dense silky fleece of the finest wool known, has been provided with a refuge and is now increasing in numbers. One of these parks is named after its prominent volcano, Isluga, which is generally similar to those seen from the ferrocarril (railway) as it climbs to the crest of the Andes in the vicinity of San Pedro between Antofagasta on the Chilean desert coast and La Paz, the capital of Bolivia at 3,600m.

At latitude 27°S and some 3,200km west of the Chilean mainland in the South Pacific Ocean, the island of Rapa Nui (Easter Island) contains a 7,800ha national park (Parque Nacional Rapa Nui), to preserve many of the 300 or so remarkable giant stone statues of mysterious origin, that abound here.

Four national parks (Parque Nacional Pichasca, Parque Nacional FrayJorge-Pta Del Viento, Parque Nacional Valle del Encanto and Parque Nacional Talinay) are located towards the southern end of the Atacama Desert at about latitude 30°S and, somewhat further south, in the zone of mediterranean-type dry shrubland, are two small- and two moderate-sized national parks of 6000–15,000 ha, one of which, Parque Nacional La Campana, about 40km northeast of the main port of Valparaiso, was visited. Notable here is the northern-most stand of beech in South America — the evergreen *N. dombeyi*, but more widespread is the dry shrubland in which thorny cactus and *Puya* (*P. chilensis* a colourful put spiny member of the pineapple family) are prominent. Here the cacti were parasitised by colourful mistletoes.

Some 700km east of Valparaiso at latitude 34°S, two islands of the Juan Fernandez group (Isla Alexandro Selkirk and Isla Robinson Crusoe) constitute the 18,300ha Parque Nacional Juan Fernandez in recognition of the island's unique

A mixture of giant cactus, (*Trichocereus* sp.) spiny *puya chilensis* and bamboo at about 1,100m in Parque Nacional La Campana in the zone of dry shrubland on the coastal ranges some 40km east of Valparaiso at 33°S latitude. The figure at lower right gives the scale. The northern-most stand of *Nothofagus*, the evergreen *N. oblique*, grows a short distance away at c. 1,500m.

The colourful mistletoe (*Tristerix aphylla*), parasitising the cactus (*Trichocereus chilensis*) in Parque Nacional La Campana.

Interior of subalpine monkey puzzle — beech forest at about 1,200m, some 100m below a treeline depressed by vulcanism on the slopes of Volcan Villarrica in Parque Nacional Villarrica. Here a sparse open canopy of monkey puzzle (*Araucaria araucaria*) emerges above a dense cover of small deciduous beech (*Nothogagus pumilio*).

An impressive notice at one of the entrances to Parque Nacional Villarrica through a grove of pure *Nothofagus pumilio* forest, one of the deciduous beeches. The national parks of Chile are run by CONAF, the national forestry organisation.

View of the 654,375ha Parque Nacional Villarrica from near the resort town of Pucon at about 39° 20'S with the frequently active Volcan Villarrica (2,840m) rising above the mixed beech forests, mostly of the deciduous species *N. pumilio* on the lower slopes. One of the evergreen beeches (*N. betuloides*), frames the view.

biological features, particularly some of the curious woody members of the rain and cloud forests.

In the *Araucaria* (monkey puzzle) forest zone that intervenes for some 300km between the dry shrubland of the north and the Valdivian temperate beech *Nothofagus* temperate rain forest zone to the south there are nine national parks (see Map) that preserve a range of natural features but particularly thermal springs, active volcanoes and the *Araucaria* forest itself. The only park visited in this region, the 654,375ha Parque Nacional Villarrica, contains impressive examples of these features. The frequently active Volcan Villarrica (2,840m), with its extensive stands of mixed beech — *Araucaria* forest on the upper flanks, is within easy walking distance from the congenial thermal resort hotel of Termas de Palguin, located near the road end at 680m on the volcano's eastern slope and conveniently reached by colectivo (taxi) from the delightful resort town of Pucon some 30km away.

The region of active vulcanism extends some distance southwards of the *Araucaria* forest zone into the zone of Valdivian beech forest that is characterised by the presence of bamboo (*Chusquea spp.*) in the understorey. The usually dense layer of bamboo often retards or delays regeneration of the beech species in these forests. One of the volcanoes, Volcan Osorno (2,660m) on the western margin of the extensive Parque Nacional Puyehue (134,125ha), is of particular interest as its most recent eruption was recorded by Charles Darwin who witnessed it from the "Beagle" when it was anchored in the harbour of Puerto Montt 60km away, in 1843. A rough gravel road gives easy access from the village of Ensenada on the shore of Lago Llanguihue through the zones of beech forest (that contains many

genera shared with New Zealand) — *Weinmannia*, *Luzuriaga*, *Pernettya*, *Hierochloe*, *Gunnera*), mixed scrub and scoria to permanent snow. The 1843 larva flow with its developing vegetation remains an obvious feature of the mountain.

The efficient, regular and economical surface public transport terminates at the southern end of the Pan American highway at Puerto Montt but a partly completed road southwards from here was recently extended through the impressive mountainous region to link nearby Chaiten with Coihaique some 300km further south and now provides public access through the transition to the true Chilean beech forests that lack bamboo and so are much more strongly reminiscent of those in New Zealand, as in the vicinity of Parque Nacional Lago Rosselot. From Coihaique, capital of Chile's XI Region, there is a long established road access 65km to the coast at Puerto Aisen and on to the port of Chacabuco through some of the impressive canyons of Parque Nacional Rio Simpson (41,160ha). Here large areas are still recovering from widespread fires lit to clear land in the 1930's — the landscape in places here is strongly reminiscent of South Westland. At the nearby sea terminal of Puerto Chacabuco there is a small national park the 221ha Parque Nacional Puerto Chacabuco, of mostly beech forest that rises from part of the harbour shore.

One of the largest and best known national parks in Chile is Parque Nacional Laguna San Rafael (1,350,123ha) at 47 °S. notable for its massive tidewater glacier but accessible only via expensive luxury cruisers from Puerto Montt or by a chartered float-plane. Chile's largest national park, Parque Nacional Bernardo O'Higgins (1,761,000ha), named after the famous Irish liberator, occupies one of the most impressive mountainous sections of the generally inaccessible southern Andes and contains the famous peaks of Monte Fitzroy (3,375m) and Cerro Pyramide (3,382m). This park is contiguous to the south with one of Chile's newest and most interesting national parks, Parque Nacional Torres del Paine (162,000ha) that was created in 1975 by the disestablishment of a large estancia or grazing run in order to preserve both a series of impressive granite spires or tors, the Paine Towers (that unfortunately were concealed in cloud during a one-day visit to the park) but also a viable herd of the declining southern camelid, the Guanco. Being located in the rain shadow of the main Andean chain, this relatively dry region contains some typical

The upper slopes of Volcan Osorno (2,660m) in the 134,125ha Parque Nacional Puyehue from a site at 750m in the larva flow recorded by Charles Darwin in 1843 when he was anchored in Puerto Montt some 60km distant. The large coarse herb (*Gunnera chilensis*) is prominent among the sparse scrub of *Embrothrium* (Chilean fire bush) *Berberris* and beech (*Nothofagus pumilio*) that has colonised the site.

Aerial view south westward over large (800,000 ha) Parque Nacional Alberto m. de Argostini and the ice fields of the Darwin Cordillera with its several tidewater glaciers along the southern coast of Chile at about 55°S latitude. Seen en route from Punta Arenas on the Magellen Strait to Puerto William on the Beagle Channel. The reddish rock in the foreground appears to be an outcrop of ultramafic rock or serpentine.

A herd of the small southern camelid, the Guanaco, in the tussock grassland — shrubland (*Festuca — Baccharis — Mulinum*) of Parque Nacional Torres del Paine (162,000 ha) which was established in 1975 from an estancia (or grazing run) as a refuge for this previously declining indigenous species.

Typical river flat beech forest of the evergreen *Nothofagus betuloides*, near Parque Nacional Lago Rosellot at about 44°S latitude on the newly completed road between Coihaique and Chaiten. The general view reminds one of the lower Hollyford Valley in Fiordland National Park.

Treeline forest about 6m tall, of the colourful deciduous beech species *Nothofagus pumilio* at about 650m near the head of the valley behind the township of Puerto William on Navarino Island at about 55°S. Leaves on the smaller bushes and those at lower altitudes have not yet turned colour. Beavers, introduced by the Argentinians to Tierra del Fuego, have established on the island where they have constructed numerous dams from beech.

View south-westwards across glaciated terrain from an 870m summit in cushion fellfield on Navarino Island along the sharp beech forest treeline of stunted (to 2m) *Nothogagus pumilio* stems at about 650m that have acquired their autumn colour. Poorly drained depressions below the treeline are largely covered by small tussocks of *Cortaderia magellanica* that resemble New Zealand snow tussock.

Patagonian steppe with a cover of tussock grassland (mostly of *Festuca* spp.) shrubland (mainly the daisy shrub *Baccharis*) and thorny cushions of *Mulinum*, in which several Rheas were seen.

Although none of the three national parks south of here (51 °S) was visited the largest two (Parque Nacional Hernando de Magellanes and Parque Nacional Alberto de Agostini; both about 800,000 ha) were seen from the air while the southernmost beech forests, moorlands and alpine vegetation that they contain are, from all accounts, similar to what was seen in day trips from Punta Arenas on the Magellan Strait and in a few days of exceptionally fine weather from the Chilean naval base on Navarino Island, on the south side of the Beagle Channel at 55 °S, less than 100km from Cape Horn.

Comparisons with New Zealand

Hopefully, this brief account will serve to emphasise that New Zealand is not alone in having nearly 10 per cent of its land area set aside as national parks. The Republic of Chile, however, has clearly achieved a much better representation of its natural landscapes and ecosystems than we have in New Zealand where the emphasis to date has been on areas of spectacular scenery in generally unproductive mountainous country. While the total number of national parks in Chile (48) far exceeds the ten in New Zealand the differential in area devoted to parks between the two countries is also considerable. It should be noted, however, that almost half (21) of the Chilean national parks, being less than 10,000ha in area, would not qualify for this category here. Rather such areas would be designated some form of reserve.

While the real extent of national parks in Chile is impressive by New Zealand standards their management appeared to be restricted to the provision of a limited system of walking tracks and associated signs, some of excellent quality. There was virtually no interpretation for the visiting public and indeed, very few park staff to be seen. The important lesson for New Zealand lies, I believe, in the representativeness of the Chilean national park system, an aspect which hopefully New Zealand will redress in terms of the revised National Parks Act (1980) and the current activity of the Protected Natural Areas Programme.

Acknowledgements

I am most grateful for the guidance and transport provided by Dr Mary Kalin Arroyo, University of Chile, Santiago, Dr Fedrico Schlegel S., University of Southern Chile, Valdivia, and Dr Edmundo Pissano of the Patagonian Institute, Punta Arenas, together with the helpful advice of Dr Ross McQueen, Victoria University, Wellington, and particularly the congenial company of Geoff Baylis, Dunedin through much of the Chilean section of the tour. Mrs J. Clough of the Zoology Department, University of Otago, kindly drew the map.

GORGE HILL — A SOUTHLAND RED TUSSOCK RESERVE

Our Society welcomes the Lands and Survey Department decision to reserve 3100 hectares of red tussock and beech forest in Western Southland. At the time of European settlement lowland tussock grasslands covered 45% of the Southland Land District (excluding Fiordland National Park). Currently less than 10 hectares of red tussock land is reserved in the District. The protection of Gorge Hill will therefore protect a representative section of pre-European vegetation unreserved elsewhere in New Zealand. The Wildlife Service also wishes to use parts of the Gorge Hill tussock lands to establish an additional population of takahe and takahe breeding facilities. Further tussock land reserves should be forthcoming from studies by the Biological Resources Centre now underway in the South Island high country.

ANTARCTICA — PENGUIN PLEA

Adelie penguins have recently been killed by construction workers building the French Government airstrip at Dumont d'Urville, Adelie Land. An even greater threat to all Antarctic life looms from the exploration and exploitation of minerals. An oil blow-out or spill, noise, seismic blasts and other disturbance could have a drastic effect on the wildlife and ecosystems. We need your help to prevent this. From 21–31 May 1984 officials meet in Tokyo to negotiate conditions for mining and oil production in the Antarctic. Until now the Antarctic Treaty system has operated to protect the continent — but the minerals negotiations could drastically change that.

Our Society is a member of the Antarctic and Southern Oceans Coalition who have been asked to send a New Zealand conservationist to Tokyo to put the case for preservation of the Antarctic. We need your help to assist with the delegates travel costs. It you can help please send any donations to our Secretary, P.O. Box 631 Wellington.

NATIONAL PARKS AND RESERVES BOARDS

Throughout New Zealand, our Society has nominees on the different National Parks and Reserves Boards as well as State Forest Park Advisory Committees. These groups play a major role in the management of any Park or Reserve in your region. You may wish to contact our nominees on these Boards and Committees. A list of nominees is available from the Secretary, P.O. Box 631, Wellington.

SNARES ISLANDS NEED GREATER PROTECTION

The sub-antarctic Snares Islands are rat free and host four endemic bird species (tit, snipe, fernbird, crested penguin) and millions of breeding seabirds.

Despite being designated a National Reserve last year, our Society considers they are still inadequately protected against the accidental escape of rats from nearby boats. The recent discovery of a Norway rat on Codfish Island adjacent to a boat anchoring area is a disaster and highlights the need to provide greater protection for the Snares. The best solution would be to create a zone around the Snares from which all boats are excluded. Policing of this zone could be by the Ministry of Defence whose planes regularly overfly the island. The first steps toward this came earlier this year when the Ministry of Agriculture and Fisheries prohibited all crayfishing within 12 miles of the Snares without a mooring permit (issued by Lands and Survey Department). Prohibition of all mooring within this zone is the next step that Government should take.

LOGUES BUSH, WELLSFORD — A SUCCESSFUL APPEAL

The Mid-North branch has expressed its sincere thanks to the public and Society branches who helped with the successful appeal to raise a public contribution of $25,000 to assist in securing the 40 hectare Logues Bush (purchased as a scenic reserve for a total of $150,000). This lowland forest of kauri, kahikatea and totara is a valuable example of a forest type once widespread through Northland.

CONSERVATION WEEK 1984 — WATER MEANS LIFE

The theme for Conservation Week this year is particularly appropriate because of widespread concern for the future of our rivers and disappearing wetlands. The year started well with the Government decision to protect the Motu as a Wild and Scenic River, and the favourable outcome of the Conservation Order application for the South Island's Ahuriri River. We await decisions on the future of the Rakaia Conservation Order application. Meanwhile Acclimatization Societies will shortly be filing applications for the Mataura River in Southland and the Rangitikei River. Wetland conservation is a key issue for our Society. At the forthcoming June Council meeting approval is to be sought for our final Society wetland policy.

HAWKES BAY KIWIS GAIN REPRIEVE

In response to major concerns expressed throughout the Hawkes Bay region, the Lands and Survey Department has postponed further clearance on its Waitere farm block while a management plan is prepared. The shrubland covered block beside the Mohaka river contains the largest recorded population of kiwis in Hawkes Bay as well as important fernbird and robin populations. This is a major achievement for our Napier branch who have led a campaign to protect the kiwis which dominated newspaper headlines throughout Hawkes Bay earlier this year. Public comment will shortly be invited on the management plan.

WHEN IS A FOREST NOT A FOREST?

Native forest has been defined over the last 10 years to be woody vegetation exceeding 6 metres in height and covering more than 5% of the ground area (eg Forestry Development Conference 1974, John Nicholls 1976, King Country (1978) and Tongariro (1983) Land Use Studies). The Government's 1978 Indigenous Forest Policy forbids the clear felling of State owned native forests unless other non-forested land is unavailable and only after social, environmental and economic factors are studied and demonstrated publically to be enhanced by the clearance. Unfortunately our branches have reported that this sensible Government policy is being violated in State Forests in Northland, Tongariro, Hawkes Bay, Nelson and Westland with continuing clearance of native forest and regenerating native forest. Violation is occurring in two main ways. Even though they exceed 6 metres in height, shrublands and regenerating forest are frequently cleared because they are considered to be only "scrub". Remnants of native forest are also often cleared in "tidy up" activities. Our Society also wants the Indigenous Forest Policy to apply to all Crown owned native forests. This would force the Lands and Survey Department to justify the clearance of native forests on farm development blocks and could also control bush clearance on Crown leasehold lands.

An example is the extensive clearance of matai/kaikawaka/totara forest on the Raurimu and Taurewa land development blocks which adjoin Tongariro National Park. This has been widely criticised in the King Country. The clearance is destroying outstanding bush areas rich in native wildlife including kiwi, parakeet, kaka and robin. It is prime habitat for the endangered parasitic wood rose (*Dactylanthus*) and is of major soil and water and recreational value.

Gerry McSweeney,
National Conservation Officer.

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SKINKS & GECKOS

by David Gregorie

Only two of the world's 22 families of lizards live in New Zealand — geckos and skinks.

Lizards are not very easy to find because many of them are coloured to match their background, but if you do find one it is easy to tell whether it is a skink or a gecko.

Geckos have quite soft loose-looking skins and are often brightly coloured. They can be yellow, bright green, brown with "carpet patterns" on their bodies, or dark green with light-coloured diamond-shaped markings.

They have wide heads, wide mouths and eyes that stick out rather like those of a frog. Their necks are narrow and their bodies much wider so that they look almost fat. Their feet are shaped like human hands and they can grip branches and twigs with them just as a monkey does. They can use their tails to hang on with too. They live in shrubs and small trees and hunt for insects to eat, usually at night. And that's another reason why they are hard to find.

Skinks are long, slim and shiny like polished leather. They don't have the bright colours of the geckos and they are quite different in shape. They have small heads and very streamlined bodies that can slip easily through grass, tussock and herbs. They live on the ground. Their legs are small and they like to tuck them up by their sides while they lie in the sun.

Lizards are reptiles. They do not have fur or feathers to keep them warm and they cannot regulate their temperature in the way that birds and mammals do. Their body temperature goes up and down with the weather instead of staying at a steady 37 °C as ours does.

Most reptiles lay eggs. Turtles and crocodiles, snakes and tuataras lay eggs. All the world's geckos lay eggs too — except those that are found only in New Zealand. New Zealand geckos have live babies.

A friend of mine once had a pair of green tree geckos in his classroom terrarium. One day we watched while the female lizard had a baby. Suddenly she lifted one back leg off the ground and shook herself. Out popped a tiny baby lizard. It ran away and hid under some bark and we could not find it again before I went home.

Skinks have live babies too.

A common skink scuttles across the forest floor.

Lizards don't feed their babies on milk as a cat or a sheep does, nor do they catch insects for them as birds do for their babies. As soon as they are born baby lizards must catch insects for themselves or they will starve. And it is much safer for them to keep away from their mother and father too, just in case their parents eat them by mistake.

A lizard's skin does not stretch to fit when it grows in the way that ours does. Instead it peels off like sunburn when it gets too tight for the growing body and a new skin grows underneath. This happens every four to eight weeks during the spring and summer.

Towards the end of autumn and in the early winter, skinks and geckos crawl under stones or pieces of bark or into holes and sleep through the cold weather. This is because there is not enough warmth in the air to keep their blood at working temperature and there are not enough insects around for them to eat.

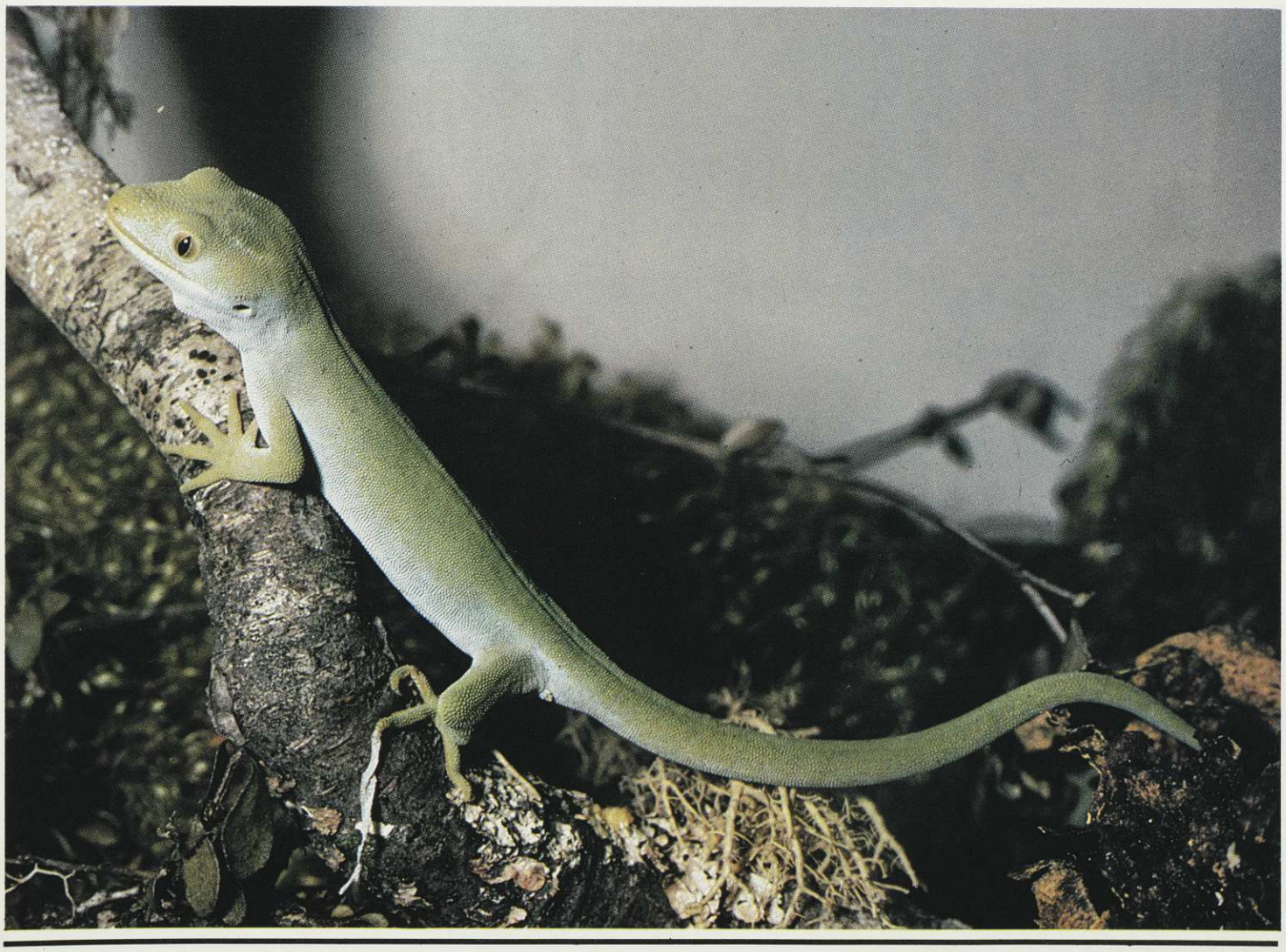
Lizards have an odd way of defending themselves if they are attacked. They can break off a part of their tails and leave it wriggling around to confuse the enemy while they escape. In time a new tail will grow but it never grows as long as the old one.

Geckos and skinks are both quite easy to keep as pets. They need a terrarium built out in the open with soil, rocks, pieces of bark and a small shrub for those that like to climb. They will eat only live food and must be given flies, moths, caterpillars, grubs and other insects. They also like a dish of honey water.

There is no need to be frightened of New Zealand lizards. They are quite harmless. They don't feel cold or slimy or creepy or in any way nasty to handle. But you do have to be careful. You might scare them into shedding their tails if you are clumsy.

Lizards are among the prettiest pets you could have.

A book to read:
The Tuatara, Lizards and Frogs of New Zealand
Richard Sharell, Collins.



An elegant green tree gecko hunts for food.
Photographs N.Z. Wildlife Service

HOW TO STUDY YOUR LOCAL WETLAND: 1 ESTUARIES

ESTUARIES ARE PLACES WHERE A RIVER MEETS THE SEA....

WHERE THE WATER IS A MIXTURE OF FRESH-WATER AND SALT WATER..

[KNOWN AS BRACKISH WATER]..

... THEY ARE PLACES WHERE PEOPLE SETTLE...

THE NUMEROUS PLANTS & ANIMALS WHICH LIVE IN ESTUARIES CAN WITHSTAND:

EXTREME HEAT...

mud crab

DRYING...

WHEN THE TIDE IS OUT...

DIFFERING SALT CONCENTRATIONS...

... WHEN THE TIDE COMES IN....

ESTUARIES ARE RICH IN FOOD BROUGHT BY SEDIMENTS...

small black mussels

sea lettuce

MANY ANIMALS LIVE IN ESTUARIES...

Flounder

Kahawai

Eel

'whitebait'

mud snail

Some people never learn..

WHAT DO THEY KNOW THAT I DON'T?

... OTHERS REGULARLY MIGRATE THROUGH ESTUARIES ...

OTHERS JUST GO THERE TO FEED...

snapper

Pied Stilt

KEEP A WATCHFULL EYE ON YOUR LOCAL ESTUARY

Bell.

BIRDS I HAVE MET
22. Korimako . . . the bellbird

by Avis Acres

This is the last of Avis Acres' "Birds I have met" because she tells me she has said quite enough about these birds over all these years. I am sure we are all sorry. The Society thanks her for all the amusing and interesting articles she has supplied for the Junior Section for so long. *The Editor.*

Bellbirds were quite common in Taupo during the nineteen-fifties, in fact they outnumbered the tuis in some areas. The kowhai trees which grew abundantly round the lake attracted large numbers when they flowered in the spring. The berries and flowers of the native fuchsia and flax also supplied korimako with food. The tell-tale stain of orange pollen from the flax flowers and vivid blue from the fuchsia on their heads always indicated where they had been feeding. Another popular rendez-vous for korimako and her friends was a certain redgum tree on the lake shore, close to the main shopping centre. I remember, once, counting over sixty bellbirds in that tree when it was blooming.

I had settled down beneath it to paint the lake in oils but was so fascinated by the antics of the bellbirds as they twisted their bodies in their efforts to extract honey from the flowers, I abandoned the oil painting and spent the morning sketching korimako. In Taupo gardens the belligerent tui usually took possession of a kowhai tree and drove the smaller bellbird away but on Kapiti Island the bellbird and tui appeared to live together quite amicably, sharing the nectar trough by the care-taker's cottage and also the rata tree which was a seething mass of bellbirds and tuis when it was flowering. Tempers then become rather frayed as they fought for their share of honey.

My first experience of the bellbirds' chimes was during a visit to Lake Waikaremoana when I heard the wonderful dawn chorus. I was awakened about 5 a.m. by a tui, then a robin and a few chimes from korimako, then all round the lake the chiming echoed from the steep bush-covered hillsides. Hundreds of bellbirds joined in the chorus almost drowning the lovely song of toutouwai, the robin and the tuis. It was the most glorious melody I had ever heard.

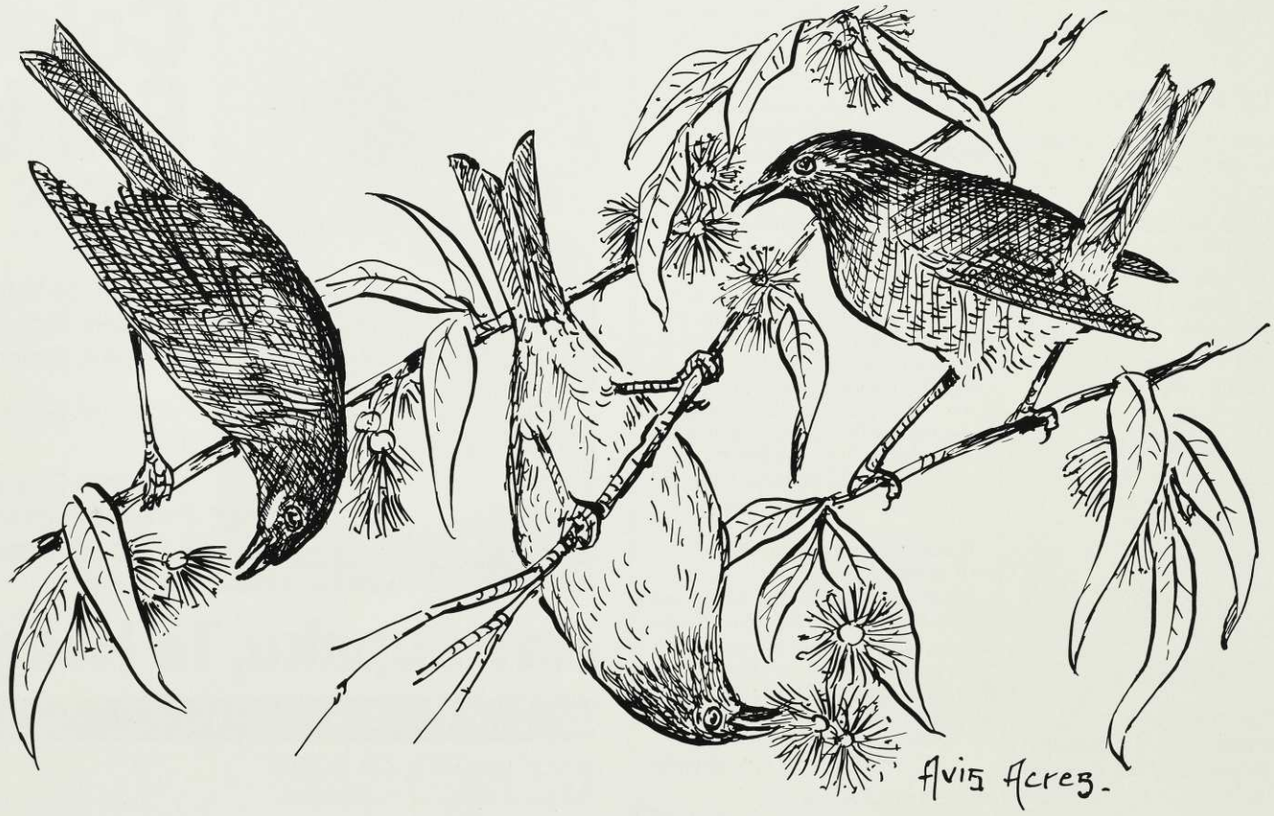
When I visited Kapiti Island I was again enchanted by the dawn chorus and the chiming of the bellbirds. The late Mr Wilkinson of Kapiti describes it as "The peeling and tinkling of finely-tuned silver bells." I agree with his statement that "No words can convey the beauty or the astounding volume coming from such tiny throats." Captain Cook and Sir Joseph Banks were also most impressed and Banks described it as "The most melodious wild music he had ever heard." The chiming is only heard at daybreak and only lasts about ten minutes but their song continues during the day.

Bellbirds were quite common at Kapiti and I had plenty of time to study them while they fed at the nectar trough. They were much smaller than the tui with olive green plumage and a purple sheen on their heads and yellowish olive sides. The iris was red, black bill and grey feet. The female was smaller and duller in colour with a white streak below the eye, and yellowish fawn under parts. Quills and tail feathers are brownish-black, the tail is forked.

Three or four pinkish-white eggs, blotched in reddish-brown are laid between September and January in a nest of twigs, rootlets and moss. It is lined with bright green or red feathers from the parakeet or kaka. Both parents feed the chicks, first with nectar and later with insects. The family leave the nest in about 14 days but are fed by their parents for the next ten days.

The brown rat is the greatest enemy, climbing low trees and killing nestlings. Korimako is very helpful destroying insects and spreading pollen and seeds. Long may this attractive little songster stay with us.

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



Bulletin 1

ANNUAL GENERAL MEETING

The 61st annual general meeting of the Society will be held at the Student Union Building, Victoria University, Wellington, on Saturday 9 June, at 9 am.

AGENDA:

1. Apologies
2. Welcome
3. Declaration of councillors
4. Minutes of last A.G.M.
5. Annual Report and statement of Accounts.
6. Appointment of auditors.
7. Remits
   1. Alteration to Clause 8 in the Constitution regarding the number of councillors per branch.
   2. Alteration to Clause 8 of the Constitution regarding the number of council meetings per year.

Note: The annual report and statement of accounts is enclosed as a supplement to this issue.

COUNCIL MEETING:

A council meeting will follow, with the election of president, deputy president, treasurer, and ten executive councillors.

SLIDE COMPETITIONS

The winner of the Society's slide competitions for 1983 were as follows:

MOIRA COX MEMORIAL SLIDE COMPETITION

First: Ms Louise Young, 519 Nottingley Road, Hastings — "*Rainbow Bracket Fungi*"

Second: Mr L. Richards, 200 Bourke Street, Invercargill — "*Tuatara*"

N.Z. BIRD SLIDE COMPETITION

First: Mr B. Chudleigh, Main Road, R.D. 1, Katikati — "*Curlew Sandpiper*"

Second: Mr C. E. Barwell, 49 Gladstone Terrace, Invercargill — "*Fern Bird Chicks*"

SUPPLEMENTS

"This issue includes supplements. Bush Telegraph, Annual Report and Mail Order."

EXOTIC INTRUDERS

by Joan Druett

Why did all these exotic plants and animals arrive to disturb the indigenous balance achieved over millions of years. Who brought them here, and when?

The author has produced a book, that is unique to New Zealand, for almost nowhere else has such an invasion taken place in measurable and recorded time. Almost nowhere else has the flora and fauna of a land been overwhelmed by introductions both benign and downright malignant.

Chapters trace the intrusion — 'In the beginning' — from the Maori to the first real introduction by Cook of pigs and then by whalers of cats, and rats by which time the process was really under way.

'The agricultural invasion' — The transport of livestock, exotic plants and grasses to support the colonists of the 1840's began the avalanche. Then the next 60 years saw the Acclimatisation societies introducing all manner of species to satisfy the sportsmen, the homesick, and those who felt the world's species should be available to them in their new and 'ill provided' country.

So the chapters proceed up to the present day.

This book will answer all your questions — who brought in the gorse, the rabbits, the sparrows, the possums, the goats, the stoats, and why did they bring them in?

Did you know the llamas were unsuccessfully introduced in 1865 or that flukes and tapeworms arrived accidentally in bellies of sheep, dogs, cats, cattle and man?

Codlin moths arrived in barrels of wormy Tasmanian apples. It seems that Cook's men introduced the flea and head lice in 1769!

The book is large with 291 pages well illustrated with historic and past photos and drawings. It is written in a most readable form, with a rare sympathy for the perpetrators of past errors, it reports their activities with an admirable blandness. There is a good index — 'Let's see about aphis. Yes! there it is. What about ragwort and praying mantis? — there they are.'

Ronald Lockley has provided a very suitable preface.

In my view, this is a key work, and should be read by Society Members and the public alike. It is a hard book to lay aside, and yet it is a book of reference. How well the author has devised it!

Highly recommended.

DAVID COLLINGWOOD

Heinemann Publishers (N.Z.) **$29.95**

Peter Scott —

TRAVEL DIARIES OF A NATURALIST

Edited by Miranda Weston-Smith

This is a beautiful book. How fortunate that Peter Scott has made his diaries available in this age of colour. I think of other famous diaries published, all tending to be boring, flat accounts lacking a visual quality and oozing egotism.

Here is Sir Peter Scott on his travels — Australia, New Zealand, New Guinea, Africa, the Galapagos Islands, Antarctica and the Falkland Islands. His artistic sketches of species along his naturalistic way, flow in the margins and share whole pages with colour photos of places visited.

The New Zealand naturalists, Graham Turbott, Bob Falla and Gordon Williams pop out of the 'New Zealand 1956' diary as his companions on his close inspection of our natural history.

There is a photo of him in front of his mother's marble statue of his father — the great explorer, Robert Falcon Scott, — which stands in Christchurch. Then there is the calm account of the historic visit he made to his father's hut at Cape Evans on Ross Island in Antarctica.

The world he describes and his experiences, told in his easy vernacular, sweeps us along. Can there be anyone who has been so immersed in Natural History and yet has travelled in the field of his choice with both the eye of the naturalist and the artist?

This diary is a work of sheer excellence and a wonderful record of a man's life and times.

Yet it has a figure 1 on the cover and one reads that it is drawn from only fifteen of the fifty notebooks covering his travels since 1956. So amazingly, there is a possibility of more to come in later volumes.

287 pages on art gloss paper, liberally illustrated and bound, this book was sent to me for review by Millwood Gallery, 291b Tinakori Road, Thorndon, Wellington, from whence it may be obtained.

A book by the first person ever to the knighted for services to conservation and the environment (1973) is one not to be overlooked. It is a work of brilliance and quality.

Excellent!

DAVID COLLINGWOOD

William Collins Sons & Co., London **$39.95**

SUMMER CAMPS 1985

This year the following camps will be held. Members should write for further details.

COOPERS BEACH, Northland
28–31 January 1985
Enquiries: Mr J McBain
Te Ngaere Beach
R D 1, Kaeo

TURANGI, near Lake Taupo
28 December to 7 January 1985
Enquiries: Mr A Elliott
49a Burgess Road
Johnsonville.

STRATFORD, near Mt Egmont
11–17 January 1985
Enquiries: Mr J Burgham
170 Bridge Street
Eltham

TUATAPERE, Southland
7–12 January 1985
Enquiries: Tony Wood
19 Forfar Street
Mornington
South Dunedin.

OBITUARY

R. H. Carter

We record with regret the death, aged 92, of a past long serving secretary of the Society who took office in 1947 when Mr R. C. Aston was president and served during the terms of Mr A. P. Harper and later Mr R. C. Nelson

In his ten years of office Mr Carter saw great changes, and the formation of 12 sections, (now branches) widened the Society's influence. He organised the public meeting in the Wellington Concert Chamber at which Professor McGregor spoke and showed slides on Waipoua Kauri Forest which was later made a reserve.

He arranged "Nature Question Time" broadcasts on 2YA and both the president 'Kauri' and himself 'Weka' were comperes of the programme. Dr R. Falla, Dr J. Salmon, Dr C. A. Fleming and Mr A. L. Poole cooperated in giving the answers in their various fields.

School groups were formed and the children involved numbered between three and four thousand. In a further effort to gain the interest of this junior membership Forest and Bird ran a serial 'Wonderful Wanderings of Wiremu Double-you Weka' by Mr Carter's daughter.

Oil pollution became apparent even 30 years ago and he did some considerable research into the problem and his findings were then published in the journal.

The work involved in these activities together with that of editorship of Forest and Bird was a heavy load and this retired naval officer who had served so faithfully as secretary resigned at the end of 1956, after 9 years in office.— N.E.D.

[SEE OVER ▶

MEMBERSHIP APPLICATION

I APPLY FOR MEMBERSHIP IN THE FOLLOWING CLASS
(and enclose my cheque or postal note)

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Husband & Wife $10.00 p.a.
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No. of Children under 17 years .....

☐ LIFE $250.00 per person

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Cut along the dotted line and post, together with your cheque or money order to:

The National Secretary
Royal Forest & Bird Protection Society of N.Z. Inc.
P.O. Box 631
Wellington.

BOOK REVIEW

TAKAHE by Roger Lavers and Jim Mills

This is a beautiful and informative book of 24 pages, 14 of them comprising fine colour photos of the Takahe and their present mountain habitat.

The extent of their pre-European distribution is described, and a map is included to show the sub-fossil and midden finds stretching from Cape Reinga in the north to the Southland coastline.

The reasons are given for their withdrawal to a final habitat in Fiordland and the further diminution of numbers caused by competition for food by deer and attacks by stoats in this mountain habitat, is discussed.

The authors have been closely involved with study of the remnant takahe and their work has been to the fore and on the spot over the past decade in the effort to save the takahe from extinction.

The text is uncomplicated, and clearly informative. Coming from these two scientists the story is told refreshingly with no padding. It is easily read and leaves one with the satisfaction that with such a good briefing one has a reliable understanding of takahe and the steps being taken to ensure their survival.

This book is the first of a series to be published on New Zealand's endangered birds. I look forward to the further titles including the Kakapo, Black stilt, Black robin, and Kokako which are being issued by the New Zealand Wildlife Service in association with the publisher.

If later titles are as well illustrated and as readable as the present book under review, we can look forward to a worthy contribution to the literature on New Zealand's threatened and endangered creatures. Moreover the low price will ensure that the books will become widely read.

Takahe is the bird that reappeared in 1948 from the myths of time, to the excitement of us all. Our conscience for the well-being and continuance of this endangered ground walking and venerable bird is an important part of our national ethic.

Strongly recommended to all.

DAVID G. COLLINGWOOD

John McIndoe Publishers **$3.95**

CLASSIFIED ADVERTISEMENTS

FOR SALE

GESTETNER DUPLICATING MACHINE

Model 360, in working order, together with a supply of ink and stencils. $100 o.n.o.
Apply, The Secretary, Head Office, Box 631, Wellington.

FOR SALE

ADDING MACHINES (2)

one hand machine Victor, one electric machine Ohdner. $10 each.
Apply, The Secretary, Head Office, Box 631, Wellington.

WANTED TO BUY

REFRIGERATOR

A small refrigerator is required for use at Head Office, at a reasonable price.
Reply, The Secretary, Head Office, Box 631, Wellington.

CONSERVATION NEWSLETTER

This one-page newsletter is already distributed monthly to all Society branch committee members. It is designed to up-date all national conservation issues and indicate actions required from branches and members to further the Society's objects (ie submission deadlines, meetings, information available, etc). It also discusses conservation activities in our 46 branches.

If you are not a branch committee member but want to keep right up to date on the key issues, now is your chance to receive Conservation News.

SUBSCRIPTION FORM

I want to receive Conservation News each month:

Name:.....

Address:.....

..... Phone No:.....

I enclose an annual sub of $5.00 to cover printing and postage:

Post to: Conservation News
P.O. Box 631
Wellington

SOCIETY'S LODGES AND HOUSES

Bushy Park, Kai Iwi

24km north of Wanganui

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

Make your own programme.

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

Fees: Members: single, $12 per night; double $18 per night. Non-members: single, $18 per night; double, $25 per night. Children aged from 5 to 12 years, half rate. Day visitors, members and non-members, $2; children under 12 years, 50c; family group of two adults and children, $5.

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

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

Patoka Lodge

Hawke's Bay

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

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

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

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

Fees (per night): Adult members, $1.50; junior members, 75c; adult non-members, $2; junior non-members, $1.

A 50 percent deposit is required with each booking.

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

Ruapehu Lodge

Whakapapa Village, Tongariro National Park.

Ruapehu Lodge is available for MEMBERS ONLY, and all bookings must be made with the Society's head office, Box 631, Wellington.

Fees: Winter Season (1 June to 31 October) all members, $7.00 per night. Summer Season (1 November to 31 May) Adults, $5.00 per night; Children, $2.50 per night. Securing Deposit (per person), $1.00 per night.

Branch parties have preferential booking up until six months in advance, after which bookings open for individual members. Private parties are limited to 10 members per group. School groups in summer season, by application.

Full payment must be paid four weeks before occupation, (otherwise bookings may be forfeited), after which time there is no refund for cancellation.

No animals or pets are allowed in the lodge or National Park.

There is no key at the lodge, but one will be posted ten days before occupancy. No member may occupy the lodge without first booking through Head Office, Wellington.

Tautuku Lodge

Coastal Otago

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

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

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

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

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

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

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

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

For free brochure and all bookings send a stamped, addressed envelope to Mrs Roy, Paparuwai, Waipati, R.D.2 Owaka

Turner Cottage

Stewart Island

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

For details write, enclosing a stamped, addressed envelope, to: "Turner Cottage", c/o Mrs N. Fife, P.O. Box 67, Halfmoon Bay, Stewart Island.

Tai Haruru Lodge

Piha, West Auckland

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

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

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

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

Rates are:

Summer (mid October to Easter inclusive)

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

Weekends: $32 minimum.

Weekly: $90 minimum.

Winter (after Easter to mid October)

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

Weekends: $24 minimum.

Weekly: $60 minimum.

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

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

Waiheke Island Cottage

Onetangi, Waiheke Island

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

Summer (mid-October to Easter, inclusive)

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

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

Weekly: $30 minimum. More than 2 adults, $1.25 per person per night.

Winter (after Easter to mid-October)

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

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

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

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

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

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

Gallery
OF NEW ZEALAND FLORA

Ixerba brexioides, the Tawari. This small tree is confined to the Northern half of the North Island and is most plentiful in the kauri district. Its distribution is in lowland and lower montaine forest from 35° 30' to a little south of 38° eg. from Whangaroa to the northern portion of Hawkes Bay.

This tree is generally a large shrub with ascending branches but it can attain 10m in height with a trunk up to 60cm at elevations above 500 metres.

The leaves are glossy, leathery 7–17cm long and 1–2.5cm broad and toothed, each tooth being tipped by a gland.

The flowers are large 3.7 to 4cm diameter and consist of five calyx leaves, five petals, five stamens and a lobed disk surrounding a five celled ovary. The petals are a waxy white and pointed.

The wood is white and even textured with a brownish heart. It is heavy, believed to be durable and was used as pit props in the higher Thames goldmines in the past.

It was first described by A. Cunningham in *Annals of Natural History 3*, 1839, based on his collection of the plant in Whangaroa in November 1828. The name chosen is interesting because "Ixerba" is an anagram of "Brexia". The genus *Ixerba* comprises this one species which is endemic and unique to New Zealand.

Thomas Kirk said in 1889 that "*Ixerba brexioides* is one of the most striking and beautiful plants in the colony".

Cockayne in 1910 commented that "New Zealand forests are not distinguished for their brilliant flowers, most are inconspicious and of dull colour". But he noted some exceptions and among these he recommended Tawari saying "*Ixerba brexioides* of the Auckland upland forests is so showy that the Maoris had a special name 'Whakau' for its blooms". Indeed it is one of the very few trees whose flowers were so honoured.

T. F. Cheeseman in 1925 said "Its elegant foliage and its conspicuous large white flowers often produced in great abundance, renders it most attractive. In olden times the flowers were strung into necklaces and garlands, and worn by maoris as personal adornment on gala days and festivals".

With such commendation from these three great botanists we must realise that we are dealing with one of New Zealand's most beautiful and elegant trees. One would think it would make a most beautiful garden shrub with its glorious flowers appearing from November to January. Alas, it is sensitive to cold and exposure and is difficult to cultivate, prefering its forest setting.

Too often it has been swept aside in forest clearances never recognised for its importance and beauty.

DAVID G. COLLINGWOOD

A forest is more than trees

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

Mustelids

In New Zealand this group of animals is represented by ferrets, stoats and weasels, which were introduced between 1867 and 1912 to control rabbits, but this was largely unsuccessful.

The largest of these animals is the ferret, or polecat, which is nearly as big as a small cat. It has creamy-white underfur with long black guard hairs and a black tail.

The second largest — the stoat or ermine — is about 35cm in length. It has a light brown coat with off-white underparts, and a bushy black-tipped tail. Stoats are the most common of the three. In cold climates its fur turns white in winter and was highly regarded as a trim for royal robes.

The weasel is the smallest and least common of the three measuring only about 22cm in length. It is mostly brown and has a short tapering tail. It is a fierce little hunter and will catch a rabbit many times bigger than itself.

All three species are now widely distributed throughout New Zealand's forest and farmlands.

Mustelids feed on rabbits, rats, mice, insects and even frogs and fish. They also prey on birds and their eggs which has made them most unpopular.

New Zealand Forest Service

NZFS5