Myosotis discolor * Portulaca oleracea * Myosotis laxa * Potentilla indica * Prunella vulgaris * Myosotis sylvatica * Oenanthe pimpinelloides * Ranunculus muricatus * Oxalis exilis Ranunculus parviflorus * Oxalis incarnata * Ranunculus repens * Ranunculus sardous * Oxalis pes-caprae * Rumex obtusifolius * Oxalis purpurea * Senecio bipinnatisectus Persicaria decipiens Phytolacca octandra * Senecio esleri Plantago lanceolata * Sherardia arvensis * Plantago major * Sison amomum * Polycarpon tetraphyllum * Solanum lycopersicum *

Solanum nigrum * Solenogyne gunnii * Soliva sessilis * Sonchus asper * Sonchus oleraceus * Stachys sylvatica * Taraxacum officinale * Trifolium repens * Veronica arvensis * Veronica persica * Veronica plebeia Veronica serpyllifolia * Viola odorata *

Mt Eden/Maungawhau urban rock-forests revisited

On the 19 July 2014 Auckland Botanical Society (ABS) repeated its Mt Eden / Maungawhau urban rock-forest field trip of 17 July 1999 (Cameron 1999a), only this time we started with a record number (?) of 66 people (see Appendix 1) at Government House and finished with 36 people at Almorah Road (compared with 38 and finishing with 22 in 1999). Although it was a cold winter's day the rain held off until the end of the trip.

The day's programme (19 July 2014):

- 10 am-noon: Government House grounds, via the Savannah Street entrance;
- Noon-1 pm: Eden Gardens for lunch;
- 1.15 pm: Withiel Thomas Reserve off Withiel Drive (with talks from others);
- Walk from Withiel Thomas to Almorah Road forest and finish there by 4 pm.

Introduction

For a background on these Mt Eden rock-forest areas of urban Auckland see Kirk (1871), Millener (1965), Cranwell (1981), Esler (1991: 193), Smale and Gardner (1999), Cameron (1999a), Esler (2004: 48-49), Bush (2006), Wilcox (2012), and a very full and readable account by Wilkins (2016). In the 19th century it was estimated to cover less than 50 ha (Smale & Gardner 1999) and today is only 3 ha (see Fig. 1). The forest is a mix of public and private land (1.7 vs 1.3 ha). There are also scattered rock-forest trees and shrubs in adjacent properties. It all has a certain level of protection under a Special Ecological

Ewen K. Cameron

Area (SEA) (Fig. 1) designation in the Unitary Plan, allowing only light tree-trimming; most other activities require a permit.

The remaining Mt Eden rock-forests lie on the north-eastern lower slopes of Mt Eden/Maungawhau on basaltic lava now estimated to be 28,000 years old (Hayward et al. 2011). Today the forests are centred around three small areas: Almorah Road (block A) (ex Goodfellow property), Government House grounds (block C) and Withiel Thomas Reserve (block B) (Fig. 1). Two of these face south and one faces north (Almorah) - this might explain the greater abundance of puriri (Vitex lucens) in the warmer Almorah forest. The best known, and the only one easily accessible to the public, is Withiel Thomas Reserve which was actually planted by Prof Thomas (see below); the other two appear to be genuine forest remnants. Lucy Cranwell (1981: 13) pointed out that one can also get a good view over the low rock wall into the Almorah rock-forest from Almorah Road.

Auckland Council recently classified its indigenous ecosystems (Singers et al. 2017) into the Department of Conservation's national ecosystem classification. The rock-forests fitted into their Puriri forest variant of WF7.2, which occurs on basaltic volcanoes in three main North Island areas: Pukekohe-Auckland, Whangarei and Kerikeri-Kaikohe. It has a threat status of Critically Endangered.



Fig. 1. Location of the three main Mt Eden rock-forests in 'public' ownership (outlined in white): A = Almorah (ex Goodfellow), B = Withiel Thomas, C = Government House (not open to the general public). The broken white line marks the approximate original extent of this forest type (based on Smale & Gardner 1999, fig. 1). All 3.0 ha of the remaining fragmented Mt Eden rock-forest, as protected under the Council's Special Ecological Area (SEA), are delineated in yellow. Aerial photo (2017) and SEA boundary from Auckland Council GeoMaps (<u>https://geomapspublic.aucklandcouncil.govt.nz/viewer/index.html</u>), adapted by Joshua Salter.



What is a rock-forest?

Lava fields with blocks of basalt rock would have been a feature of early Auckland. On Mt Eden, and a few other areas, there developed a special type of forest where broadleaf trees dominated without pohutukawa (Metrosideros excelsa) or conifers. I suspect that they started as pohutukawa forests, as seen today on the youthful Rangitoto Island. Over time the light-loving pohutukawa is replaced with the shade tolerant species. So today in these much older rock-forests we see the largest trees being mangeao (Litsea calicaris), mahoe (Melicytus ramiflorus) and titoki (*Alectryon excelsus*). These three are frequently the most abundant trees, usually associated with karaka (Corynocarpus laevigatus), pigeonwood (Hedycarva arborea), kohekohe puriri, (Dysoxylum spectabile), puka (Griselinia lucida) and ngaio (Myoporum laetum). Houpara (Pseudopanax lessonii) is frequent in the subcanopy and the commonest shrubs are kawakawa (Piper excelsum), coastal karamu (Coprosma macrocarpa subsp. *minor*), mapou (*Myrsine australis*) and hangehange (Geniostoma ligustrifolium). Ferns are frequent on the rocky ground along with patches of peperomia (Peperomia urvilleana). The forest has its own special feeling with the trees coming straight out of the rock (Fig. 2), in places their roots snaking over the ground. Bryophytes and lichens can be common on the shaded rocks and tree trunks (Fig. 3). Contrary to Esler (2004: 49), there is at least one photograph and one painting showing the Mt Eden rock-forest present in early European times: an 1860s photo by John Kinder (held by the Auckland Museum and reproduced in Hayward et al. 2011: 130) and an 1876 watercolour by Alfred Sharpe (reproduced in Wilkins 2016: 92-93).

Government House grounds (4.0 ha)

Clint Jensen of Bark Limited welcomed us to Government House grounds (Fig. 4) with an introductory talk about the grounds and their management on the margin of the Governor's Lawn (Fig. 5) and then he led us around for two hours. Bark Ltd has had the management contract for the grounds since 1997 and during this time has been active on weed control, particular focusing on wandering Jew (*Tradescantia fluminensis*) and reducing the amount of fruit salad plant (*Monstera deliciosa*). Earmarked for future removal were the bay trees (*Laurus nobilis*) (naturalising vigorously, Fig. 6) along with several tree privet adults (*Ligustrum lucidum*).

Some of the tree plantings date from the 1870s, and the garden in several places retains the natural lava outcrops and the original vegetation that were once a feature of the wider area. Exotic species of trees are increasingly complemented by trees and shrubs native to New Zealand. The house was built in 1921 by Sir Frank and Lady Mappin who spent 45 years combining the natural features of the site, existing trees and new plantings to develop the garden we see today. The Mappins gifted the house and garden to the Crown in 1966 for use as a viceregal residence. We learned that it is a permanent challenge to maintain the original character of the garden in a climate that encourages lush growth. Maintenance and development of the garden is under the direction of a management plan and a garden committee. Management goals are based on the recognition that the garden is a national treasure, and seek to conserve its historical, botanical and design values.

The management plan states that the grounds will be maintained "in sympathy to the Mappin wishes". This allows a certain freedom for placing of individual species as long as the overall tree landscape is maintained. Clint gave the example that they recently had removed a large storm-damaged Norfolk Island pine (*Araucaria heterophylla*) near the Mountain Road gate, which leaves a certain number of mature trees and they have a similar number of young trees in readiness to plant out when required. The garden is endorsed as a "Garden of National Significance" by the New Zealand Gardens Trust (www.gardens.org.nz).

In 1999 the author had measured the diameter (DBH) of the impressive Queensland kauri (*Agathis robusta*) on the side of the drive from Mountain Road (Fig. 7) (Cameron 1999b), and re-measured the tree during our 2014 visit (Fig. 8). The result indicates an increased diameter of 22.3 cm in 15 years = 1.5 cm

Figs. 2-12: 2. Rock-forest at Almorah Reserve, the large central puriri (c.80 cm DBH) with several smaller karaka trees. Photo: EKC, 20 Oct 2018. **3.** The leafy liverwort *Frullania spinifera*, and the pale patches of the crustose lichen *Porina exocha*, locally both common, on the shaded trunk of a large titoki tree, driveway margin of Rannoch Sculpture Forest. Photo: EKC, 1 Aug 2014. **4.** Bot Soc Entering the gate of Government House from Savannah Street. Photo: Philip Moll, 19 Jul 2014. **5.** Clint Jensen of Bark Ltd introducing Bot Soc to Government House grounds, on the Governor's Lawn. Photo: EKC, 19 Jul 2014. **6.** Bay tree (*Laurus nobilis*) seedlings in the rock-forest – adults close by; Government House grounds. Photo: EKC, 7 Dec 2014. **7.** A giant Queensland kauri in Government House grounds, with 2.1 m DBH. Photo: Philip Moll, 19 Jul 2014. **8.** The DBH of the giant Queensland kauri being re-measured by EKC. Photo: Philip Moll, 19 Jul 2014. **9.** A large tree of *Michelia doltsopa*, native to the eastern Himalayas, in full flower at the western end of Government House grounds; DBH 67.5 cm. Photo: Mike Wilcox, 19 Jul 2014. **11.** *Lastreopsis microsora* – one of several common ground fern species in the rock-forest area of Government House grounds. Photo: Philip Moll, 19 Jul 2014. **12.** *Arthropteris tenella* – local, creeping over the rocks in the rock-forest area of Government House grounds. Photo: Philip Moll, 19 Jul 2014.

 Table 1: Diameter of two large trees at Government

 House grounds: Queensland kauri and mangeao.

Tree	Date measured	DBH (cm)
Queensland kauri	Aug 1999 Jul 2014	187.7 210.0
mangeao	Aug 1999 Dec 2014	65.8 67.5

increase in diameter/year (Table 1). Some 4 m up, the trunk branches into two, and the canopy looked healthy. This tree has the largest diameter of any Queensland kauri in Auckland, and perhaps in New Zealand (cf. Cameron 1999b)? The well-known century-old kawaka (*Libocedrus plumosa*) near the Mountain Road gate had been dying for the last five years and was removed earlier in 2014 (C. Jensen pers. comm.). It was the largest known cultivated kawaka in New Zealand.

After walking around the upper western part of the garden (Fig. 9) we proceeded past the house and down to the rock-forest on part of the northern boundary of the grounds (block C, adjacent to Glenfell Place). There is an area of rock-forest here (0.4 ha), dominated by karaka; mahoe is locally common, with occasional titoki, pigeonwood, puriri and whau (Entelea arborescens). There are two adult mangeao present and the author returned later and also re-measured the largest mangeao here by the track (Fig. 10) which had hardly grown since it was last measured, with an increased diameter of only 1.7 cm in 15 years = 1.1 mm increase in diameter/year (Table 1). We admired some of the ground ferns growing here (Figs. 11, 12), but the locally common half-exotic hybrid, Asplenium ×lucrosum, should be removed.

Jessica Beever noted the weedy moss, *Fissidens taxifolius*, flourishing on soil in Government House grounds (see Appendix 2). A more welcome sight was a species of pin-cushion moss (probably *Leptostomum macrocarpon*), high on an untamed rock outcrop, at the western margin of the rock-forest area. *Leptostomum macrocarpon* was later seen at an accessible site by the author, epiphytic on one of the cultivated conifers near the main house.

Eden Gardens (2.2 ha) – a planted quarry site

Since 1964 Eden Gardens has been planted in the remains of an old basalt quarry – which shares its northern boundary with Government House grounds. There is an entry charge, toilets and a cafe – our lunchtime visit tested their food and drink delivery services. The basalt cliffs are a real feature of the garden along with *Rhododendron, Camellia, Magnolia*, bromeliad species and native New Zealand plants, including tree fern species. Mike Wilcox pointed out a nice Himalayan spindle tree (*Euonymus pendulus*) by the waterfall feature.



Fig. 13. Terrestrial puka (not the largest) with roots spreading over the rocks, and secondary roots wrapped around the trunk. Withiel Thomas Reserve. Photo: Joshua Salter, 4 Nov 2018.



Fig. 14. Tree privet stumps on the eastern boundary of the Almorah Reserve, above Gillies Ave motorway onramp, cut down a few evenings before this photo. Photo: EKC, 4 May 2016.

Withiel Thomas Reserve (0.7 ha)

After lunch we reconvened just inside the Withiel Thomas Reserve (0.5 km distant) and heard from three people involved with the reserve, starting with Alice Baranyovits, a PhD student at the University of Auckland. Alice outlined her study on kereru in urban Auckland, looking at various aspects including diet, where they were spending their time, movement and a plant phenology study. She had radio-tagged 14 birds, including two from Government House grounds (the radio tags transmit their data every 28 days). She found that most birds didn't move far, usually staying within 3 km of where tagged. However, one female bird had been to Helensville and back (40 km each way). Almost on cue: while Alice was talking a kereru flew into the titoki canopy above her. Gabriel Daniels, Operations Manager for Te Ngahere, then spoke about the contract weeding and pest management work that his company has being doing in the reserve. This was followed by local conservation volunteer and champion weeder, Sel Arbuckle, who personally removed most of the wandering Jew that used to be abundant in the reserve. Sel mentioned the main weeds that he was finding: climbing asparagus (Asparagus scandens), Japanese hill cherry (Prunus serrulata), loquat (Eriobotrya japonica), Homalanthus populifolius, and by the western boundary he pointed out a hedge of Mackava bella (Acanthaceae) where there were also some seedlings (now vouchered).

We walked the loop track made long ago by Prof Thomas through the rocky reserve under a tall canopy of titoki, mangeao, terrestrial puka (Fig. 13) and mahoe. The subcanopy and shrub layer was houpara, kawakawa and coastal karamu; on the rocky ground there are scattered ferns, locally peperomia, occasional shrub and tree seedlings and very few weeds. We diverted to the upper eastern margin to see the northern tree rata (Metrosideros robusta), Hall's totara (Podocarpus laetus), rimu (Dacrydium cupressinum) and the Australian Illawarra plum pine (Podocarpus elatus) - evidently all planted by Prof Thomas. During the loop walk we recorded a single seedling of both tamarillo (Cyphomandra betacea) and Bangalow palm (Archontophoenix cunninghamiana) - both new records for the reserve (see Appendix 2). This reserve is the type locality for Coprosma macrocarpa subsp. *minor* A.P.Druce ex R.O.Gardner & Heads. The voucher was collected by the author in July 1999 (AK 239596) and it is a common understorey tall shrub in this forest.

From Withiel Drive most of us walked to Almorah Road via Mountain Road, passing the entrance to 114 Mountain Road – the driveway to the Prof Thomas's old house 'Trewithiel'. Cranwell (1981: 13) records that Thomas's "...lovely garden ...was the first on a large scale to be wrested from the lava of this area..." As we walked we noted that many of the street trees on Almorah Road were appropriately titoki, one of the main rock-forest components. However, in the adjacent Gilgit Road most were the exotic silver birch (*Betula pendula*). These should be replaced with appropriate locally-sourced rock-forest species. Several of the properties still had components of the rock-forest in their sections, including ngaio, mangeao, karaka, mahoe, puriri, kawakawa, coastal karamu and many fern species. The long frontage of 18 Gilgit Road was a particularly large forest patch topped by a tall mangeao.

Almorah Road

Between Almorah Road and Gillies Avenue, predominantly on private land, is the largest continuous piece of remaining rock-forest in Auckland, covering 1.4 ha. In 1999 the Government put up for sale the largest parcel of land within this block, the old Sir William Goodfellow property (50% forested). In late 2001 a deal was finally struck after a public outcry with the purchaser (a developer) resulting in 0.63 ha of the rock-forest being purchased by the Department of Conservation and vested in Auckland Council as a reserve (Wilkins 2016). This then allowed the developer to sell off property lots, mostly contiguous with the forest, and mostly partially forested. On the 19 July 2014 visit, the nine house lots on the adjacent private land, 'Almorah Glade', were laid out with access driveways in place but at that stage none had been sold (the first sections sold in April 2016). Currently (Oct 2018) three luxurious townhouses have been built on the least-forested lots and are for sale. Sel informs me (pers. comm.) that several trees have already been cut down. Soon after publishing my previous account of the rock-forest (Cameron 1999a), stating that puka was absent in the Goodfellow property, I found a good-sized terrestrial puka on the higher land on the south side of the property; Sel informs me that there is also an epiphytic one in the adjacent reserved piece of rock-forest.

In 2014 we did a loop though the rock-forest beginning above the Gillies Avenue motorway onramp where tree privet was locally common. Two years later, around 40 tree privets were removed from here (Fig. 14) over three nights in May 2016 a big under-taking as the motorway on-ramp had to be closed so the contractors could crane out the cut trees one by one (Wilkins 2016). Further into the forest itself it was hard to realise that we were in central Auckland - the forest was stunning, with long views between the tree trunks through to the Rannoch Forest at the northern end. In a large hollow the litter was covering the rocks and here there were large king ferns and several tall (>4 m trunks) nikau (Rhopalostylis sapida). We carefully weaved our way, admiring the trees coming out of the rock, with basal water-shoots numerous on several species, especially pigeonwood (Fig. 15) and mahoe. Many ferns were present. We came out near



Fig. 15. Many of the tree-bases were encircled by watershoots – perhaps a sign of stress by drought? Pigeonwood, Almorah forest. Photo: EKC, 21 Oct 2018.



Fig. 16. Inappropriate Council planting of *Clivia miniata* over four years ago on the street-frontage of 'Almorah Glade' in an area that the rock-forest (in background) could have been extended into. Photo: EKC, 21 Oct 2018.



Fig. 17. Vehicle entrance via the rock-forest sculptures to Rannoch House, 77 Almorah Road. Photo: EKC, 1 Aug 2014.

the gate on Almorah Road and went back down the drive to a tall mangeao in the open on the higher south side, with a low water-shoot bearing male flowers out of season.

A recent collection of *Hymenophyllum flexuosum* in Almorah reserve by Ben Goodwin and R. Prime confirmed the earlier literature record of Wall and Cranwell (1936). Checking the herbarium database revealed an earlier collection of this fern by Ian Atkinson in 1954 from "Mt Eden lava forest; on basalt rocks, lava forest community" (AK 259473) great to know that it's still there. In 2014 the Albert-Eden Local Board agreed to fund a five-year weed and pest control programme in the Almorah rockforest. This was certainly needed because there was obvious possum-browsing, especially on the kohekohe, and rats would be limiting regeneration by eating many of the seeds. The new gate to the private property 'Almorah Glade' (69 Almorah Road) now excludes public access into the publically-owned best piece of rock-forest (not that I'm advocating for mass-visitation to this sensitive area). Sadly the "tidied-up" entrance to 'Almorah Glade' is a large bed of exotic Clivia miniata (Fig. 16).

Other visits

After the July 2014 visit, other visits by the author to these Mt Eden rock-forests included: 1 Aug 2014 to the Rannoch Sculpture Forest (0.4 ha) contiguous with the Almorah Road reserve; 7 Dec 2014 the rockforest at Government House grounds for two hours during an open day; 4 May 2016 Almorah rock-forest with the NZ Geographic reporter and photographer; 7 Sep 2018 the plaque unveiling at Withiel Thomas Reserve; and 20 Oct 2018 Almorah Forest to take some photographs.

Rannoch Sculpture Forest (0.4 ha)

The author visited the largest privately owned piece of Mt Eden rock-forest, Rannoch Sculpture Forest, on 1 August 2014. The area is contiguous with the Almorah reserve (0.63 ha) and there is no boundary marking between them – both areas are in contiguous native rock-forest. Apart from the house (Rannoch), driveway and clivias (*Clivia miniata*), the main difference between the Almorah Road property and Rannoch Forest is the presence of large sculptures scattered through the bush (see Wilcox 2012: 37, Wilkins 2016, Fig. 17).

The canopy of Rannoch Forest was dominated by titoki, mahoe, karaka and pigeonwood; also noted were mangeao, kohekohe, puriri, ngaio (×1), and a single large pohutukawa hybrid (*Metrosideros excelsa* × *M. robusta*) (see Table 2 for measurements of a selection of large canopy trees). One mangeao in the Almorah forest was a particularly impressive tree (Fig. 18). Cranwell (1981: 13) reported mangeao here as up to 1 m thick. The subcanopy and shrub layer was dominated by

Table	2:	Selected	measurements	of large	canopy	trees	present	in F	Rannoch	Forest.	1
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Tree species	DBH (cm)	Approx. height (m)	Comments
mangeao	88.4	24	Near margin of long driveway (S end of property); some rot down one side; trunk unbranched for 7m (Fig. 18)
mangeao	70.4		Below the long driveway (E side); healthy
puriri	63.2		Between house and Almorah Road
Hybrid pohutukawa × rata	60.0		Canopy tree in gully SE of long driveway; only 1 seen
karaka	52.9	16	
titoki	52.4		
titoki	50.2	18	In gully to SE of long driveway; with 7m-straight trunk
pigeonwood	38.8	15	

¹ = measured by the author on 1 Aug 2014

kawakawa and coastal karamu; hangehange was locally present; and nikau (trunkless) and houpara were scarce. The commonest plants covering the rocky ground were ferns: *Asplenium lamprophyllum, A. oblongifolium* (both locally common), and locally large king ferns (*Ptisana salicina*). On a rock wall *Pellaea falcata* (×2) and *Asplenium flaccidum* (×1) were present. The only epiphyte observed was *Pyrrosia elaeagnifolia* in a kohekohe; it was also locally common on the rocky ground where there was more light. No tree ferns or conifers were present, but bryophytes and lichens were common (Fig. 3).

The forest appeared to be weeded to some extent, there being no obvious weed problem. There was a scattering of wandering Jew, a patch of Plectranthus ciliatus, a single 4 m-tall Euonymus japonicus, Acanthus mollis, fruit salad plant, and a Madeira vine (Anredera cordifolia) locally on the boundary of Almorah Road. My main concern was the abundance of clivias that had been planted and were looking very at home in the shade, setting seed and starting to spread (Fig. 19). Hearteningly, the owner of the property, Sir James Wallace, has said (Wilkins 2016: 93): "Fallen trees and branches are cleared from around the sculptures, but other than possum trapping and removal of weeds, the remainder of the forest is left to itself.". However, in October 2018 one of the canopy kohekohe looked severely possumbrowsed.

Unveiling of the plaque at Withiel Thomas Reserve

By the invitation of the chair of the Albert-Eden Board, Peter Haynes, the author attended the unveiling of the Council plaque for Withiel Thomas Reserve on Withiel Drive, on 7 September 2018. The attendance was small but included six descendants of Prof Sir Algernon Phillips Withiel Thomas (Fig. 20), Albert-Eden Board representatives, Sandra Coney, a representative from Epsom Girls Grammar School, Mick Clout representing the Science Faculty of the University of Auckland and Sel Arbuckle.



Fig. 18. Possibly the largest mangeao on the Auckland isthmus, unbranched trunk for 7 m (c.24 m tall; 88.4 cm DBH) in the Rannoch Sculpture Forest. Photo: EKC, 1 Aug 2014.



Fig. 19. *Clivia miniata* planted and naturalising in Rannoch forest. The gnarly tree (centre-right) is a ngaio. Photo: EKC, 1 Aug 2014.



Fig. 20. Unveiling of the Council's new interpretative sign for Withiel Thomas Reserve. Three generations of Prof Thomas's family were present (left to right): Peter Thomas (grandson), Fiona Thompson (granddaughter), Christopher Thompson (great grandson), Katherine Ward (great granddaughter) and Sienna and Emilia Ward (great great granddaughters). Photo: Sandra Coney, 7 Sep 2018.

Prof Thomas's granddaughter, Fiona Thompson, was the only one present who actually remembered Thomas. Fiona's son, Christopher Thompson, spoke and mentioned that the property was bare, apart from some macrocarpas (Cupressus macrocarpa), when Thomas purchased the land in 1890 and that Thomas had landscaped and planted the area. He later kindly sent me a couple of historic images from the family collection, believed to have been taken by Prof Thomas, showing the land to be rather bare (Figs. 21, 22). There was also mention from the Thomas descendants of his love of hybridising daffodils (Narcissus spp.), and a few living examples with numerous perianth-lobes were brought to the unveiling. The fact that the area was planted and landscaped by Thomas explains the low number of micro-land snails that Jim Gouldstone found in Withiel Thomas Reserve; also, the puka is terrestrial in the reserve, indicating that they had established in the open (see Cameron 1999a). Esler, too, noted "...the planting in the case of Withiel Thomas Park." (Esler 2004: 49).

Christopher Thompson also answered my query of why the reserve was called 'Withiel Thomas', when Prof Thomas's first name was Algernon: "I think my grandfather Norman, who actually gifted the reserve to the ACC in 1948, was disinclined to see the name Withiel alienated from the property; it had been known as 'Trewithiel' (i.e. from Cornish meaning gathering place of the Withiels, which, in turn means hill of wooded trees) since 1890. The name has long been a family name although it derives from APW Thomas' grandmother's surname and presumably her family originated in the eponymous Cornish village. The villagers of Withiel are quite proud of the connection; they have hung his framed photograph in the porch of their church.".



Fig. 21. Prof Thomas's wife, Emily, digging around the base of what looks like a toppled macrocarpa (child unidentified). Photo: c.1891 most likely by Prof Thomas, from the Sir George Grey Special Collections, Auckland Libraries, 201-60 (or 210-63).



Fig. 22. Prof Thomas's property. Three men making a path? Photo: c.1891 most likely by Prof Thomas, from the Sir George Grey Special Collections, Auckland Libraries, 201-60 (or 210-63).

Conclusions

It was wonderful that the tree privets have been removed from the Almorah forest and the slope to the on-ramp replanted in suitable species. The Council's Special Ecological Area offers some hope that the forest won't be further fragmented. All three areas are now being better managed for weeds and mammalian pests, but the housing development at the Almorah forest may significantly diminish the footprint of the largest remaining rock-forest remnant. If it is going to survive, every opportunity must be taken, where possible, to increase the footprint of this fragmented, threatened forest type.

The importance of the Mt Eden rock-forest becomes apparent when you realise the fate of other rock-forest areas in Auckland: Mt Wellington/Penrose (Cranwell 1981) and Western Springs have all been consumed by urbanisation (Wilkins 2016). Rhys Gardner (2007: 76) described two rock-forest areas at Meola Creek: "...although they are of no great age or diversity they deserve better treatment" and Gardner and de Lange (2008) described a tree privet rock-forest at the mouth of Oakley Creek rich in bryophytes.

Forest ecologist Peter Bellingham informs me (pers. comm.) that the best rock-forest (basalt boulder field) that he has seen is the privately owned Jack's Bush in Northland, c.12 km east of Kaikohe, which has lush ferns and no weeds. The main forest species present here were described by Rawlings (1971) when reporting a Peperomia tetraphylla that he found there. Most of the species are the main ones present in the Auckland rock-forests. However, there are also several which have not been recorded Auckland forests, including: the Adiantum in bulbiferum, hispidulum, Asplenium Dicksonia squarrosa, Notogrammitis sp. (as Grammitis billardierei - not collected), Fuchsia excorticata, Rhabdothamnus solandri and Urtica ferox. The notes of а herbarium collection of Hymenophyllum flexuosum from Jack's Bush gives a feel for the forest: "Locally abundant creeping over basalt boulders in deep shade in puriri / kohekohe forest over a basalt boulder field; with abundant Asplenium tenella" *lamprophyllum* and Arthropteris (PJ Bellingham 587, 3 Jun 1993, AK 212523).

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Appendix 1: Participants of the 19 July 2014 field trip to the rock-forests

A total of 68 people attended the field trip: *Sel Arbuckle, Chris Ashton, Alice Baranyovits* (at Withiel Thomas), *Hugo Baynes, Jessica & Rosemary Beever, Dan Blanchon, Colleen & Warren Brewer, Jan Butcher, Bruce Calvert, Ewen Cameron* (leader), *Esther Dale, Gabriel Daniels, Neil Davies, Frances Duff, Frank & Mary Frazer, April Glenday, Justin Gohdes, Sharen Graham, Leslie Haines, Peter Hutton, Mike Hynard, Graeme Jane, Clint Jensen* (Bark Ltd), *Wendy John, John Lambert, Mei Nee Lee, Miriam Ludbrook, Richard Mairs, Christine Major, Melissa Marler, Tim Martin, John Millett, Philip & Terry Moll, Michelle Moloney, Carol & Garry McSweeney, Helen Nicholson, Stephanie Parkes, Gordon Perry, Helen Preston Jones, Dhahara Ranatunga, Juliet Richmond, Leigh Rumney, Anna Ryken, Joshua Salter, Doug Sheppard, Bryony Smart, Vijay Soma, Adrienne Stanton, David Stejskal, Claire Stevens, Cheryl Taylor, Merje Toome, Lenka Trefulkova, Charlie Truell, Liz Walker, Eugene Wong Doe* (at Almorah Road), *Julia Watson, Mike Wilcox, Tony Williams, David Wilson, Sarah Wyse, Angelina Young, Maureen Young.*

Appendix 2: Additions to the Mt Eden Rock-Forest Species List of Cameron (1999a).

c = common; l = local; o = occasional; s = scarce (< 5 plants seen) AF = Almorah Forest; WT = Withiel Thomas Reserve

Plant name	Plant group	Almorah (Goodfellow) & Rannoch	Withiel Thomas	Govt. House	AK voucher	Date of observation
Hymenophyllum flexuosum	fern	S ¹			295473 371040	May 1954 Jun 2018
Pellaea falcata	fern	S			353466	17 Aug 2014
Clerodendrum trichotomum *	dicot	S			357121	Mar 2015
<i>Cyphomandra betacea</i> (tamarillo) *	dicot		S			19 Jul 2014
Griselinia lucida	dicot	S				2000
<i>Mackaya bella</i> (forest bell bush) *	dicot		I		353873	19 Jul 2014
Archontophoenix cunninghamiana (Bangalow palm) *	monocot		S			Jul 2001 (AF) 19 Jul 2014 (WT)
<i>Clivia miniata</i> (clivia)	monocot	lc			353609	1 Aug 2014
Fissidens taxifolius *	moss			0		19 Jul 2014
Leptostomum macrocarpon	moss			I	355532	19 Jul 2014
Plagiomnium novae-zelandiae	moss	lc			353468	1 Aug 2014
Thuidium sparsum	moss	I			353468	1 Aug 2014
Rhynchostegium tenuifolium	moss	I			353468	1 Aug 2014
Frullania fugax	liv erw ort	о			353470	1 Aug 2014
Frullania spinifex	liv erw ort	lc			353467	1 Aug 2014
<i>Lejeunea</i> cf. <i>flava</i>	liv erw ort	0			353469	1 Aug 2014
Porina exocha	lichen	lc				1 Aug 2014

 1 = confirms the earlier literature record of Wall & Cranwell (1936)

A northern range extension for *Hymenophyllum bivalve*, Kaiwaka, Northland

Jack Warden

On the 14 May 2018 the Auckland Botanical Society (ABS) descended on the Worsfold and Wright Farm just outside of the village of Kaiwaka, Northland. It was an amazing day with a great turn-out of people. Heath Worsfold, one of the landowners, gave us an in-depth history of the local area and his family.

The day was spent exploring the bush remnants known under the Natural Areas of Rodney Ecological District (Northland Conservancy) as the Kaiwaka – Mangawhai Road bush remnants (Goldwater, et al. 2012). A full detailed list of the flora of the bush remnants is currently being updated and will be published later, to capture some of the species that will appear as the seasons change. The bush area is significant because the Worsfold and Wright families had the foresight to protect patches of bush from the ever-hungry herds of cattle they run. Compared to many of the identified Natural Areas in the district, it is always a bonus to have a bush area with an undisturbed array of ground tier species.

Although the bush area has been fenced for some time, the signs of past activities from Maori excavations, shell midden, old felled kauri (*Agathis australis*) stumps and old decaying fence lines cannot be overlooked. The bush area in a generalised sense consists of kauri – podocarp – broadleaved forest with kauri and associated podocarps dominating the