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Revisiting Tony Price's (1979) account of the native vegetation of Duck River and Rookwood Cemetery, western Sydney

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***Abstract*:** The Duck River Reserve and Rookwood Cemetery in the highly urbanised Auburn district of western Sydney hold small but botanically valuable stands of remnant native vegetation. In the late 1970s, local resident G.A. (Tony) Price, recognised the value of these remnants, both for the species they held and the clues they could give us to the past, and spent three years surveying and collecting plants at these sites. Price recorded the species present and their abundance, and described the habitats in which they were found. He observed the ecology of plant interactions, moisture, shading and fire response, interpolating them into a picture of the landscape and vegetation of the district prior to European settlement. At a time when field botany was inaccessible to many, and the focus of conservation was largely on the broader scale, Price's local scale work at these sites was unusual and important. Though never formally published, Price's 1979 account '*The Vegetation of Duck River and Rookwood Cemetery, Auburn*' has been cited in all subsequent work of consequence for the area. This paper presents and reviews Price's work and discusses his observations in relation to the current vegetation of these areas. Tony Price's contributions also highlight the value and role that ordinary citizens can play alongside professional botanists and plant ecologists in long term data collection, considered observation and environmental management. A copy of Price's original unpublished account has been included as an appendix to this paper.

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Introduction

The Auburn district is approximately 18 km west of Sydney Harbour, on the eastern margin of the Cumberland Plain, that makes up the landscape of most of western Sydney. Agriculture and urbanisation in the 200 years since European arrival has resulted in the loss of an estimated 99% of the original native vegetation cover in the Auburn Local Government Area (NPWS 1997). Small remnants of native vegetation still survive in the perimeters of council parks and along railway corridors and creek banks. The largest stands are in Rookwood Cemetery and in the Duck River Reserve at South Granville where small, but botanically valuable, remnants of four communities listed as Critically Endangered Ecological Communities under the NSW *Threatened Species Conservation Act, 1995* (TSC Act) occur. These are Cooks River/ Castlereagh ironbark forest (CRCIF), Cumberland Plain woodland (CPW), Shale Gravel Transition forest, and Sydney Coastal River Flat Forest – Alluvial Woodland, lining the riverbank of the Duck River Reserve (species assemblages are described in the Final Determinations of the NSW Scientific Committee). The Duck River Reserve and Rookwood Cemetery also encompass important populations of two species listed as Vulnerable, (*Acacia pubescens* and *Epacris purpurascens* var. *purpurascens*) and two populations listed as Endangered (*Pomaderris prunifolia* and *Wahlenbergia multicaulis*) (Greening Australia 1990, Rookwood Plan of Management 1995). The two areas hold

more than 20 floral taxa considered regionally significant because they are either rare or inadequately conserved in Western Sydney e.g., *Asterolasia correifolia, Macrozamia spiralis* and *Eucalyptus viminalis* at Duck River and *Dillwynia parvifolia*, *Juncus procerus* and *Gonocarpus longifolius* at Rookwood (Greening Australia 1990, NPWS 1997, James *et al*. 1999). The sites also provide habitat for listed vulnerable animal species such as the grey-headed flying fox, eastern bentwing bat, Cumberland land snail, regent honeyeater and green and golden bell frog. In addition, several bird species rare to the Sydney district, such as the zebra finch, yellow-rumped thornbill, diamond fire-tail finch and double-barred finch; species that feed exclusively on grass seeds but require shrubby cover for nesting have been recorded (EDAW 1996, Smith & Smith 1999, Applied Ecology 2011).

In the late 1970s, local Auburn resident G A (Tony) Price, recognised the value of these remnants both for the species they held and the clues they could give to past vegetation patterns, spent three years surveying and collecting plants in the area. He compiled an extensive list of the existing plant species, recorded ecological observations, and interpolated them into a picture of the landscape and vegetation of the district at the time of European settlement, in his unpublished account *The Vegetation of Duck River and Rookwood Cemetery, Auburn*. An electronic copy of Price's original account is included as Appendix 2 to this paper.

Greville Anthony (Tony) Price (1934–2010) grew up in Auburn and was a high school English/ History teacher and an avid collector of books. He gained his Master of Arts with 1st Class Honours in History from the University of New England in 1964. He was also a student in the (then) School of Biological Sciences at Macquarie University in the 1980s. Aside from short teaching posts in Canberra and Armidale, Tony Price lived in the house on Park Rd, Berala that he owned and his parents owned before him. He died in April 2010 at age 75 (Kathleen Mealing, Laurence Gordon, Margot Wood pers. comm.).

Tony Price was widely consulted for his botanical knowledge, and his ecological work and opinions provided baselines for research, as well as environmental management by councils, catchment authorities, community groups and others, both locally and within the wider district. He was a founding member of the Friends of Duck River Reserve whose activities included: petitioning for interpretative signage; instigating fencing of the area to protect it from minibike riders and overflow parking at the Melita Soccer Stadium; gaining funding for the removal of old car bodies from the reserve; ensuring the retention of trees along the riverbanks; propagating local species and undertaking bush regeneration work.

Tony Price left a small bequest to Macquarie University to support future plant ecology research. This paper was supported by that bequest.

Methods

Duck River and Rookwood site descriptions

The Duck River Reserve covers 16 ha of Parramatta City Council Reserve 20 km west of Sydney's Central Business District on the western banks of Duck River, between Wellington and Everley Roads in South Granville (33°52''04'S, 151°00''48'E). Rookwood Cemetery lies 4km east between Lidcombe and Strathfield (33° 52''25'S, 151° 03''58'E) covering 286 ha of Crown land under the control of the NSW Department of Lands, the majority intensively used as a cemetery. Conservation areas within Rookwood today total approximately 18 ha (DEM 2006).

Topography of the Auburn district is level to slightly undulating. Broad valleys and an alluvial floodplain drain the area that is 20 – 50 m above sea level, with gradients of less than three percent (Branagan *et al.* 1979, Parramatta River 9130–3N and Botany Bay 9130–3S 1: 25 000 topographic maps). Duck River flows into the Parramatta River, draining the suburbs of Auburn, Berala and Birrong to the east, Sefton, Chester Hill, Granville and Clyde to the west and the northern part of Yagoona to the south. Eighty percent of river discharge is generated in wet weather flowing from impermeable urban surfaces and stormwater and carrying high nutrient loads and debris (EDAW 1996). The major drainage lines within Rookwood Cemetery are brick-lined canals (Price 1979).

The geology of the district comprises Ashfield and Bringelly shales of the Wianamatta Group, with a small sandstone outcrop at Duck River (Price 1979). The soils are yellow podsols, comprising silt and clay-sized alluvial materials, with additional areas of disturbed soils present (EDAW 1996). The area is classified as belonging to the Birrong Soil Landscape, characterised by soils that show seasonal waterlogging, low water permeability, low fertility, low water availability, low wet strength with hardsetting surfaces, and subsoils that are often saline (Chapman & Murphy 1989). Soil depth varies but is typically 60 mm to clay and 1.8 m to shale (Glenn Piggott, pers. comm.).

The climate has mild, wet winters and warm, wet summers. Monthly average temperatures show summer maxima of 28.1° C in January, 17.2° C in July; and winter minima of 5.1° C in July, 18° C in January. Annual average rainfall is 983 mm (data from the Bureau of Meteorology, nearest rainfall records from Rookwood (Hawthorne Ave), nearest temperature records from Bankstown Airport).

History

Prior to European occupation, the Auburn district was occupied by the 'woods tribes' or Darug people. The Darug did not depend on fish and shellfish as the coastal indigenous peoples did; instead small animals and the tubers of native vines, lilies and orchids growing in the area comprised an important part of their diet (Granville Historical Society 1992, Kohen 1993).

European settlers referred to the district around Auburn as 'Liberty Plains' with land granted to free settlers from 1793 (Auburn Municipal Council 1982). From the early 1800s, timber was extracted from the area – ironbark and turpentine trees for use in wharves and bridges; stringybarks for railway sleepers and roofing; and other local tree species for general firewood. Later, wattlebark was extracted for use in tanneries that operated along Duck River (Granville Historical Society 1992). As timber availability decreased, orchards and vineyards were tried but were unsuccessful, and the land was subsequently subdivided and sold for dairies, poultry farms and market gardens (Auburn Municipal Council 1982, Granville Historical Society 1992).

The Duck River Reserve is all that has survived from the original 600 acres granted to James Chisholm, a sergeant of the NSW Corps in 1823. It was grazed and sold on to a timber merchant in 1882 and then investors in 1885, before being purchased by Parramatta City Council in 1946 (Price 1979; Greening Australia 1990). Since this time, Parramatta City Council has maintained it as a public open space, while developing adjoining land as rubbish tips and a 'night soil' area, which more recently have become sporting fields and a golf course (EDAW 1996). By the end of the 1800s, there was much heavy industry operating along Duck River including Hudson's, Clyde Engineering and later the Commonwealth Engineering or Comeng site. Factory sites included flour mills, iron works, tool makers and several tanneries from 1877 (Granville Historical Society 1992).

In 1860 the *Government Gazette* newspaper carried an advertisement for '100 acres of land which may be suitable for a General Cemetery', setting out general requirements such as soil 'of considerable depth', 'drainage to an area whence water supply is not obtained for domestic purposes' and close proximity to 'the Great Southern Railway between Sydney and Parramatta' (Sigrist 1989). The government surveyor who subsequently visited the Auburn district reported that 'Cohen's Hyde Park Estate at Liberty Plains was covered with dense ti-tree and wattle scrub and wooded with mahogany, stringy bark and hollybutt, though the best timber had already been cut out' (Rookwood Plan of Management 1993). The land was purchased in lots in 1861 and 1864, and the first burial occurred at Rookwood in 1867. More land was purchased as burials increased in the decades that followed. Rookwood Necropolis is now the largest cemetery in the southern hemisphere (Rookwood Plan of Management 1993).

Material and data sources

Tony Price conducted his fieldwork in 1976, 1977 and 1978 and completed his written account in 1979. He states that he studied the Duck River site most intensively. He collected voucher specimens, utilised the limited number of published field guides that were available at that time and took specimens to the identification counter at the Royal Botanic Gardens in Sydney for assistance. He recorded abundance estimates on all species, coding them as common (X), occasional (O) or rare (R) but did not record a decision rule as to how species were assigned into these abundance classes. He carefully recorded the habitat/s in which each species was found, dividing these into his eight 'micro-environments'*: 1. low woodland, Duck River; 2. ti-tree and eucalypt scrub; 3. grasslands; 4. exposed soils and subsoils; 5. drainage lines, edges of permanent sheets of water, creeks etc.; 6. permanent and transient sheets of water; 7. graves, Rookwood cemetery; and 8. dumped soil, edges of roads and tracks*. Price was also interested in the ecological processes that were occurring in the vegetation and made notes on the apparent regeneration and establishment requirements of species: their light and shade tolerances and responses to waterlogging, drought, fire and soil disturbance.

Based largely on his surveys of the remnant native vegetation at Duck River and Rookwood Cemetery, Price reconstructed a picture of pre-European vegetation for the Auburn district. He also drew from his observations of the 'scattered, veteran eucalypts' of the State hospital grounds at Lidcombe, the Carnarvon Golf Course at Berala, and various parks and yards immediately east and west of these sites. He incorporated his knowledge of local land use and fire history and compared his conclusions on the pre-European vegetation with those postulated earlier by Pidgeon (1941) and Kartzoff (1969).

Analysis

An interpretation of Tony Price's 1979 account is presented, drawing from both his species list and written comments for details of vegetation structure, floristic and growth form assemblage, species richness and weed invasion at the sites. An examination of Price's species records was made, tallying richness and growth form and extracting records of species restricted within each of his eight microenvironments. Comparisons are made between the sites, to later studies at these and other western Sydney sites, and to the vegetation of these sites today. Sorensen's index was calculated as a similarity index between the two sites: Similarity = 2a/(2a +

Table 1: Species and family richness (raw numbers with percentages in brackets)

	Total	Rookwood	Duck River	Unique to Rookwood	Unique to Duck River	Occurring both sites
Native species	311 (53%)	212 (53%)	254 (54%)	58	99	154 (50%)
Exotic species	273 (47%)	186 (47%)	213 (46%)	59	87	127 (47%)
All species	584	398 (68%)	467 (80%)	117 (20%)	186 (32%)	281 (48%)
Families	110	89	99	11	21	78

b +c) where a = the number of species present at both sites, b = the number of species present only at Rookwood, and c = the number of species present only at Duck River.

Price's species list (reproduced in Appendix 1) has been updated with plants listed alphabetically by current species name, within current family, under subheadings of growth form (derived from PlantNet and APNI websites). Species that Price recorded twice under two different names and are now considered the same species (taxonomic synonyms) have been listed only once (3 species) under their currently accepted name. Species missing both site and habitat codes (4 species) have been excluded. Species with missing or indecipherable site codes (2 species) or habitat recordings (35 species) have been included but location data left blank. The 35 taxa without habitat codes could not be used in habitat analyses. A number of other minor amendments, such as correcting spelling errors, or the erroneous coding of native species as weeds (or vice versa) were made.

Results

Price recorded a total of 584 species across the two sites: 311 native and 273 exotic (Table 1). The most species rich families were the Poaceae (88 species), Myrtaceae (61 species), Asteraceae (49), Fabaceae subfamily Faboideae (46) and subfamily Mimosoideae (16), and Iridaceae (16). In terms of both native and exotic species Duck River was floristically more diverse than Rookwood. A higher number of plant families were also found at Duck River.

The proportions of native and exotic species are remarkably consistent at the two sites (53 –54% native, 46–47% exotic). 50% of the native species and 47% of exotics occurred at both sites. Sorensen's similarity index for the two sites was 0.64 for all species, 0.66 for native flora and 0.63 for exotic flora.

The proportions of the nine growth forms were also remarkably similar at the two sites (Table 2), as was the ranking of the growth forms based on the numbers of species within each (Figure 1). Herbs were the most numerous growth form, comprising 37–39% of species. Graminoids (grasses, sedges and rushes) were the next most numerous, comprising ~21% of species. Shrubs followed at 16–19%, trees 12–15%, subshrubs and climbers, each made up 4–5% of species recorded, with ferns, succulents and aquatics in lesser numbers and each comprising <1% of growth forms recorded. Duck River had more native and exotic herb, graminoid, shrub and climber growth forms. Rookwood had slightly higher numbers of native and exotic tree species overall, while subshrubs, aquatics and succulents occurred in similar numbers at the two sites (Table 2).

Of the 8 microenvironments, ti-tree and eucalypt scrub was the most species-rich (230 species) and a high percentage of those species (78%) were natives (Figure 2, Table 3). Grasslands had the second highest number of species recorded (n=209) but a smaller percentage were native (61%). The drainage lines, creeks and edges of water also held high numbers of species, (n=195) but a higher percentage of those were exotic (58%). A large number of species were recorded

Table 2: Total, native and exotic species by growth form present at the Rookwood and Duck River sites. Species numbers shown are total at each site, unique to each site and occurring at both sites

	Total			Rookwood			Duck River			Unique to Rookwood			Unique to Duck River			Occurring both sites		
	Natives	Exotics	Tot	Natives	Exotics	Tot	Natives	Exotics	Tot	Natives	Exotics	Tot	Natives	Exotics	Tot	Natives	Exotics	Tot
Herbs	83	132	215	50	94	144	71	111	182	12	21	33	32	37	69	39	74	113
Graminoids	73	56	129	44	29	73	58	46	104	15	10	25	29	27	56	29	19	48
Shrubs	67	30	97	50	24	74	53	20	73	14	10	24	17	6	23	36	14	50
Trees	43	32	75	36	24	60	35	20	55	8	12	20	7	8	15	28	12	40
Sub-shrubs	25	4	29	18	3	21	17	3	20	8	1	9	7	1	8	10	2	12
Climbers	15	10	25	10	6	16	14	9	23	1	1	2	5	4	9	9	5	14
Aquatics	1	5	6	1	2	3	1	3	4	0	2	2	0	3	3	1	0	1
Ferns	4	1	5	2	1	3	4	0	4	0	1	1	2	0	2	2	0	2
Succulents	0	3	3	0	2	2	0	2	2	0	1	1	0	1	1	0	1	1
Total	311	273	584	211	185	396	253	214	467	58	59	117	99	87	186	154	127	281

Table 3: Number of plant species in each of nine growth forms found in Price's eight micro-environments.

		trees	shrubs	subshrubs	graminoids	herbs	climbers	ferns	succulents	aquatics	Total
Low Woodland, Duck River	Natives	21	32	7	14	22	10	2	0	0	107 (80%)
	Exotics	1	7	1	2	13	3	0	0	0	27 (20%)
	total	22	39	8	16	35	13	2	0	0	135
Ti-tree and eucalypt scrub	Natives	26	50	15	31	42	12	1	0	0	179 (78%)
	Exotics	5	9	1	8	28	2	0	0	0	51 (22%)
	total	31	59	16	39	70	14	1	0	0	230
Grassland	Natives	11	18	11	45	37	5	1	0	0	128 (61%)
	Exotics	2	5	0	28	45	1	0	0	0	81 (39%)
	total	13	23	11	73	82	6	1	0	0	209
Exposed soils and subsoils	Natives	7	14	3	10	4	3	0	0	0	41 (71%)
	Exotics	0	3	0	8	5	0	0	1	0	17 (29%)
	total	7	17	3	18	9	3	0	1	0	58
Drainage lines, creeks and edges of water	Natives	7	20	2	26	15	2	2	0	0	82 (42%)
	Exotics	14	10	1	27	58	6	2	1	2	113 (58%)
	total	21	30	3	53	73	8	4	1	2	195
Permanent and transient sheets of water	Natives	0	0	0	4	2	0	0	0	1	7 (44%)
	Exotics	0	0	0	5	1	0	0	0	3	9 (56%)
	total	0	0	0	9	3	0	0	0	4	16
Graves, Rookwood	Natives	11	6	1	3	4	0	1	0	0	26 (33%)
	Exotics	14	13	2	5	17	1	0	1	0	53 (67%)
	total	25	19	3	8	21	1	1	1	0	79
Dumped soil, edges of roads, tracks	Natives	9	5	2	9	10	1	0	0	0	35 (26%)
	Exotics	3	6	3	26	60	3	0	1	0	102 (74%)
	total	12	11	5	35	70	3	0	1	0	137

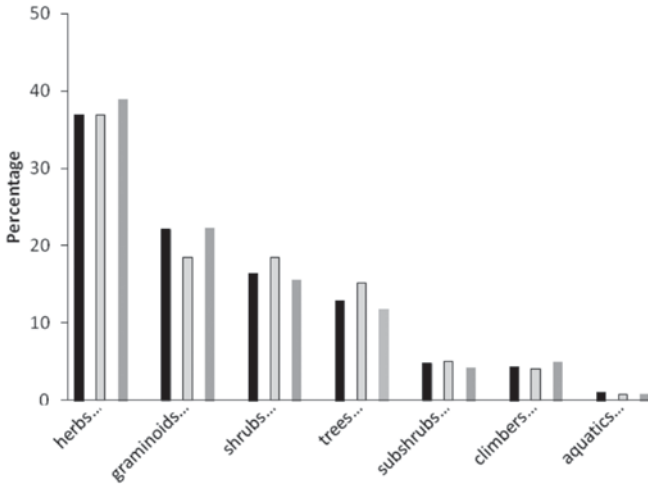

Fig. 1. Proportions of the 9 growth forms derived from Price (1979) as recorded at both sites ■ (total), at Rookwood □ and Duck River ■ .

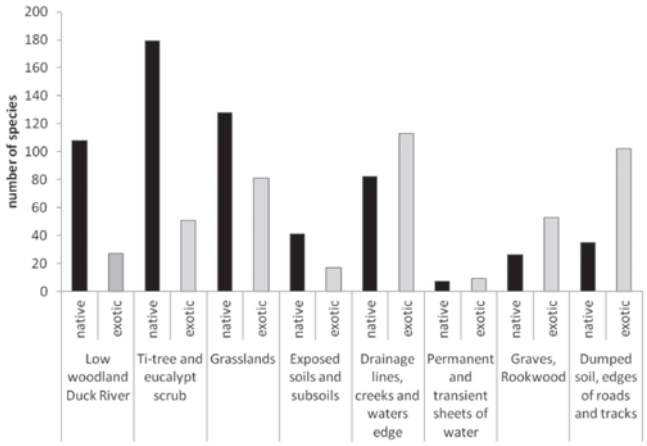

Fig. 2. The number of native and exotic species recorded by Price (1979) in each of his eight 'microenvironments'.

Fig. 3. Rookwood regeneration over graves: Some older sections of the cemetery are being managed to allow native plant regeneration with species present in this area including *Dillwynia parvifolia*, *Daviesia ulicifolia*, *Xanthorrhoea resinosa*, *Macrozamia spiralis*, *Coronidium scorpioides*, *Stylidium graminifolium*, *Chrysocephalum apiculatum*, *Lissanthe strigosa*, *Angophora bakeri*, *Themeda australis*, *Patersonia longifolia*, *Pultenaea villosa*, *Hibbertia aspera*, *Leptospermum trinervium*, *Bursaria spinosa*, *Leucopogon juniperinus*, *Lomandra gracilis*, *Lepidosperma laterale*, *Hakea sericea* seen here growing amongst the headstones.

Table 4a: Numbers of native and exotic species recorded in only 1 of the 8 micro-environments recognised by Price.

		trees	shrubs	subshrubs	graminoids	herbs	climbers	ferns	succulents	aquatics	Totals
Low Woodland, Duck River	Natives	1		2	1	7	1				12
	Exotics					2	1				3
Ti-tree and eucalypt scrub	Natives	2	13	4	7	9	3				38
	Exotics	1				2					3
Grassland	Natives	1	1	3	15	9					29
	Exotics		1		5	7					13
Exposed soils and subsoils	Natives		2	1		3					6
	Exotics		1		1	1			1		4
Drainage lines, creeks and edges of water	Natives	2	9	2	10	9	1	2			35
	Exotics	3	1		10	24	3			1	42
Permanent and transient sheets of water	Natives				2	1				1	4
	Exotics				4					3	7
Graves, Rookwood	Natives		1			1					2
	Exotics	8	4	1	2	5			1		21
Dumped soil, edges of roads, tracks	Natives				1	4					5
	Exotics		2	1	6	24					33
Totals	Natives	6	26	12	36	43	5	2	0	1	131
	Exotics	12	9	2	28	65	4	0	2	4	126
	Combined	18	35	14	64	108	9	2	2	5	257

Fig. 4. Recent Rookwood graves in the foreground to one of the areas Tony Price termed 'ti-tree and eucalypt scrub' now a designated conservation area within the cemetery. Scattered *Eucalyptus resinifera*, *Eucalyptus tereticornis*, *Eucalyptus sclerophylla*, *Angophora bakeri* and *Angophora floribunda* overtop *Melaleuca nodosa* and *Melaleuca decora* with its striking mistletoe *Amyema gaudichaudii*. More unusual species in this area include *Rhytidosporum procumbens*, *Hibbertia pedunculata*, *Dillwynia tenuifolia*, *Melaleuca erubescens*, *Bossiaea prostrata*, *Pultenaea retusa*, *Xanthorrhoea resinosa*, *Banksia spinulosa* and *Banksia oblongifolia*.

from dumped soil, edges of roads and tracks (n=137), with many of those being exotic (74%). The low woodland at Duck River held a similar number of species (n=134), but conversely showed the highest percentage of native species (80%).

A total of 257 species (131 native and 126 exotic) were recorded in only one of the eight micro-environments recognised by Price (Table 4a). From an overall total of 584 species, this represents 44% of all species, being generally more restricted or rarer in occurrence. Of note are the 38 native species, of which 13 are shrubs, recorded only in the ti-tree and eucalypt scrub; the 29 natives (15 graminoids) recorded only in the grasslands; the 42 exotic species restricted to the drainage lines (24 of them exotic herbs) and 33 exotic species (with a further 24 exotic herbs) restricted to the disturbed soil environments, as well as an interesting suite of 21 exotic species restricted to graves (Table 4b).

In his 1979 account Price made numerous observations on individual species, their regeneration and establishment requirements, light and shade tolerances and responses to waterlogging, drought, fire and soil disturbance. He also recorded flowering and fruiting times for the dominant eucalypts. Many of these observations have been subsequently incorporated into the 'Ecology of Sydney Plant Species' series by Benson and McDougall in *Cunninghamia* (1993–2005). Readers can go to this source for more comprehensive information on the ecology of individual plant species.

Discussion

Tony Price's account raises a wide range of issues that are relevant to the conservation and management of remnant bushland in an urban context today. In light of current plant ecological understanding and the vegetation at the sites today I review Price's work below under six headings: a) his picture of the vegetation of the Auburn district as it was prior to European settlement; b) his insights into the ongoing vegetation dynamics occurring at these sites in relation particularly to fire, moisture and light; c) his work as it informs

Table 4b: Species recorded in only 1 of the 8 microenvironments, arranged by growth form. Exotics are indicated by an asterisk.

Species restricted to low woodland, Duck River:

Trees:	*Glochidion ferdinandi*
Subshrubs:	*Boronia polygalifolia, Pomax umbellata*
Graminoids:	*Juncus homalocaulis*
Herbs:	*Brunoniella pumilio, Brunoniella australis, Einadia polygonoides, Brachyscome linearifolia, Cardamine lilacina, Scaevola albida, Lagenophora stipitata, *Aptenia cordifolia, *Polycarpon tetraphyllum*
Climbers:	*Tylophora barbata, *Asparagus plumosus*

Species restricted to ti-tree and eucalypt scrub:

Trees:	*Allocasuarina littoralis, Eucalyptus sideroxylon,*Morus nigra*
Shrubs:	*Isopogon anemonifolius, Persoonia laurina, Pomaderris prunifolia, Exocarpos strictus, Banksia spinulosa* var. *spinulosa, Epacris purpurascens* var. *purpurascens, Melaleuca erubescens, Podolobium ilicifolium, Monotoca scoparia, Acacia stricta, Acacia suaveolens, Notolaea ovata, Banksia oblongifolia*
Subshrubs:	*Hibbertia diffusa, Gompholobium minus, Opercularia aspera, Micrantheum ericoides*
Graminoids:	*Gahnia melanocarpa, Digitaria parviflora, Dianella revoluta, Lomandra multiflora* subsp. *multiflora, Lomandra longifolia, Austrodanthonia racemosa* var. *racemosa, Paspalidium aversum*
Herbs:	*Einadia nutans* subsp. *linifolia, Senecio quadridentatus, Senecio linearifolius, Solenogyne bellioides, Vittadinia dissecta, Wahlenbergia stricta, Goodenia heterophylla, Orthoceras strictum, Pterostylis nutans, *Chenopodium album, *Tropaeolum majus,*
Climbers:	*Billardiera scandens* var. *scandens, Cassytha glabella, Cassytha pubescens*

Species restricted to grasslands:

Trees:	*Melaleuca quinquenervia*
Shrubs:	*Melaleuca armillaris, *Nerium oleander*
Subshrubs:	*Bossiaea buxifolia, Gompholobium glabratum, Gonocarpus longifolius*
Graminoids:	*Carex inversa, Eragrostis leptostachya, Sporobolus elongatus, Austrodanthonia setacea, Lomandra cylindrica, Lomandra fluviatilis, Lomandra gracilis, Dichelachne rara, Austrostipa mollis, Aristida ramosa, Eriochloa pseudoacrotricha, Panicum simile, Sorghum leiocladum, Juncus procerus, Juncus sarophorus, *Dactylis glomerata, *Phalaris minor, *Poa pratensis, *Briza subaristata, *Chloris gayana*
Herbs:	*Calotis lappulacea, Senecio pinnatifolius* var. *pinnatifolius, Linum marginale, Caesia parviflora, Caesia parviflora* var. *vittata, Zornia dyctiocarpa, Goodenia bellidifolia, Plantago varia, Hypoxis hygrometrica, ,*Cerastium glomeratum *Lotus subbiflorus, *Richardia stellaris, *Misopates orontium, *Sparaxis spp., *Silene gallica* var. *gallica, *Romulea longifolia*

Species restricted to exposed soils and subsoils:

Shrubs:	A*cacia longissima, Kunzea ambigua, *Lycium ferocissimum*
Subshrubs:	*Astroloma humifusum*
Graminoids:	**Ehrharta longiflora*
Herbs:	*Dysphania littoralis, Vittadinia muelleri, Chamaesyce drummondii, *Hypochaeris microcephala*
Succulents:	**Aloe* spp.

Species restricted to drainage lines, creeks:

Trees:	*Melaleuca linariifolia, Casuarina glauca, *Salix babylonica, *Prunus domestica, *Prunus persica,*
Shrubs:	*Leucopogon lanceolatus var. lanceolatus, Leptospermum polygalifolium, Melaleuca ericifolia, Hovea longifolia, Goodenia ovata, Persoonia linearis, Viminaria juncea, Pomaderris lanigera, Asterolasia correifolia, *Ricinus communis*
Subshrubs:	*Mirbelia rubiifolia, Opercularia varia*
Graminoids:	*Juncus subsecundus, Juncus continuus, Schoenus apogon, Crinum pedunculatum, Cyperus mirus, Amphibromus neesii, Phragmites australis, Joycea pallida, Arundinella nepalensis, Urochloa foliosa, *Stenotaphrum secundatum, *Phormium tenax, *Bromus molliformis, *Bromus rubens, *Cortaderia selloana, *Eragrostis curvula, *Holcus lanatus, *Axonopus fissifolius, *Pennisetum glaucum, *Setaria palmifolia,*
Herbs:	*Centrolepis strigosa, Centipeda minima, Epilobium billardierianum subsp. cinereum, Einadia trigonos, Isotoma fluviatilis, Goodenia paniculata, Persicaria lapathifolia, Persicaria decipiens, Solanum americanum, *Zantedeschia aethiopica, *Spergularia rubra, *Stellaria media, *Bidens subalterans, *Apium graveolens, *Hydrocotyle bonariensis, *Leucojum aestivum, *Canna indica, *Canna spp., *Brassica fruticulosa, *Brassica juncea, *Brassica rapa subsp. sylvestris, *Rorippa nasturtium-aquaticum, *Fumaria muralis, *Mentha x. piperita, *Hippeastrum puniceum, *Gladiolus cuspidatus, *Linum usitatissimum, *Mirabilis jalapa, *Polygonum arenastrum, *Plantago coronopus, *Artemisia vulgaris, *Cotula coronopifolia, *Vellereophyton dealbatum,*

Ferns:	*Pellaea falcata, Nephrolepis cordifolia*
Climbers:	*Parsonsia straminea, *Anredera cordifolia, *Lonicera japonica, *Cardiospermum grandiflorum*
Aquatics:	**Sagittaria platyphylla*

Species restricted to permanent and transient sheets of water:

Graminoids:	*Isolepis inundata, Paspalum distichum, *Isolepis prolifera, *Juncus capitatus, *Scirpus chlorostachys, *Polypogon monspeliensis*
Herbs:	*Alternanthera denticulata*
Aquatics:	*Typha orientalis, *Myriophyllum aquaticum, *Eichhornia crassipes, *Alternanthera philoxeroides*

Species restricted to graves:

Trees:	**Pinus halepensis, *Pinus pinaster, *Pinus pinea, *Pinus radiata, *Tristania conferta, *Eucalyptus melliodora, *Araucaria bidwillii, *Robinia pseudoacacia*
Shrubs:	*Acacia myrtifolia, *Ulex europaeus, *Polygala myrtifolia, *Rhaphiolepis indica, *Lantana montevidensis*
Subshrubs:	**Pelargonium asperum*
Graminoids:	**Paspalum urvillei, *Crocosmia x. crocosmiiflora*
Herbs:	*Diuris punctata, *Vinca major, *Lavandula stoechas, *Oxalis purpurea, *Allium neapolitanum, *Watsonia aletroides*
Succulents:	**Agave americana*

Species restricted to dumped soil, edges of roads, tracks:

Shrubs:	**Genista linifolia, *Acacia podalyriifolia*
Subshrubs:	**Solanum linnaeanum*
Graminoids:	*Juncus vaginatus,*Agapanthus praecox* subsp. *orientalis, *Triticum aestivum, *Chloris virgata, *Avena fatua, *Avena ludoviciana, *Avena sterilis,*
Herbs:	*Suaeda australis, Calotis cuneifolia, Crassula sieberiana, Triptilodiscus pygmaeus, *Iris germanica, *Amaranthus hybridus, *Paronychia brasiliana, *Soliva anthemifolia, *Soliva sessilis, *Capsella bursa-pastoris, *Coronopus didymus, *Rapistrum rugosum, *Centranthus ruber, *Myosotis sylvatica, *Cichorium intybus, *Silybum marianum, *Tragopogon porrifolius, *Sisymbrium officinale, *Sisymbrium orientale, *Alyssum maritima, *Euphorbia peplus, *Chamaesyce prostrata, *Oxalis debilis* var. *corymbosa, *Oxalis latifolia, *Papaver somniferum subsp. setigerum, *Lupinus* spp., *Arctotheca calendula, *Aster subulatus,*

our understanding of weed invasion and native persistence within a suburban matrix; d) some comparisons between the vegetation at the two sites; e) prior and subsequent surveys at the sites and the recording of rare species; and f) the current conservation status of the two sites.

a) Pre-1788 vegetation of Duck River and Rookwood

Benson *et al*. (1999) and Benson & Howell (2002) have suggested sources of information that can give us a picture of the landscape and vegetation at the time of European settlement in Australia. These include historical first-hand descriptions from journals, early letters and reports; material from museum collections and other systematic data collections; old paintings and photographs; and an area's remnant vegetation in context with climate and geology. Price has used the latter to draw a picture of the area as tall woodland or forest with trees that were 60–80 feet (18–24m) high, with an understorey that was grassy, but prone to invasion by shrubs when fire-free intervals were longer. He described Duck River and Rookwood vegetation in 1979 as 'disturbed' from their original vegetation, noting that 'regrowth' and the 'scattered, veteran eucalypts' still standing pointed to past woodland or forest structure. He described the variety of shrub species in the understorey in 1979, noting the range of species 'from plants such as *Kunzea ambigua* and *Pultenaea villosa* that grow well only in the open, somewhat exposed situations, to others such as *Glochidion ferdinandi, Breynia oblongifolia* and *Notelaea longifolia,* which are normally plants of wet, shaded forests'. He also noted the occurrence of shrub species more typical of sandstone soils, including *Asterolasia correifolia*, *Banksia spinulosa*, *Pultenaea retusa, Pomaderris lanigera* and *Pomaderris ferruginea.* In summary, the native species were predominantly of a suite pertaining to clay based soils but with lesser numbers of species of a sandstone flora, particularly in Rookwood.

Price postulated that pre-1788 the area was dominated by *Eucalyptus moluccana* and *Eucalyptus fibrosa* while commenting on the diversity of tree species present at the sites, noting the presence in lower numbers of 'tree species from the drier west such as *Eucalyptus eugenioides, Eucalyptus parramattensis* and *Eucalyptus longifolia'* and that these 'mingle with others from wetter areas such as *Eucalyptus resinifera* and *Syncarpia glomulifera'*. Of the trees he notes also the presence of 'those that grow best near to waterholes', such as *Angophora floribunda* and *Eucalyptus amplifolia* (the latter only at Duck River) and to species more typical of sandy soils 'such as *Angophora bakeri*, *Eucalyptus punctata* and *Eucalyptus sclerophylla'*. Price disputed Kartzoff's (1969) idea of the area as one of blackbutt and Sydney blue gum (*Eucalyptus pilularis – Eucalyptus saligna*) high forest extending as far west as Merrylands and Granville. Rather, he agreed with Pidgeon's (1941) picture of assemblages of forest species typically found on clay shales that she recorded from the Bankstown-Liverpool district. Price's interpretation accords with Benson & Howell's (1990a, b) and Tozer's (2003 & 2010) reconstructions of the vegetation across the Cumberland Plain.

b) Vegetation dynamics – fire, moisture and light

Price described the scenario of 'too-frequent fires' reducing species diversity at both sites, noting that species with longer primary juvenile periods need fire-free intervals long enough to be able to flower and fruit before a subsequent fire, so as not to 'exhaust the gene pools'. He noted the succession dynamics of the vegetation in response to fire frequency, drawing a picture of scrub or shrubby areas 'reverting' to eucalypt woodland in the absence of fire, while following fire these areas return to grassland, which in turn, is re-invaded by shrubs and trees if fire is long absent. His conclusions are consistent with current understanding of secondary succession dynamics and disturbance by fire, both locally in Cumberland Plain woodland (see for example, Watson et al. 2009) and at a global scale (see Bond *et al*. 2005).

Price noted a bias towards *Melaleuca* species at the expense of eucalypts under regimes of frequent fire. He also noted that tree species that were quicker to reach reproductive maturity, such as *Angophora bakeri, Angophora floribunda, Eucalyptus eugenioides* and *Eucalyptus globoidea,* or those that had fire resistant bark (*Syncarpia glomulifera, Eucalyptus longifolia* and *Eucalyptus resinifera*), were able to 'persist better' under frequent fire, compared to those he states were 'more fire sensitive'. He suggested frequent fire as the cause of the decline in numbers of the once dominant *Eucalyptus moluccana,* seen at Rookwood but not Duck River.

The regular cool hazard reduction grass fires that had previously occurred every 2 years across large areas of Rookwood Cemetery had become less frequent by the mid-1970s according to Price, owing to tightening of the Environment Protection Authority's air pollution regulations (Price 1979). In 2001 a large, uncontrolled fire occurred in the eastern conservation area (Cemetery Areas 8, 27 and 28) and occasional small arson fires are currently reported by grounds staff at Rookwood cemetery (Glenn Piggott, pers. comm). The Duck River Reserve was not subject to such regular, deliberate burning in its earlier years, and the greater species richness recorded there may reflect this. However, in the 1980s it was noted with concern that some areas of the Duck River Reserve were subject to spot fires as frequently as annually (Price, G.A. cited in Greening Australia 1990). Parramatta City Council (2012) reports that for decades the reserve has been subject to arson fires 'at least every 2 years somewhere in the reserve' (David Kuhle, pers. comm.).

Price made reference to the 'vigorous growth habits' of the *Melaleuca* species outcompeting other species for light, forming 'dense stands' and 'suppressing competitors', particularly noting *Melaleuca nodosa,* which he described as 'aggressive and tolerant'. Even today at these sites, species of *Melaleuca,* particularly *Melaleuca nodosa,* develop large seed loads and recruit continuously, with adequate moisture, to develop a mixture of age cohorts in the field. They are seen colonising bare areas, eventually forming dense thickets and casting shade that suppresses much recruitment beyond the seedling stage (Hewitt unpub. doctoral studies). Price (1979) wrote that 'few plants other than tough herbs…and a few tufts of tolerant grasses…' were able to '…linger on in the dense shade' (of the *Melaleuca*). Price described 'the struggle to reach the canopy' with competition for light, and the way in which eucalypts, in contrast to *Melaleuca*, 'open up' the canopy somewhat allowing in light. This concurs with Bale *et al.* (1998) who remark that eucalypts have an open canopy structure and leaves of a pendant habit, allowing more direct and scattered light into the subcanopy. It is because of these growth habits that Price, while cautioning against too frequent a fire regime, reported fire as 'necessary to keep the ti-tree in check'.

'Niche partitioning' according to light and moisture levels was evident to Price in the distribution of grass species at the two sites. He wrote: 'At the most exposed, seasonally driest end of the spectrum in grassy glades *Themeda australis* may be dominant; in moister areas of dappled shade *Microlaena stipoides* is most common; between the 2 extremes there tends to be a mixed stand with *Microlanea stipoides, Entolasia marginata, Echinopogon ovata* and *Echinopogon caespitosus* more frequent in sheltered sites while in exposed places *Danthonia species, Aristida vagans, Stipa species,* particularly *Stipa nervosa, Dichelachne sciurea* and *Eragrostis brownii* are more common'. He noted also native *Agrostis* species present at the moistest sites while '*Dichelachne sciurea*, *Eragrostis brownii* and *Aristida vagans* are more successful at drier sites' (Price 1979). Price's idea of niche partitioning in the grassy layer, according to light and moisture levels, warrants further study, and has implications particularly for restoration efforts in grassy woodland communities.

c) Exotic species

The origin of the exotic species that Price recorded at the sites is interesting, with a number of those from Rookwood naturalised from cultural plantings at the site (e.g. 11 tree and palm species are restricted to graves). Exotic species used from the cemetery's inception to achieve a Victorian-Edwardian gardenesque style included formal avenues of *Phoenix canariensis, Pinus* and *Araucaria* species. Other exotics now growing in Rookwood were probably once planted over graves for their religious or Victorian funereal symbolism. These include perfumed species like honeysuckle (*Lonicera japonica*) representing innocence or sweetness of disposition, climbers or vines like Chinese wisteria (*Wisteria sinensis*) and morning glory (*Ipomoea indica*) to signify the bonds of love, roses for sinlessness, lilies for purity, and the varied palms and cedars for their biblical and quaranic connotations (Burke & Betteridge 1989). *Pinus* and *Cupressus*, 'evergreen' species, have symbolised the afterlife or life everlasting since Roman times. Many of these species now fall into the category of major weeds within the cemetery. UBM (2011) list problematic weeds within the cemetery as hawthorn (*Raphiolepis indica*) and privet (*Ligustrum sinense*), both of which were planted as hedges in the cemetery from the 1870s; *Coreopsis lanceolata, Watsonia meriana 'Bulbilifera'* (widely used as grave planting in the late 1800s), Camphor laurel (*Cinnamomum camphora*), freesia, bridal creeper (*Asparagus asparagoides*), Crofton weed (*Ageratina adenophora*), blue periwinkle (*Vinca major)*,

Fig. 5. The endangered species *Acacia pubescens* is seen here regenerating at Rookwood amongst graves and exotic species (*Rhaphiolepis indica* to the right).

lantana (*Lantana camara* and *Lantana montevidensis*), boneseed (*Chrysanthemoides monilifera* subsp. *monilifera*), blackberry (*Rubus spp*.), castor oil plant (*Ricinus communis)*, pampas grass (*Cortaderia selloana*), prickly pear (*Opuntia stricta*) and water hyacinth (*Eichhornia crassipes*).

Some Eucalypts from other parts of Australia have naturalised at Rookwood following planting of a few individuals e.g., *Eucalyptus saligna* (Sydney Blue Gum), *Eucalyptus punctata* (Grey Gum), *Eucalyptus melliodora* (Yellow Box), *Eucalyptus microcorys* (Tallowwood) and *Eucalyptus citriodora* (Lemon-scented Gum).

Some of the exotic tree species Price recorded at Duck River may also originate from deliberate plantings, with some traced to the time immediately following Parramatta City Council's acquisition of the land in 1946, e.g., *Erythrina sykesii* (Indian coral tree), *Salix babylonica* (weeping willow), *Populus nigrus* (poplar) and *Cinnamomum camphora* (camphor laurel) (EDAW 1996).

At the time of Price's work many of the exotic species were only present in drainage lines, on dumped soil and on the edges of roads and tracks (Tables 4a and 4b). This is a picture commonly seen in urban bushland such as the Duck River and Rookwood sites today, where run-off increases soil nutrients and moisture levels, favouring the growth of weeds (see discussion in Benson & Howell 1990a). By contrast, the areas with the lowest percentage of exotics (Tables 3 and 4a) are the core bushland areas Price termed Duck River woodland and Ti-tree and eucalypt scrub. This, too, is in accordance with what we know about the resilience of unploughed stands of native vegetation and priority effects. In assessing the impact of clearing and grazing history on the species composition of Cumberland Plain woodland remnants, Hill *et al.* (2005) found that clearing with soil disturbance had the highest impact on native species decline and exotic invasion, with grazing alone not dramatically impacting on composition. Price expressed it more colloquially from his own observations (page 10): 'Most of the original species no doubt still occur as clearing with axe and fire without years of laborious grubbing and weeding is somewhat akin to sowing dragon's teeth. The native species able to regenerate from rootstocks, lignotubers and stumps….'.

The abundance and microenvironment data for the exotic species that Price recorded in the 1970s provides a

Fig. 6. A species rich woodland understorey at Duck River Reserve in South Granville where Tony Price recorded many native species. In Summer the pretty green flowers of *Callistemon pinifolius* and the dark blue fruits of *Polyscias sambucifolia* can be seen in the shrub layer. Diverse native groundcovers and herbs include *Brunoniella australis*, *Bossiaea prostrata*, *Vittadinia muelleri*, *Dichondra repens*, *Glycine clandestina*, *Desmodium varians*, *Polymeria calycina*, *Caesia parviflora*, and *Astroloma humifusum*.

comparison with the present. For example, he recorded *Vinca major* as only occasional at Rookwood over graves, and *Rhaphiolepis indica* as rare; both are now considered common and problematic weeds across the site. The major weeds today include a number of significant ones not recorded by Price, including (at Rookwood) *Andropogon virginicus* (Whisky grass), *Olea europaea* subsp. *cuspidata* (African olive), *Eragrostis curvula* (African lovegrass), *Hypericum perforatum* (St. John's wort), *Cytisus scoparius* (English broom) and *Grevillea robusta.* At Duck River, *Thunbergia alata* (Black-eyed Susan), *Passiflora edulis* (Common passionfruit), *Ipomoea cairica* (Coastal Morning Glory) and *Acetosa sagittata* (Rambling Dock) are additional exotic vines along the riverbanks. *Olea europea* and *Eragrostis curvula* in particular have established widely elsewhere in western Sydney since the 1970s (Doug Benson pers. comm. 2012) and indicate the short time spans over which invasion and vegetation change can occur.

d) Differences between Rookwood and Duck River

Price noted that a number of ground orchids (*Diuris, Microtis* and *Thelymitra*) associated particularly with the *Themeda* grasslands at Rookwood were not present at Duck River. He suggested that these species had survived at Rookwood and not Duck River, due to different landuse histories, Rookwood with its many decades of protection from stock grazing while still exposed to frequent burning. Native geophytes of grassy woodlands are now rare, although frequently found in cemeteries where they are not at risk from stockgrazing, but still vulnerable to lawnmowers, herbicides and 'tidying up' (Loneragan 1975, Semple-Kerr 1985, McBarron *et al.* 1987, Barrett & Barrett 2001). Sadly, the area of *Themeda* grassland that Price noted as rich in native Liliaceae and Orchidaceae (he mapped it later in 1993) has since disappeared under a monoculture of kikuyu (*Pennisetum clandestinum*) and the neatly rowed headstones of a lawn cemetery.

Price noted the many species in common to both sites, but pointed to higher numbers of naturalised exotics and a suite of native species more commonly found on sandstone substrates, that were collected from Rookwood. Sorensen's index of similarity shows a moderate degree of similarity in species assemblage between the two sites; 0.649 or 65% for all species, 0.662 or 66% for native flora and 0.635 or 64% for exotic flora. By comparison, Analyses of Similarity of quadrat data collected from seven remnant Cumberland Plain Woodland sites across western Sydney (French *et al.* 2000) showed similarities of 25–49% (Bray-Curtis dissimilarity scores of 51–75%). The lower similarity amongst these sites compared with the higher proportion of species shared at Duck River and Rookwood in the late 1970s might have a number of causes. Possibly the sites assessed by French *et al.* (2000) are of different sizes, with different edge effects and different propagule pressures; or that they have been subject to different disturbance factors; or that the intervening decades between Price's surveys and this later work has enabled greater divergence in species composition to have occurred. It would be worthwhile to recalculate similarity indices at Duck River and Rookwood today. Such data may even inform our understanding of species persistence traits against historical filtering by a range of disturbance types.

Most of the difference in species assemblage between Rookwood and Duck River is in the herb, shrub and graminoid growth forms (consistent with the French *et al* (2000) finding that differences between Cumberland Plain remnant sites were mainly due to differences in understorey species). The Rookwood/ Duck River comparison is unusual, (as noted by Price) in the higher number of exotic tree species at Rookwood, having naturalised from deliberate grave plantings.

Benson and Howell (2002) draw a picture from varied historical sources of Cumberland Plain woodland species assemblages being fairly continuous before European colonisation. Without major geographical boundaries to divide the plain, species would have been distributed reasonably uniformly. This they contrast with coastal rainforest communities that are naturally dissected (by soil and landscape features), resulting in species compositions that can vary markedly from site to site, with many isolated species occurrences. This latter type of variation in species occurrences is more in accordance with the picture Price recorded at Rookwood and Duck River and of the work of French *et al.* (2000), and is consistent with the species compositions given by Benson and Howell (2002) of Cumberland Plain remnants today. The local distribution and frequencies of species has changed and each remnant can

Fig.. 7. Parramatta City Council and the community have a strong commitment to caring for the woodland at Duck River and council recently declared the Duck River Reserve a Wildlife Protection Area prohibiting cats or dogs off leashes.

Fig. 8. Parramatta City Council now maintains tracks and fencing at Duck River to minimise erosion and protect the area from trail bike riders as was initially proposed by the Friends of Duck River under Tony Price.

hold different sets of once widespread species. Remnants differ in composition due to fragmentation, differing disturbance histories and chance survivals in some, with species made rare by virtue of their being confined to just a few sites. This is another reason that these small remnants of native vegetation are of great conservation value.

e) Surveys and rare species

Smith & Smith (1999) compiled a list of plant species recorded in Rookwood up to 1999 (i.e. their own survey plus Price (1979), Mount King Ecological Survey (1992), Quality Environmental Management (1994) and Teresa James (NPWS (1997)). They listed 608 species for Rookwood, 327 native and 281 exotics, including 115 native and 95 exotic species recorded since 1979. The additional species may indicate surveys of more stringent sampling design, but may also indicate vegetation change. Certainly the many additional exotic species recorded in the decades since 1979 indicate additional weed encroachments. It is also noted that while Price recorded a large number of grasses present in the cemetery in the late 1970s he did make a note to the effect that 'graminae, poorly collected, Rookwood', and the list of grasses (now Poaceae) has been added to substantially in later years.

Smith & Smith (1999) noted also that several native species, collected from Rookwood prior to Price's work (known from old herbarium records), were not recorded by him, nor have been since, and are almost certainly no longer there – these include *Tetratheca juncea* and *Bothriochloa biloba* lodged in 1913 and 1935, respectively. There are also a small number of species recorded from Rookwood cemetery before and after Price's surveys that do not appear in his lists e.g., *Dianella revoluta* 1973 & 1995; *Boronia polygalifolia* 1912 & 1997; and *Calotis lappulacea* 1887 & 1992 (lodged records viewed via Australia's virtual herbarium website). It may be that these species did not flower and were therefore cryptic and/ or simply overlooked by Price at the time of his surveys. It should be noted that, at the time of Price's work, plant identification was a considerably greater challenge without access to experts and herbarium collections, and that while Beadle, Carolin and Evans' *Flora of the Sydney Region* (1972) provided a major spur to field botany, there were not the many flora guidebooks or electronic resources that have become available since.

No prior or subsequent flora survey of Duck River has been located that is as comprehensive as that of Price (1979). In herbaria across Australia there exist only a few dozen specimens from Duck River that predate the work of Price, among them material collected by Robert Brown in 1802, Joseph Maiden 1887, A.A. Hamilton 1909, and R. Coveny, D. Benson and H. Bryant 1976 (Australia's virtual herbarium website). And the few surveys since Price (e.g., Greening Australia 1990, NPWS 1997, Applied Ecology 2011), aside from verifying the dominant and common species in the field, all acknowledge that they are largely based on Price's 1979 account.

f) Conservation status of the sites today

The National Trust recognises Rookwood as a cemetery of World Heritage significance for both its cultural and nature conservation values. It is listed on the Register of the National Estate and under the NSW Heritage Act. While there is enormous pressure on all land within the cemetery for burial space, the vegetation conservation areas are also protected under the *Rookwood Necropolis Property Management Plan 2002*, which is a statutory document under the *NSW Threatened Species Conservation Act, 1995*. The Plan of Management recognises the regional significance of the remnant indigenous vegetation, and as a part of the fabric of the cemetery to be preserved and maintained (Rookwood Visual Significance Study 2010). Whilst it has not received the same level of external recognition, the Duck River Reserve in the Parramatta Local Government Area at South Granville is zoned 2EC for conservation, with strong council commitment to impact management and overall protection.

Fig. 9. Rookwood roadside native plantings: A number of perimeter and roadside plantings made within the cemetery since 2005 comprise native species grown from seed collected on site and germinated in the Rookwood Necropolis Joint Committee's nursery located on Hawthorne Avenue. In this planting – *Melaleuca thymifolia*, *Melaleuca erubescens*, *Dillwynia sieberi*, *Callistemon linearis*, *Acacia pubescens*, *Acacia longifolia*.

Fig. 10. At the Wellington Road end of the Duck River Reserve a wooden seat dedicated to the memory of Tony Price has been placed looking into the stately *Eucalyptus amplifolia*. Further into the reserve the track winds past *Eucalyptus moluccana*, *Eucalyptus fibrosa*, *Eucalyptus longifolia* and an unusual stand of *Eucalyptus punctata*.

Conclusion

In the 1970s, at a time when major conservation efforts were being directed at broad scale issues such as the protection of mangroves, rainforests and the development of national park systems, Tony Price's work focussed on the details of remnant vegetation in an increasingly modified suburban landscape. He saw value in this for what it revealed about the past landscape, as well as the ongoing ecological patterns. He concentrated on the careful recording of plant species and observing the ecology of plant responses to environmental conditions such as moisture, shading and fire. As a result his work is a valuable record of the presence, distribution and abundance of plant species at Rookwood and Duck River in the late 1970s, useful for comparing with the present and future times, as well as providing a picture of the district's past as seen from that viewpoint in time.

His observations that rare native species could survive in small areas such as parts of cemeteries, in spite of human impact, highlighted the importance of small areas for conservation, and provided local conservation groups with arguments for improved protection and management of such sites. Similarly, his careful observations of the ecology of native and exotic species set the scene for the development of regeneration and management programs by local conservation groups in subsequent decades.

Fig. 11. Tony Price working with other volunteers at Duck River Reserve in January 1998.

Until his death in 2010 Tony Price was still being consulted for his botanical knowledge and ecological opinion which were held in high regard. His work is testament to the value of long term citizen science and community involvement in environmental management. Tony Price joins a long tradition in botany, and the natural sciences more broadly, of citizen contribution and amateur/ professional collaborations (see Gilbert 1982 for interesting examples).

Despite competing landuse priorities at both Duck River and Rookwood, these bushland remnants still survive and certainly remain worthy of protection. As Tony Price was deeply aware, they are important for their inherent conservation values, for the clues they can give us to the past, for the regionally rare and significant flora they hold, for dependent fauna, and as a source of genetic variability for seed banking, horticulture and revegetation projects.

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Appendix 1: List of species recorded, location and abundance data X = common, O = occassional, R = rare

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
aquatic	Alismataceae	* *Sagittaria platyphylla*	Sagittaria	* *Sagittaria graminea* var. *weatherbiana*		X					X			
aquatic	Amaranthaceae	* *Alternanthera philoxeroides*	Alligator weed	* *Alternanthera philoxeroides*								X		
aquatic	Brassicaceae	* *Rorippa nasturtium-aquaticum*	Watercress	* *Rorippa nasturtium-aquaticum*		O					O			
aquatic	Haloragaceae	* *Myriophyllum aquaticum*	Parrots Feather	* *Myriophyllum brasiliense*	R							R		
aquatic	Pontederiaceae	* *Eichhornia crassipes*	Water Hyacinth	*Eichhornia crassipes*	R							R		
aquatic	Typhaceae	*Typha orientalis*	Broadleaf Cumbungi	*Typha orientalis*	R	O						O		
climber	Apocynaceae	* *Araujia sericifera*	Moth Vine	* *Araujia hortorum*	O	O	O	O	O		O			
climber	Apocynaceae	*Parsonsia straminea*	Common Silkpod	*Parsonsia straminea*		R					R			
climber	Apocynaceae	*Tylophora barbata*	Bearded Tylophora	*Tylophora barbata*		O	O							
climber	Asparagaceae	* *Asparagus asparagoides*	Bridal Creeper	* *Myrsiphyllum asparagoides*	O	X	O	O			X			
climber	Asparagaceae	* *Asparagus plumosus*	Climbing Asparagus Fern	* *Asparagus plumosus*		R	R							
climber	Basellaceae	* *Anredera cordifolia*	Madeira Vine	* *Anredera cordifolia*		X					X			
climber	Bignoniaceae	* *Campsis x tagliabuana*	Trumpet Creeper	* *Campsis x tagliabuana*		R	micro-environment not recorded							
climber	Bignoniaceae	*Pandorea pandorana*	Wonga Wonga Vine	*Pandorea pandorana*		O	R				O			
climber	Caprifoliaceae	* *Lonicera japonica*	Japanese Honeysuckle	* *Lonicera japonica*	O	X					X			
climber	Convolvulaceae	* *Ipomoea indica*	Morning Glory	* *Ipomoea indica*	O	O					O			O
climber	Convolvulaceae	*Polymeria calycina*		*Polymeria calycina*	O	X	X	X	O	O				
climber	Fabaceae, Subfamily Faboideae	* *Dipogon lignosus*	Dolichos Pea	* *Dipogon lignosus*	R	R							R	R
climber	Fabaceae, Subfamily Faboideae	* *Wisteria sinensis*	Chinese Wisteria	*Wisteria sinensis*	R		micro-environment not recorded							

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
climber	Fabaceae, Subfamily Faboideae	*Desmodium varians*	Slender Tick-trefoil	*Desmodium varians*		X	X	X						
climber	Fabaceae, Subfamily Faboideae	*Glycine clandestina*		*Glycine clandestina*	O	X	X	X	X					
climber	Fabaceae, Subfamily Faboideae	*Glycine tabacina*		*Glycine tabacina*	O	O	O	O	O					
climber	Fabaceae, Subfamily Faboideae	*Hardenbergia violacea*	Purple Coral Pea	*Hardenbergia violacea*	X	X	X	X	X	O				O
climber	Fabaceae, Subfamily Faboideae	*Kennedia rubicunda*	Dusky Coral Pea	*Kennedia rubicunda*	X	O		X	O	O				
climber	Lauraceae	*Cassytha glabella*		*Cassytha glabella*	X			X						
climber	Lauraceae	*Cassytha pubescens*		*Cassytha paniculata*	X	X		X						
climber	Luzuriagaceae	*Eustrephus latifolius*	Wombat Berry	*Eustrephus latifolius*	R	O	O	O						
climber	Pittosporaceae	*Billardiera scandens*	Hairy Apple Berry	*Billardiera scandens*	R	O		O						
climber	Ranunculaceae	*Clematis aristata*	Old Man's Beard	*Clematis aristata*	R	O	R	O						
climber	Ranunculaceae	*Clematis glycinoides*	Headache Vine	*Clematis glycinoides*		O	R	O						
climber	Sapindaceae	* *Cardiospermum grandiflorum*	Balloon Vine	* *Cardiospermum grandiflorum*		X					X			
graminoid	Alliaceae	* *Agapanthus praecox* subsp. *orientalis*	Agapathus	* *Agapanthus orientalis*	R	R								R
graminoid	Amaryllidaceae	*Crinum pedunculatum*	Swamp Lily	* *Crinum pedunculatum*		R					R			
graminoid	Cyperaceae	* *Cyperus brevifolius*		*Cyperus brevifolius*		O			O		O			
graminoid	Cyperaceae	* *Cyperus eragrostis*		* *Cyperus eragrostis*	O	O			O		O			
graminoid	Cyperaceae	* *Cyperus tenellus*		*Cyperus tenellus*	O						O			O
graminoid	Cyperaceae	* *Isolepis prolifera*		* *Scirpus prolifera*	O							O		
graminoid	Cyperaceae	* *Scirpus chlorostachys*		* *Scirpus chlorostachys*	R							R		
graminoid	Cyperaceae	*Carex inversa*		*Carex inversa*		O			O					
graminoid	Cyperaceae	*Cyathochaeta diandra*		*Cyathochaeta diandra*	X		O	O	X				X	
graminoid	Cyperaceae	*Cyperus mirus*		*Cyperus mirus*		R					R			
graminoid	Cyperaceae	*Gahnia aspera*	Rough Saw-sedge	*Gahnia aspera*		O		O			O			

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
graminoid	Cyperaceae	*Gahnia melanocarpa*	Black Fruit Saw-sedge	*Gahnia melanocarpa*		O		O						
graminoid	Cyperaceae	*Isolepis inundata*		*Scirpus inundatus*	O							O		
graminoid	Cyperaceae	*Lepidosperma laterale*		*Lepidosperma laterale*	O	X		X	O					
graminoid	Cyperaceae	*Ptilothrix deusta*		*Ptilanthelium deustum*	O				O				O	
graminoid	Cyperaceae	*Schoenus apogon*	Common Bog-rush	*Schoenus apogon*	O						O			
graminoid	Juncaceae	* *Juncus articulatus*		*Juncus articulatus*		O					O	O		
graminoid	Juncaceae	* *Juncus capitatus*		* *Juncus capitatus*	O							O		
graminoid	Juncaceae	*Juncus bufonius*	Toad Rush	*Juncus bufonius*		O					O	O		
graminoid	Juncaceae	*Juncus continuus*		*Juncus continuus*	O						O			
graminoid	Juncaceae	*Juncus fockei*		*Juncus fockei*	R				R		R			
graminoid	Juncaceae	*Juncus homalocaulis*		*Juncus homalocaulis*		R	R							
graminoid	Juncaceae	*Juncus planifolius*		*Juncus planifolius*	R	R					R	R		
graminoid	Juncaceae	*Juncus procerus*		*Juncus procerus*	R	R			R					
graminoid	Juncaceae	*Juncus sarophorus*		*Juncus sarophorus*	R	R			R					
graminoid	Juncaceae	*Juncus spp.*		*Juncus* sp. nov.	R				R					
graminoid	Juncaceae	*Juncus subsecundus*		*Juncus subsecundus*	R						R			
graminoid	Juncaceae	*Juncus usitatus*		*Juncus usitatus*	X	X			X		X			
graminoid	Juncaceae	*Juncus vaginatus*		*Juncus vaginatus*		R								R
graminoid	Lomandraceae	*Lomandra cylindrica*	Needle Mat-Rush	*Lomandra cylindrica*	O				O					
graminoid	Lomandraceae	*Lomandra filiformis*	Wattle Mat-rush	*Lomandra filiformis*	O	O		O	O					
graminoid	Lomandraceae	*Lomandra fluviatilis*	River Mat-Rush	*Lomandra fluviatilis*		O			O					
graminoid	Lomandraceae	*Lomandra gracilis*		*Lomandra gracilis*	X				X					
graminoid	Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush	*Lomandra longifolia*	O	O		O						
graminoid	Lomandraceae	*Lomandra multiflora* subsp. *multiflora*	Many-flowered Mat-rush	*Lomandra multiflora*		O		O						
graminoid	Phormiaceae	* *Phormium tenax*	New Zealand flax	* *Phormium cookianum*		R					R			
graminoid	Phormiaceae	*Dianella caerulea*	Blue Flax-lily	*Dianella caerulea*	X	X	R	O	X	R				
graminoid	Phormiaceae	*Dianella longifolia* var. *longifolia*		*Dianella laevis*	O			O	O					
graminoid	Phormiaceae	*Dianella revoluta*	Blue Flax-Lily	*Dianella revoluta*		O		O						
graminoid	Poaceae	* *Avena barbata*	Bearded Oats	* *Avena barbata*	X	X			O		X			X
graminoid	Poaceae	* *Avena fatua*	Wild Oats	* *Avena fatua*	R									R

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
graminoid	Poaceae	* *Avena ludoviciana*	Ludo Wild Oats	* *Avena ludoviciana*	R	R								R
graminoid	Poaceae	* *Avena sterilis*	Sterile Oats	* *Avena sterilis*	R									R
graminoid	Poaceae	* *Axonopus fissifolius*	Narrow-leafed Carpet Grass	* *Axonopus affinis*		R					R			
graminoid	Poaceae	* *Briza maxima*	Quaking Grass	* *Briza maxima*	O	O		O	O		O			O
graminoid	Poaceae	* *Briza minor*	Shivery Grass	* *Briza minor*	X	X		O	X		X			O
graminoid	Poaceae	* *Briza subaristata*		* *Briza triloba*		R			R					
graminoid	Poaceae	* *Bromus catharticus*	Prairie Grass	* *Ceratochloa unioloides*	O	X			O		X			O
graminoid	Poaceae	* *Bromus diandrus*	Great Brome	* *Bromus diandrus*	R	R		R	R					R
graminoid	Poaceae	* *Bromus molliformis*	Soft Brome	* *Bromus molliformis*		R					R			
graminoid	Poaceae	* *Bromus rubens*	Red Brome	* *Bromus rubens*		R					R			
graminoid	Poaceae	* *Chloris gayana*	Rhodes Grass	* *Chloris gayana*		R			R					
graminoid	Poaceae	* *Chloris virgata*	Feathertop Rhodes Grass	* *Chloris virgata*		R								R
graminoid	Poaceae	* *Cortaderia selloana*	Pampas Grass	* *Cordaueria selleana*		R					R			
graminoid	Poaceae	* *Dactylis glomerata*	Cocksfoot	* *Dactylis glomerata*		O			O					
graminoid	Poaceae	* *Digitaria ciliaris*	Summer Grass	*Digitaria ciliaris*		O			O		O			
graminoid	Poaceae	* *Digitaria sanguinalis*	Summer Grass	*Digitaria sanguinalis*		O			O					O
graminoid	Poaceae	* *Echinochloa crus-galli*	Barnyard grass	* *Echinochloa crus-galli*		O			O					O
graminoid	Poaceae	* *Ehrharta longiflora*	Annual Veldtgrass	* *Ehrharta longiflora*		R				R				
graminoid	Poaceae	* *Eleusine indica*	Crowsfoot Grass	* *Eleusine indica*		O			O	R				O
graminoid	Poaceae	* *Eleusine tristachya*	Goose Grass	* *Eleusine tristachya*		O			O					O
graminoid	Poaceae	* *Eragrostis curvula*	African Lovegrass	* *Eragrostis curvula*		R					R			
graminoid	Poaceae	* *Holcus lanatus*	Yorkshire Fog	* *Holcus lanatus*	R						R			
graminoid	Poaceae	* *Lolium multiflorum*	Italian Ryegrass	* *Lolium multiflorum*	X	X			O	O	O			X
graminoid	Poaceae	* *Lolium perenne*	Perennial Ryegrass	* *Lolium perenne*	X	X			O	O	O			X
graminoid	Poaceae	* *Paspalum dilatatum*	Paspalum	* *Paspalum cilatatum*	X	X	R	O	X	X	X		X	X
graminoid	Poaceae	* *Paspalum quadrifarium*	Tussock Paspalum	* *Paspalum quadrifarium*		O				R	O			
graminoid	Poaceae	* *Paspalum urvillei*	Vasey Grass	* *Paspalum urvillei*	R								R	

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
graminoid	Poaceae	* *Pennisetum clandestinum*	Kikuya grass	* *Pennisetum clandestinum*	X	X		R	X	O	X		O	X
graminoid	Poaceae	* *Pennisetum glaucum*	Pearl Millet	* *Setaria glauca*		R					R			
graminoid	Poaceae	* *Pennisetum macrourum*	African Feather Grass	* *Pennisetum macrourum*	X				X		O		X	X
graminoid	Poaceae	* *Phalaris aquatica*	Phalaris	* *Phalaris tuberosa*		O			O					O
graminoid	Poaceae	* *Phalaris minor*	Lesser Canary Grass	* *Phalaris minor*		O			O					
graminoid	Poaceae	* *Poa annua*	Winter Grass	* *Poa annual*	O	O			O		O			
graminoid	Poaceae	* *Poa pratensis*	Kentucky Bluegrass	* *Poa pratensis*		R			R					
graminoid	Poaceae	* *Polypogon monspeliensis*	Annual Beardgrass	* *Polypogon monspeliensis*	R	R						R		
graminoid	Poaceae	* *Setaria palmifolia*	Palm grass	* *Setaria palmifolia*		R					R			
graminoid	Poaceae	* *Setaria parviflora*		* *Setaria geniculata*	X	X	O	O	X		X			O
graminoid	Poaceae	* *Sorghum halepense*	Johnson Grass	* *Sorghum halepense*		R	micro-environment not recorded							
graminoid	Poaceae	* *Sorghum leiocladum*	Wild sorghum	* *Sorghum leiocladum*		R			R					
graminoid	Poaceae	* *Sporobolus africanus*	Parramatta Grass	* *Sporobolus africanus*	X	X				X				X
graminoid	Poaceae	* *Stenotaphrum secundatum*	Buffalo Grass	* *Stenotaphrum secundatum*	O	R					O			
graminoid	Poaceae	* *Triticum aestivum*	Common Wheat	* *Triticum aestivum*		R								R
graminoid	Poaceae	* *Vulpia bromoides*	Squirrel Tail Fescue	* *Vulpia bromoides*	X	X			X					X
graminoid	Poaceae	* *Vulpia myuros*	Rat's Tail Fescue	* *Vulpia myuros*	X	X			X					X
graminoid	Poaceae	*Amphibromus neesii*		*Amphibromus neesii*		R					R			
graminoid	Poaceae	*Aristida ramosa*	Purple Wiregrass	*Aristida ramosa*		R			R					
graminoid	Poaceae	*Aristida vagans*	Threeawn Speargrass	*Aristida vagans*	X	X		X	X					
graminoid	Poaceae	*Arundinella nepalensis*	Reedgrass	*Arundinella nepalensis*	R						R			
graminoid	Poaceae	*Austrodanthonia racemosa* var. *racemosa*		*Danthonia racemosa*		R		R						
graminoid	Poaceae	*Austrodanthonia setacea*	Smallflower Wallaby Grass	*Danthonia setacea*		O			O					
graminoid	Poaceae	*Austrostipa mollis*		*Stipa mollis*	R				R					

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
graminoid	Poaceae	*Austrostipa pubescens*		*Stipa pubescens*	X	X		X	O					
graminoid	Poaceae	*Austrostipa rudis* subsp. *nervosa*		*Stipa nervosa*	X	X	R	X	X					
graminoid	Poaceae	*Austrostipa scabra*		*Stipa scabra*		O		O	O					
graminoid	Poaceae	*Bothriochloa macra*	Red Grass, Red-leg	* *Bothriochloa macra*		R		R	R					
graminoid	Poaceae	*Chloris truncata*	Windmill Grass	*Chloris truncata*		X			X		X			
graminoid	Poaceae	*Cymbopogon refractus*	Barbed Wire Grass	*Cymbopogon refractus*		R	R	R	R					
graminoid	Poaceae	*Cynodon dactylon*	Couch, Bermudagrass	* *Cynodon dactylon*	X	X			X	X	X			X
graminoid	Poaceae	*Deyeuxia quadriseta*		*Deyeuxia quadriseta*	X	X		O	X					
graminoid	Poaceae	*Dichelachne micrantha*	Shorthair Plumegrass	*Dichelachne sciurea*	X	X	O	O	X	O	X			O
graminoid	Poaceae	*Dichelachne rara*		*Dichelachne rara*		R			R					
graminoid	Poaceae	*Digitaria parviflora*	Small-flowered Finger Grass	*Digitaria parviflora*		O		O						
graminoid	Poaceae	*Echinopogon caespitosus*	Bushy Hedgehog-grass	*Echinopogon caespitosus*	X	X	X	X						
graminoid	Poaceae	*Echinopogon ovatus*	Forest Hedgehog Grass	*Echinopogon ovatus*	X	X	X	X						
graminoid	Poaceae	*Entolasia marginata*	Bordered Panic	*Entolasia marginata*		O	O	O	R	R	O			
graminoid	Poaceae	*Entolasia stricta*	Wiry Panic	*Entolasia stricta*	X	X	O	X	X	X				O
graminoid	Poaceae	*Eragrostis brownii*	Brown's Lovegrass	*Eragrostis brownii*	X	X			X	X				X
graminoid	Poaceae	*Eragrostis leptostachya*	Paddock Lovegrass	*Eragrostis leptostachya*		O			O					
graminoid	Poaceae	*Eriochloa pseudoacrotricha*	Early Spring Grass	*Eriochloa pseudoacrotricha*	R	R			R					
graminoid	Poaceae	*Imperata cylindrica*	Blady grass	*Imperata cylindrica*	X	X	O	O	O	O	X			
graminoid	Poaceae	*Joycea pallida*	Silvertop Wallaby Grass	*Danthonia pallida*	R						R			
graminoid	Poaceae	*Lachnagrostis aemula*	Blowngrass	*Agrostis aemula*	X	X		O	X		X			O
graminoid	Poaceae	*Lachnagrostis filiformis*		*Agrostis avenacea*	X	X		O	X		X			O
graminoid	Poaceae	*Microlaena stipoides*	Weeping Grass	*Microlaena stipoides*	X	X	X	X	X		X			
graminoid	Poaceae	*Notodanthonia longifolia*	Long-leaved Wallaby Grass	*Danthonia longifolia*		R	micro-environment not recorded							

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
graminoid	Poaceae	*Notodanthonia tenuior*		*Danthonia purpurascens*	X	X		O	O	X				O
graminoid	Poaceae	*Oplismenus imbecillis*	Creeping Beard Grass	*Oplismenus imbecillis*		R	micro-environment not recorded							
graminoid	Poaceae	*Panicum simile*	Two-colour Panic	*Panicum simile*	R				R					
graminoid	Poaceae	*Paspalidium aversum*		*Paspalidium aversum*		R		R						
graminoid	Poaceae	*Paspalum distichum*	Water Couch	*Paspalum paspaloides*		O						O		
graminoid	Poaceae	*Phragmites australis*	Common Reed	*Phragmites australis*		X					X			
graminoid	Poaceae	*Poa affinis*		* *Poa affinis*	R	R			R		R			
graminoid	Poaceae	*Poa sieberiana* var. *sieberiana*	Snowgrass	*Poa sieberana* var. *sieberana*	O	O		O	O	O				
graminoid	Poaceae	*Sporobolus elongatus*	Slender Rat's Tail Grass	*Sporobolus elongatus*	O	O			O					
graminoid	Poaceae	*Themeda australis*	Kangaroo Grass, Durawi (D'harawal)	*Themeda autralis*	X	X	R	O	X	R	R			O
graminoid	Poaceae	*Urochloa foliosa*	Leafy Panic	*Brachiaria foliosa*		R					R			
graminoid	Xanthorrhoeaceae	*Xanthorrhoea resinosa*	grass tree	*Xanthorrhoea resinosa* ssp. *concava*	O	O	R	O	O		O		O	
graminoid	Iridaceae	* *Crocosmia x crocosmiiflora*	Montbretia	* *Crocosmia x crocosmiiflora*	R								R	
groundlayer fern	Adiantaceae	*Adiantum aethiopicum*	common maidenhair fern	*Adiantum aethiopicum*		X	R				X			
groundlayer fern	Adiantaceae	*Cheilanthes tenuifolia*	Rock Fern	*Cheilanthes tenuifolia*	X	X	X	X	O					
groundlayer fern	Adiantaceae	*Pellaea falcata*	sickle fern	*Pellaea falcata*		X					R			
groundlayer fern	Davalliaceae	* *Nephrolepis cordifolia*	Fishbone Fern	* *Nephrolepis cordifolia*	R						R			
groundlayer fern	Dennstaedtiaceae	*Pteridium esculentum*	Bracken, Gurgi (Cadigal)	*Pteridium esculentum*	R	O					O		R	
herb	Acanthaceae	*Brunoniella australis*	Blue trumpet	*Brunoniella australis*		X	X							
herb	Acanthaceae	*Brunoniella pumilio*	Dwarf Brunoniella	*Brunoniella pumilio*		O	O							
herb	Aizoaceae	* *Aptenia cordifolia*	Baby Sun Rose	* *Aptenia cordifolia*		O	O							
herb	Alliaceae	* *Allium neapolitanum*	Flowering Onion	* *Allium neapolitianum*	R								R	

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
herb	Alliaceae	* *Nothoscordum borbonicum*	Onion weed	* *Nothoscordum inodorum*	X	O					X			O
herb	Amaranthaceae	* *Amaranthus hybridus*	Slim amaranth	* *Amaranthus hybridus*		O								O
herb	Amaranthaceae	*Alternanthera denticulata*	Lesser joyweed	*Alternanthera denticulata*		O						O		
herb	Amaryllidaceae	* *Hippeastrum puniceum*		* *Hippeastrum x equestra*		O					O			
herb	Amaryllidaceae	* *Leucojum aestivum*	Snowflake	* *Leucojum aestivum*		R					R			
herb	Amaryllidaceae	* *Narcissus pseudonarcissus*	Daffodil	* *Narcissus ?jonquilla*		R	R				R			
herb	Anthericaceae	*Arthropodium milleflorum*	Pale Vanilla-lily	*Arthropodium milleflorum*		O	O	O						
herb	Anthericaceae	*Caesia parviflora*	Pale Grass-lily	*Caesia parviflora*	O	X			X					
herb	Anthericaceae	*Caesia parviflora* var. *vittata*		*Caesia vittata*		O			O					
herb	Anthericaceae	*Laxmannia gracilis*	Slender Wire Lily	*Laxmannia gracilis*	O	O		O	O					
herb	Anthericaceae	*Thysanotus tuberosus*	Common Fringe Lily	*Thysanotus tuberosus*	O	O		O	O					
herb	Apiaceae	* *Apium graveolens*	Celery	* *Apium graveolens*		R					R			
herb	Apiaceae	* *Cyclospermum leptophyllum*	Slender Celery	* *Apium leptophyllum*	O	O			O		O			O
herb	Apiaceae	* *Foeniculum vulgare*	Fennel	* *Foeniculum vulgare*	R	X				R	X			R
herb	Apiaceae	* *Hydrocotyle bonariensis*		* *Hydrocotyle bonariensis*	R						R			
herb	Apocynaceae	* *Vinca major*	Greater Periwinkle	* *Vinca major*	O								O	
herb	Araceae	* *Zantedeschia aethiopica*	Arum Lily	* *Zantedeschia aethiopica*		R					R			
herb	Asparagaceae	* *Asparagus officinalis*	Asparagus	* *Asparagus officinalis*	R	X	R	X						
herb	Asteraceae	* *Ageratina adenophora*	Crofton Weed	* *Eupatorium adenophorum*	O	O		O			O			
herb	Asteraceae	* *Arctotheca calendula*	Capeweed	* *Arctotheca calendula*	X	X								X
herb	Asteraceae	* *Artemisia vulgaris*	Chinese Wormwood	* *Artemisia vulgaris*		X					X			
herb	Asteraceae	* *Aster subulatus*	Wild Aster	* *Aster subulatus*		X								X
herb	Asteraceae	* *Bidens pilosa*	Cobblers Pegs	* *Bidens pilosa*	X	X	O	O			X			
herb	Asteraceae	* *Bidens subalternans*	Greater Beggar's Ticks	* *Bidens subalternans*		O					O			

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herb	Asteraceae	* *Cichorium intybus*	Chicory	* *Cichorium intybus*		R								R
herb	Asteraceae	* *Cirsium vulgare*	Spear Thistle	* *Cirsium vulgare*	O	O		O			O			O
herb	Asteraceae	* *Conyza bonariensis*	Flaxleaf Fleabane	* *Erigeron bonariensis*	O	O	O	O		O				O
herb	Asteraceae	* *Conyza sumatrensis*	Tall Fleabane	* *Erigeron floribundus*	O	O						O		O
herb	Asteraceae	* *Coreopsis lanceolata*	Coreopsis	* *Coreopsis lanceolata*	X			O	X				X	
herb	Asteraceae	* *Facelis retusa*	Annual trampweed	* *Facelis retusa*	O	O	O	O						
herb	Asteraceae	* *Gamochaeta purpurea*	Purple Cudweed	* *Gnaphalium purpureum*	X	X	O	O	X					
herb	Asteraceae	* *Helianthus annuus*	Common Sunflower	* *Helianthus annuus*		O					O			O
herb	Asteraceae	* *Hypochaeris glabra*	Smooth Catsear	* *Hypochaeris glabra*	O	O	micro-environment not recorded							
herb	Asteraceae	* *Hypochaeris microcephala*	White Flatweed	* *Hypochaeris microcephala*	R					R				
herb	Asteraceae	* *Hypochaeris radicata*	Catsear, Flatweed	* *Hypochaeris radicata*	X	X	X	X	X					X
herb	Asteraceae	* *Silybum marianum*	Variegated Thistle	* *Silybum marinanum*		R								R
herb	Asteraceae	* *Soliva anthemifolia*	Dwarf Jo-jo,	* *Soliva anthemifolia*	O	O								O
herb	Asteraceae	* *Soliva sessilis*	Jo-jo, Bindyi	* *Soliva pterospermax*	O	O								O
herb	Asteraceae	* *Sonchus asper*	Prickly Sowthistle	* *Sonchus asper*	O	O		O						O
herb	Asteraceae	* *Sonchus oleraceus*	Common Sowthistle	* *Sonchus olearaceus*	X	X	O	X						
herb	Asteraceae	* *Tragopogon porrifolius*	Salsify, Oyster Plant	* *Tragopogon porrifolius*		R								R
herb	Asteraceae	* *Vellereophyton dealbatum*	White Cudweed	* *Gnaphalium candidissimum*	X						X			
herb	Asteraceae	*Brachyscome linearifolia*		*Brachycome angustifolia* A.Cunn. ex DC. var. *angustifolia*		O	O							
herb	Asteraceae	*Calotis cuneifolia*	Purple Burr-daisy	*Calotis cuneifolia*	O	X								X
herb	Asteraceae	*Calotis lappulacea*	Yellow Burr-daisy	*Calotis lappulacea*		O			O					
herb	Asteraceae	*Centipeda minima*	Spreading Sneezeweed	*Centipeda minima*		O					O			

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herb	Asteraceae	*Chrysocephalum apiculatum*	Common Everlasting	* *Helichrysum apiculatum*	X	X		O	X					
herb	Asteraceae	*Coronidium scorpioides*	Button Everlasting	* *Helichrysum scorpioides*	X	X		O	X					
herb	Asteraceae	*Cotula australis*	Common Cotula	*Cotula australis*	X	X		O	X					X
herb	Asteraceae	*Cotula coronopifolia*	Water Buttons	*Cotula coronopifolia*	X	X					X			
herb	Asteraceae	*Euchiton gymnocephalus*		* *Gnaphalium japonicum*	X	X	O	O	X					
herb	Asteraceae	*Lagenophora stipitata*	Blue Bottle-daisy	*Lagenophora stipitata*		X	X							
herb	Asteraceae	*Picris angustifolia subsp. angustifolia*		* *Picris hieracioides*		R	micro-environment not recorded							
herb	Asteraceae	*Pseudognaphalium luteoalbum*	Jersey Cudweed	* *Gnaphalium luteoalbum*	X	X	O	O	X					X
herb	Asteraceae	*Senecio hispidulus*	Hill Fireweed	*Senecio hispidulus*	O	X	X	X			X			
herb	Asteraceae	*Senecio linearifolius*	Fireweed	*Senecio linearifolius*		R		R						
herb	Asteraceae	*Senecio pinnatifolius* var. *pinnatifolius*		*Senecio lautus*	O	O			O					
herb	Asteraceae	*Senecio quadridentatus*	Cotton Fireweed	*Senecio quadridentatus*		O		O						
herb	Asteraceae	*Solenogyne bellioides*		*Solenogyne bellioides*		O		O						
herb	Asteraceae	*Triptilodiscus pygmaeus*	Common sunray	*Helipterum australe*		O								O
herb	Asteraceae	*Vernonia cinerea*		*Vernonia cinerea*		X	X	X						
herb	Asteraceae	*Vittadinia dissecta*		*Vittadinia triloba*		O		O						
herb	Asteraceae	*Vittadinia muelleri*		*Vittadinia muelleri*		O				O				
herb	Boraginaceae	* *Myosotis sylvatica*	Forget Me Not	* *Myosotis sylvatica*		R								R
herb	Brassicaceae	* *Alyssum maritima*	Sweet Alyssum	*Alyssum maritimum*		R								R
herb	Brassicaceae	* *Brassica fruticulosa*	Twiggy Turnip	* *Brassica fruticulosa*		O					O			
herb	Brassicaceae	* *Brassica juncea*	Indian Mustard	* *Brassica juncea*		O					O			
herb	Brassicaceae	* *Brassica rapa* subsp. *sylvestris*	Turnip	* *Braccica rapa* ssp. *campestris*		O					O			
herb	Brassicaceae	* *Capsella bursa-pastoris*	Shepherd's Purse	* *Capsella bursa-pastoralis*		O								O
herb	Brassicaceae	* *Coronopus didymus*	Lesser Swinecress	* *Coronopus didymis*	O	O								O
herb	Brassicaceae	* *Lepidium bonariense*		* *Lepidium bonariense*	O	O			O					O

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herb	Brassicaceae	* *Rapistrum rugosum*	Turnip Weed	* *Rapistrum rugosum*	O									O
herb	Brassicaceae	* *Sisymbrium officinale*	Hedge Mustard	* *Sisymbrium officinale*		R								R
herb	Brassicaceae	* *Sisymbrium orientale*	Indian Hedge Mustard	* *Sisymbrium orientale*		R								R
herb	Brassicaceae	*Cardamine lilacina*		*Cardamine intermedia*		O	O							
herb	Campanulaceae	*Wahlenbergia communis*	Tufted Bluebell	*Wahlenbergia communis*	X	X	X	X	X	O				
herb	Campanulaceae	*Wahlenbergia gracilis*	Sprawling Bluebell	*Wahlenbergia gracilis*	X	X	X	X	X					
herb	Campanulaceae	*Wahlenbergia stricta*	Australian Bluebell	*Wahlenbergia stricta*		R		R						
herb	Cannaceae	* *Canna indica*	Tous-les-mois Arrowroot	* *Canna indica*		R					R			
herb	Cannaceae	* *Canna* spp.		* *Canna* spp.		R					R			
herb	Caryophyllaceae	* *Cerastium glomeratum*	Mouse-ear Chickweed	* *Cerastium glomeratum*		O			O					
herb	Caryophyllaceae	* *Paronychia brasiliana*	Chilean Whitlow Wort	* *Paronychia brasiliana*	O									O
herb	Caryophyllaceae	* *Petrorhagia nanteuilii*		* *Petrorhagia nanteuilii*	X	X		X	X					
herb	Caryophyllaceae	* *Petrorhagia velutina*		* *Petrorhagia velutina*	O	X		X	X					
herb	Caryophyllaceae	* *Polycarpon tetraphyllum*	Four-leaved Allseed	*Polycarpon tetraphyllum*		O	O							
herb	Caryophyllaceae	* *Silene gallica* var. *gallica*		* *Silene anglica*	X	X			X					
herb	Caryophyllaceae	* *Spergularia rubra*	Sandspurry	* *Spergularia rubra*	O	O					O			
herb	Caryophyllaceae	* *Stellaria media*	Common Chickweed	* *Stellaria media*		O					O			
herb	Centrolepidaceae	*Centrolepis strigosa*		*Centrolepis strigosa*	R						R			
herb	Chenopodiaceae	* *Chenopodium album*	Fat Hen	* *Chenopodium album*	O	O		O						
herb	Chenopodiaceae	*Chenopodium trigonon*	Fishweed	*Chenopodium trigonon*	O	O					O			
herb	Chenopodiaceae	*Dysphania littoralis*		*Dysphania littoralis*		O				O				
herb	Chenopodiaceae	*Einadia hastata*	Berry Saltbush	*Rhagodia hastata*	O	X	X	X						
herb	Chenopodiaceae	*Einadia nutans* subsp. *linifolia*		*Rhagodia nutans*		O		O						
herb	Chenopodiaceae	*Einadia polygonoides*		*Chenopodium polygonoides*		O	O							
herb	Chenopodiaceae	*Suaeda australis*	Seablite	*Suaeda australis*	R									R

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herb	Clusiaceae	*Hypericum japonicum*		*Hypericum japonicum*	O	X	O	O	O					O
herb	Commelinaceae	* *Tradescantia fluminensis*	Wandering Jew	* *Tradescantia albiflora*	O	X		R			X			
herb	Convolvulaceae	*Dichondra repens*	Kidney Weed, Yilibili (D'harawal)	*Dichondra repens*	X	X	X	X	X		X			
herb	Crassulaceae	* *Bryophyllum delagoense*	Mother-of-millions	?* *Bryophyllum tubiflorum*	R	R					R		R	
herb	Crassulaceae	* *Crassula multicava*		* *Crassula multicava*	R	R					R		R	
herb	Crassulaceae	* *Sedum praealtum*		* *Sedum praeltum*	R	R					R		R	
herb	Crassulaceae	*Crassula sieberiana*	Australian Stonecrop	*Crassula sieberana*	R									R
herb	Droseraceae	*Drosera peltata*		*Drosera peltata*	O	O					O			O
herb	Euphorbiaceae	* *Chamaesyce prostrata*	Red Caustic Weed	* *Euphorbia prostrata*		R								R
herb	Euphorbiaceae	* *Euphorbia peplus*	Petty Spurge	* *Euphorbia peplus*	R	R								R
herb	Euphorbiaceae	*Chamaesyce drummondii*		*Euphorbia drummondii*		O				O				
herb	Fabaceae, Subfamily Faboideae	* *Lotus angustissimus*	Slender Birds-foot Trefoil	* *Lotus angustissimus*	X	X		X	X					
herb	Fabaceae, Subfamily Faboideae	* *Lotus subbiflorus*	Hairy Birds-foot Trefoil	* *Lotus hispidus*	O				O					
herb	Fabaceae, Subfamily Faboideae	* *Medicago polymorpha*	Burr Medic	* *Medicago polymorpha*	X	X			X					X
herb	Fabaceae, Subfamily Faboideae	* *Medicago sativa*	Lucerne, Alfalfa	* *Medicago sativa*	R	R			R					R
herb	Fabaceae, Subfamily Faboideae	* *Melilotus indicus*	Hexham Scent	* *Melilotus indica*	O	O			O					O
herb	Fabaceae, Subfamily Faboideae	* *Trifolium arvense*	Haresfoot Clover	* *Trifolium arvense*	R	R			R					R
herb	Fabaceae, Subfamily Faboideae	* *Trifolium campestre*	Hop Clover	*Trifolium campestre*	O	O			O		O			O
herb	Fabaceae, Subfamily Faboideae	* *Trifolium dubium*	Yellow Suckling Clover	* *Trifolium dubium*	X	X			X		X			X

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herb	Fabaceae, Subfamily Faboideae	* *Trifolium glomeratum*	Clustered Clover	* *Trifolium glomeratum*	X	X			X		X			X
herb	Fabaceae, Subfamily Faboideae	* *Trifolium pratense*	Red Clover	* *Trifolium pratense*	R	R			R					R
herb	Fabaceae, Subfamily Faboideae	* *Trifolium repens*	White Clover	* *Trifolium repens*	X	X			X		O			O
herb	Fabaceae, Subfamily Faboideae	* *Vicia hirsuta*	Hairy Vetch	* *Vicia hirsuta*	O	O			O		O			O
herb	Fabaceae, Subfamily Faboideae	* *Vicia sativa*		* *Vicia sativa*	O	O			O		O			O
herb	Fabaceae, Subfamily Faboideae	* *Vicia sativa subsp. nigra*	Narrow-leaved Vetch	* *Vicia angustifolia*	O	O			O		O			O
herb	Fabaceae, Subfamily Faboideae	* *Vicia tetrasperma*	Slender Vetch	* *Vicia tetrasperma*	O	O			O		O			
herb	Fabaceae, Subfamily Faboideae	*Zornia dyctiocarpa*	Zornia	*Zornia dyctiocarpa*		R			R					
herb	Fumariaceae	* *Fumaria muralis*	Wall Fumitory	* *Fumaria muralis*	O	O					O			
herb	Gentianaceae	* *Centaurium erythraea*	Common Centaury	* *Centaurium erythraea*	X	X		O	X					
herb	Gentianaceae	* *Centaurium tenuiflorum*		* *Centaurium tenuiflorum*	X	X		O	X					
herb	Geraniaceae	*Pelargonium inodorum*		* *Pelargonium inodorum*	O	X	X	X						
herb	Goodeniaceae	*Goodenia bellidifolia*		*Goodenia bellidifolia*	X	X			X					
herb	Goodeniaceae	*Goodenia hederacea*	Forest Goodenia	*Goodenia hederacea*	X	X		X	X					
herb	Goodeniaceae	*Goodenia heterophylla*		*Goodenia heterophylla*	R			R						
herb	Goodeniaceae	*Goodenia paniculata*	Branched Goodenia	*Goodenia paniculata*	X	X					X			
herb	Goodeniaceae	*Scaevola albida*	Pale Fan-flower	*Scaevola albida*		O	O							
herb	Haloragaceae	*Gonocarpus tetragynus*		*Haloragis teragyna*	X	O		O	X					
herb	Hypoxidaceae	*Hypoxis hygrometrica*	Golden Weather-grass	*Hypoxis hygrometrica*	O	X			X					
herb	Iridaceae	* *Freesia hybrid*	freesia	* *Freesia refracta var. odorata*	O	O		O	O					

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herb	Iridaceae	* *Gladiolus cuspidatus*		* *Gladiolus cuspidatus*	O	O					O			
herb	Iridaceae	* *Gladiolus marginatus*		* *Watsonia marginata*	O			O					O	
herb	Iridaceae	* *Iris germanica*	Tall Bearded Iris	* *Iris germanica*		R								R
herb	Iridaceae	* *Ixia ?capillaris*		* *Ixia ?capillaris*	O				O				O	
herb	Iridaceae	* *Ixia flexuosa*	corn lily	* *Ixia flexuosa*	O				O				O	
herb	Iridaceae	* *Ixia maculata*		* *Ixia x ?maculata*	O				O				O	
herb	Iridaceae	* *Romulea longifolia*	onion grass	* *Romulea longifolia*	X	X			X					
herb	Iridaceae	* *Sisyrinchium* sp. *A sensu James & Brown (1993)*	Scourweed	* *Sisyrinchium micranthum*	O	O					O			O
herb	Iridaceae	* *Sparaxis* spp.	Harlequin flower	* *Sparaxis* spp.		R			R					
herb	Iridaceae	* *Tritonia lineata*	Montbretia	* *Tritonia lineata*	X			X					X	O
herb	Iridaceae	* *Watsonia aletroides*		* *Watsonia alectroides*	R								R	
herb	Iridaceae	* *Watsonia meriana* (L.) Mill. *'Bulbillifera'*	Wild Watsonia	* *Watsonia bulbifera*	X	X			O		X			
herb	Iridaceae	* *Watsonia* spp.		* *Watsonia hybrids*	X			X					X	
herb	Iridaceae	*Patersonia longifolia*	Purple flag	*Patersonia longifolia*	X			X	X				X	
herb	Lamiaceae	* *Lavandula stoechas*	Italian Lavender	* *Lavandula ?vera*	R								R	
herb	Lamiaceae	* *Mentha x piperita*	Peppermint	* *Mentha x piperita*		O					O			
herb	Lamiaceae	* *Scutellaria racemosa*		* *Scutellaria racemosa*		X			X		X			
herb	Lamiaceae	* *Stachys arvensis*	Stagger Weed	* *Stachys arvensis*	O	X			X		X			
herb	Linaceae	* *Linum trigynum*	French Flax	* *Linum trigynum*	X	X		X	X					
herb	Linaceae	* *Linum usitatissimum*	Flax, Linseed	* *Linum usitatissimum*		R					R			
herb	Linaceae	*Linum marginale*	Native Flax	*Linum marginale*	O	O			O					
herb	Lobeliaceae	*Isotoma fluviatilis*	Swamp Isotoma	*Isotoma fluviatilis*		R					R			
herb	Lobeliaceae	*Lobelia anceps*		*Lobelia alata*	X	X	X	X	R					
herb	Lythraceae	*Lythrum hyssopifolia*	Hyssop Loosestrife	*Lythrum hyssopifolia*	O	O					O	O		
herb	Malvaceae	* *Malva parviflora*	Small-flowered Mallow	* *Malva parviflora*	O	O			O		O			O
herb	Malvaceae	* *Modiola caroliniana*	Red-flowered Mallow	* *Modiola caroliniana*	O	O			O		O			O
herb	Myrsinaceae	* *Anagillas arvensis*	Scarlet Pimpernel	* *Anagillas arvensis*	X	X					X			X

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
herb	Nyctaginaceae	* *Mirabilis jalapa*	Four o'clock Flower	* *Mirabilis jalapa*		R					R			
herb	Orchidaceae	*Diuris aurea*		*Diuris aurea*	X			X	X					
herb	Orchidaceae	*Diuris maculata*	Spotted Doubletail	*Diuris maculata*	O	O		O	O					
herb	Orchidaceae	*Diuris punctata*	Purple Donkey Orchid	*Diuris punctata*	R								R	
herb	Orchidaceae	*Diuris sulphurea*	Tiger Orchid, Hornet Orchid	*Diuris sulphurea*	R	R		R	R					
herb	Orchidaceae	*Diuris sulphurea var. brevifolia*		*Diuris brevifolia*	X	O		X	X					
herb	Orchidaceae	*Microtis parviflora*	Slender Onion Orchid	*Microtis parviflora*	X			X	X					
herb	Orchidaceae	*Microtis unifolia*	Common Onion Orchid	*Microtis unifolia*	X			X	X					
herb	Orchidaceae	*Orthoceras strictum*	Bird's-mouth Orchid	*Orthoceras strictum*	R			R						
herb	Orchidaceae	*Pterostylis nutans*	Nodding Greenhood	*Pterostylis nutans*		R		R						
herb	Orchidaceae	*Thelymitra pauciflora*	Slender Sun Orchid	*Thelymitra pauciflora*	X	R		X	X					
herb	Oxalidaceae	* *Oxalis articulata*		* *Oxalis articulata*	R	R							R	R
herb	Oxalidaceae	* *Oxalis corniculata*		*Oxalis corniculata*	X	X	O	O	O					
herb	Oxalidaceae	* *Oxalis debilis* var. *corymbosa*		* *Oxalis corymbosa*	R	R								R
herb	Oxalidaceae	* *Oxalis latifolia*		* *Oxalis latifolia*	R	R								R
herb	Oxalidaceae	* *Oxalis pes-caprae*		* *Oxalis pes-caprae*	R	R					R		R	R
herb	Oxalidaceae	* *Oxalis purpurea*		* *Oxalis purpurea*	R								R	
herb	Papaveraceae	* *Papaver hybridum*	Rough Poppy	* *Papaver hybridum*		R					R			R
herb	Papaveraceae	* *Papaver somniferum* subsp. *setigerum*	Poppy	* *Papaver setigerum*		R								R
herb	Phyllanthaceae	*Poranthera microphylla*		*Poranthera microphylla*	X	X	X	X	O					
herb	Phytolaccaceae	* *Phytolacca octandra*	Inkweed	* *Phytolacca octandra*	O	O	O	O			O			
herb	Plantaginaceae	* *Plantago coronopus*	Buck's-horn Plantain	* *Plantago coronopus*	R						R			
herb	Plantaginaceae	* *Plantago lanceolata*	Lamb's Tongues, Plantain	* *Plantago lanceolata*	X	X			X	O	X			X
herb	Plantaginaceae	*Plantago varia*		* *Plantago varia*		X			X					
herb	Polygonaceae	* *Polygonum arenastrum*	Wireweed	* *Polygonum arenastrum*	R						R			

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herb	Polygonaceae	* *Polygonum aviculare*	Wireweed	* *Polygonum aviculare*	O	O				O				O
herb	Polygonaceae	* *Rumex conglomeratus*	Clustered Dock	* *Rumex conglomeratus*	O	O			O		O			O
herb	Polygonaceae	* *Rumex crispus*	Curled Dock	* *Rumex crispus*	X	X			O		X			O
herb	Polygonaceae	*Persicaria decipiens*	Slender Knotweed	*Polygonum decipiens*	O	X					X			
herb	Polygonaceae	*Persicaria lapathifolia*	Pale Knotweed	*Polygonum x lapathifolium*	R	R					R			
herb	Polygonaceae	*Rumex brownii*	Swamp Dock	*Rumex brownii*	O	O			O					O
herb	Portulacaceae	*Portulaca oleracea*	Pigweed, Purslane	* *Portulaca oleracea*	X	R			X				X	R
herb	Primulaceae	*Primula malacoides*	Fairy Primrose	*Primula malacoides*		R	micro-environment not recorded							
herb	Ranunculaceae	*Ranunculus lappaceus*	Common Buttercup, Yarrakalgamba (D'harawal)	*Ranunculus lappaceus*		R		R			R			
herb	Rubiaceae	* *Richardia stellaris*		* *Richardia stellaris*	O	O			O					
herb	Rubiaceae	*Opercularia diphylla*		*Opercularia diphylla*	O	X	O	X	O					
herb	Scrophulariaceae	* *Misopates orontium*	Lesser Snapdragon	* *Misopates orontium*	O	O			O					
herb	Scrophulariaceae	* *Veronica persica*	Creeping Speedwell	* *Veronica persica*	O	O					O			O
herb	Solanaceae	* *Solanum nigrum*	Black-berry Nightshade	* *Solanum nigrum*	O	X	X	X						
herb	Solanaceae	*Solanum americanum*	Glossy Nightshade	*Solanum nodiflorum*		R					R			
herb	Stackhousiaceae	*Stackhousia viminea*	Slender Stackhousia	*Stackhousia viminea*	X	X		X	X					
herb	Stylidiaceae	*Stylidium graminifolium*	Grass Trigger-plant	*Stylidium graminifolium*	X			X	X				X	
herb	Tropaeolaceae	* *Tropaeolum majus*	Nasturtium	* *Tropaeolum majus*	R	R		R						
herb	Valerianaceae	* *Centranthus ruber*	Red Valerian	* *Cetranthus ruber*		O								O
herb	Verbenaceae	* *Verbena bonariensis*	Purpletop	* *Verbena bonariensis*	X	X		O	O		X			O
herb	Verbenaceae	* *Verbena officinalis*	Common Verbena	*Verbena officinalis*	O	O					O			
herb	Violaceae	*Viola betonicifolia*	Native Violet	*Viola betonicifolia*		O	O	R						
herb	Onagraceae	*Epilobium billardierianum* subsp. *cinereum*		*Epilobium cinereum*	O						O			

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herbs	Fabaceae, Subfamily Faboideae	* *Lupinus* spp.		* *Lupinus* sp.	R									R
shrub	Apocynaceae	* *Nerium oleander*	Oleander	* *Nerium oleander*		R			R					
shrub	Araliaceae	*Polyscias sambucifolia*	Elderberry ash	*Polyscias sambucifolia*	O	O	O	O	R					
shrub	Asparagaceae	* *Asparagus aethiopicus*	Asparagus 'Fern', Sprengeri Fern	* *Asparagus sprengeri*	R	R	R	R						
shrub	Asteraceae	* *Chrysanthemoides monilifera*	Bitou Bush, Boneseed	* *Chrysanthemoides moniliferum*	X	O		X					X	
shrub	Asteraceae	*Cassinia arcuata*	Sifton Bush, Chinese Shrub	*Cassinia arcuata*	X	X	R	O		X				
shrub	Asteraceae	*Olearia microphylla*		*Olearia microphylla*	O	X	X	X						
shrub	Asteraceae	*Ozothamnus diosmifolius*		* *Helichrysum diosmifolium*	X	X	O	X						
shrub	Caprifoliaceae	* *Abelia x grandiflora*	Abelia chinensis x Abelia uniflora	* *Abelia x grandiflora*		R	micro-environment not recorded							
shrub	Celastraceae	*Maytenus silvestris*	Orange Bark	*Maytenus cunninghamii*	X	X	O	X						
shrub	Ericaceae subfamily Stephelioideae	*Leucopogon lanceolatus* var. *lanceolatus*		*Leucopogon lanceolatus* var. *lanceolatus*		O					O			
shrub	Ericaceae subfamily Stephelioideae	*Monotoca scoparia*		*Monotoca scoparia*	R			R						
shrub	Euphorbiaceae	* *Ricinus communis*	Castor Oil Plant	* *Ricinus communis*	R	R					R			
shrub	Euphorbiaceae	*Homalanthus stillingiifolius*		*Omalanthus stillingiifolius*	R	R	R	R						
shrub	Fabaceae subfamily Caesalpiniodeae	* *Senna pendula* var. *glabrata*		* *Cassia coluteoides*	R	R					R			R
shrub	Fabaceae subfamily Mimosoideae	* *Acacia saligna*	Golden Wreath Wattle	* *Acacia saligna*	X			O	O				X	
shrub	Fabaceae subfamily Mimosoideae	*Acacia falcata*		*Acacia falcata*	X	X	O	X	O	X	O		O	O
shrub	Fabaceae subfamily Mimosoideae	*Acacia longifolia subsp. longifolia*	Sydney Golden Wattle	*Acacia longifolia var. longifolia*	X	X	O	X	X	O	O		O	O
shrub	Fabaceae subfamily Mimosoideae	*Acacia myrtifolia*	Myrtle Wattle	*Acacia myrtifolia*	O								O	

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shrub	Fabaceae subfamily Mimosoideae	*Acacia stricta*	Straight Wattle	*Acacia stricta*		R		R						
shrub	Fabaceae subfamily Mimosoideae	*Acacia suaveolens*	Sweet Wattle	*Acacia suaveolens*	R			R						
shrub	Fabaceae subfamily Mimosoideae	*Acacia ulicifolia*	Prickly Moses	*Acacia ulicifolia*	O	O	O	O		O			O	
shrub	Fabaceae, Subfamily Faboideae	* *Genista linifolia*	Flaxleaf Broom	* *Teline linifolia*	O									O
shrub	Fabaceae, Subfamily Faboideae	* *Genista monspessulana*	Montpellier Broom	* *Teline monspessulana*	O	O			O	O				O
shrub	Fabaceae, Subfamily Faboideae	* *Tephrosia grandiflora*		* *Tephrosia grandiflora*	R			R			R			
shrub	Fabaceae, Subfamily Faboideae	* *Ulex europaeus*	Furze, Gorse	* *Ulex europaeus*	O								O	
shrub	Fabaceae, Subfamily Faboideae	*Daviesia ulicifolia*	Gorse Bitter Pea	*Daviesia ulicifolia*	O	X	O	O	O	R				R
shrub	Fabaceae, Subfamily Faboideae	*Dillwynia juniperina*		*Dillwynia juniperina*	X	X	O	X	X	O				
shrub	Fabaceae, Subfamily Faboideae	*Hovea longifolia*	Rusty Pods	*Hovea longifolia*		O					O			
shrub	Fabaceae, Subfamily Faboideae	*Indigofera australis*	Australian Indigo, Duwabili (D'harawal)	*Indigofera australis*		O	O	O	O					O
shrub	Fabaceae, Subfamily Faboideae	*Podolobium ilicifolium*	Prickly Shaggy Pea	*Oxylobium ilicifolium*	O			O						
shrub	Fabaceae, Subfamily Faboideae	*Pultenaea villosa*	Hairy Bush-pea	*Pultenaea villosa*	X	X	R	O	O	X			O	O
shrub	Fabaceae, Subfamily Faboideae	*Viminaria juncea*	Native Broom	*Viminaria juncea*	R						R			

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shrub	Goodeniaceae	*Goodenia ovata*	Hop Goodenia	*Goodenia ovata*		R					R			
shrub	Loranthaceae	*Amyema gaudichaudii*		*Amyema gaudichaudii*	O	O	O	O						
shrub	Loranthaceae	*Dendrophthoe vitellina*		*Dendrophthoe vitellina*	O	O		O			O			
shrub	Loranthaceae	*Muellerina eucalyptoides*		*Muellerina eucalyptoides*	O	O	O	O						
shrub	Malaceae	* *Cotoneaster* spp.		* *Cotoneaster* sp.	R	R		R					R	
shrub	Malaceae	* *Rhaphiolepis indica*	Indian Hawthorn	* *Raphiolepis indica*	R								R	
shrub	Myrtaceae	*Callistemon citrinus*	Crimson bottlebrush	*Callistemon citrinus*	R		micro-environment not recorded							
shrub	Myrtaceae	*Callistemon linearis*	Narrow-leaved Bottlebrush	*Callistemon linearis*	O	O		O	O					
shrub	Myrtaceae	*Callistemon pinifolius*	Pine-leaved Bottlebrush	*Callistemon pinifolius*	O	O		O	O					
shrub	Myrtaceae	*Callistemon rigidus*	Stiff Bottlebrush	*Callistemon rigidus*	O	O		O	O					
shrub	Myrtaceae	*Callistemon salignus*	Willow Bottlebrush	*Callistemon salignus*	R	O	R	R			O			
shrub	Myrtaceae	*Kunzea ambigua*	Tick Bush	*Kunzea ambigua*	X	O				X				
shrub	Myrtaceae	*Leptospermum polygalifolium* subsp. *polygalifolium*	Tantoon	*Leptospermum flavescens*	O	O					O			
shrub	Myrtaceae	*Leptospermum trinervium*	Flaky-barked Tea-tree	*Leptospermum attenuatum*		O			X		O		X	
shrub	Myrtaceae	*Melaleuca armillaris*	Bracelet Honey-Myrtle	* *Melaleuca armillaris*	O	O			O					
shrub	Myrtaceae	*Melaleuca decora*		*Melaleuca decora*	X	X	X	X	O	O	O			
shrub	Myrtaceae	*Melaleuca ericifolia*	Swamp Paperbark	*Melaleuca ericifolia*		O					O			
shrub	Myrtaceae	*Melaleuca erubescens*		*Melaleuca erubescens*	O	O		O						
shrub	Myrtaceae	*Melaleuca hypericifolia*	Hillock Bush	*Melaleuca hypericifolia*	R		micro-environment not recorded							
shrub	Myrtaceae	*Melaleuca nodosa*	Prickly-leaved Paperbark	*Melaleuca nodosa*	X	X	X	X	X	O	O			
shrub	Myrtaceae	*Melaleuca thymifolia*	Thyme Honey-myrtle	*Melaleuca thymifolia*	X	O		O	O		X			
shrub	Nyctaginaceae	* *Bougainvillea* spp.		* *Bougainvillea* sp	R	R			R				R	
shrub	Ochnaceae	* *Ochna serrulata*	Mickey Mouse Plant	* *Ochna serrulata*	O	O	O	O						

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shrub	Oleaceae	* *Ligustrum sinense*	Small Leaved Privet	* *Ligustrum sinense*	R	O	R	R			O			
shrub	Oleaceae	*Notelaea ovata*		*Notelea ovata*		R		R						
shrub	Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush	*Breynia oblongifolia*	O	X	X	O						
shrub	Phyllanthaceae	*Phyllanthus gunnii*	Scrubby Spurge	*Phyllanthus gasstroemii*		X	X	X						
shrub	Pittosporaceae	*Bursaria spinosa*	Blackthorn, Sweet Bursaria, Kurwan (D'harawal)	*Bursaria spinosa*	X	X	O	X	O					
shrub	Pittosporaceae	*Pittosporum revolutum*	Rough fruit Pittosporum	*Pittosporum revolutum*	O	O	O	O						
shrub	Polygalaceae	* *Polygala myrtifolia*		* *Polygala myrtifolia*	R								R	
shrub	Polygalaceae	* *Polygala virgata*		* *Polygala virgata*	O						O		O	
shrub	Proteaceae	*Banksia oblongifolia*	Fern-leaved Banksia	*Banksia aspleniifolia*	R			R						
shrub	Proteaceae	*Banksia spinulosa* var. *spinulosa*	Hairpin Banksia	*Banksia spinulosa*	X			X						
shrub	Proteaceae	*Hakea sericea*	Needlebush	*Hakea sericea*	X	R		O		X	R			
shrub	Proteaceae	*Isopogon anemonifolius*	Broad-leaf Drumsticks	*Isopogon anemonifolius*	R			R						
shrub	Proteaceae	*Persoonia laurina*	Laurel Geebung	*Persoonia laurina*	R			R						
shrub	Proteaceae	*Persoonia linearis*	Narrow-leaved Geebung	*Persoonia linearis*		R					R			
shrub	Rhamnaceae	*Pomaderris ferruginea*	Rusty Pomaderris	*Pomaderris ferruginea*	unclear entry	R		R			R			
shrub	Rhamnaceae	*Pomaderris lanigera*	Woolly Pomaderris	*Pomaderris lanigera*		R					R			
shrub	Rhamnaceae	*Pomaderris prunifolia*	Plum-leaf Pomaderris	*Pomaderris prunifolia*	R			R						
shrub	Rosaceae	* *Photinia glabra*	Japanese Photinia	* *Photinia glabra*		R				R	R			
shrub	Rosaceae	* *Rosa* spp.		* *Rosa spp.*	O	R					R		O	R
shrub	Rosaceae	* *Rubus laciniatus*	Cut-leaf Blackberry	* *Rubus vulgaris*	O	O		R			O		O	
shrub	Rosaceae	* *Spiraea cantoniensis*	May Bush	* *Spiraea cantoniensis*	R	R							R	R
shrub	Rutaceae	*Asterolasia correifolia*		*Asterolasia correifolia*		R					R			
shrub	Rutaceae	*Correa reflexa* var. *reflexa*	Native Fuchsia	*Correa reflexa* var. *reflexa*		O	O	O		R				
shrub	Rutaceae	*Zieria smithii*		*Zieria smithii*		O		R			O			
shrub	Santalaceae	*Exocarpos cupressiformis*	Cherry Ballart, Native Cherry	*Exocarpos cupressiformis*	R	O	R	O						
shrub	Santalaceae	*Exocarpos strictus*	Pale-fruit Ballart, Dwarf Cherry	*Exocarpos strictus*		R		R						

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shrub	Sapindaceae	*Dodonaea triquetra*	Large-leaf Hop Bush	*Dodonaea triquetra*		X	X	X						
shrub	Solanaceae	* *Cestrum aurantiacum*	Orange Cestrum	* *Cestrum aurantiacum*	R	R	R				R			
shrub	Solanaceae	* *Cestrum parqui*	Green Cestrum, Green Poisonberry	* *Cestrum parqui*	site not recorded		R				R			
shrub	Solanaceae	* *Lycium ferocissimum*	African Boxthorn	* *Lycium ferocissimum*		R				R				
shrub	Solanaceae	* *Solanum mauritianum*	Wild Tobacco Bush	* *Solanum mauritianum*		R	R				R			
shrub	Solanaceae	* *Solanum pseudocapsicum*	Madeira Winter Cherry	* *Solanum pseudocapsicum*		O	R	O						
shrub	Sterculiaceae	*Rulingia dasyphylla*	Kerrawang	*Rulingia pannosa*	R	X	X	R						
shrub	Thymelaeaceae	*Pimelea linifolia*	Slender Rice Flower	*Pimelea linifolia*	R	X	O	X	X					
shrub	Verbenaceae	* *Lantana camara*	Lantana	* *Lantana camara*	R	O	O							
shrub	Verbenaceae	* *Lantana montevidensis*	Trailing Lantana	* *Lantana montevidensis*	R								R	
shrub	Fabaceae subfamily Mimosoideae	* *Acacia podalyriifolia*	Queensland Silver Wattle	* *Acacia podalyriifolia*	R									R
shrub	Fabaceae subfamily Mimosoideae	* *Acacia pycnantha*	Golden Wattle	* *Acacia pycnantha*	O				O				O	
shrub	Fabaceae subfamily Mimosoideae	*Acacia longissima*	Long-leaf Wattle	*Acacia longissima*	R					R				
shrub	Fabaceae subfamily Mimosoideae	*Acacia pubescens*	Downy Wattle	*Acacia pubescens*	O	X	O	X		R				
shrub	Myoporaceae	*Myoporum insulare*	Boobialla	*Myoporum insulare*		R	R				R			
shrub	Myrsinaceae	*Myrsine variabilis*		*Rapanea variabilis*	O	O	O	O						
shrub	Zamiaceae	*Macrozamia spiralis*		*Macrozamia spiralis*	O	O	O	O	O					
shrub, vulnerable	Ericaceae subfamily Stephelioideae	*Epacris purpurascens* var. *purpurascens*		*Epacris purpurascens* var. *purpurascens*	O			O						
subshrub	Apiaceae	*Platysace ericoides*		*Platysace ericoides*	X			X	X				X	
subshrub	Dilleniaceae	*Hibbertia aspera*	Rough Guinea Flower	*Hibbertia aspera*	O	O		O	O	O				O
subshrub	Dilleniaceae	*Hibbertia diffusa*	Wedge Guinea Flower	*Hibbertia diffusa*		R		R						
subshrub	Dilleniaceae	*Hibbertia pedunculata*		*Hibbertia pedunculata*	O	O		O	O					

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subshrub	Ericaceae subfamily Stephelioideae	*Astroloma humifusum*	Native Cranberry	*Astroloma humifusum*	X	O				X				
subshrub	Ericaceae subfamily Stephelioideae	*Leucopogon juniperinus*	Prickly Beard-heath	*Leucopogon juniperinus*	O	O	O	O						
subshrub	Ericaceae subfamily Stephelioideae	*Lissanthe strigosa*	Peach Heath	*Lissanthe strigosa*	X	X		X	X					
subshrub	Fabaceae subfamily Mimosoideae	*Acacia brownii*	Heath Wattle	*Acacia brownii*	O	O	O	O		O				
subshrub	Fabaceae, Subfamily Faboideae	*Bossiaea buxifolia*		*Bossiaea buxifolia*		O			O					
subshrub	Fabaceae, Subfamily Faboideae	*Bossiaea prostrata*		*Bossiaea prostrata*	O	O		O	O					
subshrub	Fabaceae, Subfamily Faboideae	*Chorizema parviflorum*	Eastern Flame Pea	*Chorizema parviflorum*	O	O		O	O					
subshrub	Fabaceae, Subfamily Faboideae	*Dillwynia parvifolia*		*Dillwynia parvifolia var. parvifolia*	X		X	X	O					
subshrub	Fabaceae, Subfamily Faboideae	*Gompholobium glabratum*	Dainty Wedge Pea	*Gompholobium glabratum*		O			O					
subshrub	Fabaceae, Subfamily Faboideae	*Gompholobium minus*	Dwarf Wedge Pea	*Gompholobium minus*	R			R						
subshrub	Fabaceae, Subfamily Faboideae	*Mirbelia rubiifolia*	Heathy Mirbelia	*Mirbelia rubiifolia*	R						R			
subshrub	Fabaceae, Subfamily Faboideae	*Pultenaea retusa*	Notched Bush-pea	*Pultenaea retusa*	R	R			R					R
subshrub	Geraniaceae	* *Pelargonium asperum*	Rose Geranium	* *Pelargonium aspera*	R								R	
subshrub	Geraniaceae	* *Pelargonium x domesticum*	Pelargonium	* *Pelargonium domesticum*	R	R							R	R
subshrub	Haloragaceae	*Gonocarpus longifolius*		*Haloragis villosa*	R				R					
subshrub	Malvaceae	* *Sida rhombifolia*	Paddy's Lucerne	* *Sida rhombifolia*	X	X	O	O			O			O

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
subshrub	Myoporaceae	*Eremophila debilis*	Winter Apple, Amula	*Myoporum debile*		O	O	O						
subshrub	Picrodendraceae	*Micrantheum ericoides*		*Micrantheum ericoides*	X			X						
subshrub	Pittosporaceae	*Rhytidosporum procumbens*		*Marianthus procumbens*	R		micro-environment not recorded							
subshrub	Rubiaceae	*Opercularia aspera*	Coarse Stinkweed	*Opercularia aspera*		R		R						
subshrub	Rubiaceae	*Opercularia varia*	Variable Stinkweed	*Opercularia varia*		R					R			
subshrub	Rubiaceae	*Pomax umbellata*		*Pomax umbellata*	X		X							
subshrub	Rutaceae	*Boronia polygalifolia*	Dwarf Boronia	*Boronia polygalifolia*		O	O							
subshrub	Solanaceae	* *Solanum linnaeanum*	Apple of Sodom	* *Solanum sedomaeum*		R								R
subshrub	Sterculiaceae	*Lasiopetalum parviflorum*		*Lasiopetalum parviflorum*	R	X	X	R						
succulent	Agavaceae	**Agave americana*	Century plant	**Agave americana*	R								R	
succulent	Asphodelaceae	**Aloe* spp.		**Aloe* sp.	R	R				R				
succulent	Cactaceae	* *Opuntia stricta*	Prickly Pear, Smooth Pest Pear	* *Opuntia stricta*		R					R			R
tree	Amygdalaceae	* *Prunus domestica*	Plums	* *Prunus domestica*		R					R			
tree	Amygdalaceae	* *Prunus persica*	Peach, Nectarine	* *Prunus persica*		R					R			
tree	Araucariaceae	**Araucaria bidwillii*	Bunya Pine	**Araucaria bidwillii*	R								R	
tree	Araucariaceae	**Araucaria columnaris*	Cook Pine	**Araucaria columnaris*	R		micro-environment not recorded							
tree	Arecaceae	* *Phoenix canariensis*	Canary Island Date Palm	* *Phoenix canariensis*	R			R			R		R	
tree	Casuarinaceae	*Allocasuarina littoralis*	Black She-oak	*Casuarina littoralis*	R			R						
tree	Casuarinaceae	*Allocasuarina torulosa*	Forest Oak	*Casuarina torulosa*	R	R	R	R						R
tree	Casuarinaceae	*Casuarina glauca*	Swamp Oak	*Casuarina glauca*	X	O					X			
tree	Fabaceae subfamily Mimosoideae	**Acacia baileyana*	Cootamundra Wattle	**Acacia baileyana*	R	R		R						R
tree	Fabaceae subfamily Mimosoideae	*Acacia binervia*	Coast Myall	*Acacia glaucescens*	R	R	R	R	R		R			R
tree	Fabaceae subfamily Mimosoideae	*Acacia decurrens*	Black Wattle, Green Wattle	*Acacia decurrens*	O	X	O	O	O	O	O		O	O

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
tree	Fabaceae subfamily Mimosoideae	*Acacia parramattensis*	Sydney Green Wattle	*Acacia parramattensis*	X	X	O	X	X		O		O	O
tree	Fabaceae subfamily Mimosoideae	* *Erythrina crista-galli*	Cockspur Coral Tree	*Erythina* sp.	R	R					R		R	
tree	Fabaceae, Subfamily Faboideae	* *Robinia pseudoacacia*	Black Locust	* *Robinia pseudoacacia*	X								X	
tree	Fabaceae, Subfamily Faboideae	*Jacksonia scoparia*	Winged Broom-pea	*Jacksonia scoparia*		R	R		R					
tree	Lauraceae	* *Cinnamomum camphora*	Camphor Laurel	* *Cinnamomum camphora*	O	R			O		O		O	O
tree	Lythraceae	* *Lagerstroemia indica*	Crepe Myrtle	* *Lagerstroemia indica*	R	R							R	R
tree	Moraceae	* *Morus alba*	White Mulberry	* *Morus alba*		R		R			R			
tree	Moraceae	* *Morus nigra*	Black Mulberry	* *Morus nigra*		R		R						
tree	Myrtaceae	* *Eucalyptus cinerea*	Argyle Apple	*Eucalyptus cinerea*	R	R	micro-environment not recorded							
tree	Myrtaceae	* *Eucalyptus cladocalyx*	Sugar Gum	*Eucalyptus cladocalyx*	O	R	micro-environment not recorded							
tree	Myrtaceae	* *Eucalyptus globulus Labill.* var. *globulus*	Tasmanian Blue Gum	*Eucalyptus globulus ssp. globulus*	R		micro-environment not recorded							
tree	Myrtaceae	* *Eucalyptus globulus* subsp. *pseudoglobulus*	Victorian Eurabbie	*Eucalyptus globulus* ssp. *st johnii*	O	O	micro-environment not recorded							
tree	Myrtaceae	* *Eucalyptus grandis*	Flooded Gum	*Eucalyptus grandis*	O		micro-environment not recorded							
tree	Myrtaceae	* *Eucalyptus leucoxylon*	Yellow Gum	*Eucalyptus leucoxylon*		R	micro-environment not recorded							
tree	Myrtaceae	* *Eucalyptus maidenii*	Maiden's Gum	* *Eucalyptus globulus* ssp. *maidenii*		R	micro-environment not recorded							
tree	Myrtaceae	* *Eucalyptus melanophloia*	Silver-leaved Ironbark	*Eucalyptus melanophloia*		R	micro-environment not recorded							
tree	Myrtaceae	* *Eucalyptus melliodora*	Yellow Box	*Eucalyptus melliodora*	O	O							O	

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
tree	Myrtaceae	* *Eucalyptus microcorys*	Tallowwood	*Eucalyptus microcorys*	X	X							X	X
tree	Myrtaceae	* *Eucalyptus nicholii*	Narrow-leaved Black Peppermint	*Eucalyptus nicholii*	O	O	micro-environment not recorded							
tree	Myrtaceae	* *Eucalyptus saligna*	Sydney Blue Gum	* *Eucalyptus saligna*	O	O			O				O	
tree	Myrtaceae	* *Eucalyptus smithii*	Ironbark Peppermint, Gully Gum	*Eucalyptus smithii*	R		micro-environment not recorded							
tree	Myrtaceae	* *Tristania conferta*	Brush Box	* *Tristania conferta*	O								O	
tree	Myrtaceae	*Angophora bakeri*	Narrow-leaved Apple	*Angophora bakeri*	X			O		O	X		O	
tree	Myrtaceae	*Angophora costata*	Sydney Red Gum, Smooth-barked Apple	*Angophora costata*	O	O	micro-environment not recorded							
tree	Myrtaceae	*Angophora floribunda*	Rough-barked Apple	*Angophora floribunda*	R	X	R	R	R	O	X			
tree	Myrtaceae	*Corymbia citriodora*	Lemon-scented Gum	* *Eucalyptus citriodora*	X	O		O		O			X	O
tree	Myrtaceae	*Corymbia gummifera*	Red Bloodwood	*Eucalyptus gummifera*	R		micro-environment not recorded							
tree	Myrtaceae	*Corymbia maculata*	Spotted Gum	*Eucalyptus maculata*	X	O	micro-environment not recorded							
tree	Myrtaceae	*Eucalyptus acaciiformis*	Wattle-leaved Peppermint	*Eucalyptus acaciaformis*	O	O	micro-environment not recorded							
tree	Myrtaceae	*Eucalyptus amplifolia*	Cabbage Gum	*Eucalyptus amplifolia*		O	R	R		O	O			
tree	Myrtaceae	*Eucalyptus botryoides*	Bangalay	*Eucalyptus botryoides*	O	O	micro-environment not recorded							
tree	Myrtaceae	*Eucalyptus crebra*	Narrow-leaved Ironbark, Muggago (D'harawal)	*Eucalyptus crebra*		R	micro-environment not recorded							
tree	Myrtaceae	*Eucalyptus elata*	River Peppermint	*Eucalyptus elata*		R	micro-environment not recorded							
tree	Myrtaceae	*Eucalyptus eugenioides*	Thin-leaved Stringybark	*Eucalyptus eugenioides*	X	X	O	O	O	O	O		O	O

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
tree	Myrtaceae	*Eucalyptus eximea*	Yellow Bloodwood	*Eucalyptus eximea*	R		micro-environment not recorded							
tree	Myrtaceae	*Eucalyptus fibrosa*	Red Ironbark	*Eucalyptus fibrosa*	X	X	X	X			O			
tree	Myrtaceae	*Eucalyptus globoidea*	White Stringybark	*Eucalyptus globoidea*	X	O	O	X		O	O		O	
tree	Myrtaceae	*Eucalyptus longifolia*	Woollybutt	*Eucalyptus longifolia*	X	X	X	X					O	
tree	Myrtaceae	*Eucalyptus moluccana*	Grey Box, Terriyergro (D'harawal)	*Eucalyptus moluccana*	R	X	X	X			O			
tree	Myrtaceae	*Eucalyptus paniculata*	Grey Ironbark	*Eucalyptus paniculata*	O	R		O					O	
tree	Myrtaceae	*Eucalyptus parramattensis*	Parramatta Red Gum	*Eucalyptus parramattensis*	R			R					R	
tree	Myrtaceae	*Eucalyptus pilularis*	Blackbutt	*Eucalyptus pilularis*	R	R	micro-environment not recorded							
tree	Myrtaceae	*Eucalyptus punctata*	Grey Gum	*Eucalyptus punctata*	R	O	O	O					R	
tree	Myrtaceae	*Eucalyptus resinifera*	Red Mahogany	*Eucalyptus resinifera*	X	X	X	X			X			
tree	Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany	*Eucalyptus robusta*	X	X	micro-environment not recorded							
tree	Myrtaceae	*Eucalyptus sclerophylla*	Hard-leaved Scribbly Gum	*Eucalyptus sclerophylla*	O			O						O
tree	Myrtaceae	*Eucalyptus sideroxylon*	Mugga Ironbark	*Eucalyptus sideroxylon*	O	O		R						
tree	Myrtaceae	*Eucalyptus* spp. - a *scribbly gum*		*Eucalyptus* sp. - a *scribbly gum*	R		micro-environment not recorded							
tree	Myrtaceae	*Eucalyptus tereticornis*	Forest Red Gum, Buringoa (D'harawal	*Eucalyptus tereticornis*	O	R	R	R	O				O	O
tree	Myrtaceae	*Eucalyptus viminalis*	Ribbon Gum	*Eucalyptus viminalis*		R	micro-environment not recorded							
tree	Myrtaceae	*Melaleuca linariifolia*	Flax-leaved Paperbark, Budjur (Gadigal)	*Melaleuca linariifolia*	O	O					O			
tree	Myrtaceae	*Melaleuca quinquenervia*	Broad-leaved Paperbark	*Melaleuca quinquenervia*	O				O					
tree	Myrtaceae	*Melaleuca styphelioides*	Prickly-leaved Tea Tree	*Melaleuca styphelioides*	O	X	X	X	O		O			

Growth form	Current Family	Current Name	Common Name	Price's species names	Cemetery	Duck River	Low woodland, Duck River	Ti-tree & eucalypt scrub	Grasslands	Exposed soils & subsoils	Drainage lines, permanent water edges	Permanent & transient sheets of water	Graves, RW cemetery	Dumped soil, road & track edges
tree	Myrtaceae	*Syncarpia glomulifera*	Turpentine	*Syncarpia glomulifera*	X	R	X	X	O					
tree	Oleaceae	*Notelaea longifolia*	Large Mock-olive	*Notelea longifolia*	X	X	O	X	O					
tree	Phyllanthaceae	*Glochidion ferdinandi*	Cheese Tree	*Glochidion ferdinandi*		R	R							
tree	Pinaceae	* *Pinus halepensis*	Aleppo pine	* *Pinus halepensis*	O								O	
tree	Pinaceae	* *Pinus pinaster*	Cluster Pine	* *Pinus pinaster*	O								O	
tree	Pinaceae	* *Pinus pinea*	Stone Pine	* *Pinus pinea*	O								O	
tree	Pinaceae	* *Pinus radiata*	Radiata Pine	* *Pinus radiata*	O								O	
tree	Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum	*Pittosporum undulatum*	O	O	O	O						
tree	Salicaceae	* *Salix babylonica*	Weeping Willow	* *Salix babylonica*		O					O			
tree	Sterculiaceae	*Brachychiton populneus*	Kurrajong	*Brachychiton populneum*		R	R	R						
tree	Oleaceae	* *Ligustrum lucidum*	Large Leaved Privet	* *Ligustrum lucidum*	R	R	R	R						
				Number of exotics	185	214	27	51	81	17	113	9	53	102
				Number of natives	211	253	107	179	128	41	82	7	26	35
				Total species	396	467	134	230	209	58	195	16	79	137

Appendix 2

The Vegetation of Duck River and Rookwood Cemetery, Auburn (with a list of species)

G.A. Price

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Map I (Included in text) Location of sample areas
Map II (at rear) Duck and Haslems Creeks
Map III Duck River sample area (at rear)
Map IV Rookwood sample area (at rear)

The argument: The Auburn area carries the remnants of a much disturbed flora representative of that normally found in the wetter parts of the Wianamatta shales of the Cumberland Basin but there is also the remnants of a sandstone flora, particularly at Rookwood. The original type of vegetation was probably a tall woodland or dry schlerophyll forest in which the dominant trees were those of the drier parts of the Cumberland Basin (an *Eucalyptus moluccana-E.fibrosa* ssp. *fibrosa* Association) but a number of the subordinant tree species and many of the understorey plants were species of moister environments. There are no longer any stands of the original tall woodlands and the disturbed vegetation has been shaped largely by man and fire into grasslands (dominated by either native or exotic associations of grasses and herbs), ti-tree and eucalypt scrub (with Kunzea scrub a variant on exposed sub-soils) but in one area the scrub has evolved into a low woodland.

The Vegetation of Duck River and Rookwood Cemetery, Auburn

G.A.Price

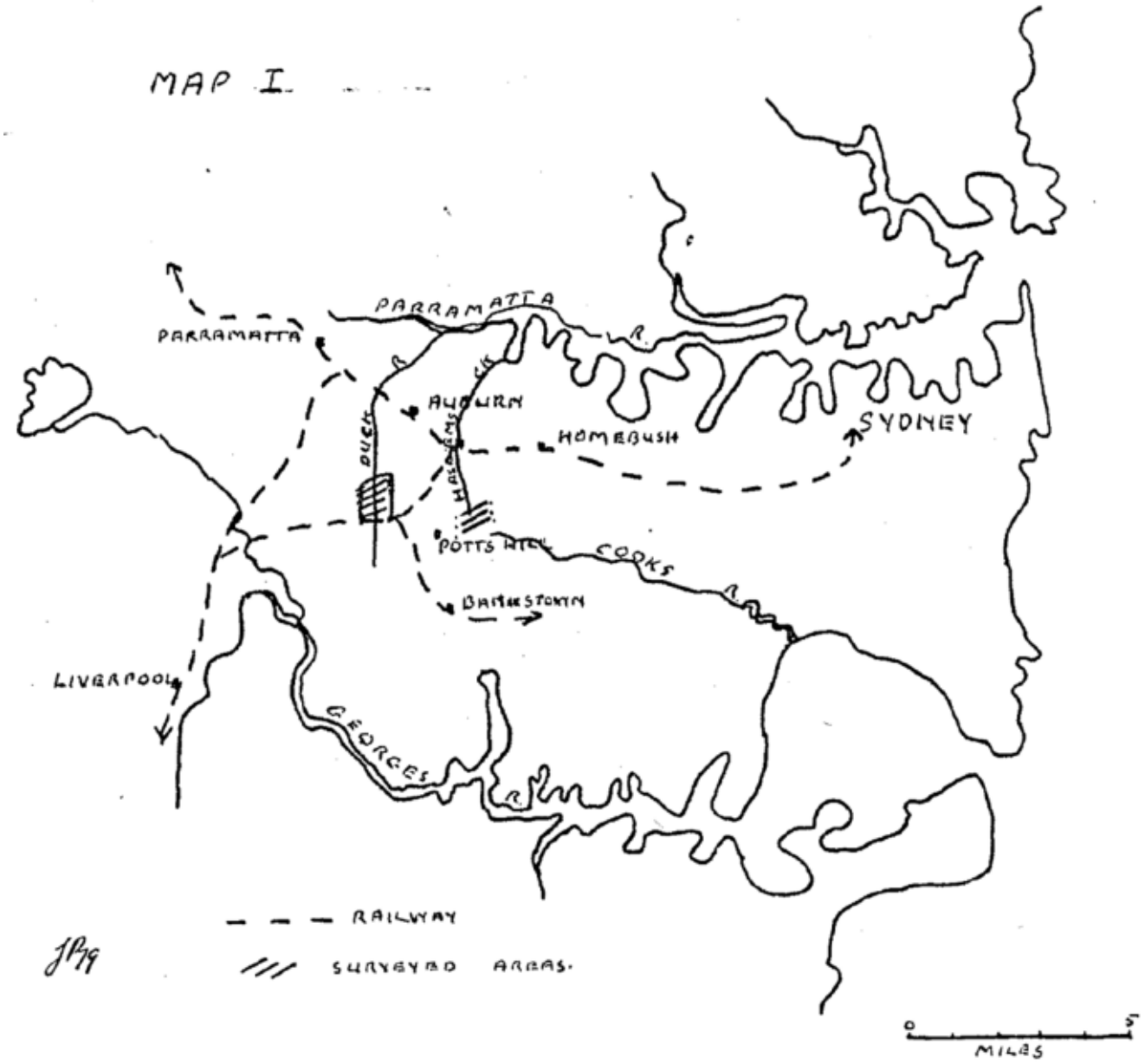
I. Location

The parts of the Rookwood Cemetery and the Duck River which have been surveyed are in the mid #-western suburbs of Sydney 12-14 miles W.S.W. of the city (see Map I). Both are part of the southwestern portion of the Parramatta River Basin butthe southern end of the Rookwood Cemetery extends over the divide between Haslem's and the Freshwater Creeks into the upper reaches of the Cooks River.

II. Landform, Geology and Soils

The Duck River and Haslem's Creek basins (see map II) form a V-shaped wedge of country that pivots in the south east on the sandstones exposed in the high country about Potts Hill by the warping and differential ersoion that has helped form the # Cumberland Basin. Outliers of sandstone-like rocks occur north of Potts Hill at such places as Phillips Hill (not seen) and the Presbyterian burial ground near Georges Avenue (a silicified siltstone). The Duck River has also cut down into a quite large stratum of sandstone that underlies and extends some distance beyond the survey area there. But none of the sandstones north of Potts Hill is massive, each apparently having a quite high clay content, and none has any obvious effect on the shape of the land. The dominant bedrock is the soft, easily eroded shales of the Wianamatta Series that are so deeply weathered that they are exposed only in railway cuttings (Rookwood, Regents Park, Chullora) and so little above base level that the land is nearly flat or gently undulating.

Both basins are poorly defined by gentle undulations little more than forty metres above sea level. The broad, almost flat plain rising gradually to the east and west and imperceptibly to the low undulations that still cut across the creeks' courses is largest on Duck River and encompasses the whole of the survey area there. The area in the Rookwood cemetery and the old State Hospital grounds is nearer to or onthe southern and eastern watershed of Haslem's creek so the country is more undulating. However, fingers of flat land extend well upstream into the cemetery from Lidcombe and are broader in the Carnarvon Golf Course (once part of the Hopstipal). The Duck River seems to have had a permanent flow these past three years though often it has been little more than a trickle of factory effluent and street drainage though that is pure enough these days to support freshwater fish and tortoise and the breeding of ducks on the deeper, broader reaches. Nonetheless, 'the river' above its # tidal basin is simply a stormwater channel for all that its natural banks have been kept in Auburn and Granville. Its l evel can change abruptly and flooding may occur below Chisolm Road after heavy storms once the catchment has become saturated. Haslem's Creek is a series of stormwater channels that flow after rain, even the most


MAP I.
PARRAMATTA
PARRAMATTA R.
AUBURN
HOMEBUSH
SYDNEY
DUCK
POTTS HILL
COOKS R.
BANKSTOWN
LIVERPOOL
GEORGES R.
RAILWAY
SURVEYED AREAS.
0
5
MILES

ephemeral gullies in the State Hoppital grounds and the Cemetery having been bricked.

Soils everywhere seem to be deep, as much as up to six to eight feet on even the Duck River sandstones, and seem always to be underlain by much decaying rock. To the eye, topsoils seem alike whatever the baserock and are a grey, vertically jointed, podsol-like 'A' horizon up to some 12-18 inches deep that protects a softer, more easily erodable subsoil. Subsoils seem more variablex in colour and texture but seem always to be clays - deep, tough, elastic red clays at 296 Park Road and on the xx northern slopes of Freshwater Creek, a yellowish-white and somewhat more crumbly clay once much valued by local tile and pipeworks on the Duck River sandstones. Since allthe soils seem to have a high clay content they are prone to crack widely and deeply in exposed places in dry weather, many of these fractures apparently persisting for years (Duck River, 296 Park Road) and sometimes become accentuated by erosion to give a peculiar raised and block-like appearance to the surface. In wet seasons all soils become saturated and most water runs off the surface rather than percolating into the subsoil. Fertility is moderate though I have not had any samples analysed. Yet, for all this apparent uniformity in the soils the remnants of a sandstone flora occur in the headwaters of Haslem's Creek and at Potts Hill but are less well represented on the Duck River. However, most of the species collected are those that are normally found on Wianamatta shales.

III. Climate

The average annual rainfall and temperature figures (see page 3) are those of an area with mild wet winters and warm wet summers and put the sample area towards the milder, wetter end of the specturm of climatic change that occurs from east to west in the Sydney Basin. Rainfall is sufficiently high for there once to have been a 'tall woodland' or 'forest' yet sufficiently variable, given the nature of the soils, for tree species from the drier west such as Eucalyptus moluccana, E.eugenioides, E. parramattensis and E. longifolia to mingle with others from wetter areas such as E.resinifera and Syncarpia glomulifera. Shrub species also range from plants such as Kunzea ambigua, Pultenaea villosa that grow well only in open, somewhat exposed situations to others such as Glochidion ferdinandi, Breynia oblongifolia and Notolaea longifolia which are normally plants of wet, shaded forests.

However, average figures of the sort given above are often less important for plants than the extremes they mask. Even over the past five years rainfall has been sufficiently variable for the totals for the years to be roughly 'average' though the soils have been waterlogged for months on end (as in the winter, spring, and early summer of 1976) and then to have gradually dried out and cracked deeply (late summer, early autumn of 1977). Exposure to sun and wind, particularly to the hot dry

north-westerlies in summer and cold dry south westerlies in winter can compound these problems of soil moisture and the stress that they can cause in plants. In the spring of 1977, for example, soils were deeply cracked and even the toughest of herbs and grasses were beginning to fail where the aspect was north westerly one without shelter. Yet scarcely fifty yards away in sheltered woodland soft species such as the maiden hair fern (Adiantum aethiopicum) were growing well in a topsoil which was still moist. Probably similar variations in temperature extremes can occur. Frost, for example, seems only to occur in open grasslands at Duck River and trees and shrubs there provide a great deal of shelter from chill southerlies in winter.

The survey was made during a cycle of wetter than average years and it may be that during droughts some of the plants adapted to moister environments might fail as the one colony of Pomaderris ferruginea on Duck River almost did during the dry spring of 1977. However, there would probably always be moister, more sheltered niches in which such species might survive or re-establish. Of course, it may be that at least some of the aberrant distributions given in the species list owe little or no thing to changes in rainfall and are due simply to the disturbed ecology of the bushland areas about Sydney and the changes in the habits of migratory birds and so on that this has caused.

IV. The micro-environments and their vegetation

(a) The creeks, waterholes, seasonally flooded lands and drainage lines

The permanent and transient sheets of water

Only in the deeper reaches of the Duck River is water permanent and deep enough for there to be soft, quite delicate but as yet unidentified water plants which survive despite repeated, quite violent flushing during every heavy fall of rain. Soft but pliant knotweeds (Polygonum decipiens, P. lapathifolium) and alligator weed (Alternanthera philoxeroides) rooted in the banks about low water level also seem able to regenerate after floods from a straggle of stripped stems by the following growing season, the alligator weed so successfully that it takes over much of the water surface by mid summer despite the CSIRO's control programme.

The areas of semi-permanent and transient sheets of water are equally difficult environments where changes in the depth of the water, the length of time it persists and the strength of its flow, if any, can be critical for the plants that grow there. Bull-rushes (Typha orientalis) grow well in the dams on Carnarvon Golf Course and the semi-permanent pond in the old shallow clay pit behind the Woolworth's factory on Duck River. A succession of wet seasons has also allowed quite small colonies to spread onto a few sites that are simply moist but the river in flood is too violent for them to have colonised the normally still waters behind the Princes Road weir. Saggitaria (Sagittarria graminea var weatheriana) has also adapated to the changing levels of the water in the Duck River clay pits.

-3a-

Data relating to Climate

Average figures are not published for stations near Auburn, so those for Sydney (12-14 miles to the east and by the sea) and Parramatta (4 miles to the west) are given.

line 1 Average Daily maximum temperature in degrees Fahrenheit
line 2 Average daily minimum temperature
line 3 Average daily mean temperature
line 4 Average index of mean relative humidity
line 5 Average daily 3 p.m. relative humidity
line 6 average monthly and Yearly rainfall in inches and points

	Jan	Feb	Mar	Ap.	May	Jun	Jul	Aug	Sep	Oct	Nov.	Dec	Year
	786	787	766	720	670	628	618	643	683	717	745	769	711
	651	655	629	577	524	481	464	476	514	559	598	632	563
	718	721	698	649	597	555	541	560	599	638	671	701	637
	68	71	72	71	70	68	67	64	62	63	65	68	66
	62	64	63	62	61	59	57	53	53	56	59	62	59
	386	315	444	565	498	368	489	241	277	280	254	363	4480
	832	8		747	690	640	627	662	713	754	788	821	741
	621	6		626	467	420	405	416	463	515	563	604	517
	727	7		37	579	530	516	539	588	635	675	713	629
	67			2	73	67	70	67	65	64	64	64	68
	333	33			298	276	322	210	212	234	241	287	3480

The monthly rainfall received and the number of days on which rain fell are available for the Clyde Wagon Maintenance Works (roughly the crossing of the Main Western Railway line on Duck River) and the Potts Hill Reservoir. However, rainfall figures are in millimetres. The average annual rainfall at Clyde is 994mm , that at Potts Hill 908mm .

Figure	Jan	Feb	Mar	Ap	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year's Total
	13	6	14	5	10	13	4	7	5	11	8	2	108
	120·3	71·0	28·0	1880	268·9	128·2	3·6	76·4	25·4	77·4	33·9	5·5	1280·53
	17	8	14	15	10	13	3	9	5	14	9	3	120
	118·0	73·8	26·0	136·7	182·0	128·1	5·6	92·4	20·4	66·2	51·2	6·9	1241·3
	4	11	14	10	3	13	4	9	8	10	9	8	103
	29·4	105·1	129·8	91·5	8·8	204·4	140·9	170	30·3	76·7	54·2	5·6	893·7
	7	13	15	12	4	13	6	8	10	11	11	4	115
	35·6	115·2	155·4	124·8	6·0	203·8	154·2	163	30·8	78·8	57·7	15·9	969·7
	14	13	13	6	4	7	9	5	8	17	12	4	112
	248·7	163·4	229·6	17·0	24·2	115·0	114·4	46	43·0	235·0	65·2	9·0	1289·1
	14	8	15	8	5	7	11	5	7	21	13	4	128
	243·7	170·2	244·7	28·9	23·7	112·7	128·3	72·2	39·7	189·2	93·2	24·4	1784·9
	11	9	8	2	8	9	2	2	12	3	7	6	79
	55·4	118·8	49·4	8·4	102	89·0	1·4	140	49·4	6·6	15·4	30·0	628
	10	9	7	3	10	12	3	3	14	5	8	6	90
	72·8	150·8	87·4	15·2	115·6	101·8	2·0	13·4	54·0	6·5	24·2	18·0	659·7
	13	6	13	8	9	13	4	4	13				
	238·0	188	28·0	67·0	84·6	27·2	15·3	9·2	36·1				
	13	9	15	10	9	13	4	7	14				
	247·4	35·7	38·4	80·1	80·2	35·4	10·1	15·6	77·6				

But I doubt that the water hyacinth (Eichhornia crassipes) and parrots feather (Myriophyllum brasiliense) in the small, quite shallow pond in xx the tip at Georges Avenue, Rookwood, are anything but recent jetsam from an acquarium that must fail. The quickly maturing rushes and sedge-like plants (Juncus capitatus, J. continuous, J. planifolius; Scirapus prolifer, S. inundatus, S. chlorostachyE) that grow in and abo ut the edge of this and other somewhat more transient sheets of water seem better adapted to the alternately flooded and sun-baked and cracked soils that occur in such areas. Goodenia paniculata, a fleshy rooted native perennial is competitive in somewhat similar situations if the water is less persistent. Other rushes, sedges and herbs grow well where bul ldozing, digging, wheelruts and erosion cause the soil to be under water too long for most other plants to survive. Some are drought-resistant perennials, others quick-growing annuals that can mature and seed surprisingly quickly, Cyperus tenellus being able to go through this cycle on uneven paths and grasslands during a long spell of wet weather. The seeds of other plants such as Senecio hispidulus and Erigeron floribundus can also be washed into these short-lived pools, germinate profusely after the water recedes, and then survive with varying degrees of success.

The edges of creeks and waterholes; other drainage lines

The Duck River has a profile that has been shaped by the great fluctuations in the volume o f water it has to carry. The bed is deeply incised ten to twenty feet below the plain and is either permanent pools, exposed clays and rock or shifting beds of silt and road gravel all confined between low inner banks. On one side or the other there is often a broad bench or long slope back to the outer rim of the creek and here moisture levels, humidity and perhaps nutrients tend to be at their highes t particularly if the banks are wooded and shaded. But the flow of water can be sufficiently violent to flatten shrubs and even undercut and topple trees particularly where the river's course has become unstable due to the east bank of the golf course having been reclaimed. Most woody plants, therefore, now perch about the rim of the upper bank though upstream a few survivors and sekeletons suggest that trees and tall shrubs once grew down to the inner bank. Back on the plain the natural drainage pattern has been truncated but not entirely replaced by culverts and stormwater channels. Thefo rty foot contour on map III outl ines the course o f four such gul lies, each of them broad and U-shaped, rarely more than four to six feet deep, but still long enough to carry up to eighteen inches of water in heavy storms and to remain moist with s eepage for some time after particularly where there is any shelter. Those on the west bank still flow into impermanent waterholes on their lower reaches of the sort that probably formed the swimming holes that once were found on Haslem's creek before they were replaced by stormwater channels and the waterworks of the Carnarvon Golf course.

These drainage lines seem to have been deliberately cleared of tall shrubs and trees particularly in the Cemetery where the scrub tends to occur in regimented stands well back from their edges. But the brickwork of the channels there often as not has blocked local surface drainage water which has eroded new natural lines alongside them.

Most of the plants collected can be found growing about these watercourses as well as in many other places. But others grow only on them, though for a variety of reasons. On the Duck River Hakea sericea and Persoonia linearis are riverside plants probably because only there are they much protected from the fires that have killed them off on the plain. Much the same reason may explain why the only specimens of Goodenia ovata, Asterolasia correifolia, Leucopogon lanceolatus, Pomaderris lanigera, Pomaderris ferruginea, and Hovea longifolia occur on the banks of the river or the deep drainage easement on its west bank. Or it may be that some of these species are there simply because birds coming into drink have passed seeds which they have brought in from outside the sample area. Floodwaters, too, have probably introduced a number of species to the banks of the river such as the Arum Lily (Zantedeschia aethiopica), the swamp lily (Crinum pedunculatum), the hippeastrum (Hippeastrum x equestre, Dutch hybrid (?), the snow flake (Leucojum aestivum) and the madeira vine (Anredera cordifolia). Other species, particularly many of the exotics, grow on these sites because they appear to need the moister soils, higher humidity and enriched soils found there if they are to survive or to be competitive.

So aggressive are some of these exotics that they they tend to be dominants which suppress and exclude many native plants. Where soils are moistest on Duck River creepers such as jasmine (Lonicera japonica), the balloon vine (Cardiospermum grandiflorum) and occasionally Myrsiphyllum asparagoides form layer on layer of runners so quickly that few herbs and small shrubs other than the reed (Phragmites australis), fennel (Foeniculum vulgare), and watsonia (Watsonia bulbifera) escape through this canopy whilst the larger shrubs and trees are weakened by it, particularly by the fires that the creepers carry up into their crowns. Where shade is dense the wandering jew (Tradescantia albiflora) also forms dense mats. A little higher up the banks prairie grass (Ceratochloa unioloides) can be equally aggressive in season as can kikuyu (Pennisetum clandestinum) wherever it spills over the banks from playing fields. A somewhat different range of exotics tends to be dominant on cleared drainage lines that are only seasonally moist, there usually being a paspalum-couch (Paspalum dilatatum-Cynodon dactylon) association of mainly exotic grasses and herbs on such sites. The two dominants in this association show a wide range of tolerance, either being competitive on soils that are continuously moist, both being capable of pioneering quite dry exposed sites particularly where the soil has been disturbed, but each seeming to be at its most vigorous where the soils are quite moist for much of its growing season. However, the two more important herbs

that form a substratum in this association on the Duck River (Scutellaria racemosa and Lotus angustissimum) seem to be moisture loving species that survive dry seasons either as seeds or as a fleshy root system. In Rookwood cemetery this association (but without skullcap, apparently) is often replaced by stands of Watsonia bulbifera so dense that they exclude most other plants. But this species also fails where soils are under water for any length of time and gradually thins out upslope to occasional scattered plants.

Apart from the common reed (Phragmites australis), which is found only within the banks of the Duck River, most of the native species that prefer moist soils seem tolerant of a range of habitats. Even quite soft, moisture loving herbs such as the pale knotweed (Polygonum decipiens) and the common ranunculus (Ranunculus lappaceus) can grow in places that are simply damp and sheltered whilst waterbuttons (Cotula coronopifolia) can grow if the soils are simply seasonally damp. Shrubs and trees such as Casuarina glauca, Callistemon salignus, Melaleuca linariifolia and Leptospermum flavescens seem tolerant of sites near permanent or seasonalwater, damp sites, or even slopes in the caseof the swamp oak. Tree species that obviously grow and reproduce best where there is permanent water (Angophora floribunda on Duck River) or about impermanent waterholes (the fine stand of Eucalyptus amplifolia about the gully at Wellington road) seem even more adapatable and able to extend out onto the undulating plain (New Street and St. Johns Road for the red gum, Kibo Reserve and Kingsland Road for the Angophora). Given the range of habitats towhich all these species can adapt probably none formed dominant stands on the permament and seasonalwatercourses but were simply more common in the original woodlands at these places. The stands of swamp oak in the Cemetery and those of Angophora floribunda and the red gum on Duck River seem recent and are probably due to disturbance.

(b) Exposed soils and subsoils.

Cool grass and scrub fires are constantly exposing thetopsoil but in most seasons it is quickly protected from damage by regeneration from roots, stems and seeds. Where it is not or where the subsoil is brought to the surface by erosion or interference the habitat becomes a far more difficult one for plants. Soils that become compacted, baked hard by the sun, and polished by the wind and the rain offer few rootholds other than the fractures that occur in these vertically structured soils. Subsoils are even more difficult for plants to colonise, particularly the subsoil s on the Duck River sandstone s. That rock breaks down into a finely divided clay that is sufficiently unstable on slopes for the surface run-off and perhaps even the impact of raindrops to undermine seedlings

or to overwhelm them with debris. The red clays are also easily eroded. On such sites each pioneering plant must result from a delicate balance that allows for the chance lodgement of a seed on bare and often sloping ground, its nurture by rains sufficient to keep it moist yet notthat heavy thatthey undermine or swamp the seedling, and shelter that neither suppresses it nor allows a few days of bright sunshine to dessicate the seedbed.

Yet plants can adapt to these exacting requirements and the tougher and more prolific among them can build up into quite large populations. If there is a source of seed even seedlings of tree species such as Eucalyptus eugenioides, E. amplifolia and Angophora floribunda take on the bared subsoil of the breakaways in the clay pits and gullies on Duck River, 1978 having been a particularly good year for the germination of Angophoras. Howeverx,shrub species are more usual with those species with seed that has adaptations that ensure it isspread wide perhaps being the first to co lonise such areas. Cassinia arcuata, which has wind blown seed, is often the most commonand tallest shrub and it may be that once established it attracts birds which bring in seed of the tougher wattles (Acacia falcata, A. longifolia, A. brownii, A. pubescens) and pea-flowered plants (Pultenaea villosa being the most common though Daviesia ulicifolia and Dillwynia juniperina may be present). Scattered tuftsand tussocks of tough native and exotic grasses are also well-represented (Danthonia purpurascens, Entolasia stricta, Eragrostis brownii, Dichelachne sciurea; Paspalum dilatatum, Cynodon dactylon),possbily because their seed is windblown or spread by animals, and there may be other ground cover such as Asteroloma humifusum and Hardenbergia violacea. But Kunzea ambigua, though often ultimately dominant on such soils, maybe absent if there are no fruiting specimens nearby as the seed seems spread mainly by windthrow orwater. Hakea sericea is an equally prolific species, if present, though how so large-seeded a species the seedlings of which are rarely found more than a few yards from their parents came to be so widespread in the district is a nice question. Indeed, many of the native species that grow in these exposed sites are so light-demanding and their seedlings so intolerant of overmoist and shady conditions that they may once have been chancesurvivors in the original woodland. But nowadays it is the very clearing and burning that once may have cause d an explosive increase in their numbers and spread them wide that threaten their very existence.

No doubt in the fullness of time the soils on these disturbed areas once reverted to an eucalypt woodland. Today that succession need not occur but may be checked by fire, further clearing, or be the interposition of a new and perhaps more stable phase, that of grasslands which include a high proportion of exotic species. On parts of the clay pits on the east bank of Duck River a form of the paspalum couch and herb association and a mixed pasture of those and native grasses such as

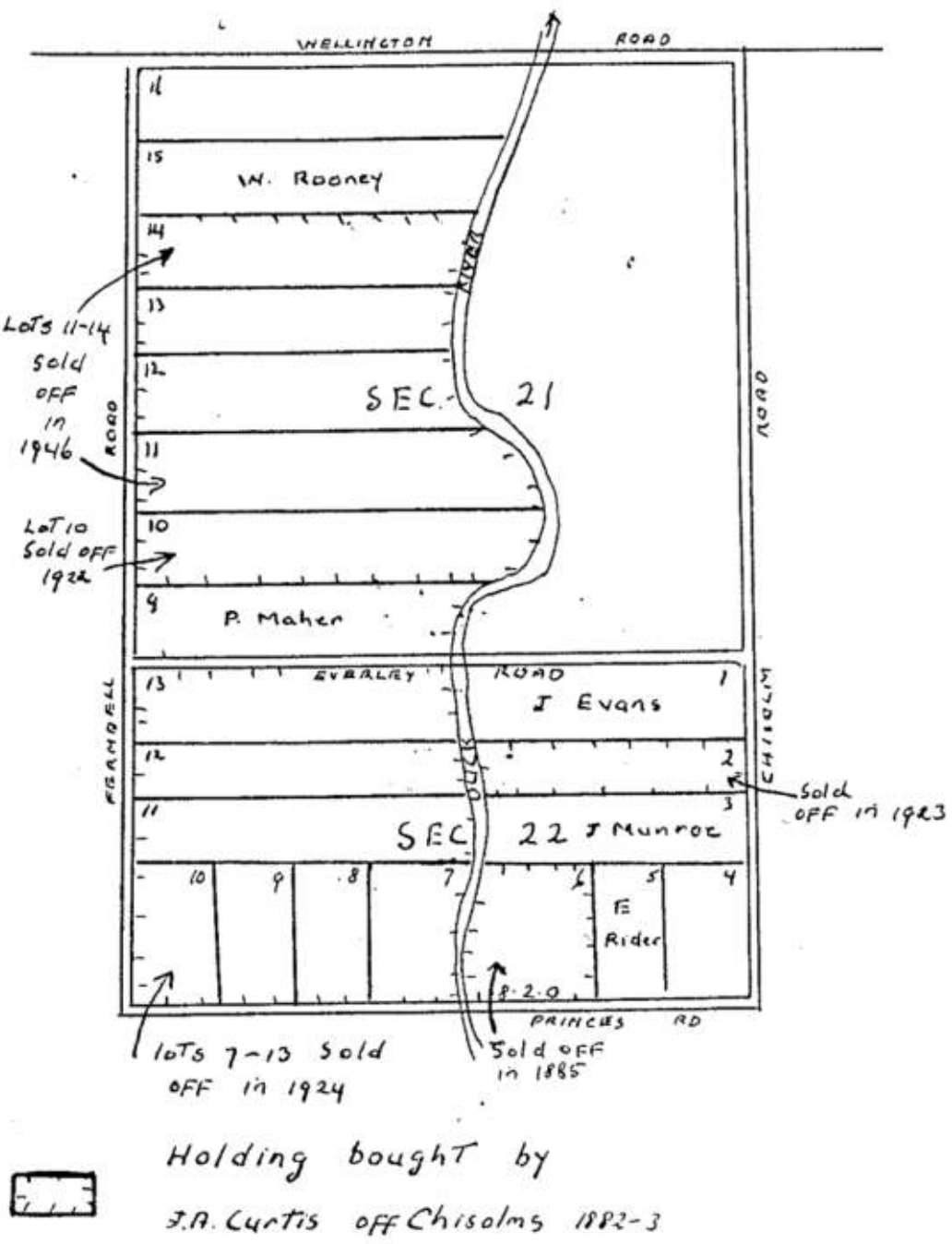
Dichelachne sciurea and Eragrostis brownii may well establish if the area is ever kept free of mini bikes. However, wherever Cassinia arcuata grows well in these pits and on parts of nearby sewerage and drainage easements it and its associates, Pultenaea villosa and the wattles, seem to be able to keep the grasses sufficiently in check for further shrub seedlings to take. It may be that these areas, once the soil profile becomes more mature, could in turn be invaded by Melaleucas or even eucalypts and ultimately become woodlands. But wherever the genes of Kunzea ambigua are present the sites with disturbed soil profiles would seem first to become Kunzea scrub, which is the typical vegetation type on much o f the southern slope of the Crematorium Hill and the rim of a small clay pit on Duck River at Princes Road.

Kunzea ambigua with its prolific regeneration, its need for intense light, its spreading habit of growth and dense canopy, its height, and the large amount of litter it sheds, quickly becomes dominant in these scrubs. Other taller shrubs such as the wattles, occasional melaleucas, particularly Melaleuca nodosa, Hakea sericea and Casuarina littoralis seem able to remain part of the community by their natural increase in height but are able to reproduce only where the ground is more open. Small shrubs such as Cassinia arcuata, Pultenaea villosa, Daviesia ulicifolia and the ground cover of Astroloma humifusum, Hardenbergia violacea, Danthonia purpurascens, Entolasia stricta and so on at best linger on before gradually being suppressed unlessthey are able to colonise the edges of the scrub. Tree species are rare in theexisting scrubs, but are so everywhere in the Cemetery and on the allotment on Duck River where the fragments of it occur. Seedlings of Angophora floribunda do occur cheek by jowl with the Kunzea at Princes road and eucalypt seedlings can establish on the soils of breakways but I have not seen them do so in direct competition with the scrub. However, the Kunzea, wattles and the like are relatively short-lived and the scrub would gradually be opened up by deaths, windthrow and fires to the invasion of other species, particularl y once the soil profile became more mature. Seedling eucalypts might only establish by chance, of course, but most seem to do that anyway. Ultimately they would tend to dominate and suppress the scrub and it would revert to eucalypt woodland in much the same way as some of the ti-tree scrubs are now doing.

(c) The P lain and Undulating Land

here the micro-environment seems dependent on and differs in each vegetation type. And the structre and composition of the vegetation, within the range of possibilities nature allows, is determined nowadays very much by man and fire.

At Rookwood 'the bush' and the 'burial grounds' have always been incompatible and 'the bush' also irreconcilable with the Victorians' concept of'a necropolis' as a beautiful garden of lawns, shrubberies,


LARGE HOLDINGS
CHISOLM ESTATE
DUCK RIVER
WELLINGTON ROAD
W. ROONEY
SEC. 21
P. Maher
EVERLEY ROAD
J Evans
SEC 22 J Munroe
E Rider
PRINCES RD
FERNDELL ROAD
CHISOLM ROAD
DUCK RIVER
LOTS 11-14 Sold OFF in 1946
LOT 10 Sold OFF 1922
Sold OFF in 1923
LOTS 7-13 Sold OFF in 1924
Sold OFF in 1885
Holding bought by
J.A. Curtis off Chisolms 1882-3

avenues of trees, ponds and fountains. Yet the bushland survived as manageable Themeda grasslands and depauperate scrubs along swampy drainage lines and gullies and out of sight over the watershed towards Chullora. It did so and now even encroaches onto the older burial grounds only because of a latterday preference for cremation that has left some waste land and impoverished the various denominational trusts. But fire, until recently, became the trusts' one economic tool of management and grasslands, scrubs, shrubberies and avenues have been indiscriminately burned for many years. Grasslands and scrubs survived, established an uneasy equilibrium with one another, and seemed likely to become permanent vegetation types until grave-digging became mechanised and bulldozers were able to make short shrift of both. The old State Hospital grounds (which once included the Carnarvon Golf Course) have been even more completely cleared of all but a few veteran trees and shrubs, perhaps because 'The Old Men's Home' was expected to be self-sufficient in vegetables, milk and cheese. However, it may well be that these areas and the cemetery were at least partly cleared for grazing much earlier as they were all part of the 1340 acres of the 2640 granted Richard Hyde Potts which were repurchased by the crown by (about 1860?).

On Duck River the relation between the present vegetation types and the past use of the land is much clearer. On Map III grasslands give way abruptly to gum and ti-tree scrub at the old property boundaries, the one stand of tall woodland that has re-established over some seventy years is on an unusable part of the Hillston market garden, and the one other area of low woodland is on an isolated part of a property on the west bank. Once the whole of the survey area was part of a 600 acre grant given in 1823 to James Chisolm, variously seargent in the NSW corps, proprietor of the Thistle inn in George street, businessman and then grazier. The grant ultimately became part of a larger estate, 'Everley', named after Chisolm's property at Redfern, but whether or not it was much cleared and worked in with the Chisolm family's other properties at Narellan, Goulburn and the Bland I can't say. But increasingly it became more profitable to subdivide and sell the land though, being low lying and near the river, it was surveyed into farmlets (see Diagram I) and not into suburban allotments of the sort that seemed likely for a time to turn the ridge towards Auburn into another middle class Arcadia like Strathfield. In 1882-3 all but eight of the twenty-one allotments into which the survey area was subdivided were sold to J.A. Curtis who, perhaps significantly, was a Sydney timber merchant and he, in turn, sold all but 8½ acres to Robert Chadwick in 1885. The various members of the Chadwick family (some of whome are sometimes described in the transfer documents as 'surveyors') held this property intact until 1922-4 when the southern allotments were sold but it was not until 1946 that they parted with the area which now includes the best preserved areas of bushland. That bush, I would guess, survived so long simply because it was on this large and possibly speculative

holding. The market gardeners, dairymen and the like usually could ill-afford to let their land lie idle.

If the exact chronology of all this destruction is in doubt its outcome is not. No stand of the original vegetation survived not even on the Hillston property where the fine group of eucalypts has regenerated since 1902 from a cleared but badly placed chicken farm. Most of the original species no doubt still occur as clearing with axe and fire without years of laborious grubbing and weeding is somewhat akin to sowing dragons' teeth. The native species able to regenerate from rootstocks, lignotubers and stumps range through the full gambit of growth forms from ferns, soft herbs, creepers and shrubs to all the dominant trees. Many of these and other species also seed profusely and would have found a cleared and burned seebed ideal for their regeneration. Proof of the native species' tough, enduring qualities lie both in the proportion they still form of the species list and the way in which they still exclude all but a few exotics from most stands of regenerated scrub. What was destroyed, and that probably quite quickly and perhaps irredeemably, was the structure and composition of the original vegetation. For what was once probably an area of tall woodland or dry schlerophyll forest dominated by a eucalyptus E. moluccana-E. fibrosa association has been reduced to mainly the grasslands and depauperate eucalypt and melaleuca scrubs shown on the maps. Both are unstable, the grasslands being prone to invasio n by shrubs and trees, the scrub having a propensity to revert into woodland. But fires are frequent, as often as once in two years if sufficient dead litter accumulates about the base of grass tussocks to fuel the cool grass that are most common. Most woody plants lack the chance to re-establish and raise their crowns above the flames before they are burned back once mosex. Those that are tall enough to be unaffected rarely have the girth to be free of the risk of being axed back to fire sensitive regeneration from stumps. Systematic clearing may have first formed the grasslands and scrubs but nowadays vandalism seems sufficient to keep them indefinitely as the dominant vegetation types in most places.

(1) The Grasslands

1. Grasslands in which almost pure stands of Themeda australis are dominant occur where the land has been cleared a long time and little interfered with other than by firing. In the Cemetery the largest areas are in the unused parts of the Independentand Methodist burial grounds but the species has also re-established its dominance on the western slopes of the Presbyterian burial ground no. 2 despite the massive disturbance there when it was in use between 1890 and 1910. On Duck River the one large stand of Themeda australis is back a little from Wellington Road and is more an open, low parkland with a scattered upperstorey of eucalypts and ti-tree. Elsewhere on the River most colonies of the grass are small and in open glades in the scrubs and woodlands. The two variants

of the species at Rookwood form discrete though adjoining populations, the one a much more robust, broader-leaved and more glaucous form, the other a finer, greener and smaller one which is the only form found on Duck River. Both are vigorous perennials that flower and seed prolifically in early summer unless burned in spring, a dry season seeming only to affect the height of the culms. Tussocks are closely spaced, leaves arch over between them to almost touch, root systems are fibrous and aggressive so that there is little light or surface moisture in an undistrubed stand for the seedlings of competing species or, indeed, for those of Themeda. Yet other species are often associated with the stands, many of them ground orchids (Diuris, Microtis & Thelymitra spp.), mainly at Rookwood), herbs with bulbs or corms (Hypoxis hygrometrica and naturalised South African plants such as Romulea longifolia, Freesia refracta, and Ixia, Watsonia and Tritonia spp., the latter three only at Rookwood), Patersonia longifolia (Rookwood), Xanthorrhoea and Lomandra spp.; and a few low shrubs that can survive if fires are not too frequent to stop them regenerating from rootstocks (Lissanthe strigosa, Chorizema parviflorum, Bossiaea buxifolia, & latysace ericoides, last species Rookwood only).

These grasslands persist only because they are often burned. Yet fire, when followed by wet weather probably helps to establish the seedlings of shrubs and trees which, were they able tosurvive and to build up into large popplations, would ultimately supress the light-demanding Themeda australis. But in the cemetery, so far, the balance seems to favour the grasses. Seedlings of some of the old avenue plantings such as Pinus radiata, and Eucalyptus saligna do establish but seem to have been no more able than the more common of the native eucalypts (Eucalyptus resinifera and E. tereticornis) in ~~xxxxxxxxxx~~ growing into fruiting and flowering specimens as distinct from transient populations of saplings. Angophora bakeri with its rough, more fire-resistant bark and its early flowering and fruitng habit might be more successful were it more widepread but, for whatever reason, it is not. Leptospermum attenuatum therefore is the one shrub species that has built up large populations of mature specimens but these are mainly in the burial grounds and in any case seem naturally to be scattered and to form crowns sufficiently open to be tolerant of the grass. Melaleuca nodosa probably poses the greatest potential threat to these grasslands being a species that is able to re-generate on a wide range of sites, one that is fast growing, quickto flower and well able to build up a population o f lignotubers that regenerate after fire and provide an environment suited to the establishment of other shrub species inwhich far more shade-tolerant grasses than Themeda are soonsupressed. But fires in the cemetery keepthe stands to heights barely more than one or two metres high and probably help confine them to the moister soakage lines. Some of the more common associates of Melaleuca nodosa in these small scrubs are themselves less of a threat to the grasslands as they are more fire-sensitive, this though the pinnate acacias (Acacia parramattensis, A. dealbata, A. pubescens) sucker from the old root system after fire and the heath-like pea flowered species such

Pultenaea villosa and P. microphylla re-generate profusely from seed. Yet they survive in the scrubs and in more sheltered places about the edges of the grasslands and with the kerbing of graveswhere the odds against their being burned are higher and could increase quite rapidly in numbers if fires were less frequent.

In the open parklands on Duck River the situation is more complex as the eucalypts (Eucalyptus moluccanna, E. fibrosa ssp. fibrosa, E. eugenioides E. longifolia, E. resinifera) and the ti-tree (Melaleuca decora) must once have been able to regenerate successfully for them to form an upper storey to the stand of Themeda australis. However, few gum or ti-tree seedlings appear to have established for quite some time and the stand comes close to having an even-aged appearance and may be the first phases of regeneration after these allotments were cleared when grasses may or may not have been as common as they are now. Most eucalypts are roughly fifteen to twenty-five feet high unless they have been axed or cut backby fire. The ti-treeis also old most of the plants being from perhaps eight to fifteen feet high though the population of smaller stems with diameters from 3-5cm is of indeterminate age as such fire-sensitive specimens can regenerate many times when damaged. The lack of young eucalypts is partly due to the absence of many mature, fruiting specimens but even where these are found there are no seedlings and few young plants. The ti-tree, though also slow to mature, does now flower freely and set seed and it may be there are no seedlings because the quite exacting conditionsthey need if they are to establish are not being met. Young plants of Melaleuca decora are rare everywhere in the district but the one congested, even-aged stand of several hundred specimens I have come across is on a site at Rookwood so seasonally moist that I wouldguess regeneration might be abundant in a period of quite wet weather on a suitable seed bed. But the most favourable seedbeds in these parklands are within the occasional small scrubs which already have a fairly full complement of shrubs. Here the canopy is closed and casts sufficient shade to exclude all grasses other than scattered tufts of shadetolerant species such as Entolasia marginata, E. stricta and Microlaena stipoides and there is much bare ground. Once the canopy is opened up by fire, the accumulated store of seed is better able to germinate on ground that has a mulch of scorched and partly burned ti-tree and gum leaves and the seedlings are the better able to survive as there is broken shade and no established root system near the surface. The nearby grasslands, when burned, are often deficient in seed, the ground tends to bare and unshaded at first, and such plants that do establish can be quickly overwhelmed by the leaves of the regenerating tussocks and deprived of moisture by their established, quite aggressive root systems. Clearly there is no one, simple explanation why the balance has been tilted in favour of the grasses in these parklands. But here, as at Rookwood, they form a micro-environment favourable to fire and, being in public places near residential areas

areas, are probably being burned so often that the tree and shrub species that otherwise would supplant thegrasses are now unable to re-establish their dominance.

ii. No onespecies of grass is dominant on cleared lands where the original grasses have been much disturbed by grazing, clearing, levelling and so on. Usually the mix is of native species (Dichelachne sieurea, Eragrostis brownii, E. phillipica, Agrostis aemula, A. avenacea, Aristida vagans, and Danthonia spp. particularly Danthonia purpurascens) with a larger proportion of exotics, particularly of the species that are dominant on the cleared, seasonally wet drainage lines (Paspalum dilatatum, Cynodon dactylon, Briza minor, Setaria geniculata). Themeda australis, if it occurs, tends to form small isolated colonies or solitary tussocks as it is killed off by over-grazing and does not easily re-establish on disturbed soils. The density of the sward varies with the season and the moisture status of the site and may be very close on drainage lines even in dry seasons but quitesparse and open in exposed places. Usually there are herbs, some of them such as Centaurium tenuiflorum, C. erythraea, Linum trigynum and Wisepates orontium tolerant of a wide range of sites, others such as Lotus angustissimus, Scutellaria racemosa andso on forming a substorey to the grasses on moistersoils. A variety of emergents such as the dock (Rumex crispus), Verbena bonariensis,, thistles (Sonchus spp. Cirsium vulgare) and rushes (Juncus spp.) also occur. Grasses such as Vulpia bromoides, V. myuros and Sporolobus africanus near tracks and kikuyu (Pennisetum clandestinum) near dumped spoil can build up quite sizeable local populations or even, in the case of kikuyu, exclude most competitors.

There seems to be an uneasy balance between the species in these stands. Differences in their growth habit and their seasonal flush of flowering no doubt help the low annual, Briza minor, and the shadder native perennial, Dichelachne sciurea, build up such large populations in a pasture which in winter often seems to be almost entirely coarse, leafy tussocks of paspalum. But their quick response to the first warm spring rains would probably be of little avail in the long run were the more aggressive but more warmth demanding paspalum not checked from becoming rank and choking out most of it competitors by repeated burning. The composition of the grassland also changes with the moisture status of the siteand might therefore also vary over a cycle of wet or dry years. The moistest sites are very much the preserve of the exotic grasses and herbs with only Agrostis spp. among the native grasses being at all common thoughboth Dichelachne sciurea and Microlaena stipoides may be present. But native species such as Dichelachne sciurea, Eragrostis brownii and Aristida vagans are much more successful on dry sites and are ableto bloom and set seed proflifically in a dry season such as that of 1978/9 when the paspalumand couch remain stunted and scarcely able to renew their crowns let alone form culms. In such

area s, indeed, these grasslands may be susceptible to invasion by Themeda australis. For that grass seems to be re-establishing on the dry ex osed soils along the southern boundary and along the tracks through the old dairy on Wellington Road at Duck River. And if such an invasion is possible during the recent cycle of wet years it is conceivable that in the past the grass could also re-establish its dominance on the well-drained slopes of the older burial grounds in the Cemetery.

Most of these areas seem to have been disturbed too recently for there to be much evidence of their having been invaded by shrubs or trees. However, about Overley Road on the east bank of Duck River a population of wattles (Acacia falcata, A . longifolia, A parramattensis) and pea-flowered species (Pultenaea villosa, Teline monspessulana) have built up among the grasses on dumped heaps of spoil. The same species and others from the rim of bushland along the river (Eucalyptus moluccana, E. eugenioides or E. globoidea, Angophora floribunda, Lomandra longifolia, and even Clematis aristata) are invading the grasses that have taken over the western end of the old Hillston market garden. However, both areas have been freefrom fire for at least three years, probably more. And though they suggest that grassland is only a transient vegetation type in this district the succession to woodland must surely be a very slow one as even the Hillston property, isolated though it is by the creek and road, has nonetheless suffered a quite violent fire in recent years that has killed or seriously weakned a number of large eucalypts, cut back the regenerating trees, and led to the formation of f a fairly mature second generation of wattles and pea-flowered species.

(2) Scrubs and low woodlands

Ti-tree and eucalypt scrub (or variants on it in which such species as Angophora bakeri and Syncarpia glomulifera are also dominants) is the most common typ e of vegetation on land that has been partly cleared or which has been recolonised by shrubs and trees. In places on the w est bank of Duck River the eucalypts have become dominant and are tall enough to form a low woodland.

A t their simplest the scrubs are dense stands dominatedby one or another of the three more important ti-trees, Melaleuca decora, M. nodosa and M. styphelioides. Scrubs in which thedominant storey is almost solely of Melaleuca nodosa are not as common as might be expected of this aggressive and tolerant species, the only one that is visibly and actively colonising new ground at present, but they do occur in Rookwood and as small stands on the Duck River. However, they are rarely taller than perhaps nine to fifteen feet and, as the stems and crowns are quite fire-sensitive, are at constant risk of being cut back by the flames, often to ground level. Melaleuca styphelioides is also fire sensitive

and an indifferent coloniser (and therefore, perhaps, has been eliminated from Rookwood) which is rarely a dominant shrub. But when freed from fire, as it has been by the exposed sub-soils of the deep drainage easement on the west bank of Duck River, it can form tall scrubs which so far are up to about fifteen to twenty feet high. Melaleuca decora, like M. nodosa is almost ubiquitous and often is dominant in taller scrubs up to fifteen to twenty feet high. Height for height it seems to be able to build up a stem with a greater diameter and perhaps a greater thickness of fire-resistant bark than either M. nodosa or M. styphelioides, its crown seems to have a distinctly better ability to re-establish if scorched and, despite its thick-stemmed, umbrageous habit in the open, can form slender stems and narrow crowns in dense stands that enable it to grow up into the canopy even of woodlands in competition with other species, particularly the eucalypts. More usually the scrubs are not monospecific stands of a dominant ti-tree but mixes of several of the species mentioned and the saplings of some of the rough-barked and fibrous barked trees that are most conveniently described as being 'ti-tree and eucalypt scrubs'. The trees (Eucalyptus fibrosa ssp. fibrosa, E. resinifera, Angophora bakeri, Syncarpia glomulifera, the latter two in Rookwood only; E. longifolia and E. moluccana) normally do not form fairly pure stands, the one exception being that in the Presbyterian cemetery dominanted by Angophora bakeri, a species which has reproduced so freely from seed and suckered so aggressively from the base after fires as to have formed a low scrub four to eight feet high. Elsewhere, the tree species have growth forms and a frequency that range from low, fire-sensitive growth from occasional lignotubers that may be part of the groundstorey in a scrub, through specimens that are co-dominants with Melaleuca decora in taller scrubs, to stands on the west bank of Duck River up to thirty five to forty feet high that are becoming dominants in their own right and forming either grassy low woodlands, usually where Melaleuca decora is an important element in the stand, or low shrubby woodlands where it is not.

The scrubs owe their form and their very existence to the ti-trees. The innate vigour, adaptability and persistence of the three main species have enabled them to profit most from the clearing of the original woodlands so that nowadays they are almost ubiquitous, dominant in most stages of the succession, and the species to whose ecology others, even the eucalypts, have to adapt if they are to survive. However, when young the ti-trees are rarely so dense that they are able to exclude or suppress other plants and usually there is a wide range of low shrubs, herbs and grasses present. Wiry panic (Entolasia stricta) is the grass most able to adapt to them but the shade tolerant meadow rice grass (Microlaena stipoides) is almost as common and usually there may be specimens of most of the native grasses collected present. Scattered herbs of open grassy places and the woodlands may also occur - such plants as the ground orchids (Microtis spp., Diuris spp., Thelymitra spp.)

and the trigger flower (Stylidium graminifolium) at Rookwood, various Lomandra spp. Dianella spp. ,xxx daisies (Senecio hispidulus, Vernonia cinerea, Solenogyne bellioides, Calotis cuneifolia),xxxx creepers such as Glycine spp. and Myrsiphyllum asparagoides andso on. Shrubs of open places such as the wattles, various pea-flowered species (Pultenaea spp., Daviesia ulicifolia, Dillwynia juniperina, Indigofera australis), Pimelea linifolia, daisies (Olearia microphylla, Helichrysum diosmifolium), blackthorn (Bursaria spinosa), bottlebrushes (Callistemon linearis, C. C pinifolius, even C. salignus) and the low growing Melaleucas (M. erubescens, M. thymifolia) are usually more common than specimens of species that prefer moister or more shady habitats such as Polyscias sambucifolius, Pittosporum undulatum and Breynia oblongifolia. But once the ti- tree becomes fire-free it may form a dense stand of even-aged stems, even if originally the scrub was a piecemeal aggregation of many genera tions of seedlings about a core of fruiting specimens and not the outcome of one profuse germination in an unusually good season, and those stems may form a canopy so complete as to supress most other plants unable to match their rates of growth. In some almost pure stands of Melaleuca nodosa on Duck River, for example, the canopy is rarely more than si x to ten feethigh and few plants other than tough herbs such as Dianella caerulea,xxx Lomandra spp. and a few tufts of tolerant grasses can linger on in the dense shade and the accumulation of litter. Low stands of Melaleuca decora and M. styphelioides can be equally intolerant of ground plants and low shrubs. But most scrubs are more diverse and more structured, the dense canopy of an upper storey of M. decora tending to be broken up by eucalypts and the taller wattles so there may be sufficient light for there to be a second storey of a few of the more fire-sensitive shrubs, including M. nodosa and M. styphelioides,and a little more ground cover.

Fire, to the extent that it helps keep the ti-tree in check, does much to diversify and restructure the scrubs. Even the densest of them may burn and have their canopies cut back, by a cool grass or litter fire if only about eight feet high or if there is a secondary storey of shrubs, by a crown fire if taller, and once the floor is opened up to light it forms a very favourable seedbed that is susc eptible to invasion by other plants. Often all that results is an ephemeral though flourishing ground cover of fire weeds from seed which has been washed or blown to the site or brought there by birds. On Duck River, where the store of such seed seems somewhat greater than that in most parts of Rookwood, the most common plants to appear are short-lived herbs such as Pelargonium inodorum, Polymeria odycina, Senecio hispidulus, Solanum spp. and occasional Phytolacca octandra but shrub species may also establish, Cassinia arcuata, Helichrysum diosmifolium, Olearia microphylla, Pimelia linifolia, Pultenaea villosa, Acacia falcata, and Acacia longifolia being among the more common ones.

Occasionally these seedlings may come up so profusely about the edges of a scrub as to choke the site and are gradually thinned out by lack of moisture and light as they compete with one another and with the regenetating basal suckers and crown shoots of the ti-tree. The plants, therefore, may be short-lived, but depending on when they establish and the seasons that follow some (usually the Cassinia, Pimilea, and some of the Helichrysum and Olearia) may bloom in their first year, others in their second or in following years, the wattles being the last to mature and often the only ones that are able to grow up into and diversify the canopy. More rarely, at least nowadays, eucalypt seedlings can invade the scrub of ti-tree in much the same way, there being occasional tall stands of Melaleuca decora in Rookwood where young, quite slender stemmed, small crowned and very fire sensitive specimens of Eucalyptus resinifera are fighting for a place in the canopy.

But fire can also simplify the scrubs if it is too violent or too frequent. On the west bank of the Duck River in the summer of 1975 (I would guess) a scrub fire killed off many of the emerging eucalypt dominants with stems of less than 10 cm. D.B.H. and reduced many others to lignotuberous regeneration that is now simply the equal of the original understorey of ti-tree. Populations of some of the fire-sensitive wattles and pea-flowered species also seem to be rebuilt only slowly after fires which in any case need to be at least less frequent than once every two years if the gene pool of even the most prolific and quick-maturing species is not to be put at risk and exhausted. Nevertheless, the interplay between fire and the natural growth habits of the ti-tree can also help create new opportunities for other species to recolonise even the densest, mono-specific scrub. By constantly pruning off the lowest branches, by weeding out weaker specimens, and by stimulating the more vigorous ti-trees to grow up wards the ground is gradually opened up to light and in this dappled shade a dense groundstorey can gradually develop, one that is probably the richer in species and growth forms of eucalypts are common in these tall shrubs and low woodlands as their canopy is more open than that of the ti-trees.

Grasses are the most common ground cover wherever Melaleuca decora is an important constituent of the tall scrubs and low woodlands, perhaps because of fire and because of the shade cast by the canopy, or perhaps because of some past factor in the succession that eludes me. At its simplest, the sward is made up of species distributed in ways that correlate nicely with the moistness and the light status of the different sites. At the most exposed, seasonally driest end of the spectrum in grassy glades kangaroo grass (Themeda australis) may be dominant; in moister areas of dappled shade meadow rice grass (Microlaena stipoides) is most common; between the two extremes there tends to be a mixed stand with meadow rice grass, margined panic (Entolasia marginata) and hedgehog grasses (Echinopogon ovatus and E. caespitosus) more frequent in sheltered sites and wallaby grasses (Danthonia spp.) three awned spear grasses (mainly

Aristida vagans), s pear grasses (Stipa spp., particularly Stipa nervosa ~~var~~ var. nervosa) and short haired plume grass (Dichelachne sciurea) and loves grasses (Eragrostis brownii and E. phillipica) more common in more exposed places. Some species show a wide range of tolerance along this spectrum, the wiry panic being one of the few grasses able to grow on exposed bare soils and yet able to tolerate the dense shade about a substorey of ti-tree whilst short-haired plume grass is almost ubiquitous. But many sites are too disturbed for these adaptations to have sorted the grasses out. Themeda australis and Stipa nervosa, for example, persist as constituents of the sward in shady woodlands though they seem unable to flower. Stands of Microlaena stipoides and Entolasia marginata cansurvive in neat circles about the stumps of cut ti-tree in open glades or as larger stands in areas of felled and cleared scrub, somewhat thinned and weakened it is true and unable to flower freely or grow well in dry seasons and therefore susceptible to being invaded, often by exotics such as Paspalum dilatatum, Lotus angustissimus and Scutellaria racemosa. More usually, the few herbs that occur in these swards are natives such as Dichondra repens, Polymeria calycina, Hardenbergia violacea, Brunoniella australis, Viola betonicifolia, Lobelia alata, Goodenia albida, Myoporum decile, Tylophora barbata, and even the maiden hair fern (Adiantum aethiopicum). But all are far more common where the grasses are sparsest.

The understorey of shrubs and tall herbs, in the low wooded birds, include a number of shade tolerant or moisture seeking species, many of them having seeds that are probably spread bybirds. The cheese tree (Glochidion ferdinandi), Omalanthus stillingiifolius, the pittosporums (Pittosporum undulatum, P. revolutum), the lantana (Lantana camara), the privets (mainly Ligustrum sinanse) are some of the less successful colonists; Breynia oblongifolia, Phyllanthus gasstroemii, Asparagus officinalis, Myrsiphyllum asparagoides,, Rapanea variabilis, Notolaealongifolia with their ability to survive or even multiply after fires by suckering are some of the more successful ones. However, shrubs with a wide range of tolerance may establish, many of them being fire weeds and plants of the scrubs and exposed places such as the wattles, Pimelea linifolia, Helichrysum diosmifolium, Olearia microphylla, Pultenaea villosa, Daviesia ulicifolia, Indigofera australis,, the hop bush (Dodonaea triquetra) and even accasional Cassinia arcuata. Usually such plants are scattered specimens but in a few places on Duck River that appear to have been fire free some of them have built up into a dense substratum of shrubs beneath the eucalypts. One such stand is a mixture of Hopbush, Dillwynia, Helichrysum with some 5-6ft high occasional Epacrids. Others include small stands of species that elsewhere are only occasional plants in the scrubs, the one population of the fire-sensitive Lasiopetalum parviflorum having been built up by seedcarried by flows of water, others of Kulingia pannosa apparently being less ephemeral as the species both seeds prolifically and suckers from

its rootstocks after fire. However, fires seem to have been too frequent in most places for a continuous low stratum of shrubs to form. Probably constant burning has also gradually reduced the remnants of an older, tall shrub and low tree stratum to isolated specimens, the Kurrajong (Brachychiton populneum), forest oak (Casuarina torulosa), black she-oak (Casuarina littoralis) and the dogwood (Jacksonia scoparia) being on the verge of extinction. However, the native cherry (Exocarpus cupressiformis) regenerates well though there are only a few mature specimens.

The composition of the dominants in the woodlands and scrubs has also been altered, probably mainly by fire, and in ways other than the the obvious bias towards Melaleucas at the expense of the trees. The two dominant species in the original grey box-broad leaved ironbark (Eucalyptus moluccana-E. fibrosa) association are also the last to mature into fruiting specimens and are, at some stages in their growth, among the most fire sensitive specimens. Thus a single fire either killed outright many stems of these species or a thickness less than 10cm. DBH or reduced them to lignotubers whilst most of the red mahogany (E. resinifera) and the woollybutt (E. longifolia) survived, the crowns of the woollybutt usualling being the ones least damaged. The broad-leaved ironbark is nonetheless well represented in most stands since the stems of a slightly larger girth have more insulation between the cambium and the deep furrows in the bark that seem to be the Achilles heel of the young saplings. But stems of the grey box remain susceptible to severe fire damage much longer and, once cut back to a lignotuber or stump, most specimens have great difficulty in rebuilding a crown now fires are so common despite the rapid increases in height they can make. In the scrubs at Rookwood there are now only several stems left. In those at Duck River there are many more but very few are fruiting specimens. A careful check over three years of the stand at the southern end of the Rosneath Golf Course and a more cursory one of part of that on the west bank suggests that the grey box does not flower until it is about twenty five feet high and then only indifferently, if at all, unless the crown is healthy, vigorous, well-developed and free from much competition. Only specimens with a girth of roughly 18-24" DBH or more and with good crowns from 40-60ft high (but again in open situations) seem to flower and fruit well but then do so so prolifically and with such a fine indifference to the state of the season that this must be one reason for the original dominance of the species. The broad-leaved ironbark seems much more of a sporadic bloomer with the size of the crop of blossom, if any, probably dependent more on the status of the site and the health of the individual stem than the state of the season. However, there seems to be a scatter of specimens with crowns that may have, or soon will have, the potential to flower and others that may be recent regeneration and not simply degenerate lignotubers. But I cannot fairly say after three years of searching that I have seen seedlings of the grey box (which, interestingly, proved difficult to grow in the nursery as they are

are susceptible to attack by mildew).

The shift to tree species which are quick to mature and fruit or have fire resistant barks has probably most favoured the Angophoras which are becoming dominants in some places, Angophora floribunda along the banks of Duck River and Angophora bakeri on moist drainage lines in the Presbyterian burial ground. Both species have a striking ability to colonise exposed sites, to quickly build up lignotubers, to sucker profusely after fires, to form stems that are soon protected by fire-resistant bark, are able to flower and fruit at heights of only five to eight feet, and set mature seed within four to six months. The turpentine (Syncarpia glomulifera) and red mahogany (E. resinifera) though not sowell endowed (see table over) nonetheless are sufficiently fire resistant to have become two of the most common tree species at Rookwood, the turpentine perhaps being the more common because of its ability to sucker from the root system and form thickets once the mainstem is damaged. The woollybutt (E longifolia) also has a surprisingly fire-resistant crown and bark and these attributes as well as a rapid rate of growth, particularly when the tree is cut, and an ability to flower when young have helped the species become more common on Duck River than it probably once was. More fire-sensitive species such as the stringybarks (E. eugenioides, E. globoidea) and the red gums (E. amplifolia, E parramattensis, E tereticornis) seem nonetheless to have been able to increase their numbers because they are quick to mature and bloom prolifically, the stringybarks once their foliage is mature at heights of about 10-12 feet, the gums somewhatsooner at even 6-8ft., and because their seedlings seem well able to establish on difficult sites such as bare subsoils or grasslands. Adaptations of this sort which no doubt once helped them compete with the box and ironbark seem now to allow themto multiply at the expense of those species, particularly the grey box.

(2) Tall woodlands

Both sample areas have been so long cleared of their original vegetation that even the best stands of trees such as those about the Millston property on Duck River are regrowth. But the fragmentary evidence provided by regeneration of this sort and by the few veteran eucalypts elsewhere suggests that both were once areas of tall woodlands or dry schlerophyll forests some 60-80ft. high in which the dominants were species of the drier clay soils of the Sydney Basin, the grey box and broad-leaved ironbark.~~In~~(An E moluccana-E fibrosa association) However, their associations were both species of the drier areas such as E longifolia, E tereticornis, E.eugenioides, species of

SPECIES NATIVE TO DUCK R & ROOKWOOD and those that have naturalised.

Flowering Time	When inflorescence initiated	Time taken for buds to mature	When fruit mature	Time taken for fruit to mature	Notes
late summer – early autumn	About flowering time	12 months	late spring – Summer	6 months	[illegible] variant [illegible]
Summer	About flowering Time	12 months	Spring – Summer	8 weeks	An occasional specimen [illegible] [illegible] [illegible] but do not flower
late summer early autumn	Spring	5–6 months	Spring	4–5 months	Bark surprisingly fire resistant though often [illegible] after [illegible] Vertically hanging leaves make crown relatively fire resistant. Suckers [illegible]
Summer	About Flowering Time	12 months	Spring – Summer also autumn	9 months 3 months	Can flower when 8–10 ft high. Juvenile [illegible] have different bud & fruit forms
Variable usually late winter – early spring	About flowering Time & later	12 months	Collected late autumn & late winter	6–9 months	Some [illegible] wherever growing vigorously. Some specimens clearly belong to one or other of species but others have buds & fruits that could be fairly said to belong to either – some of the latter populations flower Sept [illegible] (E. globoidea?) others [illegible] (E. eugenioides?) flower at 15 [illegible]
Summer	Spring & later	16 months	Collected late winter	6–8 months	
late Spring	About flowering Time	12 months	late autumn winter	4–6 months	Extends into undulating land, [illegible] St. Flowers at 6–8 ft.
Late Spring – Early Summer	?	12 months?	collected [illegible], no [illegible]		Mainly [illegible], on [illegible] & [illegible] of hill
early spring	About Flowering Time?	12 months	autumn	5–6 months	[illegible] in Duck River; flowering at 6 [illegible]
Summer	Spring	2–3 months	late summer early autumn	2–3 months	Common, creek banks: Duck River. Occasional on undulating land & residential area; Occasional undulating land and creek banks, Rookwood.
Summer	Spring	2–3 months	late summer early autumn	2–3 months	Not yet seen West of Cemetery
late spring	?		collected late winter	?	[illegible] Reserve, [illegible] dept's land Kingsland Rd – [illegible] Rd; Fairways, [illegible]. Suckers [illegible] after fires
Late Summer – early autumn	Variable – About flowering Time?	12 months	Summer?	9–12 months?	Naturalised [illegible] in Rookwood, Duck River, but also possibly native to latter area
late winter early spring	?	?	[illegible] by winter	?	Planted & naturalised Rookwood, but possibly also native there
?		?	collected in August	?	Several specimens [illegible] Rd, opposite [illegible] [illegible] & RC, Rookwood.
Variable – usually autumn & winter – [illegible]	late spring	3–5 months	Summer	6 months	Commonly planted. Specimens in [illegible] [illegible] [illegible] might be native
Winter	Summer	17–19 months	Summer	6–9 months	Commonly planted, dense thickets of seedlings, Rookwood, RC Burial ground & saplings & [illegible] trees. Also naturalised C of E [illegible] Railway cuttings
Variable – late autumn – early spring	late spring	9–10 months	Autumn	6 months	Planted, but naturalised in goods yard, Regents Park Railway Station.
late winter	?	?	?	?	Planted, often [illegible] [illegible] slowly, but naturalised in Rookwood
Variable – autumn – late spring	Variable late winter, late autumn	Not clear, but quickly possibly 6 months	collected in late winter	?	Much planted; naturalised [illegible] and [illegible] [illegible]. (Dense thickets of young seedlings [illegible]) Develops [illegible] shape
Variable – [illegible] – summer	Spring? ?	4–5 mths ?	Variable – winter, spring	4–6 months!	Occasional [illegible], naturalised at Rookwood, Presbyterian cemetery [illegible]. Much planted, naturalised Presbyterian Cemetery [illegible]

TABLE SPECIES and Their …

Species (Eucalyptus)	Distribution DC	RA	R	Status	Nature of Site	Nature of bark	Flowering Time
moluccana	VC	O	R	D	All sites	Sub-fibrous	late summer-early autumn
…chroca ssp. …chroca	VC	—	R	D	All sites	Laminated + fissured	Summer
…ongifolia	C	O	C	S	All sites	Sub-fibrous	late Summer early autumn
…sinipera	C	—	C	SD	All sites	Stringy	Summer
…loboidea	O?	—	O	SD	All sites	Stringy	Variable usually late winter to spring
…ugenioides	C?	—	O	SD	All sites	Stringy	Summer
…mplifolia	O	O	—	SD	Damp + undulating	Gum	late Spring
…amaldulensis	—	—	R	S	Damp + undulating	Gum	Late Spring - Early Summer
…ereticornis	R	R	O	S	Damp-undulating	Gum	early spring
…ophora …floribunda	C	R	R	SD	Damp + undulating	~~Stringy~~ Sub-fibrous to hard rough	Summer
…ophora …kerc	—	—	C	SD	Damp + undulating	Stringy to rough + hard	Summer
…carpa …nelifera	R?	O	C	SD	All sites	Stringy	late spring
…nunctata	O?	—	P	S?	Shelltrail	Gum	Late Summer - early autumn
…aniculata	P	—	O?	S?	undulating	Iron bark	Late winter early spring
…clerophylla	—	R	R	S?	damp + undulating	Gum	?
…ideroxylon.	R?	P	P	—	undulating	Iron bark	Variable - usually autumn winter-spring
citriodora	P	P	N	— (SD)	undulating	Gum	late autumn - winter
…lobulus ssp maidenii	P	N	P	—	undulating	Gum	Variable - late autumn early spring
melliodora	P	—	N	—	undulating	Box	Late winter
microcorys	P	P	N	— (SD)	undulating	Stringy	Variable late autumn to late spring
saligna	P	P	N	— (SD)	damp + undulating	Gum	Variable - Summer to late autumn
…stans …ospecta	P	P	N	—	all sites	Half fibrous Gum-like	Summer

… very common … common … occasional … rare	DC = Duck River RA = Residential area R = Carnarvon Golf Course, State Hospital, Cemetery P = Planted N = Naturalised	D = dominant S = subordinant SD = become dominant in some regeneration

wetter areas such as Angophora floribunda and E.resinifera and species of the sandstone soils and their ecotones such as the ~~xx~~ Angophora bakeri, the grey gum (E. punctata) and the scribbly gum (E. sclerophylla).

The structure of the original vegetation is least in doubt for all that most of the ~~v~~exteran eucalypts have the small butts and much branched and spreading crowns of open woodland trees that have always been free of much competition throughout lifetimes that must be of at least one hundred years to judge from the yardstick of the eight grey box and their three offspring about 296 Park Road - at least fifty years in the growing at a little over a foot a year and fifty years in which their height and contour are known to have changed but little. But remnants of this sort are probably atyp ical. Wherever competition among the trees has been fierce, as it has been on parts of the Hillston property, the form of the dominants in the stand has become that of forest trees with long slender butts and shallow small crowns whilst that of the remaining closely spaced specimens is of long slender, scarcely branched poles. Competition has also forced many of the box and ironbark on the west bank of Duck River to adopt much the same growth habit though these specimens,of course, are far from being the sixty to eighty feet high of the older stands of box on the Hillston property and the ironbarks in the State Hospital grounds.

The composition of the original stands of eucalypts is more of an open question but in the least disturbed regeneration on Duck River the grey box and broad leaved ironbark are usually dominant. Eastwards of the river both species are also well represented among the occasional veterans that survive in parks and gardens and no doubt the E. moluccana-S fibrosa association once extended into the very disturbed scrubs at Rookwood, as it still does into the low woodlands to the south at Potts Hill, for all that there now seem to be only two grey box in the areas of the cemetery examined. Probably many of the subordinant tree species were also ~~xx~~ once scattered indiscriminantly throughout thewhole area as the woollybutt, red mahogany, two stringybarks and the rough barkedapple still area. But nowadays some species seem to survive by chance in one area and not in the other. The three species of red gum, for example, grow on sites not obviously different from one another yet E parramattensis is an occasional tree in Rookwood and one that is found to the west about Fairfield but does not now at least (see Maiden) seem to grow on Duck River where the common red gum is E amplifolia (a species that seems absent from Rookwood) and where there are now only three sapling forest red gu m (E tereticornis) though this species is common enough in the Cemetery. The turpentine (Syncarpia glomulifera), like the forest red gum, extends westwards along theridge fromRookwood towards the southern Railway line but survives only in the shrubberies between the fairways on the Rosneath Golf course on Duck River. More open to doubt are the status and former distribution of the trees which normally are species of sandstone areas and their ecotones. The narrow-leaved apple (Angophora bakeri)

and the small stand of scribbly gum (E. sclerophylla) at Rookwood are probably natives that are part of the remnants of a sandstone flora there, with the scribbly gum perhaps also occurring near the Lidcombe reserve with turpentine, forest red gum, rough barked apple and box. But the two small stands of the grey gum in the heart of the low woodlands on the west bank of Duck River are puzzling, to say the least, but look to be the peers of the other native tree species, are in an area where no one would have reason to plant them, and therefore must be tentatively looked on as an unusual occurrence of this, the most fire-sensitive of all the species collected that survives in this one, sheltered spot. Grey ironbark (E. paniculata) may also have once been native to Rookwood but has been so much planted there and then naturalised that its status must remain an open question. Other eucalypts to have naturalised at Rookwood are more obviously exotics, some having established only a few specimens (the blue gum, E. saligna, the grey gum, E. punctata, the yellow box, E. melliodora) whilst others are sufficiently invasive to form dense thickets, the tallowood (E. microcorys) mainly in the horse paddocks at the State Hospital and the lemon scented gum (E. citriodora) in old burial grounds and even railway cuttings. But the very success of these species, nonetheless, is a nice comment on the status of the sites as ones able to support forest trees tolerant of clay-based soils.

The interpretation put forward here differs from that of Kartzoff (Nature and a city) who suggests that the 'high forest' of blackbutt and Sydney blue gum (an E. pilularis-E. saligna association) may have extended as far west as Merrylands and Granville. Certainly some of the species within that association as he lists them are present - the turpentine, the rough- barked apple, the red mahogany, the white stringybark, the grey gum and the scribbly gum. But most, other than those of the the sandstones and their ecotones, are given by Alma Fidgeon as being species of the 'shales' of 'the Cumberland Basin' and are quite consistent with the 'forest types' and 'subsidiary species' she recorded for the 'Bankstown-Liverpool District' (Table 10, page 152 of article in Bibliography). The area, no doubt is transitional both in the amount of rainfall it receives and the proportion of its soils derived from sandstones particularly along the ridge towards Potts Hill where so many of the remnants of the original vegetation are. But the box and ironbark are dominant in the least distrubed regeneration, they are the species best suited to the soils and have slender quick growing habits of growth that would make them competitive with any of Kartzoff's 'forest trees' - indeed, the ironbark in the nursery is surprisingly tolerant of shade, has the leaf disposition and form of 'forest' trees such as E. paniculata, and the veterans on Joseph Street with girths up to five to seven feet are among the most massive and impressive trees in the district. Probably, therefore, it is not unreasonable to assume the E. moluccana-tiliodosa association, or a variant of it in which forest red gum was an important component, extended as far east as Homebush. Perhaps the grey box

is near to its eastern limits here particularly if it issusceptible to 'wet feet' as Kartzoff suggests. But the 'staginess' he thinks to be indicative of this weakness is mainly found in older specimens, not vigorous and healthy younger ones, and may be a complexphenomenon in a species that in old age seems more dependent on forming new growth as laterals off massive limbs rather than the extension of the main leaderax and which seems very susceptible to pruning by cold southerlies - for the species is also near its southern limits in the County of Cumberland and some exposed species have quite russet foliage by the end of winter. Nor is the low the only species that seems to adapt with difficulty to clearing and disturbance, many specimens of E. eugenioides being equally staggy with diverted street drainage subject as one possible cause. But I can offer no explanation for the failure of the oldest stand of E. fibrosa in the State Hosptial grounds other than old age or [illegible], for the almost general decay among many planted specimens of E. botryoides Indeed, the only two native tree species obviously affected by the ebb and flow of the seasons these past three years have been the cabbage gum and the woollybutt, the hailstorm and the dry spring and early summer of 1976/7 having almost totally destroyed the developing inflorescences of both species and finally killed off several failing specimens of the cabbage gum.

The one stand of regenerated trees that is almost a tall woodland has been included in the Rosneath Golf course and has as a substorey a few scattered Melaleuca decora and a ground cover of exotic and native grasses and ground herbs that are regularly mowed.

V. The Future

Those stands of bushland that have not been made natural reserves probably have little or no future. In the cemetery the largest area of scrub is sandwiched between the Anglican and Catholic burial grounds, the two that are being most actively extended to cope with Sydney's much larger, ageing population. The Crematorium management, apparently anxious to establish its boundaries, has surveyed and begun extending walls towards the heath-like low scrub to its west. The areas of scrub and grassland in the Presbyterian, Wesleyan and Independent burial grounds are the least needed but also at risk because the grounds seem to be developed and bulldozed haphazardly rather than systematically. On Duck River, Auburn Council is about to begin to turn the scrub on the east bank south of Overley Road into playing fields and the Hillston property, now held on a life occupancy, will soon revert to council.

The low woodland, scrubs and grassland on the west bank of Duck River North of the intended playing fields on the north side of Overley Road has been reserved as natural bushland. But there are no rangers, cutting of

trees and burning off is indiscriminate and the better areas of woodland to the south are gradually being opened up to vehicles so that stolen cars may be the more discretely stripped and burned and the circuit for mini-bike riders extended. If Parramatta Council were to open up the riverside walk that was to be made when Auburn council received its grants to build a Botanic Gardens on the river just north of Chisolm Road vandalism of this sort might be checked during the day. However, as the state may soon have the only examples of most of the different habitats, types of vegetation (other than Kunzea scrub and tall woodland), and many of the species representative of the disturbed vegetation in the Auburn area, a more active form of management is probably desirable. Since the area is a reserve, it has to remain open to the public and probably to vehicles. Parramatta council's efforts to close off Everley Road failed and were, in anycase, somewhat pointless as vehicles have always had access to the park from Wellington Road. But were rangers (council apparently has some) to visist the area after 3 p.m. weekdays, during schoolholidays and at weekends much vandalism could be checked. Fires would still occur and probably it is desirable that theyshould on a small andcontrolled scale to avoid a crown fire that could destory the area of low woodland. But fires need to be less frequent than they are if the vegetation is not to be damaged and if it is to be attractive enough for people to use the riverside walk. Perhaps the best compromise would be to use fire as a tool of management, burning a mosaic of small areas over several seasons and using the many paths as checks to cool grass fires. Burning in late winter or early spring might give a better regeneration of seedlings. Such a programme could possibly be worked in with one to re-introduce native plants of the sort that Baulkham Hills Shire Council is experimenting with in reserves at Carlingford.

The areas of tall woodland and the trees on the Hillston property probablywill probably survive best if included in the Auburn Municipal Golf Course.

VI. The species collected

Of the 568 species collected (representative of 101 families) 292 (51%) seem to have been native to a district in which the clay-based soils nonetheless carry the remnants of a sandstone flora, particularly about Rookwood. Included among the 276 exotics are a number of Australian species. (see tables on next page).

Ten families include some 312 (55%) of the species collected, those being best represented being the Graminaeae, Compositaeae, Papilionaceae, Myrtaceae and Mimosaceae. The latter three families, no doubt, would be well represented in most samples of Australian vegetation other than those made in rainforests. Monocotyledonous familes are particularly well represented partly because the soils favour the growth of grasses, sedges and rushes, partly because a number of species, particularly orchids

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Table - Families with most species

Family	No. of species Total	Natives	Exotics	Family	No. of Species Total	Natives	Exotics
Gramineae	93	44	49	Liliaceae	13	8	5
Compositae	50	22	28	Cruciferae	12	1	11
Papilionaceae	44	21	23	Euphorbiaceae	10	7	3
Myrtaceae	40	31	9	Orchidaceae	9	9	-
Mimosaceae	16	12	4	Xanthorrhoeaceae	7	7	-
Iridaceae	16	1	15	Amaryllidaceae	7	-	7
Cyperaceae	15	13	2	Chenopodiaceae	8	6	2
Oxalidaceae	13	3	10	Caryophyllaceae	7	1	6

Table

Distribution of indigenous and exotic species between the major taxa

	No of families	No. of species Total	Indig enous	Exotic	No. of Species on Duck R. Total	Indig-enous	Exotic	No of Species only at Rookwood Total	Indig-enous	Exotic
[illegible] PHYTA	2	4	3	1	3	3	—	1	—	1
[illegible] OPSIDA	3	5	—	5	—	—	—	5	—	5
[illegible] OPSIDA	79	376	201	175	311	168	143	65	33	32
[illegible] ONES	17	183	88	95	144	67	77	39	21	18
[illegible]	101	568	292	276	458	238	220	110	54	56

Table

Distribution of species among the families

	No of species													
1	2	3	4	5	6	7	8	9	10	11-20	21-30	31-40	41-50	over 50
[illegible]	18	16	7	2	4	3	2	3	1	6	—	1	2	1

have survived at Rookwood where the land probably has not been grazed for a long time, and partly because of the number of bulbs that have naturalised.

The native species listed are recorded by Beadle et alia as being adapted to habitats that range from wet schlerophyll forests through to the dry parts of the Cumberland Plain but are mainly those that could be expected to be growing in the area. Many of those adapted to the moister environments tend to have a limited distribution (Tylophora barbata, Pittosporum undulatum, Glochidion ferdinandi, Pandorea pandorana) or to be represented by solitary specimens or colonies (Parsonia straminea, Opliswenus imbecillis). But others are common (Breynia oblongifolia) or occur indiscriminately in most habitats (Notolaea longifolia). The native species recorded by Beadle et alia as normally growing on sandstone soils andtheir ecotones are best represented in Rookwood where a number of species occur that appear not to be growing on Duck River. (see appendix II). Other species are found in both places or on Duck River only (e.g. Eucalyptus punctata, Asterolasia correifolia, Pultenaea retusa, Pomaderris lanigera and P. ferruginea).

The exotic species among the Australian natives are mainly garden plants that have naturalised (Melaleuca armillaris, M. quinquenervia; Eucalyptus citriodora, E. globulus ssp. maidenii, E melliodora, E.microcorys, E. saligna; Tristania conferta; Acacia podalyriifolia, A.cyanantha, A. saligna). The exotics from outside Australia include many of the species likely to establish in a closely settled area of Sydney with clay soils. However, a number that are invasive weeds in the moister environment of the garden here have difficulty in establishing in much of the bushland (Cinnamomum camphora, Pittosporum undulatum, Ligustrum lucidum and L. sinense, Ochna serrulata). Unusual distributions include the ice weed (Aptenia cordifolia) at the base of the eucalypts at the Southern end of Rosneath Golf Course; Gnaphalium candidissimum and H yurocotyle bonariensis on moist drainage lines at Rookwood; Suaeda australis beneath pine trees at Rookwood; the number of South African bulb species that have naturalised in thecemetery, particularly Watsonia bulbifera which is an invasive weed there and may become one on Duck River.

Roughly 115 species were collected at Rookwood that do not seem to grow on Duck River. Of these eleven were tree and palm species (Pinus spp., A raucaria sp., Eucalyp t spp., Tristania sp., P hoenix sp.) that have been able to naturalise because the area is a cemetery; eight were South African bulbs found there for the same reason; twenty five normally grow on soils derived from sandstones andtheir ecotones; some of the o rchids, rushes, sedges and sedge-like plants (thirteen species) may occur there because the area has not beengrazed for many years.

Many species are listed as occurring only on Duck River but these may well be present in Rookwood as I have only collected there from September to Mid November, 1978 but have spent much time over three years collecting on Duck River.

Appendix I - List of Species

Nomenclature is as in N.E.B. Beadle *et alia*, Flora of the Sydney Region, 1972 edition, if the species is listed in that text; the relevant page number is given in brackets. Other Eucalyptus species are cited as by Johnson and Carryatt, appendix to W.F. Blakely, A Key to the Eucalypts, 3rd. ed., 1965. Other species have been identified from a variety of works such as J.M. Black, Flora of South Australia. I had access to no satisfactory flora for south Africa and have used the Keys in the Oxford Dictionary of Gardening and L.H. Bayley's Manual of Horticulture.

Many species, particularly those with unusual distributions, have been identified for me by the botanists of the Royal Botanic Gardens Sydney.

Plant families within the major taxa and their subdivisions have been arranged alphabetically for my own convenience. Naturalised species are marked with an asterisk. Plants shown in brackets were found as seedlings in the area but have not naturalised and were not included when the tables in the text were drawn up.

The distribution of the species through the different micro-environments referred to in the text and the frequency with which species occur, if known, has been shown by the following symbols

C - Rookwood cemetery, State Hospital Grounds, Carnarvon Golf Course, Kibo Reserve, waste land belonging to the ~~xxxxx~~ Education Department, Kingsland and Waters Road (ie. east of the main southern railway)

D - Duck River; rarely, west of the southern railway

1 - low woodland, Duck River

2 - ti-tree and eucalypt scrub

3 - grasslands

4 - exposed soils and subsoils

5 - drainage lines and edges of permanent sheets ofwater, creeks etc.

6 - permanent and transient sheets of water

7 - graves, Rookwood Cemetery

8 - dumped soil, edges of roads, tracks

A - common

O - occasional

R - rare (one to several specimens seen)

The tables in the last section of the text, for want of time, were drawn up from a rough draft of this appendix and therefore probably don't agree exactly with it. However, the differences aren't such that they would change the argument in the text.

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PTERIDOPHYTA	C	D	1	2	3	4	5	6	7	8
ADIANTACEAE										
Adiantum aethiopicum L. (69)		X	R				X			
Cheilanthes tenuifolia (Burm.f) SW. sens. lat. (71)	X	X	X	X	O					
Pellaea falcata (R. Br.) Fee var. falcata (70)		X					R			
DENNSTAEDTIACEAE										
Pteridium esculentum (Forst. f) Cockayne	R	O					O		R	
DAVALLIACEAE										
Nephrolepis cordifolia (L.) Presl. Jones and Clemesha, Aust. Ferns, 226	R						R			
GYMNOSPERMAE										
ARAUCARIACEAE										
Araucaria bidwillii Hook.	R								R	
(Araucaria columnaris (Forster) Hook.)	R									
PINACEAE										
Pinus halepensis Miller	O								O	
Pinus pinaster Sol. ex Ait. (96)	O								O	
Pinus pinea L.	O								O	
Pinus radiata Don (96)	O								O	
ZAMIACEAE										
Macrozamia spiralis (Salisb.) Miq. (96)	O	O	O	O	O					
ANGIOSPERMAE										
DICOTYLEDONES										
ACANTHACEAE										
Brunoniella australis (R. Br.) Bremek.		X	X							
Brunoniella pumilio (R. Br.) Bremek (504)		C	O							
AIZOACEAE										
Tetragonia tenuifolia (L.) Schwantes (130)		O	O							
AMARANTHACEAE										
Alternanthera denticulata R.Br. (196)		O						O		
Alternanthera philoxeroides (Mart.) Griseb. (196)		X						X		
Amaranthus hybridus L. sens. lat.		O						"		O
ANACARDIACEAE										
Schinus terebinthifolius (Sieb. ex DC.) Raddi (391)	O	O	O	O	R					
APOCYNACEAE										
Nerium oleander L. (Black, IV 695)		R			R					
Parsonsia straminea (R.Br.) F. Muell. (416)		R					R			
x Vinca major L. (Hill)	O							-	O	
ASCLEPIADACEAE										
Araujia hortorum Fournier (419)	O	O	O	O	O		O			
Tylophora barbata R. Br. (419)		O	O							

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	C	D	1	2	3	4	5	6	7	8
BIGNONIACEAE										
Pandorea pandorana (Andr.) Steen (502)		O	R				O			
y Campsis x Tagliabuana		R								
BASELLACEAE										
xAndredera cordifolia (Ten.) Steen (197)		X					X			
BORAGINACEAE										
(Myosotis sylvatica)		R								R
CACTACEAE										
xOpuntia stricta (Haw.) Haw. (235)		R					R			R
CAESALPINIACEAE										
xCassia coluteoides Coll. (277)	R	R					R			R
CAMPANULACEAE										
Wahlenbergia communis Carolin (434)	X	X	X	X	X	O				
Wahlenbergia gracilis(Forst. et f.) Schrad. (434)	X	X	X	X	X					
Wahlenbergia stricta Sweet (434)		R		R						
CAPRIFOLIACEAE										
xLonicera japonica Thunb. (429)	O	X					X			
(Abeliaxgrandiflora)		R								
CARYOPHYLLACEAE										
xCerastium glomeratum Thill. (175)		O			O					
xPetrorhagia nanteuilii (Burnet) Ballet, Heywood (177)	X	X		X	X					
xPetrorhagia velutina (Guss.)Ball et Heywood (177)	O	X		X	X					
Polycarpon tetraphyllum (L.) L. (177)		O	O							
xSilene anglica L (178)	X	X			X					
XParonychia brasiliana DC. (178)	O									O
xSpergularia rubra (L.) J.etC.Presl. sens.lat. (177)	O	O					O			
xStellaria media (L.) Vill. (176)		O					O			
CASSYTHACEAE										
Cassytha glabella R. Br. (152)	X			X						
Cassytha paniculata R. Br. (152)	X	X		X						
CASUARINACEAE										
(Casuarina cunninghamiana Miq.)										
Casuarina glauca Sieb ex Spreng(353)	X	O					X			
Casuarina littoralis Salisb. (352)	R			R						
Casuarina torulosa Ait. (352)	R	R	R	R						R
CHENOPODIACEAE										
xChenopodium album L. (192)	O	O		O						
Chenopodium polygonoides (Murr.) Aellen		O	O							
Chenopodium trigonon Roem. et Schult.	O	O					O			
Dysphania littoralis R. Br. (194)		O				O				
Rhagodia hastata R. Br. (192)	O	X	X	X						
Rhagodia nutans R.Br.		O		O						
Suaeda australis (R. Br.) Moq.	R									R
CRELASTRACEAE										
MAYTENUS cunninghamii (F. Muell.)Loes. (360)	X	X	O	X						

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COMPOSITAE	C	B	1	2	3	4	5	6	7	8
xArtemisia vulgaris L. (465)		X					X			
xArctotheca calendula (L.) Levyns	X	X								X
xAster subulatus Michx. (457)		X								X
xBidens subalternans DC (460)		O					O			
xBidens pilosa L. (460)	X	X	O	O			X			
Calotis cuneifolia R. Br. (453) Calotis lappulacea Benth	O	O			O					X
Brachycome angustifolia A. Cunn. ex DC. var. angustifolia		O	O							
Cassinia arcuata R. Br. (471)	X	X	R	O		X				
Centipeda minima (L.)A. Br. et Ascners. (463)		O					O			
xChrysanthemoides moniliferum (L.) T. Norë. (469)	X	O		X					X	
xCichorium intybus L. (478)		R								R
xCirsium vulgare (Savi) Ten. (476)	O	O		O			O			O
xCoreopsis lanceolata L. (461)	X			O	X				X	
Cotula australis (Sieb. ex Spreng.) Hook. f. (463)	X	X		O	X					X
Cotula coronopifolia L (462)	X	X					X			
xErigeron bonariensis L. (457)	O	O	O	O		O				O
xErigeron floribundus (H.B.K.) Sch. Bip.	O	O						O		O
xEupatorium adenophorum Spreng. (450)	O	O		O			O			
xFacelis retusa (Lam.) Sch. Bip. (471)	O	O	O	O						
XGnaphalium candidissimum Lam. (470)	X						X			
xGnaphaliumluteo-album L.	X	X	O	O	X					X
xGnaphalium japonicum Thumb.	X	X	O	O	X					
xGnaphalium purpureum L.	X	X	O	O	X					
xGnaphalium spicatum Lam.	R	R								
xHelianthus annuus L.		O					O			O
xHelichrysum apiculatum (Labill.)DC.473	X	X		O	X					
xHelichrysum diosmifolium (Vent.) Sweet	X	X	D	X						
xHelichrysum scorpioides Labill. (475)	X	X		O	X					
Helipterum australe (A.Gray) Druce 473		O								O
xHypochoeris glabra L. (480)	O	O								
xHypochoeris radicata L.	X	X	X	X	X					X
xHypochoeris microcephala (Sch. Bip .) Cabr. var albiflora (O.K.) Cabr.	R					R				
Lagenophora stipitata (Labill.)Druce (451)		X	X							
Olearia microphylla (Vent.) Maiden et Betche (454)	O	X	X	X						
xPicris hieracioides L.		R								
Senecio hispidulus A. Rich var hispidulus (466)	O	X	X	X			X			
Senecio lautus Forst. f. ex Willd. 468	O	O			O					
Senecio linearifolius A. Rich. (467)		R		R						
Senecio quadridentatus Labill. (466)		O		O						
xSilybum marianum (L) Gaertn. (477)		R								R
Solenogyne bellioides Cass. var. bellioides 451		O		O						
xSoliva anthemifolia (Juss.)R. Br.ex DC.	O	O								O
XSoliva pterosperma (Juss) Less. (464)	O	O								O

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	C	D	1	2	3	4	5	6	7	8
xSonchus asper (L.) Hill (481)	O	O		O						O
XSonchus oleraceus L.	X	X	O	X						
xTragopogon porrifolius L. (479)		R								R
Vernonia cinerea Less. (450)		X	X	X						
Vittadinia Muelleri N.T. Burbidge (456)		O				O				
Vittadinia triloba (Gaudich.) DC.		O		O						
CONVOLVULACEAE										
Dichondra repens Forst. et.f. (494)	X	X	X	X	X		X			
XIpomaea indicia (Burm.)Merrill (493)	O	O	O	O	O	O	O			O
Polymeria calycina R. Br. (494)	O	X	X	X	O	O				
CRASSULACEAE										
?xBryophyllum tubiflorum	R	R					R		R	
xCrassula multicava	R	R					R		R	
Crassula sieberana (Schultes)Druce (173)	R?									R
xSedum praealtum	R	R					R		R	
CRUCIFERAE										
xBrassica fruticulosa Cyr. (163)		O					O			
xBrassica juncea (L) Czernjaew		O					O			
xBrassica rapa L. ssp. campestris (L.) Clapham (163)		O					O			
XCapsella bursa-pastoralis (L.) Medic. (165)		O								O
Cardamine intermedia Hook. (165)		O	O							
xCoronopus didymus (L.)Sm. (167)	O	O								O
xLepidium bonariense L. (166)	O	O			O					O
xRapistrum rugosum (L.)All. (167)	O									O
xRorippa nasturtium-aquaticum (L.) Hayek (164)		O					O			
xSisymbrium officinale (L.) Scop. (163)		R								R
xSisymbrium orientale L. (162)		R								R
(Alyssum maritimum)		R								R
DILLENIACEAE										
Hibbertia aspera DC. (230)	O	O		O	O	O				O
Hibbertia diffusa R. Br. ex DC. (229)		R		R						
Hibbertia pedunculata R.Br. ex DC.	O	O		O	O					
DROSERACEAE										
Drosera peltata Sm ex Willd. (174)	O	O					O			O
ERICACEAE										
Astroloma humifusum (Cav.) R. Br. (402)	X	O				X				
Leucopogon lanceolatus (Sm.) R. Br. var. lanceolatus (405)	O	O	O	O			O			
Leucopogon juniperinus R. Br. (406)	O	O	O	O						
Lissanthe strigosa (Sm) R. Br. (404)	X	X		X	X					
Monotoca scoparia (Sm.) R.Br. (404)	R			R						
Epacris purpurascens R.Br. var purpurascens (409)	O			O						

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	C	D	1	2	3	4	5	6	7	8
EUPHORBIACEAE										
Breynia oblongifolia J. Muell. (251)	O	X	X	O						
Euphorbia drummondii Boiss. (247)		O				O				
xEuphorbia peplus L. (247)	R	R								R
xEuphorbia prostrata Ait. (247)		R								R
Glochidion ferdinandi (J.Muell.) F.M. Bailey (251)		R	R							
Micrantheum ericoides Desf. (248)	X			X						
Omalanthus stillingiifolius F.Muell? (253)	R	R	R	R						
Phyllanthus gasstroemii J. Muell.(249)		X	X	X						
Poranthera microphylla Brongn. (247)	X	X	X	X	X					
xRicinus communis L. (251)	R	R					R			
FUMARIACEAE										
xFumaria muralis Sond. ex Koch (159)	O	O					O			
GENTIANACEAE										
xCentaurium erythraea Rafn.(421)	X	X		O	X					
xCentaurium tenuiflorum (Hoffm. et Link) Fritsch (421)	X	X		O	X					
GERANIACEAE										
xPelargonium aspera Ehr. ex Willd.(202)	R								R	
xPelargonium domesticum L. H. Bailey	R	R							R	R
xPelargonium inodorum Willd. (202)	O	X	X	X						
GOODENIACEAE										
Goodenia bellidifolia Sm (441)	X	X			X					
Goodenia heterophylla Sm. (441)	R			R						
Goodenia hederacea Sm. (441)	X	X		X	X					
Goodenia ovata Sm (441)		R					R			
Goodenia paniculata Sm. (441)	X	X					X			
Scaevola albida (Sm.) Druce (442)		O	O							
HALORAGACEAE										
Haloragis tetragyna (Labill.) Hook.f. (207)	X	O		O	X					
Haloragis villosa Schindler (207)	R				R					
xMyriophyllum brasiliense Cambess.(208)	R							R		
HYPERICACEAE										
Hypericum japonicum Thunb.	O	X	O	O	O					O
LABIATAE										
xLavendula (vera ?)	R								R	
xScutellaria racemosa Pers. (512)		X			X		X			
xStachys arvensis (L.)L. (513)	O	X			X		X			
xMentha X piperita L. var.(511)		O					O			
LINACEAE										
Linum marginale A. Cunn. ex Planch.(198)	O	O			O					
xLinum trigynum L. (198)	X	X		X	X					
xLinum usitatissimum L. (198)		R					R			
LAURACEAE										
xCinnamomum camphora (L.) Nees (152)	O	R			R		O		O	O
LOBELIACEAE										
Lobelia alata Labill. (456) ex Benth.	X	X	X	X	R					
Isotoma fluviatilis (R.Br.)F.Muell.		R					R			

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	C	D	1	2	3	4	5	6	7	8
LORANTHACEAE										
Amyema gaudichaudii (DC.) Tiegh. (370)	O	O	O	O						
Dendrophthoe vitellina (F.Muell.) Tiegh.	O	O		O			O			
Muellerina eucalyptoides (DC.) Barlow (371)	O	O	O	O						
LYTHRACEAE										
Lythrum hyssopifolia L. (203)	O	O					O	O		
xLagerstroemia indica	R	R							R	R
MALVACEAE										
xMalva parviflora L. (243)	O	O			O		O			O
xModiola caroliniana (L.) G. Don (243)	O	O			O		O			O
xSida rhombifolia L. (245)	X	X	O	O			O			O
MIMOSACEAE										
xAcacia baileyana F.Muell (273)	R	R		R						R
Acacia brownii (Poir.) Steud ex DC (265)	O	O	O	O		O				
Acacia decurrens (Wendl.) Willd. (273)	O	X	O	O	O	O	O		O	O
Acacia falcata Willd. (268)	X	X	O	X	O	O	O		O	O
Acacia glaucescens Willd. (272)	R	R	R	R	R		R			R
Acacia longifolia (Andrews) Willd. var. longifolia (272)	X	X	O	X	X	O	O		O	O
Acacia longissima Wendl. (271)	R					R				
Acacia myrtifolia (Sm.) Willd. (267)	O								O	
Acacia parramattensis Tindale (273)	X	X	O	X	X		O		O	O
xAcacia podalyriifolia A. Cunn. ex G. Don (267)	R									R
Acacia pubescens (Vent.) R. Br. (274)	O	X	O	X		R				
xAcacia pycnantha Benth. (269)	O				O				O	
xAcacia saligna (269)	X			O	O				X	
Acacia stricta (Andrews) Willd.		R		R						
Acacia suaveolens (Sm) W illd. (270)	R			R						
Acacia ulicifolia (Salisb.) Court (263)	O	O	O	O		O			O	
MORACEAE										
xMorus nigra		R		R						
xMorus alba		R		R			R			
MYOPORACEAE										
Myoporum insulare R. Br. (505)		R	R				R			
Myoporum debile R. Br. (505)		O	O	O						
MYRSINACEAE										
Rapanea variabilis (R. Br.) Mez. (431)	O	O	O	O						
MYRTACEAE										
(Callistemon x citrinus (Curtis) Skeels (346)										
Callistemon linearis DC. (346)	O	O		O	O					
Callistemon pinifolius DC. (346)	O	O		O	O					
Callistemon rigidus R. Br. (355)	O	O		O	O					
Callistemon salignus (Sm.) DC. (345)	R	O	R	R			O			
Kunzea ambigua (Sm.) Druce (344)	X	O				X				
Leptospermum attenuatum Sm. (341)	X	O			X		O		X	
Leptospermum flavescens Sm. (342)	O	O					O			

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MYRTACEAE (cont.)	C	D	1	2	3	4	5	6	7	8
xMelaleuca armillaris Sm. (347)	O	O			O					
Melaleuca decora (Salisb.) Britten	X	X	X	X	O	O	O			
Melaleuca ericifolia Sm. (347)		O					O			
Melaleuca erubescens (Benth.) Otto(348)	O	O		O						
(Melaleuca hypericifolia Sm.) (348)	R									
Melaleuca linariifolia Sm. (348)	O	O					O			
Melaleuca nodosa Soland. ex Gaertn. (347)	X	X	X	X	X	O	O			
Melaleuca styphelioides Sm. (347) (not at Rookwood Cemetery)	O	X	X	X	O		O			
xMelaleuca quinquenervia (Cav.) S.T. Blake	O				O					
Melaleuca thymifolia Sm (348)	X	O		O	O		X			
Angophora bakeri C. Hall (311)	X			O		O	X		O	
Angophora floribunda (Sm.) Sweet	R	X	R	R	R	O	X			
(Angophora costata (Gaertn.) Bruce)	O	O								
Syncarpia glomulifera (Sm.) Niedenzu (310)	X	R	X	X	O					
xAristania conferta R. Br. (310)	O								O	
(Eucalypts cited as in Beadle et alia or K.D. Johnson and R. Marryatt, Taxonomy and Nomenclature of Eucalypts, Forest Research Inst. Leaflet 92)										
(Eucalyptus acaciiformis Deane et Maiden)	(O)	(O)								
Eucalyptus amplifolia Naudin (324)		O	R	R		O	O			
(Eucalyptus botryoides Sm)	(O)	(O)								
(Eucalyptus cinerea F. Muell. ex Benth.	(R)	(R)								
(Eucalyptus cladocalyx F. Muell.)	(O)	(R)								
xEucalyptus cirriodora Hook.	X	(O)		O		O			X	O
(Eucalyptus crebra F. Muell.) (318),		(R)								
(Eucalyptus eximia Schau.) (334)	(R)									
(Eucalyptus elata Dehnh.) (327)		(R)								
Eucalyptus eugenioides Sieb. ex Spreng. (330)	X	X	O	O	O	O	O		O	O
Eucalyptus fibrosa F. Muell. ssp. fibrosa (317)	X	X	X	X			O			
Eucalyptus globoidea Blakely (351)	X	O?	O	X		O?	O		O	
(Eucalyptus globulus Labill. ssp. globulus (-))	(R)									
xEucalyptus globulus Labill. ssp. maidenii		R								R
(Eucalyptus globulus Labill. ssp. sp. johnii)	(O)	(O)								
(Eucalyptus grandis W. Hill ex Maiden (322))	(O)									
(Eucalyptus gummifera (Gaertn.) Hochr.) (335)	(R)									
(Eucalyptus leucoxylon F. Muell.)		(R)								
Eucalyptus longifolia Link. (315)	X	X	X	X					O	
(Eucalyptus maculata Hook. (315)	(X)	(O)								
(Eucalyptus melanophloia F. Muell.)		(R)								
xEucalyptus melliodora A. Cunn. ex Schau. (319)	O	O							O	
xEucalyptus microcorys F. Muell.	X	X							X	X
Eucalyptus moluccana Roxb. (337)	R	X	X	X			O			

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	C	D	1	2	3	4	5	6	7	8
MYRTACEAE (cont.)										
(Eucalyptus nicholii Maiden et Blakely)	(O)	(O)								
?Eucalyptus paniculata Sm. (318)	O	R		O					O	
Eucalyptus paramattensis C. Hall (324) ~~var. sphaerocalyx~~				R					R	
(Eucalyptus pilularis Sm.) (337)	(R)	(R)								
?Eucalyptus punctata DC. (321)	R	O	O	O					R	
Eucalyptus resinifera Sm. (333)	X	X	X	X			X			
(Eucalyptus robusta Sm.) (332)	(X)	(X)								
xEucalyptus saligna Sm. (336)	O	(O)			O				O	
Eucalyptus sclerophylla (Naudin) L. Johnson & D. Blaxell ~~A. Cunn. ex Woolls~~ A Cunn. ex Woolls	O			O						O
?Eucalyptus sideroxylon/ssp. sideroxylon	(O)	O		R						
(Eucalyptus smithii R.T. Baker) (341)	(R)									
?Eucalyptus sp. - a scribbly gum?	R									
Eucalyptus tereticornis Sm. (324)	O	R	R	R	O				O	O
(Eucalyptus viminalis Labill. (317)		(R)								
NYCTAGINACEAE										
xBougainvillea sp.	R	R			R				R	
xMirabilis jalapa L. (211)		R					R			
OCHNACEAE										
xOchna serrulata (Hoechst.) Walp.	O	O	O	O						
OLEACEAE										
xLigustrum lucidum Ait. (415)	R	R	R	R						
xLigustrum sinense Lour. (415)	R	O	R	R			O			
Notelea longifolia Vent. (415)	X	X	O	X	XO					
Notelea ovata R. Br. (415)		R		R						
Onagraceae										
Epilobium cinereum A. Rich. (205)	O						O			
OXALIDACEAE										
Oxalis corniculata L. (199)	X	X	O	O	O					
xOxalis articulata Sav. (199)	R	R							R	R
xOxalis corymbosa DC. (198)	R	R								R
xOxalis latifolia H.B. et K. (199)	R	R								R
xOxalis pes-caprae L. (198)	R	R					R		R	R
xOxalis purpurea L. (198)	R								R	
PAPAVERACEAE										
xPapaver hybridum L. (158)		R					R			R
xPapaver setigerum DC (158)		R								R
PAPILIONACEAE										
Bossiaea buxifolia A. Cunn. (301)		O			O					
Bossiaea prostrata R. Br. (301)	O	O		O	O					
Chorizema parviflorum Benth. (282)	O	O		O	O					
Daviesia ~~sp.~~ ulicifolia Andr. (285)	O	X	O	O	O	R				R
Desmodium varians Endl. (295)		X	X	X						
Dillwynia juniperina Sudd (194) xDipogon lignosus (L.) Verd.	X	X	O	X	X	O			R	R
Dillwynia parvifolia Rudge var parvifolia (192) Erythrina sp.	X	R	X	X	O		R		R	

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PAPILIONACEAE (cont.)	C	D	1	2	3	4	5	6	7	8
Glycine clandestina Wendl. (306)	OX	X	X	X	X					
Glycine tabacina Benth. (306)	O	O	O	O	O					
Gompholobium glabratum Sieb. ex DC. (284)		O			O					
Gompholobium minus Sm. (284)	R			R						
Hardenbergia violacea (Schneev.) Stearn (305)	X	X	X	X	X	O				O
Hovea longifolia R. Br. ex Ait. (300)		O					O			
Indigofera australis Willd. (304)		O	O	O	O					O
Jacksonia scoparia R.Br. (294)		R	R		R					
Kennedia rubicunda Vent. (305)	X	O		X	O	O				
xLupinus sp.	R									R
xLotus hispidus Desf. ex DC (296)	O				O					
XLotus angustissimus L. (296)	X	X		X	X					
xMedicago polymorpha L. var. vulgaris (Benth.) Shin. (299)	RX	RX			RX					RX
xMedicago sativa L. (299)	R	R			R					R
xMelilotus indica (L.) All.(298)	O	O			O					O
Mirbelia rubiifolia (Andr.) G. Don (281)	R						R			
Oxylobium ilicifolium (Andr.) Domin (283)	O			O						
Pultenaea retusa Sm. (286)	R	R			R					R
Pultenaea villosa Willd. (290)	X	X	R	O	O	X			O	O
xRobinia pseudoacacia L. (304)	X								X	
xTeline monspessulana (L.) C. Koch (302)	O	O			O	O				O
xTeline linifolia (L.) Webb et Berth	O									O
xTrifolium arvense L. (298)	R	R			R					R
xTrifolium dubium Sibth. (296)	X	X			X		X			X
xTrifolium campestre Schreb. (296)	O	O			O		O			O
xTrifolium glomeratum L. (297) ~~[illegible]~~	X	X			X		X			X
xTrifolium pratense L. (297)	R	R			R					R
xTrifolium repens L. (297)	X	X			X		O			O
xTephrosia grandiflora (L'Her.ex Ait.) Pers. (304)	R			R			R			
xVicia angustifolia L. (304)	O	O			O		O			O
xVicia hirsuta (L.) S.F. Gray (305)	O	O			O		O			O
xVicia sativa L. (304)	O	O			O		O			O
xVicia tetrasperma (L.) Schreb. (305)	O	O			O		O			
(Wisteria sinensis) Viminaria juncea (Schrad.) Hoffmgg (294) ~~[illegible]~~	R X						R			
xUlex europaeus L. (302)	O								O	
Zornia dyctiocarpa DC. (295)		R			R					
PHYTOLACCACEAE										
xPhytolacca octandra L. (187)	O	O	O	O			O			
PITTOSPORACEAE										
Billardiera scandens Sm. (2932)	R	O		O						
Bursaria spinosa Cav. (251)	X	X	O	X	O					
Pittosporum revolutum Ait. (251)	O	O	O	O						
Pittosporum undulatum Vent. (251)	O	O	O	O						

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	C	D	1	2	3	4	5	6	7	8
PLANTAGINACEAE										
xPlantago coronopus L. (4 33)	R						R			
xPlantago lanceolata L. (432)	A	A			A	O	A			X
xPlantago varia R. Br. (435)		X			A					
POLYGONACEAE										
xPolygonum aronastrum	R						R			
xPolygonum aviculare L. sens lat.(184)	O	O				O				O
Polygonum decipiens R. Br. (185)	O	X					X			
Polygonum x lapathifolium L. (185)	R	R					R			
Rumex brownii Campd. (183)	O	O			O					O
xRumex crispus L. (184)	X	A			O		A			O
xRumex conglomeratus Murray (183)	O	O			O		O			O
POLYGALACEAE										
xPolygala myrtifolia L. (170)	R								R	
xPolygala virgata Thunb. (170)	O						O		O	
PORTULACACEAE										
xPortulaca oleracea L. (181)	X	R			A				X	R
PRIMULACEAE										
xAnagallis arvensis L. (430)	X	A					A			X
(Primula malacoides)		R								
PROTEACEAE										
Banksia asplenifolia Salisb. (220)	R			R						
Banksia spinulosa Sm. (typ ~~local~~ form) (218)	X			X						
Isopogon anemonifolius (Salisb.) Knight var anemonifolius	R			R						
Persoonia laurina Pers.	R			R						
Persoonia linearis Andr.		R					R			
Hakea sericea Schrad. (221)	X	R		O		A	R			
RANUNCULACEAE										
Clematis aristata R. Br. ex DC.(154)	R	O	R	O						
Clematis glycinoides DC. (154)		O	R	O						
Ranunculus lappaceus Sm. (155)		R		R			R			
SALICACEAE										
xSalix babylonica L. (354)		O					O			
ROSACEAE										
Acaena ferruginea Sieb ex Fenzl. (360)		R		R			R			
Acaena lanigera (Andr.) Sims (366)		R					R			
Acaena prunifolia Fenzl in Hueg.	R			R						
RUBIACEAE										
Opercularia aspera Gaertn. (425)	R	R	R	R	R					
Opercularia diphylla Gaertn. (425)	O	X	O	X	O					
Opercularia varia Hook f. (425)		R					R			
Pomax umbellata (Gaertn.) Soland. ex A. Rich. (424)	X		X							
xRichardia stellaris (Cham.et Schlecht) Steud.	O	O			O					
ROSACEAE										
xCotoneaster sp.	R	R		R					R	
xPotentilla glabra		R				R	R			

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	C	D	1	2	3	4	5	6	7	8
ROSACEAE (cont.)										
xPrunus persica		R					R			
xPrunus domestica		R					R			
xRaphiolepis indica (L.) Lindl.	R								R	
xRosa spp.	O	R					R		O	R
xRubus vulgaris Weihe et Wees (260)	O	O		X			O		O	
xSpiraea cantoniensis	R	R							R	R
(RUBIACEAE) - see previous page										
RUTACEAE										
Asterolasia correifolia Benth. (382)		R					R			
Boronia polygalifolia Sm. (376)		O	O							
Correa reflexa (Labill.) Vent. var reflexa (380)		O	O	O		R				
Zieria smithii Andr. (379)		O		R			O			
(SALICACEAE)- see previous page										
SANTALACEAE										
Exocarpos cupressiformis Labill. (373)	R	O	R	O						
Exocarpus strictus R. Br. (373)		R		R						
SAPINDACEAE										
xCardios permum grandiflorum Swartz.(388)		X					X			
Dodonaea triquetra Wendl. (386)		X	X	X						
SOLANACEAE										
xCestrum parqui L'Her. (489)			R				R			
xCestrum aurantiacum Lindl. (489)	R	R	R				R			
xLycium ferocissimum Miers (490)		R				R				
(xPetunia hybrid)										
xSolanum mauritianum Scop. (487)		R	R				R			
Solanum nodiflorum Jacq. (488)		R					R			
xSolanum nigrum L. (488)	O	X	X	X						
xSolanum pseudocapsicum (488)		O	R	O						
xSolanum sodomaeum L. (489)		R								R
SCHROPHULARIACEAE										
xMisopates orontium (L.) Rafin.	O	O			O					
xVeronica persica Poir. (499)	O	O					O			O
(Cymbalaria muralis Baumg.)										
STERCULIACEAE										
(Brachychiton acerifolium (A. Cunn.ex G. Don) F. Muell. 239)										
Brachychiton populneum R. Br. (239)		R	R	R						
Lasiopetalum parviflorum Rudge (240)	R	X	X	R						
Rulingia pannosa R. Br. (239)	R	X	X	R						
STACKHOUSIACEAE										
Stackhousia viminea Sm. (262)	X	X		X	X					
STYLIDIACEAE										
Stylidium graminifolium Swartz ex Willd. (437)	X			X	X				X	
THYMELAEACEAE										
Pimelea linifolia Sm. (210)	R	X	O	X	X					
TROPAEOLACEAE										
xTropaeolum majus L. (202)	R	R		R						

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	C	D	1	2	3	4	5	6	7	8
UMBELLIFERAE										
xApium graveolens L. (396)		R					R			
xApium leptophyllum (Pers.) F. Muell.	O	O			O		O			O
xFoeniculum vulgare Mill.	R	X				R	X			R
xHydrocotyle bonariensis Lam. (394)	R						R			
Platysace ericoides (Sieb. ex. Spreng.) C. Norman	X			X	X				X	
VALERIANACEAE										
xCentranthus ruber DC (Black IV 801)		O								O
VERBENACEAE										
xLantana camara L.	R	O	O							
xLantana montevidensis (Spreng.) Briq.	R								R	
XVerbena bonariensis L.	X	X		O	O		X			O
Verbena officinalis L.	O	O					O			
VIOLACEAE										
xViola betonicifolia Sm. (168)		O	O	R						

SUBDIVISION MONOCOTYLEDONES

AGAVACEAE										
xAgave americana L.	R								R	
xPhormium cookianum Hill		R					R			
ALISMATACEAE										
xSagittaria graminea Michx. var. weatherbiana (Fern.)Bogin (one largecolony)		X					X			
AMARYLLIDACEAE										
xAllium neapolitianum Cyr.	R								R	
xAgapanthus orientalis	R	R								R
xCrinum pedunculatum R. Br.		R					R			
xLeucojum aestivum		R					R			
xNarcissus (jonquilla?)		R	R				R			
xNothoscordum inodorum (Ait.) Nicholson (540)	X	O					X			O
xHippeastrum x equestre (Dutch Hybrid)		O					O			
CANNACEAE										
XCanna indica L.		R					R			
xCanna sp.		R					R			
ARACEAE ARACEAE										
xZantedeschia aethiopica (L.) Spreng.		R					R			

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	C	D	1	2	3	4	5	6	7	8
COMMELINACEAE										
xTradescantia albiflora Kunth. (525)	O	X		R			X			
CENTROLEPIDACEAE										
Centrolepis strigosa (R. Br.) Roem. et Schult. (591)	R						R			
CYPERACEAE										
Carex inversa R. Br. (617)		O			O					
Cyathochaeta diandra Nees (603)	X		O	O	X				X	
Cyperus brevifolius (Rottb.) Hassk. (603)		O			O		O			
xCyperus eragrostis Lam. (600)	O	O			O		O			
Cyperus gracilis R. Br. Clarke (601)		-					R			
Cyperus tenellus L. f. (601)	O						O			O
Lepidosperma laterale R. Br. (612)	O	X		X	O					
Lepidosperma lineare R. Br. (612)	R			R						
Gahnia aspera (R. Br.) Spreng. (614)		O		O			O			
Gahnia melanocarpa R. Br. (614)		O		O						
Ptilanthelium deustum (R. Br.) Kuntze (611)	O				O				O	
Schoenus apogon Roem. et Schult. (610)	O						O			
xScirpus chlorostachys	R							R		
Scirpus inundatus (R.Br.) Poir.	O							O		
xScirpus proliferx Rottb. (606)	O							O		
HYPOXIDACEAE										
Hypoxis hygrometrica Labill. (552)	O	X			X					
GRAMINEAE (Poorly collected, Rookwood)										
(Note that arrangement is not alphabetical but as in Beadle et alia)										
xBromus diandrus Roth. (632)	R	R		R	R					R
xBromus molliformis L.		R					R			
xBromus rubens L.		R					R			
xCeratochloa unioloides R.B.K. (632)	O	X			O		X			O
xVulpia myuros (L.) Gmel. (633)	X	X			X					X
xVulpia bromoides (L.) S.F. Gray (633)	X	X			X					X
xPoa annual L. (634)	O	O			O		O			
xPoa affinis R. Br. (635)	R	R			R		R			
Poa sieberana Spreng. var. sieberana (636)	O	O		O	O	O				
xPoa ~~sieberana~~-pratensis L. (635)		R			R					
xDactylis glomerata L. (637)		O			O					
xBriza maxima L. (637)	O	O		O	O		O			O
xBriza minor L.	X	X		O	X		X			O
xBriza triloba Nees (637)		R			R					
xLolium multiflorum Lam (639)	X	X			O	O	O			X
xLolium perenne L.	X	X			O	O	O			X
xTriticum aestivum L. (640)		R								R
Phragmites australis (Cav.) Trin. ex Steud. (641)		X					X			

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GRAMINEAE (cont.)	C	B	1	2	3	4	5	6	7	8
xCortaderia selloana (Schult.) A schers et Graebn. (641)		R					R			
Eragrostis brownii Nees ex Steud. (643)	A	A			A	A				X
xEragrostis curvula (Schrad.) Nees		R					R			
Eragrostis leptostachya Steud. (642)		O			O					
Eragrostis philippica Jedwabnick (642)		O			O					
xEleusine indica (L.) Gaertn. (644)		O			O	R				O
xEleusine tristachya (Lam.)Lam.		O			O					O
xSporobolus africanus (Poir.) Robyns et Tournay (645)	X	A				A				X
Sporobolus elongatus R. Br. (645)	O	O			C					
xChloris gayana Kunth. (646)		R			R					
Chloris truncata R. Br. (645)		A			A		A			
xChloris virgata Swartz (646)		R								R
xCynodon dactylon (L.) Pers. (646)	A	X			A	X	A			X
xAvena barbata Brot. (647)	X	X			O		X			X
xAvena fatua L.	R									R
xAvena ludoviciana Dur.	R	R								R
xAvena sterilis L. (647)	R									R
xHolcus lanatus L. (648)	R						R			
Amphibromus neesii Steud. (648)		R					R			
Danthonia longifolia R. Br. (650)		R								
Danthonia pallida R. Br. (649)	R						R			
Danthonia purpurascens J. Vickery(651)	X	X		O	C	X				O
Danthonia racemosa R. Br. (651)		R		R						
Danthonia setacea R. Br. (650)		O			O					
Agrostis aemula R. Br. (652)	X	X		O	X		X			O
Agrostis avenacea Gmel. (652)	X	X		O	X		X			O
Deyeuxia quadriseta (Labill.) Benth. (653)	X	X		O	X					
Echinopogon ovatus (Forst. f.) Beauv.	A	A	A	A						
Echinopogon caespitosus C.E. Hubbard (654)	X	X	X	X						
Micheluchne sciurea (R.Br.) Hook F. (655)	X	X	O	O	X	O	X			O
Micheluchne rara (A. Br.) J Vickery		R			R					
xPolypogon monspeliensis (L.)Desf.(655)	R	R						R		
Stipa mollis R. Br. (656)	R				R					
Stipa nervosa J. Vickery var. nervosa	X	X	R	X	X					
Stipa pubescens R. Br. (657)	X	X		X	C					
Stipa scabra Lindl.		O		O	o					
Aristida ramosa R. Br. (658)		R			R					
Aristida vagans Cav. (65 28)	X	A		A	A					
xPhalaris tuberosa L. (661)		O			O					O
xPhalaris minor Retz. (661)		O			O					
Microlaena stipoides (Labill.) R. Br. (661)	X	A	A	A	A		X			
xEhrharta longiflora Sm. (661)		R				R				
Arundinella nepalensis Trin. (662)	R						R			
Digitaria ciliaris (Retz.) Koel. (664)		O			O		O			
Digitaria parviflora (R. Br.) Hughes(664)		O		O						
Digitaria sanguinalis (L.) Scop. (664)		O			O					O

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[illegible] (cont.)	C	D	1	2	3	4	5	6	7	8
xStenotaphrum secundatum (Walt.) Kuntze (665)	O	R					O			
Eriochloa pseudoacrotricha (Stapf. ex Chell.) Black (665)	R	R			R					
xAxonopus affinis A. Chase (665)		R					R			
Brachiaria foliosa (R. Br.) Hughes (665)		R					R			
xPaspalum dilatatum Poir. (666)	X	A	R	O	A	A	X		X	X
Paspalum paspaloides (Michx.) Scribn.		O						O		
xPaspalum quadrifarium Lam. (666)		O				R	O			
xPaspalum urvillei Steud. (666)	R								R	
Pa spalidium aversum J. Vickery (667)		R		R						
Entolasia marginata (R.Br.) Hughes (667)		O	O	O	R	R	O			
Entolasia stricta (R. Br.) Hughes (667)	X	X	O	X	A	X				O
Panicum simile Domin (669)	R				R					
Oplismenus imbecillis (R. Br.) Roem. et Schult. (670)		R								
xEchinochloa crus-galli (L.) Beauv. (671)		O			O					O
xSetaria glauca (L.) Beauv. (671)		R					R			
xSetaria geniculata (Lam.) Beauv. (671)	X	X	O	O	X		X			O
xSetaria palmifolia (Koen.) Stapf		R					R			
xPennisetum clandestinum Hochst. ex Chiov. (672)	X	X		R	X	O	X		O	X
xPennisetum macrourum Trin. (672)	X				X		O		X	X
Imperata cylindrica (L.) Beauv. var. major (Nees) C.E. Hubbard (674)	X	X	O	O	O	O	X			
xSorghum halepense (L.) Pers. (675)		R								
xSorghum leiocladum (Hack.) C.E. Hubbard		R			R					
xBothriochloa macra (Steud.) S.T. Blake (675)		R		R	R					
Cymbopogon refractus (R. Br.) A Camus (676)		R	R	R	R					
Themeda australis (R. Br.) Stapf	X	X	R	O	X	R	R			O

[illegible] -see back several pages.

xChasmanthe X crocosmiiflora (Hort. ex Lemoire) N.E. Br. (545)	R								R	
xIris germanica L. (541)		R								R
xIxia (capillaris?)	O				O				O	
xIxia flexuosa L. (544)	O				O				O	
xIxia (A maculata?)	O				O				O	
xGladiolus cuspidatus Jacq. (546)	O	O					O			
xFreesia refracta (Jacq.) Klatt var. alba (Klatt) Baker (544)	O	O		O	O					
xHomalea longifolia (Salisb.) Baker (542)	X	X			X					
xDisyrinchium micranthum Cav.	O	O					O			O
xSparaxis sp.		R			R					
xWatsonia bulbifera	X	X			O		X			
xWatsonia aletroides	R								R	
xWatsonia hybrids	X			X					X	
xWatsonia (marginata?)	O			O					O	
xCrocosmia lineata (Salisb.) Ker-Gawl. (545)	X			X					X	O
Patersonia longifolia R. Br. (543)	X			X	X				X	

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	C	D	1	2	3	4	5	6	7	8
JUNCACEAE										
xJuncus articulatus L. (588)		O					O	O		
Juncus bufonius L. (587)		O					O	O		
xJuncus capitatus Weig. (587)	O							O		
Juncus continuus	O						O			
Juncus fockei Buchen (588)	R				R		R			
Juncus homalocaulis F. Muell. ex Benth (587)		R	R							
Juncus planifolius R. Br. (588)	R	R					R	R		
Juncus procerus E.Mey (589)	R	R			R					
Juncus saropharus L.A.S. Johnson (589)	R	R			R					
Juncus sp. nov.	R				R					
Juncus subsecundus N.A. Wakefield (589)	R						R			
Juncus usitatus L.A.S. Johnson (589)	R	R			R		R			
Juncus vaginatus R. Br. (589)		R								R
LILIACEAE										
xAloe sp.	R	R				R				
Arthropodium milleflorum (DC.) Macbride (532)		O	O	O						
xAsparagus officinalis L. (531)	R	X	R	X						
xAsparagus plumosus Baker (530)		R	R							
xAsparagus sprengeri Regel (530)	R	R	R	R						
Caesia vittata R. Br. (533)	R	O			O					
Caesia parviflora (533)	O	X			X					
Dianella caerulea Sims (533)	X	X	R	O	X	R				
Dianella laevis R. Br. (534)	O			O	O					
Dianella revoluta R. Br. (534)		O		O						
xKyrsip hyllum asparagoides (L.) Willd. (531)	O	X	O	O			X			
Laxmannia gracilis R. Br. (535)	O	O		O	O					
Thysanotus tuberosus R. Br. (532)	O	O		O	O					
ORCHIDACEAE										
Diuris aurea Sm.(565)	X			X	X					
Diuris brevifolia Rogers (566)	X	O		X	X					
Diuris maculata Sm. (565)	O	O		O	O					
Diuris sulphurea R. Br. (566)	R	R		R	R					
Diuris punctata Sm. (565)	R								R	
Microtis parviflora R. Br. (567)	X			X	X					
Microtis unifolia (Forst. f.) Reichb.f.	X			X	X					
Orthoceras strictum R. Br. (566)	R			R						
Pterostylis nutans R. Br. (579)		R		R						
Thelymitra pauciflora R. Br. (564)	X	R		X	X					
PALMAE										
xPhoenix canariensis	R			R			R		R	
PHILESIACEAE										
Eustrephus latifolius R. Br. (532)	R	O	O	O						
PONTEDERIACEAE										
Eichhornia crassipes (Mart.) Solms. (526)	R							R		
TYPHACEAE										
Typha orientalis Pers. (556)	R	O						O		

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	C	D	1	2	3	4	5	6	7	8
Lomandra cylindrica Lee (549)	C				C					
Lomandra filiformis (Thunb.) J. Britt. ssp. ~~Pauciflora~~ *correcta Lee* (549)	C	C		C	C					
Lomandra fluviatilis (R. Br.) Lee (550)		C			C					
Lomandra gracilis (R. Br.) Lee	X				X					
Lomandra multiflora (R. Br.) J. Britt.		C		C						
Lomandra longifolia Labill. (549)	C	C		C						
Xanthorrhoea resinosa *Pers.* ssp. concava Lee (547)	C	C	R	C	C		C		C	

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Appendix II - List of

Species Collected only at Rookwood

S = species normally growing on soils derived from sandstones or their ecotones

PTERIDOPHYTA

OLEANDRACEAE

xNephrolepis cordifolia

GYMNOSPERMAE

ARAUCARIACEAE

xAraucaria bidwillii

(Araucaria columnaris)

PINACEAE

xPinus halepensis

xPinus pinaster

xPinus pinea

xPinus radiata

ANGIOSPERMAE

DICOTYLEDONES

APOCYNACEAE

xVinca major

CARYOPHYLLACEAE

xParonychia brasiliana

~~xSpergularia rubra~~

CASSYTHACEAE

Cassytha glabella

CASUARINACEAE

Casuarina littoralis

CHENOPODIACEAE

Suaeda australis

COMPOSITAE

xCoreopsis lanceolata

xGnaphalium candidissimum

xHypochoeris microcephala var albiflora

CRASSULACEAE

Crassula sieberana

CRUCIFERAE

xRapistrum rugosum

EPACRIDACEAE

Epacris purpurascens var.purpurascens

S Monotoca scoparia

EUPHORBIACEAE

S Micrantheum ericoides

GERANIACEAE

xPelargonium zonale

GOODENIACEAE

Goodenia heterophylla

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MALORAGACEAE
Haloragis villosa
xMyriophyllum brasiliense
LAURACEAE
xLaurandula (vera?)
MIMOSACEAE
Acacia longissima
S Acacia myrtifolia
xAcacia podalyriifolia
xAcacia pycnantha
xAcacia saligna
S Acacia suaveolens
MYRTACEAE
S Angophora bakeri
(Callistemon citrinus ~~salignus~~)
xEucalyptus citriodora
xEucalyptus melliodora
xEucalyptus microcorys
S Eucalyp tus paniculata
Eucalyptus parramattensis
S?Eucalyptus sclerophylla
x Eucalyptus saligna
S? Eucalyptus species - a scribbly gum?
(Melaleucahypericifolia)
xMelaleuca quinquenervia
xTristania conferta
ONAGRACEAE
Epilobium xcinereum
OXALIDACEAE
xOxalis purpurea
PITTOSPORACEAE
Billwynia parvifolia var. parvifolia
Comp holocoium minus
xPinus sp.
S Pittosporum rubiifolia
Oxylobium ilicifolium
xRobinia pseudoacacia
xTeline linifolia
xTephrosia grandiflora
xUlex europaeus
Viminaria juncea
(Wisteria sinensis)
PLUMBAGINACEAE
S Marianthus procumbens
POLYGONACEAE
xPersicaria lapathifolia
xRumex conglomeratus

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POLYGALACEAE
xPolygala myrtifolia
xPolygala virgata
POLYGONACEAE
xPolygonum arenastrum
PROTEACEAE
S Banksia aspleniifolia
S Banksia spinulosa
S Isopogon anemonifolius var anemonifolius
Persoonia laurina
RUBIACEAE
Pomaderris prunifolia
ROSACEAE
xRhaphiolepis indica
RUBIACEAE
Pomax umbellata
STYLIDIACEAE
Stylidium graminifolium
UMBELLIFERAE
xHydrocotyle bonariensis
S Platysace ericoides

SUBDIVISION: MONOCOTYLEDONES
AMARYLLIDACEAE
xAllium neapolitianum
CENTROLEPIDACEAE
S? Centrolepis strigosa
CYPERACEAE
S Cyathochaeta diandra
Cyperus tenellus
S? Lepidosperma lineare
S Schoenus apogon
S Ptilanthelium deustum
xScirpus chlorostachys
Scirpus inundatus
xScirpus prolifer
GRAMINEAE
xAvena sterilis
xHolcus lanatus
Danthonia pallida
Stipa mollis
Arundinella nepalensis
xPaspalum urvillei
Panicum simile
xPennisetum macrourum

IRIDACEAE

xxCrocosmia x crocosmiiflora

x(Ixia capillaris?)

xIxia flexuosa

x(Ixia x maculata?)

S Patersonia longifolia

xTritonia lineata

xWatsonia aletroides

xWatsonia (marginata?)

xWatsonia hybrids

JUNCACEAE

xJuncus capitatus

Juncus continuus

Juncus fockei

Juncus sp. nov.

Juncus subsecundus

LILIACEAE

S?Dianella laevis

ORCHIDACEAE

Diuris aurea

Diuris punctata

Microtis parviflora

Microtis unifolia

S?Orthoceras strictum

PALMAE

xPhoenix canariensis

PONTEDERIACEAE

Eichhornia crassipes

XANTHORRHOEACEAE

Lomandra cylindrica

Lomandra gracilis

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