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# The Magazine of the Friends of Pukekura Park

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*Friends of Pukekura Park*
*New Plymouth*

Tui feeding at *Aloe maculata* flowers

Tui feeding at *Prunus campanulata* flowers.

Photos David Medway

Tui feeding at *Phormium cookianum* flowers

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## Banded Tui sighted at Brooklands

**David Medway**

Between August 2003 and July 2006 a team from the Department of Conservation carried out a study of Tui (*Prosthemadera novaeseelandiae*) and New Zealand Pigeon (*Hemiphaga novaeseelandiae*) in and near New Plymouth, including in Pukekura Park. Some 26 Tui were colour-banded and fitted with small radio transmitters. One was banded at Lake Mangamahoe in October 2004 with a green over white combination on its left leg. The study team mistakenly thought that this bird had later died, so they used the same colour combination on another Tui which they banded at Te Henui Walkway in September 2005. Therefore, a Tui with this colour-band combination which is seen after September 2005 may be either of these birds.

On several occasions between 26 July and 3 August 2006 I observed a Tui with a green band over a white band on its left leg feeding at flowers of a Formosan Cherry (*Prunus campanulata*) in Ambush Gully. It was not wearing a transmitter which may have fallen off. On 6 & 7 December 2011, staff at Brooklands Zoo saw a Tui feeding at flowers of the group of *Phormium cookianum* flax growing near the Otter enclosure. This Tui also bore a green band over a white band on its left leg. Because two Tui were banded with the same colour combination, it is not possible to know if the banded Tui seen at the Zoo in 2011 was the same banded bird that I saw in nearby Ambush Gully in 2006.

It is pleasing that at least one of the Tui banded locally in 2003-2006 was still alive and frequenting the Park in late 2011. Tui may live for 12 or more years so there may be further records of this bird, or of other Tui banded during the study.


**Tui feeding at *Prunus campanulata* flowers.**

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## Summer scene and planned upgrade

**Donna Christiansen**
**Technical Officer Fernery and Display Houses**

At the time of writing, the Tuberous Begonias are coming into flower and creating a blaze of colour in the Begonia House. The summer bulbs are making a show. The Glory Lilies (*Gloriosa superba*) always prompt comment as this plant is not often seen in today's gardens. There are also Pineapple Lilies *(Eucomis* spp.) with their stunning scented upright flowers, Oriental Lilies (*Lilium* spp.) in all their glory wafting their heavy scent throughout the Glass House, and Blood Lilies (*Scadoxus multiflorus*) with their spherical umbel flower heads consisting of up to 200 small red flowers with protruding stamens. The New Plymouth Floral Art Society created and displayed some lovely floral masterpieces this summer. A floral-covered outfit is prominent in the Begonia House, and an aerial arrangement is eye-catching in the Annex. Kirkii the Kiwi is a must-see. He is situated in the bushman's hut in the Annex, and fits in very well with our native plant display.

2011 was a very busy year at the Fernery with 42,077 visitors. 2012 will be another busy year. Apart from our daily chores to have the displays looking great for visitors to see, we are gearing up for big changes with the planned upgrade within the Fernery Compound. Planning of this has been ongoing for 18 months. It involves the demolition of the staffroom-office and propagation glasshouse which was originally a potting shed and propagation house built in the 1940s. In 1993, the potting shed was converted into temporary staff facilities when the staffroom in front of the main entrance was demolished. The new building, which will be situated on the same site, will provide facilities for the Fernery and Pukekura Park staff. The Curator's office will be on the ground floor and above there will be a new propagation glasshouse and covered growing area. The roof on the Fern House will be replaced with a structure that is the same profile as the present one. The old boiler which heats the Begonia House and top propagation glasshouse will also be replaced. It has been around since the 1950s and has become inefficient owing to age. It was not upgraded when the glasshouses were rebuilt and enlarged in 2001. The installation of a ventilation system in the Display Houses will be a very welcome addition to help with air movement to improve plant health and disease control. Last, but not least, there will be a new potting shed, and chemical storage and tool shed. This is a large project but the finished product will allow us to grow display plants more efficiently and to enjoy better staff facilities.

## Some summer highlights in the Park

**Ian Hutchinson**
**Technical Officer Pukekura Park**

The herbaceous border at Brooklands is currently looking very colourful with great displays from the Dahlias, Penstemons, *Canna* Lilies, *Phlox*, Salvias and *Monarda*. The Flower Carpet Roses in the Zoo car park have also been flowering very well this summer, and we have added some standard *Rosa* 'Iceberg' as well in the section against the Zoo fence, the red and the white contrasting nicely.

The Roses at The Gables have been particularly good. The varieties that only flower in one flush in early summer flowered most profusely with this being the best flowering for many years. The varieties that repeat flower, such as *Rosa* 'Mutabilis', *Rosa* 'Penelope', and *Rosa* 'Sparrieshoop' look like they will continue producing new flowers well into late summer. The Shasta Daisies in the bed in front of the picket fence also had their best flowering for many years. It is amazing what compost and TLC can do! The tuberous Begonias next to the Shasta Daisies are starting to flower well, in shades of pink, white, and yellow and are well worth having a look at. In the main garden we have planted *Impatiens* 'Cranberry Punch' mixed in between the shrubs and perennials. These are lovely and vibrant in red, orange, and pinky-red shadings. The gardens were all given a mulch of composted bark last spring and the benefits of this in terms of plant health and vigor are already showing, together with the added bonus of weed reduction.

Above: Begonias in front of The Gable's picket fence.

Left: One of the many flowers on the Lily Pond which is looking great at this time of year.

Photos Derek Hughes

The Fred Parker Lawn borders at Pukekura are showing the benefits of last year's revamp. The new perennials we added included varieties of *Penstemon*, *Geranium*, *Eryngium*, and *Lobelia*. They are all performing well, and in combination with the New Guinea *Impatiens* have resulted in a very colourful display. Late last year we planted some *Streptocarpus* on the bank by the Teahouse *Wisteria* and on the edge of the Sunken Dell. These have flowered continuously since they were planted, the flowers being blues, purples, pinks, reds, and white. They are proving to be very good value.

*Impatiens* make an impressive display, above in the Fred Parker Lawn borders and below at Brooklands.

Photos Derek Hughes

Flower Carpet Roses and *Rosa* 'Iceberg' against the Zoo fence.

A well placed seat in the herbaceous border at Brooklands on a stunning summer day.

Photo Anne Bayliss

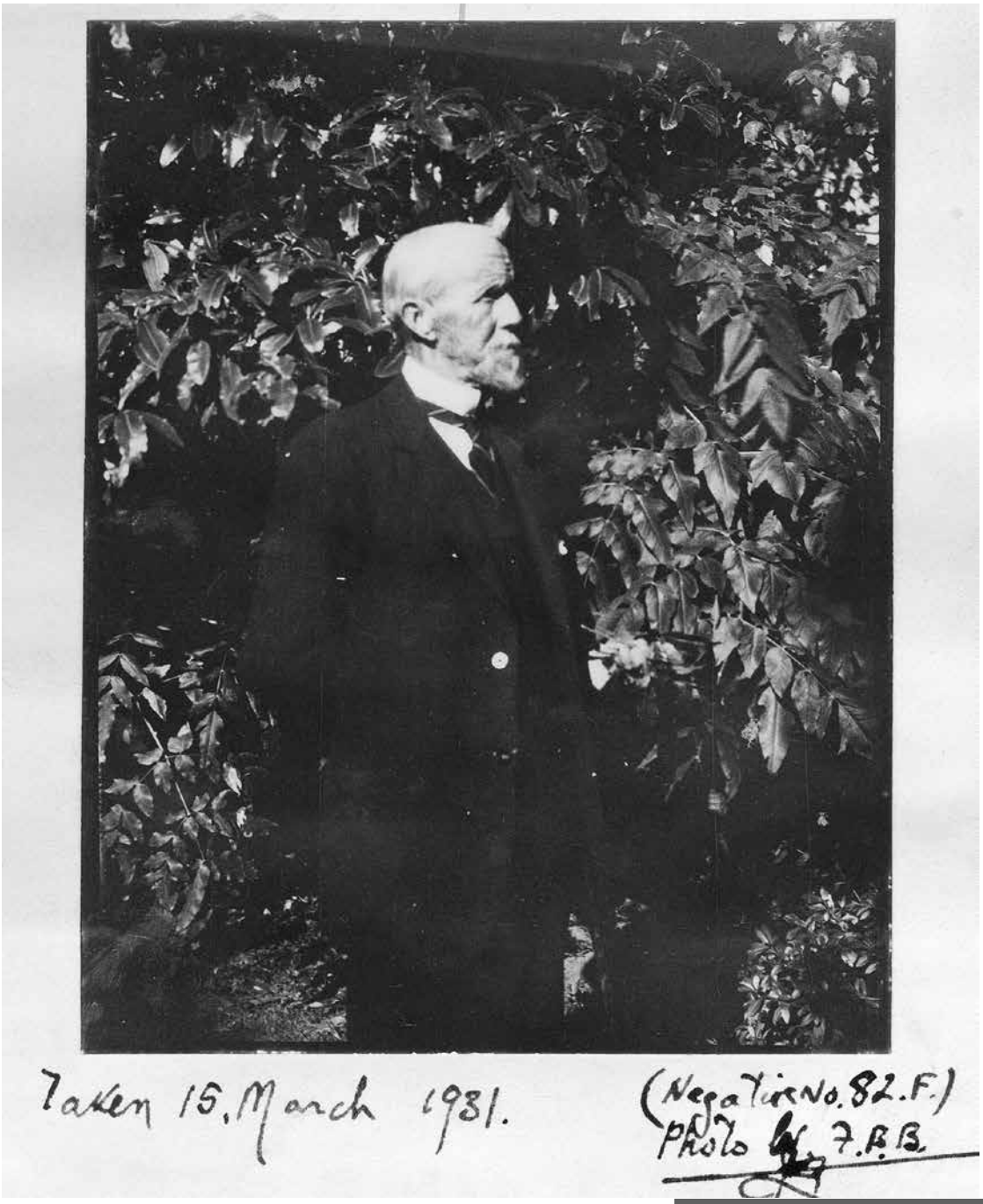
## W. W. Smith and the first breeding of Kiwis in captivity

**David Medway**

W.W.Smith (1852-1942), who was Curator of Pukekura Park from 1908-1920, was also a leading naturalist of his time. The Christchurch naturalist, James Drummond, described Smith as "perhaps the most reliable observer in New Zealand" (*Taranaki Herald* 28/4/1928, p.12). The Dunedin naturalist, G. M. Thomson, writing in 1922 in his *Naturalisation of animals & plants in New Zealand*, said that Smith was "one of the most careful and observant naturalists in New Zealand" whose "experience as a field naturalist is second to none in the Dominion". Smith's abilities as a naturalist are also referred to in a feature article about him in the *Taranaki Herald* (Christmas Supplement 17/12/1932), and in an Obituary in that newspaper (*Taranaki Herald* 3/3/1942, p.2).

Smith commenced duty as Curator of Pukekura Park on 23 March 1908 (*Taranaki Herald* 4/7/1908, p.2). He recorded much later, in 1923, that "Thirty years ago, when residing at Ashburton, I began some experiments with a pair of living kiwis received from the Nelson district. Owing to my leaving the district later, for two years, my

W. W. Smith taken on 15/3/1931 (Fred B. Butler, Puke Ariki PHO2012-0002).



experiments were abandoned, and the birds were sent to the Christchurch Gardens. On coming to reside in New Plymouth, fifteen years ago, I resumed and conducted a series of experiments with kiwis in captivity, extending over eleven years" (*The Young Citizen*).

In June 1923, Smith was invited by the Young Citizens League of Auckland to contribute articles about birds to *The Young Citizen* being their monthly journal devoted to the interests of young people (Smith Archives, Puke Ariki). The first article Smith contributed to that journal was a long and very detailed account of his experiments with the Kiwis he had kept in captivity in Pukekura Park. It appeared in *The Young Citizen* in three instalments - Volume 3(5)(31/7/1923), p.4, Volume 3(6)(31/8/1923), p.4, and Volume 3(8)(31/10/1923), p.5. Extracts from it appeared in the *Taranaki Herald* of 28/10/1933, p.4, 27/1/1934, p.3, and 22/6/1937, p.6. Unfortunately, none of the diaries that Smith might have kept for the years he experimented with Kiwis in Pukekura Park, other than that for 1908, are known to exist.

On 30 June 1908 Smith wrote about Kiwis to Newton King of neighbouring Brooklands, and on 6 July 1908 he received a reply offering them (Smith Archives, Puke Ariki). Smith later recorded that in July 1908 Newton King gave him a large female Kiwi which had been captured the previous week. Smith prepared a "spacious and dark house with soil floor, and a large wired-in grass yard" in which to keep his Kiwis. Roomy boxes were sunk in the ten-foot square soil floor as sleeping and nesting compartments. A food box and drinking trough, which was filled daily with clean water, were placed on each side of a ten-inch square door giving access from the house to the yard (*The Young Citizen*). Somehow the myth developed and has persisted that Smith kept his Kiwis on the small island in Fountain Lake which was removed in 1954 during construction of the fountain. The house and yard to which Smith referred is undoubtedly the structure at the northern end of what is now Hatchery Lawn which is depicted in the accompanying photograph by A. W. Reid of Stratford. This photograph is not dated, but internal evidence indicates it was taken in the 1910s at the time Smith was undertaking his Kiwi experiments. A regular visitor to Smith's nearby cottage recalled that there might even be time for a visit to the large pen where his Kiwis lived (*Taranaki Herald* 7/3/1942, p.4). Smith's experiments must have been known to many locals during the eleven years he carried them out in a prominent structure in a well-frequented part of the Park.

Smith procured three more Kiwis, two males and a female, shortly after he received the first Kiwi from Newton King. It was considered that the Kiwis added to the attractiveness of the grounds (*Taranaki Herald* 19/2/1909, p.2). It appears that Smith experimented with a total of fifteen birds of different ages and from different parts of Taranaki during the eleven years he kept Kiwis in captivity in the Park (*The Young Citizen*; *Taranaki Herald* 30/8/1932, p.4). It is apparent that Smith did not retain all the Kiwis he examined during this period. In letters of 12 and 17 November 1911, he informed James Drummond that all twenty Kiwis of both sexes, from districts remote from each other in Taranaki, that had passed through his hands during the last three years belonged to *Apteryx mantelli*, the North Island Brown Kiwi. Smith told Drummond that he had obtained "extremely interesting results with these grotesque birds in captivity". He was expecting more Kiwis the following week which he would examine carefully (Drummond papers, Canterbury Museum). The Kiwis examined by Smith over the years came from a variety of sources. For example, in February 1909 a half-grown Kiwi brought in by a resident of Urenui was placed "for the present" with the Kiwis that Smith had under observation, and in May 1909 a "most magnificent" specimen captured by a hunter at Puniwhakau was presented to the Pukekura Park Board (*Taranaki Herald* 19/2/1909, p.2; 21/5/1909, p.3). It appears that wild Kiwis were at least occasionally present in Pukekura Park in the years Smith was conducting his experiments. He mentioned that one or other of his captive birds would call and "on hearing a responsive hail from other kiwis in the bush in Pukekura Park would listen attentively until the response ceased" (*The Young Citizen*).

In 1933, Smith wrote that after many years experience with Kiwis in captivity, and "inducing them to nest and rear their young successfully, I am thus impressed that the kiwi can be saved from extinction" (*Taranaki Herald* 28/10/1933, p.4). He considered that "When kept in roomy and comfortable quarters and well fed the older birds pair and lay eggs and hatch them". Five large robust females laid seven eggs during the years he kept Kiwis in the Park (*Taranaki Herald* 30/8/1932, p.4). Smith retained "each pair of birds about two years, and again liberated

them, with their young, in their original bush home, whence they came, and where their natural food is plentiful" (*The Young Citizen*). Taken together, these statements suggest that more than one pair of Smith's captive birds produced young, but he has left a detailed record of only the first successful breeding.

Smith recorded that the food of his captive Kiwis was "varied much" during the years of his experiments. They were "voracious feeders, and consume much solid food nightly when supplied to them. The females being larger and stronger than the males require more food. Owing to the difficulty in obtaining a sufficient quantity of their natural food, including earthworms, huhu and other large beetle grubs, slugs and larvae of the several large and splendid root-feeding species of Porina moths, I continued to feed them on beef, mutton and the flesh of healthy rats when my dog caught them. They partook freely of liver, and the cleaned and washed intestines of cattle and sheep. All these foods had to be cut in small pieces swallowable by the kiwis, otherwise they could not have eaten them ….. They prefer earthworms and huhu grubs to any other natural food. A healthy female would consume a pint of huhu every night if procurable. They relished half-boiled rice and, when placed in a shallow dish of water, they would pick out every seed. They liked hard-boiled eggs and cheese, but would not eat bread, porridge or potatoes". Smith supplied them with "coarse grit, lime, pounded oyster-shell, and egg-forming food to force or induce them to nest and lay eggs" (*The Young Citizen*).

In December 1909, one of the original Kiwi pairs nested and the female laid two eggs on the soil floor in their dark recess. The first egg was laid on the 10th, the second on the 18th. North Island Brown Kiwis normally lay the eggs of two-egg clutches at intervals of about three-four weeks, but a bird in captivity near Napier in 1943 laid two eggs of the same weight only eleven days apart. The second egg laid by Smith's bird was slightly smaller than the first. Smith recorded that the two eggs measured, respectively, 5.35 and 5.28 inches in length, with a breadth of 3.33 and 3.27 inches. They weighed 15¼ and 13¾ ounces. With averages of 135mm in length by 84mm in width and 411 grams in weight these eggs are about the normal dimensions and weight of those of North Island Brown Kiwi. The male took possession of the nest and began incubating the eggs the day after the second egg was laid. Smith observed that only the male incubated them, and that the time it left the eggs each evening to feed, drink, wash, and ramble about the grass yard was very irregular. The heat generated by the bird when on the eggs made the soil in which they were embedded very dry. To obviate this, Smith sprinkled lukewarm water around the eggs to produce a more moist bed to aid in their incubation. Smith waited until the sitting bird went into the yard in the evening when he shut it out until he had examined the eggs. He found that on placing the bulb and part of the mercurial tube of a good thermometer perpendicularly on the side of both eggs, it recorded, on most nights, from 103 degrees (39.44°C) to 105 degrees (40.55°C). The heat of the soil for six inches around the eggs generally ranged from 82 degrees (27.77°C) to 85 degrees (29.44°C). Smith considered that "The high temperature is favourable to the bird leaving the nest for several hours each evening without chilling the eggs" (*The Young Citizen*).

The first egg hatched on the night of the 42nd day of incubation, and the second egg hatched some time during the night of the 43rd day. He was "somewhat impressed that these eggs were incubated and hatched under exceptionally warm conditions, which may have developed them one or more days sooner than if hatched naturally in the cool forest" (*The Young Citizen*). In fact, these incubation periods are considerably shorter than the normal incubation period of about 70-90 days for North Island Brown Kiwi. Nevertheless, Smith considered that both chicks appeared to be normally developed. They were "early astir in the evening in quest of food, and they occasionally visited the food-box on very dull and wet days. They were exceedingly active, and soon learned the locality of the shallow box, and to extract the earthworms and grubs from the soil placed therein. In a fortnight they were able to eat fresh mince-meat and fish, and continued to thrive perfectly". Smith did not see them drinking during the first month (*The Young Citizen*). Smith recorded that "The newly hatched chick is pure white, and the delicate bill is light pink, changing to reddish brown in a month. In two months the plumage is pale brown, intermixed with whitish markings. At four months the general plumage assumes a darker brown, with the shafts of the feathers of a lighter tint. At six months it is a uniform brown, with a blackish shade, but not so dark as the mature plumage of adults". Smith considered that "the snow-white kiwi chicks of the first month are exquisitely beautiful objects", and that a Kiwi chick for weeks after hatching was "the most exquisitely beautiful

form of young bird-life conceivable in its white silky plumage and bright pink beak and legs" (*The Young Citizen*; *Taranaki Herald* 30/8/1932, p.4).

The pure-white plumage of these newly-hatched chicks, and its subsequent darkening, is a matter of considerable scientific interest because the chicks of the North Island Brown Kiwi normally have dark-brown plumage when they are born. In 1912, Smith thought that the difficulty he had experienced in making his captive Kiwis lay and hatch their eggs was probably due in some measure to certain foods which they obtain in their wild state being lacking in foods supplied to them in confinement (*Taranaki Herald* 5/7/1912, p.4). Perhaps some mineral deficiency in the diet that Smith's adult Kiwis subsisted on at the time caused a similar deficiency in their eggs which prevented the production of melanin by the developing chicks or prevented the deposition of melanin into their growing feathers. Apparently Kiwis moult throughout the year and their feathers are constantly being renewed. Frequent moulting, coupled with some unknown chemical change that enabled the production of melanin by the chicks or enabled the deposition of a gradually increasing amount of melanin into their feathers, might explain the progressive darkening of their plumage over the months following their birth. It is not known what effect, if any, the abnormally short incubation period of these chicks may have had on the colouration of their plumage. In 2011, two much-publicised white chicks were hatched from eggs produced by a pair of North Island Brown Kiwis living in the wild at Pukaha Mount Bruce National Wildlife Centre near Masterton. They are thought to be the first white Kiwis hatched in captivity, but those produced by W. W. Smith's birds beat them by 101 years !!

The author of the feature article about W. W. Smith that appeared in the *Taranaki Herald* (Christmas Supplement 17/12/1932) considered that Smith had achieved the feat of raising the first Kiwis in captivity. It is generally believed that the credit for this belongs to F. D. Robson, Curator of the game farm of the Hawkes Bay Acclimatisation Society near Napier where in 1945 a pair of captive North Island Brown Kiwis produced two chicks. It is a pity that Smith did not publish an account of his unique experiments in a scientific journal so that they became widely-known in the scientific community. Nevertheless, his article in *The Young Citizen* which described them was known to, and his achievements were recognized by, at least one eminent scientist. Dr (later Sir) Robert Falla, then Director of the Canterbury Museum, on learning of the Napier event pointed out that years earlier "Mr W. W. Smith of New Plymouth had some kiwis which mated and raised chicks, and he published a very full and detailed account of their family life" (*Taranaki Herald* 17/10/1946, p.3).

View of Fountain Lake in the 1910s (A. W. Reid, Puke Ariki PHO2012-0001).

## The Tulip Trees of Pukekura Park

**David Medway**

The genus *Liriodendron* is in the primitive Magnolia (Magnoliaceae) family. It was believed to consist of a single species (*L. tulipifera*), which is native to eastern North America, until a second similar species (*L. chinense*) was found in central China in 1875. Both are fast growing, tall, deciduous trees with distinctive large, truncated, 4-lobed leaves. Their flowers have a superficial resemblance to Tulips, hence the common name. Individual plants of *L. tulipifera* may not flower until they are 15-20 years of age.

*Liriodendron tulipifera* from *Curtis's Botanical Magazine* Volume 8 (1794), folio 275.

*L. tulipifera* is common in cultivation in New Zealand. Many specimens can be found in public places in New Plymouth including Pukekura Park, Te Henui Walkway, Te Henui Cemetery, Audrey Gale Park, and Tupare. There are at least five specimens of *L. tulipifera* in Pukekura Park. The two largest are immediately behind Bellringer Pavilion, and on the Eastern Hillside plateau above Racecourse Walk.

Because of large scale felling, *L. chinense* is now a very rare and endangered species in the wild, being composed of small populations or scattered individuals in mountainous areas of China and northern Vietnam. It is uncommon in cultivation in the West. There are five specimens in Pukekura Park. One that was planted near the large *L. tulipifera* on the Eastern Hillside plateau above Racecourse Walk

*Liriodendron tulipifera* flower.

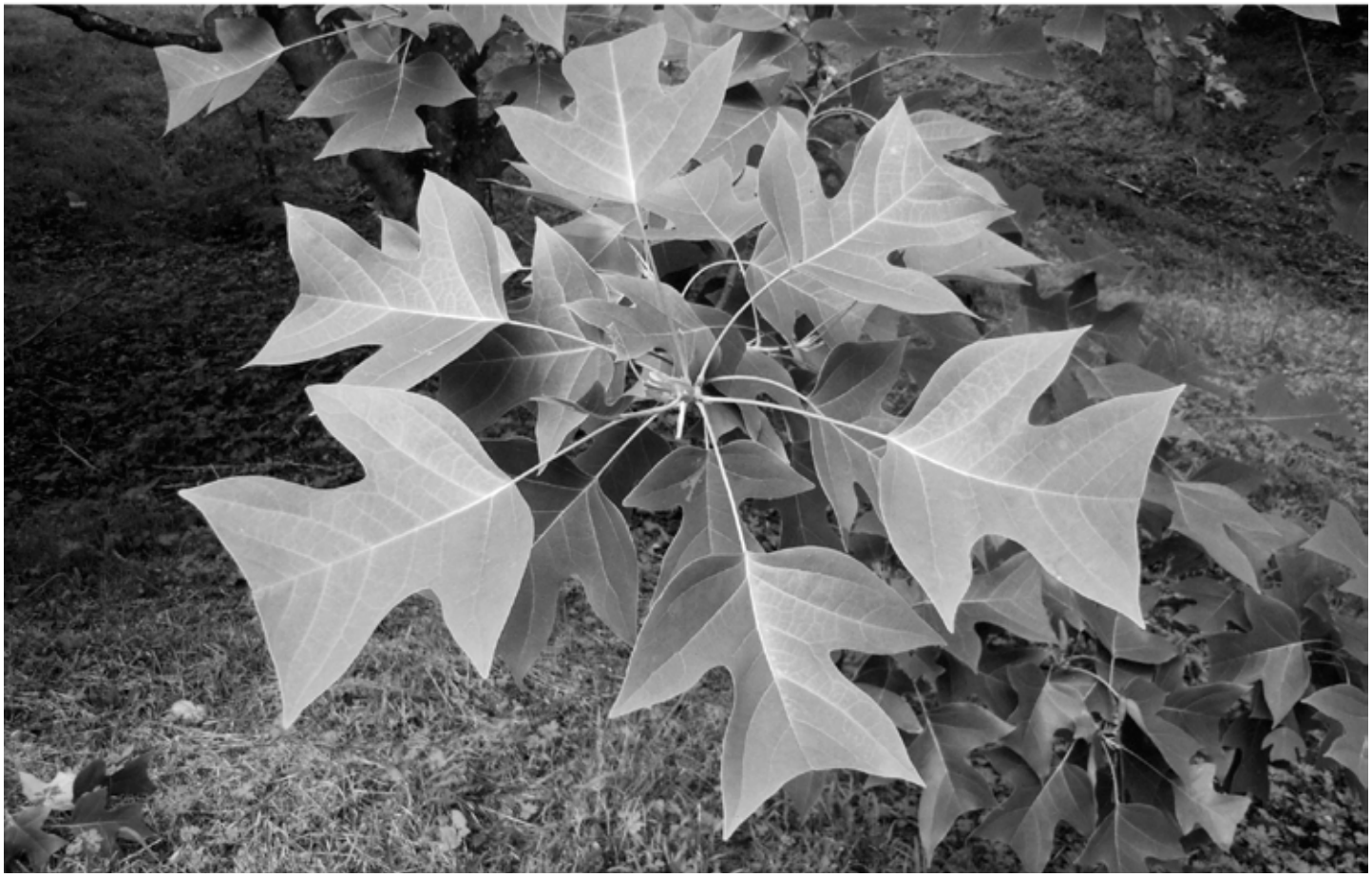
Opening *Liriodendron chinense* flower.

*Liriodendron chinense* flower.

on 15 June 1993, and four that were planted in the Chinese Collection at the Coronation Avenue entrance to the Park on 6 September 1993 (*Planting Book* 5/1993-13/10/1993: 11, 42). The largest and best of these five specimens is beside the pathway leading down to Fuller Walk from the Coronation Avenue entrance. This specimen flowered in late November-early December 2011, the only one of the five *L. chinense* to do so.

*L. tulipifera* and *L. chinense* are not always easy to tell apart when they are not flowering. Generally, *L. chinense* has leaves which are more truncate at their tips with more deeply-cut lateral lobes than those of *L. tulipifera*, but there is considerable variation in these features. However, the flowers of the two species are quite different. In particular, the petals of *L. tulipifera* are greenish-yellow with conspicuous orange patches near their bases, whereas those of *L. chinense* are green with yellow striations and they do not have orange patches. These differences between the flowers can be seen in the accompanying photographs taken in Pukekura Park on 5 December 2011.

The flowers of both species of *Liriodendron* produce nectar. The orange patches on the flowers of *L. tulipifera* are the nectaries. In their native habitats, both species are pollinated by insects most notably by various bees and flies which are attracted to the flowers for their nectar and pollen. The large amount of nectar produced by *L. tulipifera* makes it a major honey plant in parts of the eastern United States. The National Beekeepers' Association of New Zealand and others recommend that *L. tulipifera* be planted in our country and urban gardens as a nectar and pollen producing tree for honeybees (*www.treesforbeesnz.org*).



Leaves of *Liriodendron chinense*.

## Lorenzo has an operation

**Jolene West**
**Field Staff Brooklands Zoo**

In late October 2011, Brooklands Zoo staff noticed that Lorenzo, one of the Cotton-top Tamarins (*Saguinus oedipus*), had sustained an arm injury. An initial x-ray at a local veterinary clinic revealed that he had fractured his arm. We will never know how he did this. Specialist surgery is needed for this type of fracture so on 1 November Assistant Curator Eve Cozzi and I travelled with Lorenzo to Massey University's veterinary hospital in Palmerston North for surgery on his left olecranon near his elbow joint. The surgery took about one and a half hours. The broken fragment was tiny, and the vet placed a metal pin and wires in Lorenzo's arm to hold it in place. The body length of a Cotton-top Tamarin is only about 17cm so one can imagine operating on an animal that size would be very challenging! Lorenzo did really well during the operation and in recovery from the general anaesthetic. We monitored him for two hours afterwards and travelled back to Brooklands Zoo the same day.

Lorenzo before his operation.

When we arrived back we left Lorenzo in the transport cage inside the Tamarin den overnight to aid in restricting his arm movement. Lorenzo's mate Nephrite was very excited to have him back home. She had been calling out all day, wondering where he was. Keeping a Cotton-top Tamarin from moving its arm too much during healing is no easy task! The first six to eight weeks are the most important time for the ligaments and bones to heal. We kept Nephrite and Lorenzo in a temporary off-display enclosure during that time. Both Cotton-top Tamarins were placed back on display just before Christmas. During the Tamarin's time off-display, Zoo staff took the opportunity to give their enclosure a make-over: We trimmed back plants, replaced ropes, replaced some table tops, and did some water-blasting. Both the surgery and the convalescence have done their jobs and Lorenzo's arm is healing wonderfully.

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