

Botanical notes on Oakley Creek, Mt Albert/Avondale

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Introduction

Oakley Creek is the longest waterway on the Auckland isthmus. Its main branch rises on the slopes of Hillsborough and enlarges in the low ground of Hay Park and the Akaranga Golf Course. Running westwards from here it joins with a slightly shorter branch from the south side of Mt Roskill, then makes a succession of short curves along the edge of an old, valley-filling, basaltic flow from Mt Albert. It then leaves the basalt to enter the sandstone of the Waterview ridge, where it runs northwards for nearly a kilometre, to enter a narrow tidal inlet at the place where the Northwestern Motorway begins (Figs. 1, 2).

To a first approximation, that is, by measurement of its course on the 1:50,000 geological map (Kermode 1992), Oakley Creek is approximately 15 km long. It is channelled and culverted in its upper two thirds, until New North Road is reached; from there, except for a few lengths of walling and rip-rap, it runs freely. Its catchment area is c. 12 sq. km.

A few years ago, as one of Transit NZ's "Waterview Connection" ecologists, I investigated two sections of the route proposed for the new motorway: the upper part of Oakley Creek between Mt Roskill and the New North Road, and the creek's tidal mouth. These were not without interest (see respectively Appendix 1, Note 1, and Gardner & de Lange 2008). It had been obvious though that the intervening "Lower Oakley Creek", from New North Road down to the sea, was much more valuable, and a decision was therefore made to tunnel underneath it. This made a botanical assessment unnecessary.

My interest in "Lower Oakley Creek" revived after Peter de Lange told me of the bryological finds he had been making here (Appendix 1, Note 2). I also became aware that the European history of the area was very well-documented indeed, a boon for ecologists and other decipherers of the made landscape (Appendix 1, Notes 3 & 4).

I had hoped to write about all of this part of the creek but now find it expedient to concentrate on

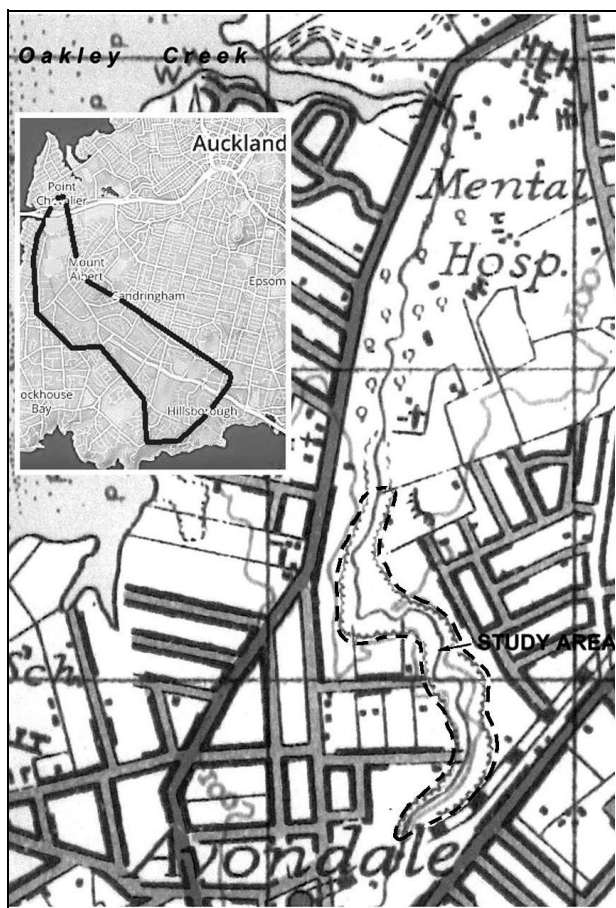


Fig. 1. Study area (dashed line) and catchment area (inset). Based on "N42 Auckland" 1st ed. 1946; grid of 1 km squares.

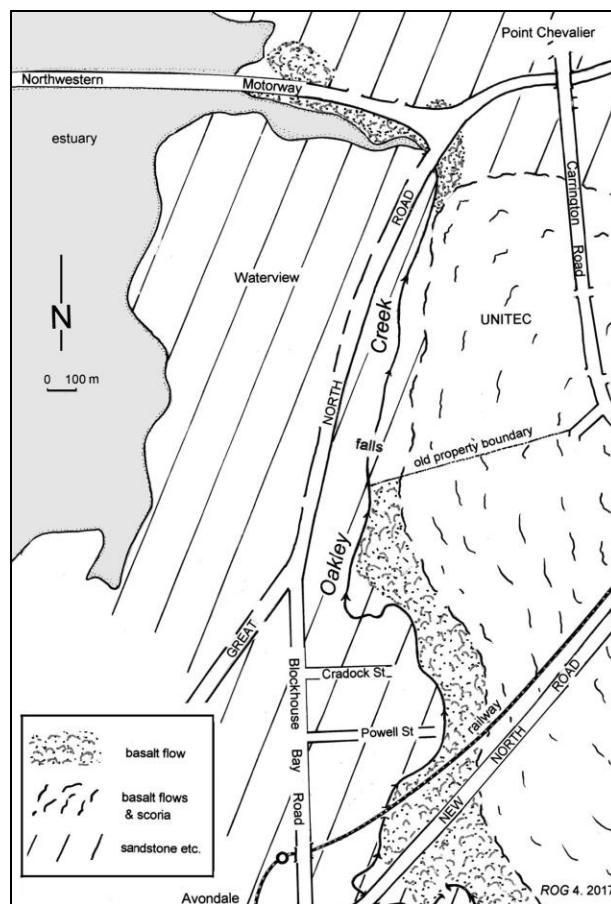


Fig. 2. Geological setting of lower Oakley Creek (based on "Geology of the Auckland urban Area, 1:50,000" (Kermode 1992).

just some of it. So my study area here takes in Oakley Creek ("the stream", see Appendix 1, Note 3) from the railway north to the old boundary of what used to be Mental Asylum land and is now mostly the campus of the Unitec Institute of Technology. I have omitted the difficult-to-access portion of the Creek between New North Road and the railway — a brief scramble there turned up nothing very special.

Some more history and topography

The railway line (which opened in 1880) and the Unitec boundary are 1 km apart but because the stream curves and meanders its actual course measures nearly double that. In times of heavy rain, as in the storms of March 2017, it overflows its banks considerably, and so a fair proportion of it is flanked by alluvial flood-level terraces several metres wide (to c. 20 m wide at the foot of Powell Street). But in three places — near the railway, at the large bends at the southwest corner of the Phyllis Reserve, and at the northern end of this reserve — the stream is quite confined, generally between basalt on the east and sandstone on the west.

The ground on the western (Avondale) side of the stream rises up towards the broad "Waterview ridge" on which Great North Road is situated, its highest part (c. 40 m a.s.l.) here being in the vicinity of Cradock and Powell Streets. These sandstone-underlain slopes are relatively long, damp and shaded. They face out over the shorter basaltic slopes on the eastern side of the creek and the uniformly low (c. 25 m a.s.l.) and nearly level volcanic ground beyond (including the Unitec campus).

In the late 19th C. both sides of the stream were in farms and smallholdings. Then, in 1903, the western properties were developed into Cradock Hamlet, one of several in the Avondale district that would provide affordable homes for working-folk. This subdivision was done right down to the stream edge, without any esplanade strip to act as a bush reserve. The eastern side of the stream remained in larger blocks, and after WW II most of it was reserved for quarry purposes. Quarrying in the 1940s and '50s removed nearly all the vegetation on the slopes immediately above the stream. The quarried land north of Springfield Avenue then became a municipal rubbish tip, and on parts of the slopes down to the stream edge today one can see familiarly-shaped bottles and rusty objects (but no plastic bags) poking out of a clay cover-deposit. Further south, the quarried slopes have had basalt boulders and clay pushed down over them.

This quarried, tipped-onto and re-contoured land then became the Phyllis and Harbutt Reserves: playing fields, grassed playgrounds for dogs and rabbits, restoration plantings, and natural areas of weedy scrub and woodland.

Vegetation

Some general remarks here precede an account of the habitats and their plant-communities. The location of these communities is shown in Fig. 3. See Appendix 2 for a species list for the area.

As noted already, the vegetation along the western side of the stream is discontinuous, varied, and largely exotic in composition: lawns, gardens, scrub, and "overgrown woodland", that is, plantings of exotic trees that are accumulating weeds and a few self-sown native species. Recent subdivision has provided some esplanade strips but as yet there is no continuous streamside access. For this reason I say little about the western side's vegetation, except to indicate three places where native species are conspicuous.

The eastern side of the stream, with its more unified history, has relatively extensive and homogeneous plant-communities. But, as Fig. 3 shows, some of the differences from place to place along the higher ground are due to the bush-gardening activities by the Friends of Oakley Creek and other community groups, who for more than a decade have been felling weed-trees, hand-weeding and herbiciding, killing pests, and enriching with a diversity of native plants.

This restoration of the slopes has proceeded in a patchwork way rather than along a "rolling front" and is still very incomplete. But the alluvial terraces are now more or less fully planted with native shrubs and trees, e.g. *Dacrycarpus dacrydioides* and *Syzygium maire* 3 m tall and 5 cm dbh, and also with substantial numbers of *Cortaderia fulvida*, *Cyperus ustulatus*, *Carex virgata* and *Phormium tenax*.

There are some older areas of native plantings too, mainly along the upper edges of the slopes of the two reserves. They would have been done by the Auckland City Council some time after the land had been re-contoured. Ngaio (*Myoporum laetum*) and taupata (*Coprosma repens*), both very tolerant of drought and difficult soils, are doing well on the steep hard clay slope that seals the edge of the former tip at what is now the Phyllis Reserve, while karo (*Pittosporum crassifolium*) is flourishing on the looser volcanic soils of the corresponding slope at the Harbutt Reserve.

Large native streamside trees such as cabbage tree (*Cordyline australis*), totara (*Podocarpus totara*) and kowhai (*Sophora* sp.) are lacking, with the exception of a fine stand of kanuka (*Kunzea robusta*) at one place. Mahoe (*Melicytus ramiflorus*) and ponga tree-fern (*Cyathea dealbata*) dominate the places with the best representation of native species.

The exotic trees of the study area are rather undistinguished too. There are no old planes (*Platanus × acerifolia*) or English oaks (*Quercus*

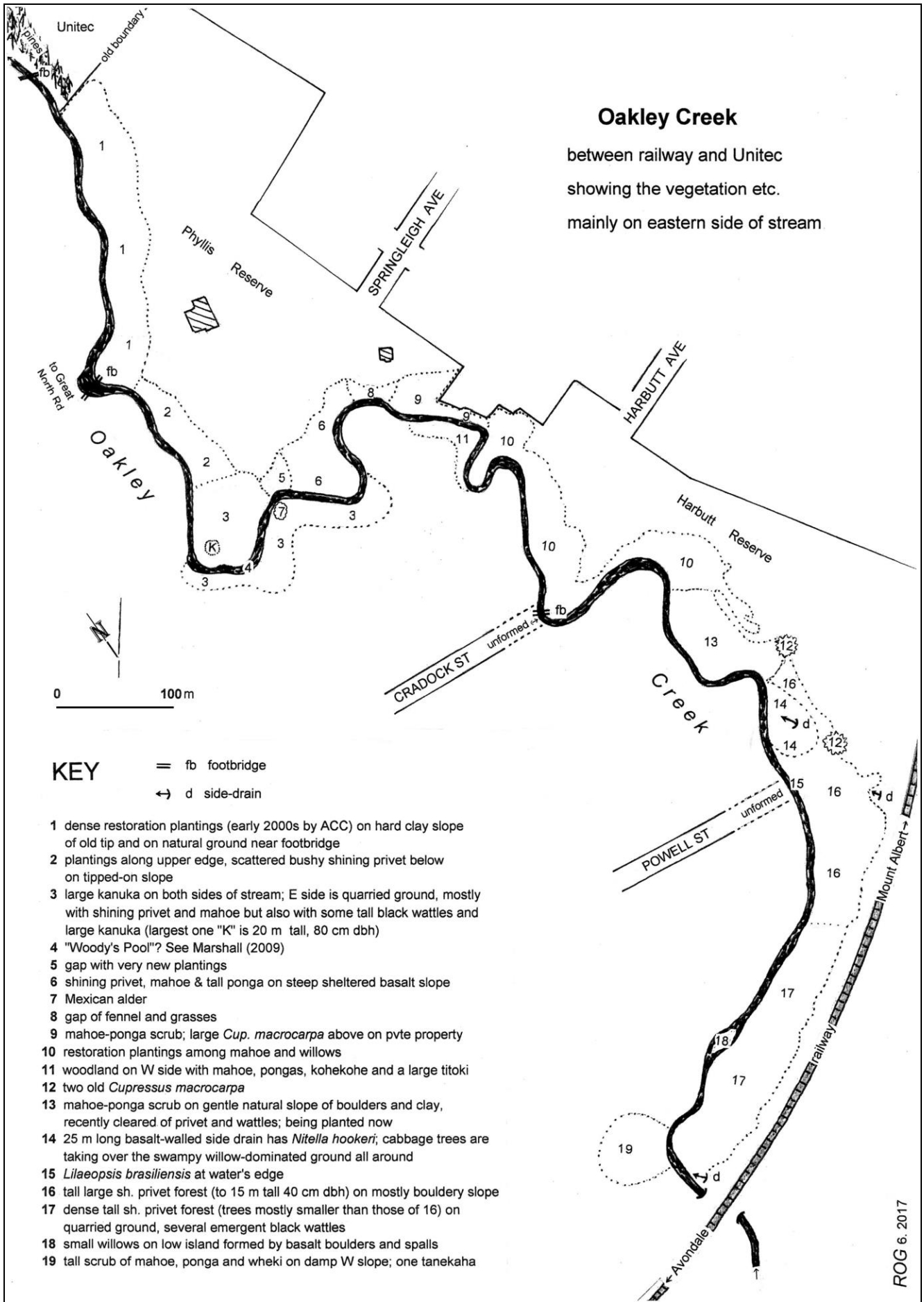


Fig. 3. Vegetation and other topographical features. Drawn by ROG, Jun 2017.

robur) as there are further downstream. There are however a considerable number of big old crack willow trees (*Salix fragilis*), some of them hollow or fallen. Most are c. 15 m tall and 50–100 cm dbh. I presume that they are old plantings, because they grow up on the slopes as well as near the stream. For some reason they have not proved competent parents — only one place (**18** on Fig. 3) now has a cover of small willows. Oddly, the old boundary with the Mental Asylum Land (Unitec) seems never to have had substantial trees along it.

Just beyond the south-west corner of the Phyllis Reserve, at the water's edge (**7** on Fig. 3; Fig. 4) there is a good-sized *Alnus acuminata* (Mexican alder), a species uncommon in Auckland. This tree must owe its perfect situation to some intelligent plants person of former years. There are also two very large old *Cupressus macrocarpa* trees at the top of the slope towards the southern end of the Harbutt Reserve (**12** on Fig. 3) that must be relics of farming days here.

The removal of the area's large old black wattles (*Acacia mearnsii*) is probably necessary but mention should be made of their historical interest. That is, in the mid-1860s Benjamin Gittos established a tannery alongside the stream, just beyond where the railway line now runs; our wattles can be supposed to be the offspring of plants that came up from seed mixed in with tan-bark imported from Australia.

1. Plants of the stream, stream-banks, and flood-level terraces

Typically, the stream runs steadily to quite swiftly between sandy-clay alluvial banks a metre or so high and c. 3–4 m apart. At several places basaltic rubble covers the stream bed and produces shallow rapids, but over the larger proportion of the stream's course the normal water-depth in summer is 20–50 cm.

Wherever the stream is relatively slow-flowing and sun-lit, e.g., south of the Cradock St footbridge, the waterweed *Egeria densa* makes thick floating growths. It can grow in swifter water too (if there is

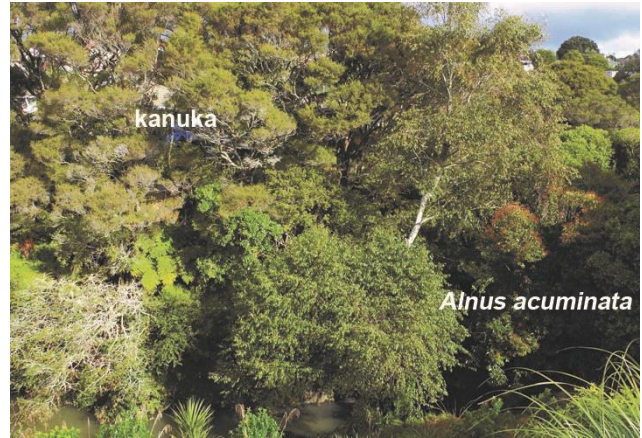


Fig. 4. View from south-west corner of Phyllis Reserve playing fields, looking across to stream's western side and its band of tall kanuka (*Kunzea robusta*) above a single streamside *Alnus acuminata* (foliage at left of label). Photo: 12 Jul 2017. All photos by ROG.

sufficient sun), each plant anchored by a bunch of wiry roots that pass through the rocks, silt and gravel and into the clay below (Fig. 5). The torrents of water that came down the stream during the March 2017 storms have temporarily reduced this plant's abundance — at various places now (May 2017), just below water level, one can see bare clay ledges densely penetrated by the roots of the former *Egeria* cover.

Potamogeton crispus is rather infrequent. The only other aquatic plant seen was the charophyte *Nitella hookeri*, which was abundant in the shaded, steadily flowing water of an old side-drain (**14** on Fig. 3) and under the Cradock St footbridge.

More or less at water-level, on stable ledges of clay, silty grit, sandstone or massed willow roots, there are growths of *Hydrocotyle tripartita*, *Callitriche stagnalis*, *Isolepis* sp. or spp., and locally, the distinctively pale-green, semi-circular patches of the aquatic liverwort *Riccia fluitans*. Around the foot of Powell Street these are being replaced by a turf of the adventive herb *Lilaeopsis brasiliensis* (Apiaceae), an aquarium plant newly escaped in New Zealand (**15** on Fig. 3; Fig. 6; Appendix 1, Note 5).

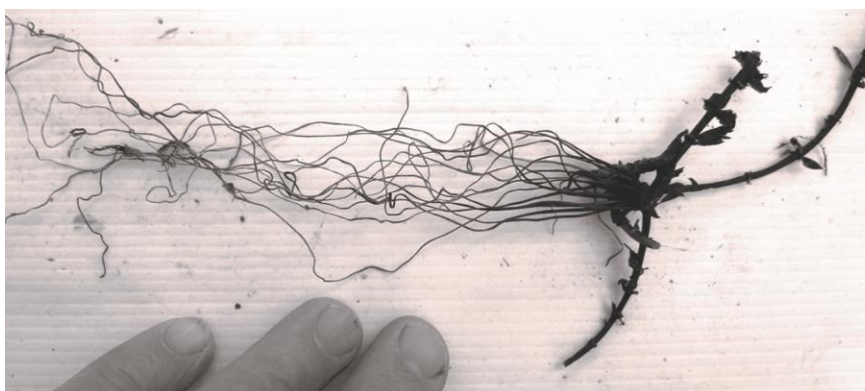


Fig. 5. *Egeria densa* showing its roots. From colony on rock/gravel streambed near railway. Photo: 15 May 2017.



Fig. 6. Turf of *Lilaeopsis brasiliensis*. at foot of Powell Street. Photo: 7 Mar 2017.

Along sunny edges of the stream there may be narrow bands of alligator weed (*Alternanthera philoxeroides*), water pepper (*Persicaria hydropiper*), and *Veronica anagallis-aquatica*. All were much reduced in abundance by the bank-stripping flows of March 2017. Watercress (*Nasturtium officinale*) and water celery (*Apium nodiflorum*) are present but do not form tall growths anywhere.

The upper sides and lip of the stream-banks are generally covered with adventive herbs and grasses. The weedy ferns *Deparia petersenii* and *Diplazium australe* are plentiful too, much more so than *Blechnum chambersii* and *B. novae-zelandiae*, which occur mainly on shaded stable sandstone banks on the western side of the stream. *Blechnum squarrosum* is locally common, as is *Adiantum raddianum* (neither species was seen further upslope). *Juncus effusus* and another leafless rush (*J. sarophorus* ?) occur locally, with the latter not being seen other than along the stream-banks, usually right at the water's edge.

Relatively dry open places on the flood-level terraces are largely covered by weedy herbs like *Ranunculus repens* and *Allium triquetrum* and by grasses and sedges, but *Haloragis erecta* is locally abundant, apparently coming up from seed after clearance with herbicide. The coarse grass *Setaria palmifolia* is increasing greatly in several places. Wetter places are also weed-dominated at the moment, but *Tradescantia fluminensis* and *Selaginella kraussiana* are rather infrequent. Ginger (*Hedychium gardnerianum*) has been knocked back with herbicide but zombie rhizomes still lurk near the foot of Powell Street. Around the large willows of the flooded ground groves of cabbage trees are developing.

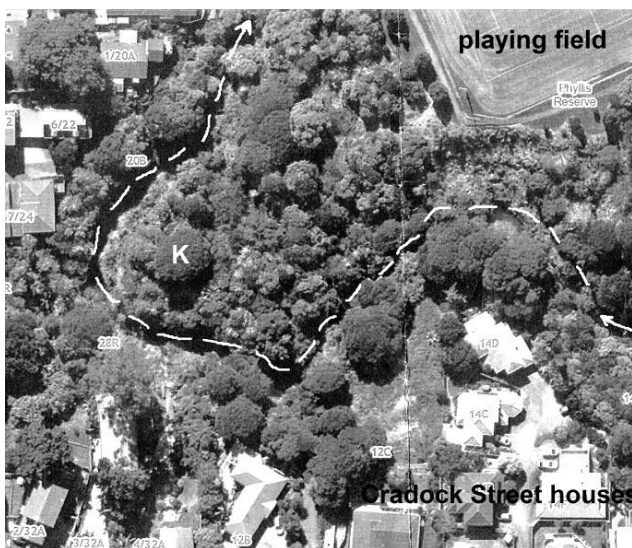


Fig. 7. Oakley Creek (course dashed) at the SW corner of Phyllis St Reserve, showing location (K) of the largest kanuka here. Based on Auckland Council's GeoMaps current 1:2500 colour aerial image.

The flood-resistant native sedge *Carex geminata* agg. is present only locally. Possibly the rather sandy nature of the alluvium being deposited here makes these terraces too dry in summer to be favourable for the species (cf. at Meola Creek, where this plant is abundant under willow, on wet dark-coloured silty clay).

As noted above, these terrace habitats have now been augmented with native plantings. The floods of March 2017 pushed over a good few of these, and left crescents of debris around the toetoe, flax and *Cyperus ustulatus*. This mulch will serve to keep the weeds down, but the great amount of plastic rubbish in it makes one hope that eventually some kind of screening-device will be installed upstream.

2. Vegetation of the slopes

A. The western slopes

Much of the ground west above the stream, below the houses and their gardens, carries scrub (often largely of Chinese privet, *Ligustrum sinense*) and woodland (including boundary plantings of *Cupressus macrocarpa*, etc.). Moderately large trees of shining privet (*Ligustrum lucidum*) have usually come to dominate the older woodland stands. There are several streamside strips of native scrub, mainly of mahoe and ponga but with a few groups of wheki tree-fern, *Dicksonia squarrosa*. Mamaku tree-fern (*Cyathea medullaris*) is infrequent; nowhere does it form tall groups, no rare juveniles conspicuous anywhere.

The western side's best feature is the stand of twenty or so good-sized kanuka (*Kunzea robusta*, typically c. 15 m tall and 30–50 cm dbh) at the rear of the house sections beyond the northeast end of Cradock Street (**3** on Fig. 3; Figs. 4, 7). They face across to the rather more scattered but similar-sized kanuka among the tall shining privet on the tongues of basaltic ground on the eastern side. Kanuka is regenerating all around here in open places, most conspicuously along the sandstone stream-banks.

Two other sites on the western slopes can be mentioned. One of these, a shaded piece of scrub close to the railway (**19** on Fig. 3), has a healthy 40 year-old tanekaha (*Phyllocladus trichomanoides*) emerging above its mahoe and ponga. The second is located immediately downstream of the tight meander at the northern end of the Harbutt Reserve (**11** on Fig. 3). Here a strip of old woodland (including some large streamside *Casuarina cunninghamiana* trees) contains an abundance of ponga, several oldish mahoe, the study area's largest titoki, and at least two well-grown though probably quite young kohekohe (*Dysoxylum spectabile*) trees. The latter are accompanied by a great number of juveniles close by, wherever the ponga litter is not too dense.

B. The eastern slopes

Here perhaps all of the original ground has been modified by quarrying or re-contouring. At the large bends on the south-west corner of the Phyllis Reserve (**3** & **6** on Fig. 3) there are areas that appear just as quarrying left them. There are spreads of boulders, short vertical rock faces, low walling, expanses of level ground, and low heaps of spalls or rock waste (Fig. 8). Even in these very dry places shining privet, along with a lesser amount of black wattle and mahoe, has managed to grow surprisingly well (some privet canopy trees make nearly a centimetre of diameter growth each year; Fig. 9). However, the ponga tree-ferns here are found mainly in hollows where soil has accumulated, or on the deeper finer debris of the short steep slopes down to the stream. Kanuka (the "white teatree" of Marshall 2009) has a scattered occurrence, but the biggest tree here, of 80 cm dbh and perhaps nearly 20 m tall, must be one of the largest on the Auckland isthmus.

The best area of tall mahoe-ponga scrub (which almost deserves to be called "rock forest" except that no large native trees occur in it) lies mid-way along the Harbutt Reserve, on a gentle slope of boulders and clay (**13** on Fig. 3). As usual in the study area the mahoe at this place are mostly multi-trunked individuals 4–7 m tall. They are accompanied in the canopy by ponga tree-ferns (3–5 m tall) and by a lesser amount of fairly young but fertile individuals of *Myrsine australis* and *Hedycarya arborea*. Surprisingly, *Coprosma macrocarpa* var. *minor* is present just as small individuals (to c. 3 m tall and 5 cm dbh) and not as a canopy tree. *Coprosma robusta* occurs plentifully in gaps and along the margins.

Except for kawakawa (*Piper excelsum*) native understorey plants, including saplings of tree species, are rather infrequent. The two species of privet are not regenerating to any great degree. The ground-layer sedges and grasses are rather poorly represented, mainly by just a few tussocks of *Carex lambertiana* and *C. solandri*. The most abundant fern by far is *Pteris tremula* but its total cover too is very slight.

Further south from that area, from opposite the end of Powell Street to the railway line (**16** & **17** on Fig. 3), the sloping ground consists of quarried, clay-covered ledges and slopes or of boulders alone. This area has not been restored yet and, especially, close to the stream, carries numerous large shining privet trees (to c. 15 m tall and 40 cm dbh). There is a light understorey of Chinese privet and native trees and shrubs, mainly *Myrsine australis* and *Hedycarya arborea*. Close to the railway at one place there are still a few big old black wattles but younger plants are lacking. Until recently *Asparagus scandens* was abundant right through this area; now, after a

comprehensive herbiciding, only a few plants are showing signs of regrowth.

Indication of the areas that have been restored with native plants is given in Fig. 3. The older plantings, done by Auckland City Council, favoured reliability (ngaio, taupata, cabbage tree, *Pittosporum crassifolium*, *P. eugenoides* and *P. tenuifolium*, *Metrosideros excelsa*). The more recent plantings are much more varied and include nurse species such as kanuka (*Kunzea* sp. or spp.), *Coprosma robusta* and mahoe but with a good representation too of rock-forest trees like titoki and kohekohe. Scattered within the scrub areas (not just on their upper edges) there are native trees which from their size must have been planted more than twenty years ago: they include nikau (*Rhopalostylis sapida*), lacebark (*Hoheria populnea* and *H. sexstylosa*), ribbonwood (*Plagianthus regius*), and rimu (*Dacrydium cupressinum*), and possibly kohekohe, titoki and puriri (*Vitex lucens*).



Fig. 8. Low heap of basalt spalls, out of which grows a large *Ligustrum sinense*. On floor of old quarry near stream at SW corner of Phyllis Reserve. Photo: 30 Aug 2017.

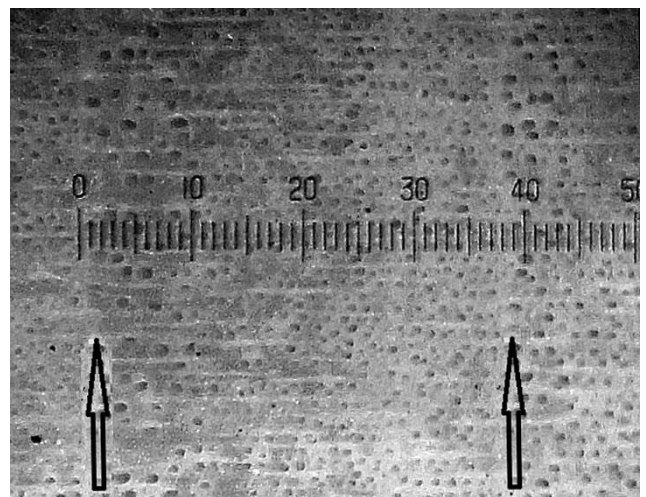


Fig. 9. Core of a canopy *Ligustrum lucidum* of c. 25 cm dbh, making annual diameter increase of c. 0.5 cm per year (10 graticule units = 0.625 mm, so this growth ring is approx. 2.5 mm thick). Growth towards right of photo. Start of annual rings (arrowed) marked by vessels of larger diameter. Location as for Fig. 8. Photo: 28 Jun 2017.

References

- Gardner, R.; de Lange, P. 2008: Rock-forest at the mouth of Oakley Creek, Auckland. *Auckland Botanical Society Journal* 63: 48–49.
- Hall, K.; Wilcox, M.; John, W. 2009: Oakley Creek Te Auaunga, Waterview. *Auckland Botanical Society Journal* 64: 123–133.
- Marshall, H. 2009: Completing the motorway and preserving our heritage. *Mount Albert Historical Society Newsletter* 10: 8. [Our country's pre-eminent acoustician, Sir Harold Marshall grew up within earshot of the Phyllis Ave quarrying and tipping].
- Truttman, L. 2010 [subsequently revised]: Edwin Oakley (c. 1824–1886), a mill and a creek. <http://timespanner.blogspot.co.nz/2010/08/edwin-oakley-mill-and-creek.html>

Appendix 1: Notes

- 1 Behind the Stoddard Road industrial area, in patches of boggy ground, there used to be (obs. ROG, 2004) *Epilobium hirtigerum*, *Eleocharis gracilis*, *Hypericum pusillum*, *Myriophyllum propinquum*, and a single old kanuka (*Kunzea ericoides* s.l.) wrapped in *Muehlenbeckia australis*. Further downstream, the walled-in course through Alan Wood Reserve had *Blechnum (Doodia) squarrosum* and the enigmatic *Geranium* "Oakley Creek".
- 2 Several of these bryological finds for the lower part of Oakley Creek, that is, for the section alongside Unitec campus, are noted in Hall et al. (2009). Included is the rare aquatic moss *Fissidens berteroi*, but Peter de Lange has told me (May 2017) that this find of his was actually made several kilometres upstream, near the top end of the Alan Wood Reserve.
- 3 The historical material of this article comes almost entirely from the continuing investigations of local historian Lisa Truttman, with numerous publications in the Avondale–Waterview Historical Journal (since 2001) and its predecessor news-sheets, all accessible on-line (<http://timespanner.blogspot.co.nz>). Those wanting more detail on the historical statements I make should search these articles. See too the evocative description by Marshall (2009) of the study area as it was fifty years ago. The oldest aerial photographs available in Auckland Council's on-line GeoMaps site (2017) (<https://geomapspublic.aucklandcouncil.govt.nz>) were taken in 1940 and are of surprisingly good quality.
- 4 The Maori name for Oakley Creek is Te Auaunga, "stream of swirling waters. The European name, I had vaguely thought, would have come from the old English oak trees (*Quercus robur*) still so conspicuous in the Unitec part of this area. (Some of the biggest oaks, now lost in the making of the new motorway viaduct but still visible on GoogleEarth as of April 2017, stood west of the Great North Road culvert by the tidal inlet, where there once was a flour mill and then a tannery).
But not so: the creek is named for early settler and rather unsuccessful entrepreneur Edwin Oakley (c. 1824–86), who attempted to set up a water-powered flax mill near the waterfall. His letter about this in 1843 to Governor Fitzroy refers to the stream by description rather than by name: his project was to be situated "upon a creek which your Petitioner can describe to your Excellency no better at the present time as situate between four and five miles from Auckland on the Road to the Wao and Karangahape District" (Truttman 2010). Newspaper lists and advertisements show that the name "Oakley (or Oakley's) Creek" was in use at least as early as the 1860s.
And why "Creek" rather than "Stream"? Dictionaries say that the former term once referred just to a narrow and winding tidal inlet. Subsequently (via the transitional term "freshwater creek"!) there came about the usage so prevalent in colonial Australia and New Zealand, that is, its application to any small waterway. I leave the explanation of this trend to linguists and cultural historians. However, it is true that the mouth of Oakley Creek did reach the sea at a narrow and winding inlet, and as an important landing place for goods moved by small boats it seems likely to have been known to every sailor as a "creek".
- 5 When I described this *Lilaeopsis* to Peter de Lange he wondered whether it might be a larger-leaved, inland ecotype of the native *L. novae-zelandiae*. But with the help of Paul Champion (NIWA, Hamilton) we realized that it is actually a freshwater species from the Americas, *L. brasiliensis*. Its leaves are typically 5 cm or so long, and somewhat flattened and obscurely septate; its umbel is 3- or 5-flowered. A voucher specimen is *ROG 11279*, AK 367831; apparently a first record for New Zealand.
In the aquarium trade this turf-former is known by names like "microsword grass" and yes, it is available commercially in New Zealand (thanks, MPI), along with a number of other novel aquatic weeds, e.g., from Stone & Water World in Albany and Mt Wellington, Auckland (stoneworld.co.nz, accessed 21 May 2017).
At Oakley Creek, so far as is known, it presently grows along the water's edge from c. 100 m south of the foot of Powell St to within 200 m or so of the Cradock St footbridge. It might just be dispersing vegetatively here — a plant I have been growing since Feb 2017 produced numerous flowers that summer but no fruit.

Appendix 2: Species list (native higher-plants, based on observations 2015-present)

FERNS	
<i>Adiantum hispidulum</i>	Local on quarried rock faces; uncommon in mahoe scrub (having been swamped by climbing asparagus?); common on shaded sandstone banks on stream's W side, between the two northern foot-bridges.
<i>Asplenium flaccidum</i>	Uncommon epiphyte on ponga tree-ferns.
<i>Asplenium oblongifolium</i>	Uncommon among rocks, and seen once low on a streamside ponga.
<i>Asplenium polyodon</i>	Uncommon epiphyte on ponga.
<i>Blechnum chambersii</i>	Local along shaded sandstone stream banks but not very large or vigorous.
<i>Blechnum novae-zelandiae</i>	Infrequent close to stream's W side; no large colonies.
<i>Blechnum parrisiae (Doodia australis)</i>	Uncommon in mahoe scrub, mainly on vertical faces; also among grasses along the top of stream's banks. Like <i>Adiantum hispidulum</i> , much more common in light woodland N beyond the study area.
<i>Blechnum (Doodia) squarrosum</i>	Locally common near top of stream banks but seldom large or fertile.

<i>Cyathea dealbata</i>	Common on both sides of stream, mainly as adult plants (mostly 3–6 m tall), often in groves just above the inner edge of the flooded zones. Juveniles occur mostly along the stream banks together with the weedy athyroid ferns <i>Deparia petersenii</i> and <i>Diplazium australe</i> (and locally, <i>Pteris cretica</i> and <i>Adiantum raddianum</i>), and are not abundant in any kind of scrub.
<i>Cyathea medullaris</i>	A few dead 5–8 m tall trunks in older scrub on E slopes; just a few tall individuals on the W slopes. Much more common in streamside scrub N beyond the study area, at least to the waterfall.
<i>Dicksonia squarrosa</i>	Locally common in shady seepage areas especially on W side of stream, to c. 5 m tall.
<i>Lastreopsis glabella</i>	Local on the W side of stream in damp exotic woodland and in mahoe-dominated streamside scrub; uncommon as depauperate plants on the streambanks themselves.
<i>Microsorium pustulatum</i>	Uncommon in mahoe rock forest, on rotting logs on the ground and as a low epiphyte at the base of largemulti-trunked shining privet trees.
<i>Paesia scaberula</i>	Seen once, in mahoe scrub.
<i>Pneumatopteris pennigera</i>	Seen on one damp sandstone streambank.
<i>Pteridium esculentum</i>	Local along the upper edge of scrub on both sides of the stream; springing up abundantly in the recently partly cleared piece of mahoe rock forest at the Harbutt Reserve.
<i>Tmesipteris lanceolata</i>	Seen once, on a ponga.
<i>Trichomanes venosum</i>	Seen twice, low on pongas in dense mahoe scrub.

GYMNOSPERMS

<i>Phyllocladus trichomanoides</i>	One young adult c. 10 m tall and 20 cm dbh in the native scrub on W bank close to railway line; ring-coring dates it as c. 40 years old.
<i>Podocarpus totara</i>	Numerous seedlings and saplings (to c. 4 m tall 5 cm dbh) occur close to the stream in the kanuka-dominated areas at the SW corner of the Phyllis Reserve. Elsewhere, a medium-sized tree at the rear of a house above the E bank may be a planting. Hardly regenerating in shining privet stands, but quite often growing under a mahoe canopy (and often appearing to be natural rather than planted).

DICOT TREES & SHRUBS

<i>Alectryon excelsum</i>	Scattered throughout as seedlings and saplings (natural or planted?). Possibly a couple of good-sized trees, in association with large mahoe, are natural to the study area.
<i>Beilschmiedia tarairi</i>	The single streamside tree towards the N end of the study area seems likely to have been planted.
<i>Coprosma macrocarpa</i> subsp. <i>minor</i>	Uncommon; only seen as small young plants.
<i>Coprosma robusta</i>	Abundant in disturbed scrubby waste, at the edges of privet scrub along the streamside, and in restoration plantings.
<i>Corynocarpus laevigatus</i>	A number of scattered smallish trees (none larger than c. 20 cm dbh); regenerating locally.
<i>Dysoxylum spectabile</i>	Several smallish trees (to c. 10 m tall 20 cm dbh) each side of the stream near the footbridge between Phyllis Reserve and Great North Road. The ones on the W bank here are surrounded by seedlings but throughout this piece of exotic woodland hardly any are reaching sapling size. Elsewhere in the study area kohekohe seems likely to occur mainly as restoration-plantings.
<i>Geniostoma ligustrifolium</i>	Uncommon in mahoe and privet scrub; no old individuals seen.
<i>Hedycarya arborea</i>	Locally common as young plants (to c. 5(-8) m tall) in mahoe scrub, and in tall shining privet scrub near railway; no large trees seen, but some are fertile and saplings are quite common throughout (what disperses the fruit?).
<i>Hoheria populnea</i>	Several planted trees of considerable size occur throughout the area and are regenerating lightly.
<i>Kunzea robusta</i>	Conspicuous on both sides of the creek near the central-southern part of Phyllis Reserve, where two tongues of basalt run down to the creek, and across the stream from here, between it and the Cradock St houses. Mostly seen as large healthy good-sized trees; regenerating only to a slight extent. On the western side of the stream, most of the twenty or so larger trees are c. 15 m tall and 25–50 cm dbh and there is at least one stand of close-spaced younger plants. On the eastern side the large trees are fewer and scattered. Elsewhere in the study area the species (or similar taxa) occur only as plantings.
<i>Leptospermum scoparium</i>	One old dead tree seen in association with the Phyllis Reserve kanuka, on the E side of the stream; possibly a planting.
<i>Myrsine australis</i>	Throughout the basaltic scrub areas as seedlings and saplings, but not forming dense thickets here or anywhere else; only two large individuals (10 m tall 15 cm dbh) seen. Regenerating abundantly, however, at the northern end of the Phyllis Reserve restoration-planting, perhaps because the leaf-litter coming from the Unitec pines just beyond provides a good seed bed.

<i>Meliclytus ramiflorus</i>	The most abundant native species in scrub on both sides of the stream, most trees being multi-trunked and 3-7 m tall. Several of the largest, close to the creek or otherwise in favourable places, are a metre or so in basal diam. Seedlings and saplings are quite common, but like those of other native understorey species they are infrequent where the shining privet is dense.
<i>Piper excelsum</i>	Locally plentiful as rather small plants, mainly towards the foot of scrubby slopes in open places; quite frequent in the mahoe scrub patches. Some plants have particularly glossy leaves and green stems (and sometimes, peltate leaves) and would be hybrids with forms planted in the vicinity,
<i>Pittosporum eugenoides</i>	Occasional as seedlings and saplings in the central basaltic scrub areas; no old trees seen. Perhaps just originating from plantings.
<i>Pittosporum tenuifolium</i>	As above, but less common.

DICOT CLIMBERS

<i>Metrosideros perforata</i>	Seen once, low on a ponga.
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DICOT HERBS

<i>Haloragis erecta</i>	Forming dense stands on some of the sunny alluvial ground at the foot of scrubby slopes, apparently after clearance (by weedkiller ?).
<i>Hydrocotyle moschata</i>	Uncommon, in open places near the stream.
<i>Lobelia angulata</i>	Seen once on wet rocks in the stream.

MONOCOTS

<i>Carex geminata</i> agg.	Uncommon on flood terraces.
<i>Carex flagellifera</i>	Occasional in open scrub; possibly just plantings.
<i>Carex lambertiana</i>	Widespread and sometimes plentiful throughout scrub and woodland, even under shining privet.
<i>Carex solandri</i>	Scattered in mahoe rock forest and in privet scrub. Along with <i>Carex lambertiana</i> and <i>Pteris tremula</i> , able to colonize the Phyllis Reserve ACC restoration planting, coping with its dense canopy and the hard clay soil from which rainwash has stripped all humus.
<i>Carex (Uncinia) uncinata</i>	Uncommon; a few plants in the kanuka-dominated area on the W side of stream, and in the tall dense and rather damp mahoe-ponga scrub on the W bank near the railway.
<i>Cordyline australis</i>	Quite common throughout as naturally-occurring young plants but also used in restoration plantings. Locally abundant at several places in very wet ground dominated by large willows, as smallish trees (to c. 8 m tall and 20 cm basal diam). No individuals of substantially greater size were seen.
<i>Deyeuxia quadriseta</i>	Several plants in dry open basaltic ground.
<i>Dianella nigra</i>	Uncommon; seen only in the dry shining privet – kanuka – black wattle scrub of the basalt tongues at the SW corner of Phyllis Reserve.
<i>Gahnia lacera</i>	One large clump on an old sandstone bank at the foot of mahoe scrub at the SW corner of Phyllis Reserve.
<i>Gahnia setifolia</i>	Several unhealthy colonies near the <i>Dianella nigra</i> plants noted above
<i>Juncus prismatocarpus</i>	Seen once on the stream edge.
<i>Juncus ?sarophorus</i>	Small flood-torn tussocks scattered along the stream edges.
<i>Isolepis ?inundatus</i>	Quite frequent in patches up to a metre sq. in extent along stream edges especially in sunny places on clay.
<i>Isolepis ?reticularis</i>	Locally as flood-resistant mats on sticky clay ledges close to stream.
<i>Microlaena stipoides</i>	Throughout, but not forming extensive swards anywhere.
<i>Oplismenus hirtellus</i>	Small patches here and there at the lower edge of scrubby slopes, where these pass into open alluvial ground.
<i>Rhopalostylis sapida</i>	Scattered seedlings. One individual in open damp ground has a trunk c. 1.5 m tall and might be an Auckland City Council planting.