

Are cabbage trees worth anything?

Relating ecological and human values
in the cabbage tree, *tī kōuka*

Footrot Flats



PHILIP SIMPSON

Cabbage trees entered 'New Zealand' along tropical archipelagos some 15 million years ago.¹ They have adapted to the vicissitudes of sea-level, mountain building and erosion, and climate change, and have evolved into different species and regional forms. A remarkable set of structural and physiological features has developed to equip them for survival in a changeable and sometimes extreme environment.

It was the qualities of strength and durability that were seized on by Māori, and they favoured some or selected new forms to satisfy their daily needs. The same qualities of survival underscore Pākehā respect for cabbage trees. They too have recognised variety and have bred new forms to satisfy their aesthetic mores. A sense of national identity has grown around the cabbage tree and people have been shocked by the epidemic disease 'Sudden Decline'. One of our best known natural symbols, of strength, uniqueness and humility (someone said 'a real kiwi') has fallen down. What are we doing to the world?

There are often intimate linkages between the natural values of plants and human uses. For example the tōtara, an endemic New Zealand conifer, inhabits alluvial soils where drought and water-logging can occur repeatedly. The fibrous bark and the tough leaves protect the tree from drought, and the wood is impregnated with a resin that inhibits damage from water-generated decay. Māori used tōtara bark for thatching and bird storage baskets, and European settlers favoured the wood for those parts of structures that were exposed to rain and the ground: roofing, window sills,

piles, and fence posts.

The cabbage tree exemplifies the relationship between people and plants, not only the whole tree itself but also its parts, the leaves, the internal tissues, and their biochemistry.

When Polynesian settlers named the New Zealand cabbage trees 'tī' they were retaining a tradition of using its tropical relative, *Cordyline fruticosa* (formerly known as *C. terminalis*). They brought it with them and called it *tī pore*, 'the 'short' cabbage tree. European whalers and sealers adopted 'cabbage palm' from Cook's first voyage because the tips of palms were often eaten as a vegetable ('cabbage') by sailors, and because of the archetypal similarity between cabbage trees and tropical palms that the temperate travellers had seen for the first time. It is perhaps the leafy, tropical look combined with temperate strength that account for the world fame of cabbage trees.

In this paper I am exploring two themes. One is a relationship between natural properties and cultural values. The other, a conservation-driven issue, is the worth of the cabbage tree. To what extent should we be concerned at the loss of cabbage trees through the disease Sudden Decline? The themes are really one and the same because understanding that a particular value is firmly rooted in an adaptive ecological process (as manifested by particular structural and biochemical features, for instance), provides a reliable platform for appropriate conservation actions.

Above: Footrot Flats by Murray Ball helped to encourage Government to fund research into the cause of Sudden Decline, which, however, remains elusive.

BEING A TREE

Foremost among the natural characteristics of the cabbage tree is its impressive size and longevity. What's so valuable about being a tree? 'You can't see the wood for the trees' means you are preoccupied with detail and cannot see the whole picture or context. Trees grow together and form forest (called 'woods' by early European explorers, like Bishop Selwyn).

Cabbage trees do this by colonising freshly exposed ground (usually wetland formed after a flood, or burnt ground) in dense stands that last for hundreds of years. The large scale of the resulting forest creates new environments that innumerable other species of organisms can use, the mutual interrelationships generating diversity and stability. Trees, the largest and oldest organisms on Earth, generate diversity by creating multi-dimensional habitats in space and sequential habitats in time.

If there is one single factor that is critical to the ability of cabbage trees to actually be trees, and is therefore critical to most of their ecological and cultural roles, it is the growth of wood. Each year the growth layer (cambium) under the bark produces a new annual ring of wood. Structurally this wood is not like that of tōtara or the apple tree, however, prompting some people to say, 'The cabbage tree is not a real tree at all!' The wood is composed of an interconnected network of fibres, like three-dimensional lace, embedded within packing tissue that stores water and food. The fibrous network conducts food and water between the leaves and roots, through the trunk and branches. The critical property of the network of fibres and the turgid packing tissue is the mechanical strength they provide, which holds up the heavy branches and heads of leaves, and prevents collapse during storms. Watch a cabbage tree in the wind. Without the strength it

would not survive. Is it a real tree?

Each of the thousands of fibres within the trunk of the cabbage tree consists of water- and food-conducting cells (xylem and phloem, respectively), the former wrapped around the latter like reinforcing concrete. Now, in a so-called 'real' tree this is not the case; rather, the xylem forms the woody core of the trunk and the phloem forms a cylinder beneath the bark. Such a 'real' tree can, therefore, be ring-barked by chopping through

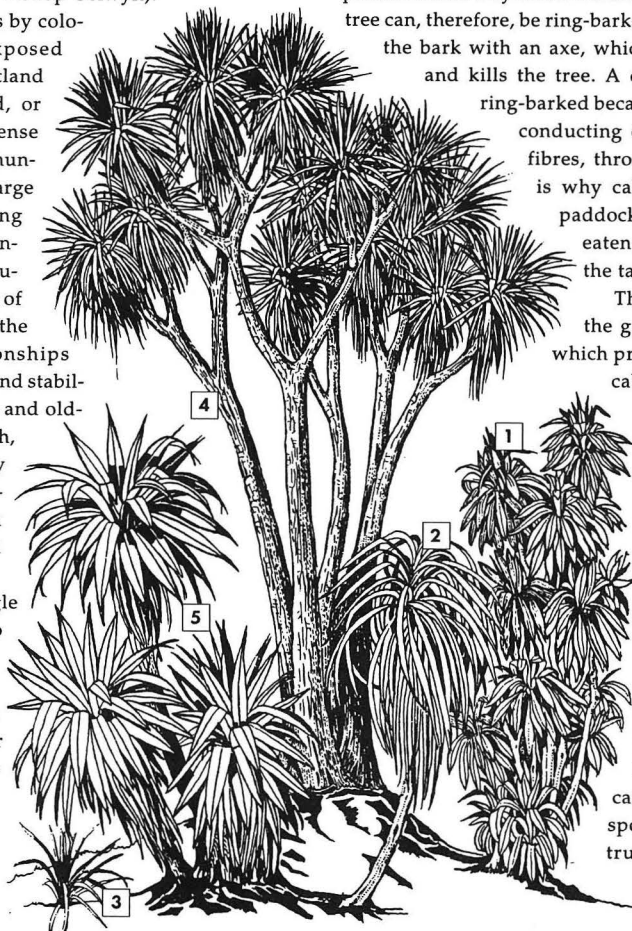
the bark with an axe, which destroys the phloem and kills the tree. A cabbage tree cannot be

ring-barked because the water and food-conducting cells occur together, in fibres, throughout the trunk. This is why cabbage trees survive in paddocks even when stock have eaten off the bark to get at the tasty food beneath.

The tasty food is actually the growth layer (cambium) which produces the wood of the cabbage tree trunk. The cambium contains a

store of sugar and starch to nourish a burst of growth in spring when a new crop of leaves is formed. The cambium also produces the bark around the outside of the tree, which protects the softer tissues within from physical injury, infection and loss of water. The cambium makes layers of spongy cork which, as the trunk enlarges, fracture into a maze of cork-lined crevices that are ideal for the attachment

of mosses and lichens and the fine roots of larger plants like ferns, lilies and orchids. These epiphytes in turn attract a host of animals, so that each cabbage tree becomes an ecosystem in itself.



Above: Species of *Cordyline* in New Zealand:

1. *Cordyline fruticosa* Pacific Cabbage Tree, *Ti pore*
2. *Cordyline banksii* Forest Cabbage Tree, *Ti ngāhere*
3. *Cordyline pumilio* Dwarf Cabbage Tree, *Ti rauriki, mauku*
4. *Cordyline australis* Cabbage Tree, *Ti kōuka*
5. *Cordyline indivisa* Mountain Cabbage Tree, *Ti Tōi*

From A.L. Poole and N. Adams, *Trees and Shrubs of New Zealand* (1963).

The ability of cabbage trees to produce wood year after year for centuries is the fundamental that underlies their stature as trees. By being trees, grouped with others into forests, cabbage trees have the scale and complexity to attract and maintain the myriad of other life forms that mutually interrelate. What we commonly see today however, is a lonely cabbage tree in the paddock, surviving because of its virtues. It has lost its mates and its future: it is a 'man alone',² against insuperable odds.

But there are other virtues of being a tree. By storing a large quantity of water and food, it can survive the tough times that inevitably confront a long-lived plant. The many heads of leaves, over two hundred on a large tree, make lots of food when times are good. Similarly the blanket of flowers leads on to a vast crop of fruits and seeds. I calculated once, by extrapolating from a sample, that a hectare of trees produces 400 million seeds. This sort of fecundity is needed by a plant adapted to the occasional catastrophic flood. By producing nutritious fruits in vast numbers, flocks of birds such as kererū are attracted to disperse them, a fact well appreciated by Maori hunters before Queen Victoria required the swamp flax for her ships and dairy farmers required the swamp soil where the cabbage tree forests grew.

So much for being a tree. But there are many other features of the cabbage tree that help it on its way and at the same time fashion the basis for human endeavour.

Rhizomes and roots

Beneath the ground the cabbage tree forms a set of remarkable stems, which grow vertically downwards from their tips like a cluster of pegs. These rhizomes (often colloquially called 'roots') are unique in the plant world. They anchor the tree solidly in the soil. They store a large supply of sugar and water. They produce the real roots, described below. And they bear buds that can grow into new cabbage trees. The rhizomes, termed *more* by Kai Tahu who ate them, make cabbage trees almost indestructible because they survive if the trunk is broken or burnt, and their buds regenerate the tree. It is because of this, and the great difficulty in digging them out before tractors were used (and then having to fill in the hole), that many cabbage trees survive on today's farms. Often these survivors have several trunks, showing that the buried rhizome has regrown several trees where a single tree once stood.

The real roots of the cabbage tree are equally remarkable structures. They are long, narrow and very tough, a large number (over 1000 even in a teenage tree) radiating from the rhizome, so that they completely dominate the soil for many square metres around a tree. When they are young cabbage tree roots produce

a tissue that can conduct air, and this allows them to grow in the waterlogged, oxygen-less soil of wetlands. When they are old, however, they form a very hard skin that protects the root from damage, especially from drought. These features of the root explain why cabbage trees can grow in almost any soil, whether wet or dry, sandy, clay, or rocky, in every climate below about a thousand metres and as part of a wide range of vegetation: wetland, shrubland, grassland, duneland or forest. Cabbage trees are famous for their ability to regenerate and part of the answer lies in the roots. Because roots can form from the cambium on any part of the stem, pieces of branch falling to the ground, even chips from the axe, can root and send forth new leaves.

Leaves

In young trees, old leaves die and reflex to form a 'skirt' that protects the young trunk from damage. Adult leaves live for two years so that if one annual set fails (because of frost, for instance), the other can survive. Leaves are extremely tough: the veins which conduct the food and water are covered in long fibres which strengthen the leaf against wind, and the leaf-bases wrap around the stem so that not even a cyclone can dislodge them. The leaves dancing in a breeze, or roaring madly in a storm, form one of the great moving sculptures of the New Zealand landscape. The leaf surface is covered by a layer of wax (cuticle), and breathing pores are sunken below this surface: these features protect the leaf from damage from cold, salt, drought, abrasion and wind. Leaves are genetically adaptable – narrow and fibrous in dry areas, broader and lax in windy coastal areas, thicker and more upright in cold, upland areas. Each leaf bears a bud at its junction with the stem, which can grow into a new shoot if one is needed, as after flowering or injury.

Flowers and fruit

Flowers open early in the spring and mature rapidly to produce ripe fruit in one season. The flowers are small but are produced in vast numbers. A powerful perfume envelops the tree, attracting numerous little insects that serve as pollinators. Some of these insects live only on cabbage trees. All the trees in an area flower at once, providing a huge nectar and pollen source that beekeepers enjoy because it builds up the number of bees in the hives. Fruit are small 'berries' adapted for bird consumption and subsequent seed dispersal. The seeds are rich in oil which serves as a food reserve for the developing seedling.

Biochemistry

All parts of the plant store food reserves (starch, sugar, and oil) to energise rapid growth of the young tree, the flower shoot, and vegetative growth in early spring or after injury or at the end of a drought. Sapogenins

(‘organic soap’) are bitter chemicals that discourage insects (and perhaps discouraged moa) from eating the leaf-forming shoot tip. Aromatic oils in the leaves discourage other trees from growing directly under cabbage trees, by slowing down the rate of decomposition of the fallen leaves which accumulate and prevent germination. Oil in the fruits (linoleic acid) has a role in bird metabolism (to stimulate egg-laying) and therefore may have encouraged a mutual relationship with seed dispersers (birds such as *kererū* and *kākā*).

Habitat and genetics

Two cabbage trees are required to produce fertile seeds. This out-breeding maintains a high degree of genetic diversity in a population and results in the evolution of regional forms. Hybrids (resulting from reproduction between *tī kōuka* and other species such as the forest cabbage tree, *tī ngahere*) suggest a way that new adaptations may arise. Cabbage trees are opportunists. The seedling is sensitive to smothering by other vegetation, so cabbage trees colonise new, open surfaces created by extreme events such as flooding, erosion, and damage to forest (by fire, storms, drought). These events are rare, so cabbage trees are capable of massive colonisation to produce a forest of uniform age that will gradually mature over a long period of time. People are good catalysts for cabbage trees by removing bush and creating open ground.

MAORI VALUES AND USES

Tī kōuka were valued to such a degree that proverbs (*whakataukī*) about them evolved, demonstrating a deep link between nature and culture. *Whakataukī* record observations about the trees that reflected important qualities or events in people’s lives. A death in the family might be referred to by the *whakataukī* ‘*E hara e te tī, e wana ake*’ meaning ‘This death is not like the

cabbage tree which sends forth new shoots’. The cabbage tree will usually regrow if it is damaged, the regrowth coming from buds on the underground rhizomes which, ecologically, provide the tree with a means of regenerating itself if it is damaged by a flood, a fire, a falling tree, or an insect or fungal attack. ‘*He uru a ki,*

he uru tī, e pihi ake’ means ‘Even as the *tī* reproduces itself, so does the spoken word reappear’, hence it is well to be guarded in one’s speech. In ‘*He rau tī-pinaki, he arero wahine*’, ‘the pliant leaf of the cabbage tree, the word of a woman’, a sense of strength through adaptability seems to be implied.³

Cabbage trees were common markers in the Maori landscape. They were valued in this way because of their remarkable ability to grow in a wide diversity of environments (coastal to upland; alluvial valleys, wetlands, dry hillsides; the winterless *Te Paki* to subantarctic *Rakiura*). Their ability to withstand adversity, such as

drought, flooding, fire and harvesting, and their ability to regrow after damage, was recognised. As well, their ability to grow out in the open meant that cabbage trees could be planted successfully by people. The often large size and distinctive appearance made cabbage trees stand out in the landscape. Near the mouth of the *Waiapu River* at *East Cape* was a *tī kōuka* on which the first fish was hung as a tribute to *Tangaroa*; it was also a marker of the location of a fishing ground. Another *tī kōuka*, called ‘*Hereora*’, located the boundary of a food-gathering area (*wakawaka*) of a *hapū* of *Kai Tahu*; today this tree grows in the grounds of *Burnside High School* in *Christchurch*. Because they were long-lived, reliable and useful, *tī kōuka* were seen as life-supporting trees and were often planted at *urupā* (burial grounds), and sometimes they were *iho-whenua* (places where the placenta was buried). Such trees were *tapu* and sometimes figured prominently in the *whakapapa* of the group. Some of these traditions relate back to values generated in *Polynesia*. Today, the tropical Pacific *tī* (*Cordyline fruticosa*) is commonly planted around



Cabbage trees are extremely important 'pro-life' images to Māori. W. Dittmer 'The creation of nature' in Te Tohunga, 1907.

important places and used ceremonially at gravesides (as in Rarotonga).

The rustling of the leaves of the cabbage tree (resulting from their tough surfaces and strap-like shape which yields to the wind), in combination with the tree's importance to human welfare before and after death, perhaps underlies some people regarding the cabbage tree as temporarily sheltering the spirits of the departed. More generally, the life-force (mauri) of forest or landscape can reside in a cabbage tree. Mauri might be broadly interpreted as the ecological health of the landscape, and because mauri can be influenced by people it can be regarded as an indicator of the quality of the relationship between people and nature.

Kaingaroa gains its name from a story involving two women who were turned into cabbage trees, and remained as landscape evidence of one of the ancestral stories of the area.⁴ These cabbage trees were named 'Nga tī whakāwe o Kaingaroa' ('the phantom trees of Kaingaroa') because they seemed to move with the traveller over the otherwise featureless plain. They were 'haere ti', 'cabbage trees that moved'. They were chopped down during skirmishes and then overgrown by pines.

Cabbage trees have been the basis of other place names. 'Puketī' refers to a hill bearing cabbage trees; 'Temuka' is a contraction of 'Te Umu Kaha', a reference to the ovens used in that area to cook cabbage trees; the 'Kauru River' in South Canterbury records the value of the area for producing kāuru as food as described below; 'Waimauku' near Auckland records a flood that left only the tips of the cabbage trees visible, as if they were mauku, the dwarf cabbage tree (*Cordyline pumilio*). Even 'Kaiapoi', a formerly important Kai Tahu settlement, is said to derive its name from the kāuru and other foods brought together at the pā and dispersed to surrounding whanau.

Cabbage trees as food

Carbohydrates are stored in the underground and aerial stems of cabbage trees. Although starch is prominent in actively growing tissue around the periphery of the stems (the cambium) and near the young leaf-bases, the main storage product is gluco-fructo-furanan, a complex carbohydrate that is steamed (hydrolysed) to form the sugar fructose. This substance is formed within the soft matrix tissue which surrounds the fibrous conducting strands of the wood, and it clings to these fibres like granules (para) after cooking. The sugar is concentrated in the rhizomes (kōpura, or more) and stems of young plants, and appears to reflect the gradual building up of stored food as the young tree establishes itself and grows rapidly before beginning to flower. The concentration also fluctuates seasonally and was sufficient to be harvested only in spring and summer.⁵

Young rhizomes and stems are much less fibrous than tissue formed later. At the tip of the stem (korito) where the growing point (apical meristem) is producing leaves and stem tissue, tissue expansion is rapid, and hard, fibrous tissue is absent. Here, although the level of carbohydrate is less than in rhizomes, the whole tissue can be cooked and eaten directly as kōuka. Bitter sapogenins influence the flavour somewhat, so that kōuka was harvested by people chosen because they had 'sweet hands'. Because sapogenins aid the digestion of fat, kōuka is a common accompaniment to tuna (eels), birds (especially mutton-birds), and more recently wild pork and roast mutton. Sapogenins are 'soap chemicals' which act to break up complex molecules like fat: hence the Māori uses and cabbage tree biochemistry are perfectly matched. The harvest of korito for kōuka is still widespread today, not only for the food value but also for its medicinal quality. The value of kōuka is praised in the whakataukī attributed to Chief Taharakau when describing the down-to-earth virtues of his home: 'He ahi kōuka i te ao, he wahine i te pō', 'Kōuka in the morning and a woman at night'.⁶ One of the reasons tī are grown on pā sites is because they supply a constant source of food as kōuka.⁷

Harvesting of the rhizomes and trunks of young cabbage trees was a major activity of the southern Waitaha, Kati Mamoe and Kai Tahu. Kāuru was the preserved product derived from the steaming of stems in large ovens, umu tī. Young cabbage trees were harvested when about one metre tall (three to five years old). The tip of the rhizome was often left in the ground to regrow, the tip of the leafy shoot could likewise be replanted, and sometimes branches were buried horizontally to provide new plants. In these ways, cabbage tree 'orchards' were maintained and kāuru was a reliable food for consumption after storage, for use during travel, and for trade. Bundles of stems, trimmed of roots, bark and leaves, were cooked in sometimes very large umu, three metres or more long.⁵ These umu are visible today, especially in South Canterbury and the Otago Peninsula and constitute a remarkable archaeological relic of a former agricultural era. A unique hafted adze appears to have been developed by the early southern tribes to trim the tī trunks.⁸ Kāuru was eaten either by chewing directly, or by pounding in water to make a honey-like liquid (waitau kāuru).

The technology to cook cabbage trees in umu tī was brought to Aotearoa with the Pacific cabbage tree, tī pore. Here it was probably applied to all cabbage tree species, certainly to tī rauriki, which like tī pore had many underground storage stems. Indeed, a sterile cultivar, tī tawhiti, was developed through cultivation and selection for vegetative growth. It is probably a cultivar of tī kōuka, and, like many intensively cultivated plants, it has lost the power of sexual reproduc-

tion. According to Elsdon Best,

*The ti tawhiti was grown by the natives at Waikato, Whanganui, Taranaki, Heretaunga, the East Coast and Bay of Plenty districts, and probably elsewhere, but was unknown in the South Island.*⁹

The flower stalk was pinched off when it appeared so that those that never flowered were eventually favoured and ti tawhiti is now stuck in a permanently juvenile condition. It is sold today as a garden plant under the name *Cordyline* Thomas Kirk.¹⁰

There is considerable confusion over the naming of cabbage trees, their various parts and the products that were used. A number of names now seem to have lost their identity – ti eiei, for instance, said to be a variety with exceptionally strong leaves. Ti pore was originally introduced at the time of Māori settlement. It grew only in the far north and is now extinct in New Zealand except on the Kermadec Islands. The *name* lives on, however, and is now applied to an introduced Australian species, *Cordyline rubra*, which is widely grown in Auckland and occasionally further south. 'Tumatakuru' is the name for the widespread thorn woodland plant, corrupted to 'matagouri': 'tumata' means 'to set fire to', while 'kuru' is a corruption of 'kāuru', the cooked cabbage tree. Here is an explanation for the origin of the name 'tumatakuru', because this plant would have been a very significant firewood on the dry, treeless, Canterbury plains. Thus, use of the cabbage tree has given rise to the name of another plant.

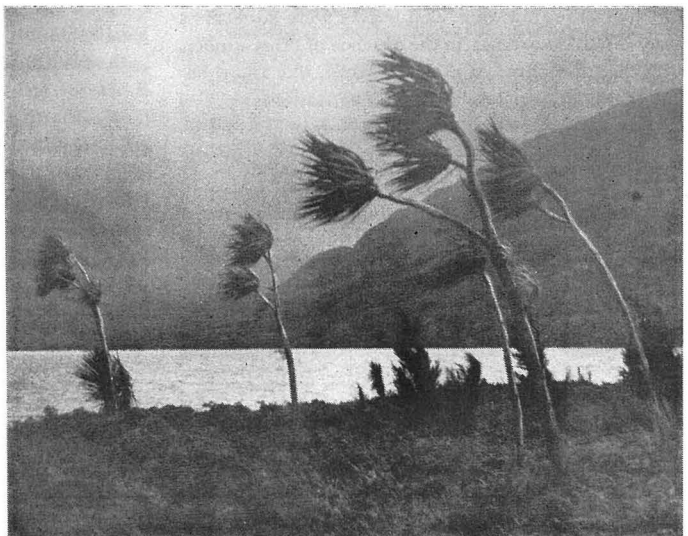
Cabbage tree leaves and fibres

The fibrous leaves of the cabbage tree are exceptionally strong, and the wax coat that covers them makes them smooth and slippery. Hence children made toboggans from the heads of leaves, riding them down a grassy slope. There was a reported 'outbreak' of tobogganing at Henley in the 1860s, resolved by mothers mending trousers with bright floral patches! The leaves and fibres are particularly resistant to damage by prolonged or repeated soaking. Hence they were used for rain capes (kahu), baskets (kete) for steaming food in or to gather shellfish in, for fishing lines and nets, and for anchor ropes. The museum at Okain's Bay on Bank's Peninsula has a

unique fishing sinker of a stone in a woven ti bag, found in a nearby cave. The broad leaves of ti tōi (*Cordyline indivisa*, mountain cabbage tree) were especially well suited for capes with fibres of various thicknesses being used for different parts of the cape. The collections of kahu tōi in today's museums show a wonderful diversity in modes of construction, the use of dyes and combinations of fibre-species. Waist mats were also commonly made from tōi and sometimes ti kōuka. The strong fibre of ti kōuka was used to make items that required endurance, such as sandals (paraerae) used on journeys up rivers and across mountains to obtain jade (pounamu). The fibres of cabbage tree leaves are said to be stronger than those of flax (harakeke, *Phormium tenax*). Hence narrow strips of cabbage tree leaf were valued for snaring birds such as kererū. The rauhuka (strips of leaf) from kōuka tarariki were favoured. These cabbage trees come from the drier eastern country (East Cape to Wairarapa) where the leaves are particularly strong because they are adapted to summer drought. Ti fibres were used as cordage for innumerable everyday purposes, including tying up bundles of food and sewing sails. The fact that cabbage trees were so widespread and able to be easily grown, meant that the fibres were readily available whenever they were needed.

Health and recreation

As already mentioned the sapogenin content of kōuka aided the digestion of fats and may also have assisted in preventing heart disease.¹¹ Raw kōuka was used as a general blood cleanser by Māori herbal healers. The leaves when scraped or heated to form an infusion provided medicines for both internal and external use – skin disorders, healing of cuts and assistance to nursing



Right: 'Storm', George Chance, 1932. The wind was so strong that he had to tie himself to a tree to get this photograph. From George Chance: Photographs, Dunedin Public Art Gallery, 1985.

mothers, diarrhoea and colic. The presence of steroidal sapogenins and cinchophen (similar to aspirin) may be responsible for the relief of inflammation and fever, respectively.

Tobogganing has been mentioned. Another game is 'Tirakau' or 'sticks' which was traditionally played using lengths of very light wood such as whau and makomako.¹² Dried cabbage tree branches are likewise exceptionally light and pleasant to handle. The local abundance of cabbage trees near sites of settlement is circumstantial evidence that the game tirakau would have been named for its use of dried tī branches, bearing in mind that in some regions tī kōuka is known as tī rākau.

MODERN USES

The advent of cane sugar may have put an end to the production of kāuru. Modern interest in the stored fructose is for economic and industrial use, and trials demonstrate that with agronomic practices to induce reliability and maximum efficiency, a fructose crop would be potentially worthwhile.¹³ Cabbage tree seeds yield the largest proportion of linoleic acid of any plant,¹⁴ and could conceivably become a valued product. Paper made from leaf fibres or the stem residue following fructose extraction could increase the economic potential of cabbage trees. In fact, a by-product of kāuru production was a fibrous material called kaikaha tī, which was valued for wrapping precious items such as cloaks and feathers.

Uses by Pākehā

Colonial settlers used cabbage trees for food, fibre and building. The hollow trunks of old trees were sometimes used as chimneys in settlers' houses, utilising the fact that the wood of the trunk stored a lot of water which retarded burning. The trunks were sometimes used to make a cottage, in the absence of other timber, with the leaves used as thatch. Pākehā, like Māori before them, pick up dead cabbage tree leaves for use as kindling.

However, Pākehā uses relate mostly to the aesthetic appeal of cabbage trees. As a result of their ability to survive forest clearance and grazing by stock, cabbage trees are frequently the only native tree present in the agricultural landscape. The firing of the dense tussocks of eastern New Zealand opened up the soil to colonisation by cabbage trees (which had previously migrated only on recently flooded surfaces or soils bare for other reasons) and they became widespread landscape features. Wetlands create open ground for cabbage trees to grow, and when the wetlands were drained the trees often remained in groups within the paddocks.

This exposure of Pākehā to cabbage trees resulted in the naming of local features accordingly, just as Māori

had done - 'Cabbage Tree Gully', or 'Cabbage Tree Flat' in Marlborough and Hawkes Bay, respectively, for instance. The former area has recently been planted in pines, having survived 150 years of burning and grazing. The pines are even more dangerous because they will shade out the cabbage trees and the reason for the name will be lost.

Because cabbage trees are an integral part of the landscape of certain districts, local groups have chosen their image as a logo - the Hauraki District Council for instance, uses the image advertising their tourist routes. As a result of a change in the parliamentary system to MMP, the Next Step Democracy Movement chose the cabbage tree as its logo to represent the survival and rebirth of democracy in New Zealand, reflecting the same value as some of the Māori whakatauki. The Titahi Bay Rugby Club figured a single cabbage tree as its emblem, possibly erroneously, because 'titahi' can also refer to the distinctive coastal cliffs in this part of the country. The Natural Heritage Foundation uses the cabbage tree to symbolize its concern with indigenous New Zealand.

Many New Zealanders associate cabbage trees with indigenousness. When Brian Rudman, a reporter with the former *Auckland Star*, campaigned for funding for research into Sudden Decline, the epidemic disease that has killed thousands of cabbage trees over the last decade, his argument was that Dutch Elm Disease had attracted immediate emergency funding while the cabbage trees succumbed. Murray Ball in his 'Footrot Flats' cartoon published a number of issues on the subject, and by focusing on perceptions of uselessness struck chords of deep feelings of respect for cabbage trees.

Cabbage trees have become an icon of New Zealand identity. The frequency of their use as a recognisable plant on stamps is second only to tree ferns. The 1933 Health Stamp, which shows a cabbage tree beside a path to the rising sun, is particularly evocative. James K. Baxter and Sam Hunt have written poems about them, Russell Clark created a series of now famous landscapes based on the Kaingaroa legend, and innumerable other artists (Kinder, Barraud, McCahon, Lee-Johnson, Foley, Nigel Brown and Johanna Pegler, to name a few) and photographers (George Chance, Patrick Reynolds and Jocelyn Carlin) have used the archetypal image in their work. A common theme is the cabbage tree's sturdy denial of the calamity of human impact on nature.

The horticultural value of cabbage trees is substantial. Avenues of cabbage trees are planted along roads and footpaths and around parks. People whose job it is to mow grass are sometimes frustrated by the tenacity of the leaf fibres, and I have seen cabbage trees poisoned on golf courses for this reason. These people should know that cabbage trees can be successfully

transplanted, even when quite large. Important buildings frequently have cabbage trees framing the main entrance, as do the former Dominion Museum, Parliament Buildings in Wellington, and the Ratana Temple. In the last case they symbolise the healthy relationship between the spiritual and physical worlds. They are found in school and church grounds. Cabbage trees were common in the gardens of early rural houses and sometimes these trees are now all that remain of the home, standing beside a lonesome chimney. The re-birth of interest in indigenous New Zealand has led to a spectacular increase in the number of young cabbage trees in cities. Ironically this has led to what appears to be a population explosion of the cabbage tree looper (tikopa) – the caterpillar hatched by the moth who lives by day camouflaged among the dead cabbage tree leaves which form the protective skirts on young cabbage tree trunks.

It is the damage caused by the loopers that identifies one of the problems about breeding coloured cultivars of cabbage trees, because these seem less protected from insect depredations, and had less protection during the 'big chill' in Southland during July 1996. Brown, purple, red, pink and yellow/green variegated foliage has been created by the horticultural industry.¹⁵ Hybrid species such as 'Green Goddess' cater for the leafy, tropical look desired by today's boutique patio gardens. Unfortunately the urban market has its problems because the natural resistance to pests and disease that developed over millions of years can be lost when plants are isolated from the ecosystem they are part of. Genetic stresses resulting from the cultural favouring of non-adaptive mutations, and the genetic porridge that results from the mixing in cities of cabbage trees from different areas, and subsequent trading of the unrecognisable offspring, could conceivably be one of the contributing causes of the Sudden Decline epidemic.¹⁶ The inherent versatility that led Māori to name a range of regional forms for distinctive uses has been used by Pākehā to create a range of mutants to satisfy a predilection for the unnatural, even the bizarre, in their gardens. Nevertheless, it is not all bad, for the weakness of the mutants seldom enables the plants to survive beyond childhood so it is unlikely that evolution will be curtailed. Indeed, hybridisation is probably a mechanism of evolution that cabbage trees have used and it may be especially appropriate for the very rapid ecological changes that surround human actions today.

CONCLUSION

The disease which has swept thousands of trees from the landscape has kindled an awareness that ecological health, mauri, has been jeopardized and cannot survive or rebuild without the help of human hands. The re-

markable gifts that cabbage trees have provided for people now have to be reciprocated. People and plants now need each other. The strength of the commitment will depend on our vision of the cabbage tree. As Colin McCahon once wrote on his painting of the same name 'To know it is to love it'. It is my hope, having brought together the ancient and continuing natural and cultural perspectives of the cabbage tree, that we will know well what cabbage trees are.

NOTES

- 1 One interpretation is as follows: From an origin in 'S.E. Asia' one lineage of *Cordylone* went into 'Queensland' and is currently represented by seven shrubby rain forest species. Another lineage entered 'New Zealand' and shortly divided into two groups. The first was closely related to the small tropical species and is today represented by *C. banksii* (ti ngahere), and *C. pumilio* (ti rauriki); the second evolved into trees and occurs as *C. obtecta* (Norfolk Is.), *C. kaspar* (Three Kings Islands), *C. australis* (ti kōuka, throughout New Zealand), and *C. indivisa* (ti tōi, New Zealand mountains). The cabbage tree of this paper is ti kōuka.
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