

‘Picturesque Scientific Gardening’: developing Adelaide Botanic Garden 1865-1891

But stay, here come the gardeners Richard II, III iv 24

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The Botanic Garden was a source of great pride to the people of Adelaide in the latter part of the nineteenth century. It demonstrated that the wilderness could be tamed and civilization brought to the Antipodes. Writing in 1875 to a British horticultural journal a local resident enthused:

You should see our Botanic Gardens, under the care of Dr Schomburgk, brother of Sir R. Schomburgk, discoverer of the Victoria Regia Lily, you would pronounce them worthy to be numbered amongst the most lovely public gardens in the whole world.⁴²

William H Marcus in *South Australia, its history, resources and productions*, published in 1876 asserted:

... the glory of Adelaide and the pride of its citizens, is our beautiful Botanic Garden, which under the magic wand of the accomplished Director, Dr Richard Schomburgk has grown into a thing of beauty which will be a joy for ever. They who have seen all the Botanic Gardens in the other colonies, without a moment's doubt or hesitation given the palm to ours.⁴³

Schomburgk himself, while accepting that the botanic garden had a role as a place of recreation providing a 'thing of beauty which will be a joy for ever', believed this role was not as important as the provision of an educational and scientific institution:

A Botanic Garden is not a mere colonial show got up for the purpose of attracting the colonists or stranger who may honor South Australia with a visit. It is really an educational institution, by means of whose operation instruction may be spread over the colony, as to the constitution, habits, and mode of culture of introduced plants, not solely for the profit of individuals who may be engaged in the culture of the soil, but for the ultimate benefit of the whole community which furnishes funds for that purpose.⁴⁴

Providing a balance between the 'picturesque' and the 'scientific' was the key to success in colonial Adelaide. The development of the Botanic Garden which occurred in the period 1865-91 under the directorship of Schomburgk (1811-1891), its second Director, produced an institution with an international reputation. It was remarkable for the extent of the collection of plant material, the development of the site, and the links developed with contacts in Australia and overseas to build up the collection. A considerable amount of research was carried out into economic plants for use in crops. In addition the Gardens provided an important recreational resource for a large number of visitors from both city and country. William

Shakespeare as the Secretary of the Sunday School Union, applied to the Board for permission to hold a children's picnic in Botanic Park on Saturday 24 October 1883. Permission was granted.⁴⁵

Established in 1855 the Botanic Garden was opened to the public in 1857. Colonel Light had set aside an area for a botanic garden in his 1837 plan, but the site, located in what we now call the West Parklands, was subject to flooding and had to be abandoned. A second site, occupied by Thomas Allen and used to grow fruit and vegetables, was also abandoned. A third attempt in 1839 was more successful. John Bailey was responsible for planting a garden on the north bank of the River Torrens, opposite the present site of the Adelaide Zoological Gardens, but there were insufficient funds for it to continue. In 1854 the Agricultural and Horticultural Society recommended the establishment of a botanic garden of some 47 acres (18.5 ha) on the present site. George William Francis, who had lobbied from 1849 onwards for the establishment of a botanic garden, was appointed as first Superintendent. He was responsible for the hard work of the first plantings and planning such important features as Main Walk, which provides the north-south axis, the development of waterways which cross the site diagonally, the provision of paths, seats, greenhouses and a conservatory, and the establishment of beds for economic plants such as those possessing medicinal value.⁴⁶

The Schomburgk era

The Board of the Botanic Garden appointed Richard Moritz Schomburgk Director in 1865 following the death of Francis. Schomburgk had come to Adelaide in 1849 together with his brother Otto and the educationalist C W L Muecke. All three were leaders of a South Australian Colonization Society established in Berlin by supporters of liberal reforms who were disillusioned with the outcome of the uprisings throughout Germany in 1848. Richard Schomburgk had been apprenticed as a gardener in Germany from about 1825 until about 1832 when German gardeners had an excellent reputation throughout Europe. After working at Sanssouci, the Prussian royal gardens at Potsdam on the outskirts of Berlin, he furthered his career by accompanying his older brother Robert, later Sir Robert, on the Boundary expedition to British Guiana (1840-44), an expedition under the auspices of the British Government and Royal Geographical Society. Returning to Berlin, Richard produced *Reisen in Britisch Guiana*, a three volume account of the expedition together with natural history observations. Richard and Otto, both protégés of the eminent Alexander von Humboldt, were encouraged to make a new life in Australia after they became, in Richard's words, 'black sheep' for supporting the liberal cause in 1848.⁴⁷ The Schomburgks settled at Buchsfelde (renamed Loos in 1917) near Gawler, where they were active in community affairs. Over a period of sixteen years Richard gained experience of farming, horticulture and viticulture under Australian conditions.⁴⁸

Upon his appointment to the Botanic Garden at the age of fifty-four Schomburgk was able to use both his reputation in European and local scientific circles and his enthusiastic approach to get support for improvements he proposed. These included heating the Orchid House, stove houses and Conservatory with

hot water pipes, painting the greenhouses, ordering some 600 new labels for plants, rearranging the Herbarium, getting samples of artificial fruits, forming an experimental garden, increasing the number of 'florists' flowers', developing a rosery, providing a new aviary and stronger cages for some of the animals and using a previously uncultivated part of the Garden for a system garden for the 'scientific arrangement of the natural system of Plants'.⁴⁹

The extent of Schomburgk's list suggests that he had made good use of both his reputation and his position as the new Director to give the Board members a vision of new developments. The proposals were an early demonstration of Schomburgk's ability to give attention to the different roles of a botanic garden - a balanced approach which was to be his trademark and an important reason for his success as director. On the one hand he was suggesting rearrangement of the Herbarium, the provision of better labels and a system garden. These were all part of the scientific and educational role of the botanic garden as was the development of an experimental garden for 'medicinal, industrial and fodder plants' which was likely to be attractive to members of parliament and local business leaders. On the other hand his plans for better animal houses, while reflecting his interest in natural history, would appeal to family groups. In having a zoological collection he was, like his counterparts in Melbourne and Sydney, providing for those interested in the acclimatization of animals as well as plants. Keen gardeners would appreciate his new rose garden, the new heating system for the conservatories, and development of an orchid house for a valuable and steadily increasing orchid collection.⁵⁰ He also proposed an 'aquarium' for Nymphaeaceae and other aquatic plants popular with the general public. His first recorded outward letter was to the City Corporation to purchase manure from the streets, indicating a practical approach combined with a certain lack of self-consciousness.⁵¹

Although Schomburgk proposed a system garden in 1866 it was not established until 1871 by which time other projects with more popular appeal had been completed. The provision of a system garden or class ground where plants are laid out according to their botanical classification was important for the scientific role of the Botanic Garden. The Director expressed his regret that there was little interest in the study of botany and hoped for better things with the 'rising generation'.⁵²

An important early project was the 1866 planting of the avenue of Moreton Bay figs (*Ficus macrophylla*), one of the earliest native species to be used in landscape design.⁵³ The fully grown trees today form a magnificent avenue with a cathedral-like quality. Schomburgk's avenues of 'the handsome American ash-tree' (*Fraxinus americana*), *Pinus insignis* [*Pinus radiata*] and another of *Araucaria* species, were useful as a design feature in helping to break the rather flat site into smaller sections and to provide visual interest. Adelaide's Botanic Garden site does not have the advantages of Sydney's site with its harbour background, or those of Melbourne, a large site adjoining the River Yarra, or the hillside and river valley setting of Hobart's Botanic Garden. Avenues were a feature of many of the famous German gardens which Schomburgk knew in his younger days and those that remain in Adelaide Botanic Garden have few counterparts in the other Australian botanic

gardens established in the nineteenth century.

The waterways were planted with trees such as weeping willows and islands within the streams were developed with shrubberies, flowers and statues. Improving the paths with guttering and gravelling was important at a time when women wore long skirts. There were experiments with grasses such as couch and buffalo to provide lawns which could withstand Adelaide's long, dry summers. Statues, fountains and flower beds planted in the fashionable geometrical patterns of the day added to the popularity of the Gardens. Local residents organized a public subscription in 1867 to raise funds for two new statues, one of which, 'The Amazon', can still be seen near the Kiosk. The use of statuary in gardens was something with which Schomburgk was very familiar from his European training. His argument that these new acquisitions not only enhanced the beauty of the gardens but cultivated 'the public taste for the fine arts', reflects the theme so common in these times that civilization was transforming the wilderness.

Statuary also helped to create the atmosphere of a mature garden while trees and bushes were still growing. One feature soon to produce a great display was the rosery planted with some 300 varieties; by 1868 the Director could refer to this as 'a much admired feature of the garden'. The roses were planted in 'amphitheatrical rows'; some 402 cultivars and 42 species were listed in the 1878 *Catalogue*.⁵⁴

The Victoria House

During this early period Schomburgk obtained funds for the Victoria House for the giant waterlily *Victoria regia* [now known as *Victoria amazonica*]. The waterlily was already associated with the names of Robert and Richard Schomburgk who had seen it growing in British Guiana; Robert's specimens and descriptions led to its botanical classification.⁵⁵ Reports in scientific and horticultural journals of this 'vegetable wonder' produced great interest. Richard's proposal for the Victoria House was accepted, although he himself admitted that it was quite risky because some members of the government considered it an extravagance. What is more, he admitted that the waterlily had not been grown successfully in Europe before he left for Australia and that he had no practical experience of growing one.⁵⁶

Despite these forebodings, the venture was a great success. The flowering of 'this magnificent queen of aquatics' produced a degree of excitement in Adelaide comparable to Bradman's cricket scores at the Adelaide Oval in later years. The *Register* of 12 October 1868 reported 5840 visitors on the previous Sunday. There were as many as 30 000 visitors in a four week period and about 300 000 visitors a year -remarkable popularity given that the 1866 census gave the whole South Australian population as 163 000. The flowers were reported to be up to 13 inches (33cm) in diameter and the leaves up to 6 feet 4 inches (193cm) in diameter. Newspapers printed hour by hour descriptions of the opening of the flowers.⁵⁷ After Dr Schomburgk gave a talk on the *Victoria* to the Philosophical Society (later the Royal Society) on 29 September 1868 the *Examiner and Daily Telegraph* reported that 'the congratulations of the Society were tendered to the Doctor for his successful raising of the *Victoria Regina* [sic]'. South Australians were proud of the successful flowering because the plant possessed international prestige and

was difficult to grow.⁵⁸ The Botanic Gardens in Melbourne grew the royal waterlily shortly before Adelaide's *Victoria*, but their staff could not match Schomburgk's consistent success in subsequent seasons. Adelaide is the only Australian botanic garden which has regularly cultivated the *Victoria* since 1868.

One visitor was not impressed. In a letter published in the *Advertiser* a writer with the nom de plume of 'Jolly Humbug' referred to a 'dirty-looking' flower which he admitted was 30 hours old and might have been on the wane:

The whole froth that we have heard about the flower is just a little German bumptious brag, and nothing else. The water-wheel and the leaves are by far the best part of the show.⁵⁹

However the editor, suggesting that the writer himself might be in 'the wane of life', declared that it was 'too late in the day to make fun of the *Victoria Regia*' and, indeed, visitors were numerous and appreciative. The *Examiner and Daily Telegraph* described the *Victoria House* as 'a model of gracefulness', commenting that ... the immense improvements that have been made during the last few months are a credit to the skill and taste of Dr. Schomburgk and the liberality of the Government.⁶⁰

The *Observer* described the Doctor's *Victoria House* enthusiastically as 'a Sydenham Palace in miniature' and 'the greatest undertaking that he has yet attempted'. Referring to 'the Fairyland that is to be' the writer explained that as plants grew 'there would be a tropical lake embosomed in a semi-tropical forest - an epitome of the most luxuriant scenery in the world 'All the art of European horticulture will be employed to display the wonders of American and Indian vegetation'.⁶¹ The *Victoria House*, which could accommodate epiphytic and terrestrial orchids and other plants requiring warm, humid conditions such as *Dracaena*, *Croton*, *Caladium*, *Dieffenbachia*, *Anthurium* and *Maranta*, provided one of the substantial and noticeable improvements which helped to build up the prestige of the Botanic Garden and with it Schomburgk's own reputation. Schomburgk wrote that the collection was the most numerous and valuable in the Southern hemisphere, the kind of comment which would bring a glow of parochial pride to his readers. The display with its orchids and climbers trained along the rafters, its ferns and philodendrons was also intended to interest the gardener who might wish to grow tropical plants at home, for by this time successful settlers were establishing fine houses in which conservatories were considered an asset.

The Palm House

A vast increase in the collection of tropical plants⁶² and overcrowding in existing glasshouses led Schomburgk to make an eloquent appeal for a new Tropical House in his 1873 *Report*. A number of plants had reached the roof or would shortly do so, and he argued:

... it would indeed be a sacrilege to top these fine specimens, and so spoil them for ever. We have at present barely sufficient room to afford accommodation and display the extensive and valuable collection of plants, and as overcrowding is so dangerous for them, it is indispensably necessary to their health and safety that means should be found to erect a new and commodious

structure which is now so much required.

A new structure would provide for the requirements of the plants for many years to come'. He had heard:

... very favourable accounts of a palm-house built of iron in Bremen, which is considered one of the finest structures of its kind in Germany, for its tasteful and elegant proportions and general suitableness.

This palm-house, owned by a man named Rothermund, Schomburgk argued would provide a model for one in Adelaide and he waxed eloquent as he described the proposed structure. It would have a rotunda with an ornamental fountain surrounded by palms and tree-ferns. These could be planted directly in the ground rather than being grown in pots, enabling 'luxuriant growth' and the display of 'their graceful and

noble foliage to greater advantage'. He estimated that the proposed g

Palm House would cost about £1400, which would require a special government grant. However, the Director wrote persuasively that with such a structure:

I think our garden would be complete, and would add still further to the fame which it already possesses in the neighbouring colonies and abroad.

In a colony heavily dependant on primary industry, a favourable season increased the chances of getting a special grant.⁶³ The argument that the Palm House would bring further prestige to the colony was a persuasive one. By 1874 the government and the legislature had approved the Botanic Garden's proposal and an order was placed with the manufacturer, J Hoper of Bremen. The architect supervising the project was Gustav Runge, who had designed Rothermund's palm-house. Runge, who had also previously designed the Philadelphia Opera House, the Customs House in Bremen and the Breitenweg Baths, had won recognition for his arrangement for heating and ventilation.⁶⁴ The prefabricated palm house, an iron and glass construction using a combination of wrought and cast iron, one hundred feet long and thirty feet wide (30.5m by 10m), arrived in Adelaide in August 1875.

The nineteenth century had seen great advances in both heating and ventilation techniques. Hollow cast iron supports were produced which could support the roof and serve as a conduit for rainwater from the roof. In Britain, new techniques for producing glass, the repeal of the Glass Act in 1845, combined with lower prices for coal and iron, and improved production techniques for iron all facilitated the spread of glasshouses. Conservatories became fashionable amongst the well-to-do at a time when there was enormous interest in horticulture as a recreational activity. Pioneering work in design saw glasshouses erected in the botanical gardens of Dublin, Belfast and Kew between 1839-1848. The Crystal Palace of 1851 was the epitome of this new technology. In Germany large glasshouses were built after the 1860s in the botanic gardens of Berlin, Karlsruhe, Schonbrunn, Strasbourg and Wurzburg: in these European hothouses the outstanding plant among the exotic vegetation raised was the palm.⁶⁵ The new Palm House in Adelaide was comparable in size with such overseas counterparts as

those in Edinburgh and Florence.⁶⁶ Many of these nineteenth century European glasshouses have been destroyed by fire or war-time damage, while others were demolished in the early years of the twentieth century because of the cost of maintaining them. Adelaide's Old Palm House is the finest Victorian glasshouse remaining in Australia and, on the basis of current research, the only remaining example in the world of German cast iron/wrought iron conservatory architecture of its period.⁶⁷

Schomburgk himself supervised the transfer of tropical plants from the other glasshouses at the Botanic Garden including a sixteen foot (4.9m) high *Latania borbonica* [*Livistona chinensis*] which was placed in the central part of the rotunda surrounded by plants with variegated leaves. Nearby there was a collection of tall tree-ferns obtained from Queensland, New Zealand and Port Natal. There was a selection of climbing plants on the eight pillars supporting the rotunda and smaller plants by the red and blued tiled walkways. Little changed today is the grotto at the western end constructed from stalactite, imported from the Black Forest in Germany, with a small stream cascading over stones into a basin. To avoid flooding the Palm House was placed on a raised terrace which was decorated with flower beds and planted with bright annuals.

Opening the Palm House on 22 January 1877 Lady Musgrave said:

This splendid palm-house has crowned our gardens with a beauty – I may say magnificence - which all Adelaide will appreciate with pride.⁶⁸

The Director described it enthusiastically as 'like a fairy tale of the thousand and one nights'. The total cost was £3800 excluding painting and glazing done by the Garden's own workmen. Ironwork and glass, including freight and commission, cost £ 1300 and building the foundation of the terrace, the flight of steps and statuary approximately £2500. However within three months Schomburgk was writing in his report for 1876-7

No doubt the whole undertaking is a great success; but as there is nothing perfect in this world, so it is with our Palm House, it should be at least twice as large. In a few years by the steady increase of tropical plants, the house will be overcrowded, and the noble palms will soon have reached the roof.

This was a down-to-earth remark in some contrast to the previous talk of 'the fairy tale of a thousand and one nights'. The problem was that the palms grew almost too luxuriantly and a number of them could not be topped. Some might have to be removed altogether to prevent damage to the roof. Very soon the Director was suggesting that the Palm House be enlarged or a new building be added, but a hundred years were to pass before this proposal came to fruition. The present Director Dr Brian Morley and his Board succeeded in obtaining a special Bicentennial grant to build the new Tropical Conservatory, opened in November 1989.

Tree-planting

Schomburgk began planting the arboretum in the north-east corner of the Gardens in 1867. He wrote that year that the arboretum, a collection of trees grown to illustrate the diversity of species and forms, would be planted with Australian

trees and shrubs from the western, eastern and north-eastern parts of Australia. Some 42 species of Eucalyptus and 70 of Acacia had been raised from seed in his nursery. The arboretum, to be seen today near the new Tropical Conservatory, adjoined the pinetum or collection of pines. These trees, part of the group often referred to as conifers, enjoyed great popularity in later nineteenth century Britain, Germany and Italy.⁶⁹ Schomburgk wrote the next year that his pines were thriving 'uncommonly well' and promoted the use of the stone pine (*Pinus pinaster*), the aleppo pine (*Pinus halepensis*) and the Californian pine (now *Pinus radiata*) as being very suitable for public tree planting. His support contributed to the popularity of conifers for parks and large private gardens; popularity which produced a legacy of mature trees along the River Torrens between the University and the Zoological Gardens, in the North Parklands near Lefevre Terrace and in Botanic Park along Hackney Road.

Beyond the Garden's confines Schomburgk was active in promoting civic tree-planting. One way that this could be achieved was by providing local government bodies, schools and cemeteries with young trees raised in the Botanic Garden's nursery - ranging from 4500 to 12 800 between 1870 and 1879, then gradually reducing as the Forest Board developed its nursery facilities. There were further opportunities to demonstrate various species when an extra 84 acres (34ha) of the old Police Paddock were made available to form the adjoining Botanic Park. Schomburgk planned a landscape garden and arboretum with a carriage drive lined with shady trees and grassed areas with 'scattered clumps or single trees, conspicuous to the eye by their fine foliage or form.'⁷⁰ Although the summer of 1873-4 was particularly hot and dry, with temperatures of 105.0 to 111.0°F (40.5-44.0°C) and only one inch of rain (25mm) between September and February, he reported only 2% losses in the first group of 4000 young trees of the 9000 in the new park,⁷¹ demonstrating that early planting and assiduous attention to watering enabled young trees to survive difficult conditions. 'I understand that the loss of trees by other public bodies this season is very material; but I consider this is their own fault', he wrote, adding that if trees were watered adequately when planted they would withstand great dryness subsequently.⁷²

Schomburgk tried to plant as many varieties as possible of European and North American forest trees such as ash, oak, birch, lime, and pine, as well as the best Australian trees available. There were avenues of cork elm, Moreton Bay fig and oriental plane tree, the last of which he strongly recommended for public planting as could be seen in Paris. Further planting went on in subsequent years and the remainder of the trees had been planted by the beginning of 1877, with European and North American forest trees growing 'luxuriantly' and reaching a height of 10-12 feet (3.0-3.7m) that year and 25-30 feet (7.5-9.0m) by 1879. Towards Hackney Road where the soil was fairly stony conifers such as *Pinus halepensis* (Aleppo Pine) and *Pinus pinaster* (the Maritime or Cluster Pine) were planted.

The Park was laid out so as to provide views from an elevated vantage point towards North Adelaide to St Peter's Cathedral and across to Walkerville. A half circle planted with shady trees was provided with seats so that the fine view

could be enjoyed. Over the years the trees have grown so that this view is not possible today. The drive, intended for carriages, was planted with two rows of avenue trees on each side; two hundred plane trees on the outside and the inside row planted alternately with the native *Lagunaria patersonii* (the Pyramid Tree or Norfolk Island Hibiscus) and *Sterculia diversifolia* [*Brachychiton populneus*]. Although there was a good supply of water, exceptionally dry summers meant that watering became a major task in both the Park and the main part of the Gardens. The 1879 *Report* recorded a particularly hot summer with a four week period when shade temperatures fluctuated between 95°F and 106°F (35°C-41°C) reaching 113°F (45°C). European settlers still had much to learn about such climatic extremes, even forty years after European settlement had begun in Adelaide, and it was an important factor in the trial and error process of learning what could be grown successfully on the Adelaide plains.

Development of Botanic Park also included further attention to the banks of the River Torrens in order to prevent the banks from collapsing, and the provision of entrance gates at both Frome Road and Hackney Road. Each gate had a lodge with a man in attendance to control the transit of carriages through the Park along the carriage way which opened in 1884. The following year 7772 carriages and some 900 horsemen used what the Director described as 'one of the finest drives in the southern hemisphere'. Pedestrians could enjoy the avenue of plane trees, 'the abundance of shade' in hot weather and the fine views of Medindie and surrounding suburbs. These facts and the way they were reported were characteristic of a society eager to congratulate itself on its respectability, and its progress in the gentle arts of civilisation as understood by the comfortable antipodean middle classes.

'Roughs and unruly boys'

The same is revealed by the other side of the coin - reports of 'roughs and unruly boys'. The same no doubt whom Shakespeare prosecuted for misbehaviour in the Torrens Lake! For in addition to the more respectable visitors, such as the horsemen using the new drive in Botanic Park, there were 'disorderly people of both sexes' sleeping in hollow gum trees or under pine-trees and who were not so welcome.⁷³ Young trees were uprooted; others as high as 6-8 feet (1.8-2.4m) were snapped in two.⁷⁴ It was 'really disheartening' to the Director who had similar problems in the plantation for which he was responsible at Bowden where there was an additional problem of unruly goats. Damage occurred along North Terrace even when the trees were protected by tree-guards. Such damage occurred in the main part of the Botanic Gardens too. Schomburgk wrote of:

the continuous vulgar practice from which the Garden suffers so much, viz., of cutting the seats, carving names in trees, and the grave annoyance of writing indecent sentences on the pedestals of the statues ... and I am sorry to say that even in the Palm House the broad leaves of the large Pandanus at the entrance doors are suffering from this disgusting practice.

He had little doubt that the culprits were

... roughs, and unruly boys who kill their time by frequenting the Garden more than I wish for, and who also on every opportunity show disobedience

to orders, and insolence to the men when reprimanded.⁷⁵

Theft was also a problem. A detective was employed during 1868 after a spate of robberies of plants. The rule was adopted that flowers might not be brought into the Gardens after 'one occasion when about twenty people came in with flowers in their button-holes, and hundreds went out with some'.⁷⁶ Small items such as hyacinths, ranunculi, anemonies and pansies and more valuable items from glasshouses were sometimes stolen. However Schomburgk could report that the conduct of most of the visitors was 'orderly' aided by the presence of two policemen on Sunday afternoons to preserve 'general decorum'.⁷⁷ Schomburgk noted the abominable nuisances perpetrated by a minority of visitors

are not confined to any class of society, neither does it preponderate in any class; each has its own besetting foibles, such as destroying trees, plucking flowers, stealing plants, cutting trees and seats, disobedience to orders and indecorous conduct.⁷⁸

Orderly conduct included keeping to the paths, refraining from picking the flowers or not bringing perambulators into the Gardens. The reasons behind the last are not clear although it was probably to prevent damage by perambulator wheels to the paths. It was not until the time of the third director, Maurice Holtze, that people were allowed to walk on the grass or smoke in the gardens. This might be a land of open spaces but Adelaide in the period 1860-1890 was a place where decorum was to be maintained, as William Shakespeare well understood.

Museum of Economic Botany

With the Palm House erected Schomburgk began to campaign for his next large scale project. The existing Museum, 'built of rustic work in the exact proportions of the celebrated Parthenon in Athens',⁷⁹ was 'one of the institutions in the garden most appreciated by visitors'. For all that it was too small. Many interesting objects had to be 'stowed away from want of room' and specimens were in danger of damage by damp and the ravages of termites. He therefore proposed a new building for the economic botany collection and the herbarium. As early as 1870 he put forward 'his favourite scheme' to make the museum a 'kind of technical one' where commercial and economic plants could be exhibited both in their raw state and in various stages of manufacture.⁸⁰

Finally Schomburgk had his way and the Museum of Economic Botany was built in 1880-1. The model for the Museum appears to have been the Museum of Economic Botany at Kew, opened in 1847. Adelaide's Museum of Economic Botany was designed and supervised by the Government Architect-in-Chief, E J Woods. It was in the 'Attic style', 104 feet long and 40 feet wide (31.7m by 12.2m) with a central portico and flight of steps thus repeating the classical style of design used in the first museum. The building cost £2900; extra work such as rough painting and most of the work of the fixtures being done by the Gardens' own staff.

Schomburgk worked for many months on the arrangement of items, having, he said, 'no skilled assistance'.⁸¹ He made good use of a printed guide to the display at the Museum of Economic Botany at Kew. At the eastern end of the building a separate room was set aside to house his Herbarium which was a collection of

scientific plant specimens, dried and pressed, stored between sheets of paper. It played a vital role in the identification and classification of plant specimens. The fine ceiling of the Museum painted in classical style by the decorative artist W J Williams has survived to the present day. The building is now listed on the inventory of the National Estate. Statues representing the four seasons were placed on the terrace, repeating the classical theme, though regrettably it seems that these were sold as recently as the 1950s. A terrace was formed outside with lawns and flowerbeds said to be laid out in 'Greek style' in accordance with the classical style of the building, the development of this whole area forming the last major project of the Schomburgk era.

The Museum of Economic Botany provided an important adjunct to the scientific and educational role of the Botanic Garden. Besides the Herbarium it contained a display of plant products indicating their value in food, construction, medicine and technology. In this period when the petrochemical era was in its infancy, plant products were used for a wide variety of purposes for which today we would use metal alloys, synthetic fabrics, plastics and other manufactured materials. There were exhibits such as leaves, roots, bark used to dye fabrics, dyed fabric samples, gums and resins together with a display of their use in varnishes, pharmaceutical products, 'indiarubber and guttapercha'. There were plants yielding fibres, together with displays of rope and household products such as baskets and mats, a display of plant products such as cereal, olives, and grape products used for food and beverages, a carpological (fruit) collection and a toxicological collection, including morphine and the arrow poison urari (curare) which Schomburgk collected on his British Guiana expedition.⁸² There was also a collection of plants dangerous to livestock. He had obtained from his compatriot Paul Foelsche, head of the police in the Northern Territory, plants used by Aborigines near Darwin for medicines, food and drink. What was notable about Schomburgk's concern with plant material used by Aboriginal people is that this was an era when many people regarded Aboriginal knowledge of plant use with indifference and when ethnological displays at the South Australian Museum were very limited. He was delighted with the popularity of the Museum of Economic Botany exhibits amongst visitors; it seems to have exceeded his own expectations. Not only was there a strong belief current in the educational value of such museum exhibits but the existence of the Museum would have provided a welcome refuge for visitors on rainy days and in the middle of summer.

Schomburgk's great love for the Herbarium, which eventually contained some 18 000 specimens and where he was 'always to be found' in his latter years,⁸³ was not shared by his successor Holtze. Veitch reported after his 1893 visit that 'Mr Holtze hopes ... shortly to transfer these elsewhere'.⁸⁴ Only a few herbarium specimens from the Schomburgk era appear to have survived. During the first half of the twentieth century the scientific role of Adelaide Botanic Garden was minimal and it was not until the Directorship of Noel Lothian that the Herbarium and the botanical library were re-established in 1955.⁸⁵

Developments after 1880

The year 1880 can be seen as the end of the great development phase of the period

1865-1891. This was the year when the main entrance gates to the Botanic Garden were ordered, chosen from the pattern book of Turner and Allen, a firm of art founders in London, at a cost of F454 15s 9d. The attractive gates helped to provide an inviting atmosphere for visitors to the gardens as they looked along Main Walk but also were important in enhancing the streetscape of North Terrace as the main 'boulevarde' of Adelaide.⁸⁶

There were a number of improvements still to come but the main work was now done. Schomburgk turned sixty nine in 1880 and despite being very active his drive to begin new projects appears to have been less powerful in the last decade of his term of office than it had been earlier. The South Australian economy was badly affected by poor seasons in the 1880s. There were some new developments which arose from handing over the collection of mammals to the Zoological Society in 1883. This not only made available the areas where the cages had been but also five acres (2ha) of land that had been used for growing cereals for feed. A long battle was waged between the Botanic Gardens Board and the committee of the Zoological Society over this matter which centred not only on the fate of the animals themselves but on the issue of whether the Acclimatization and Zoological Society should be granted portion of Botanic Park. This was one battle for resources which Schomburgk and his Board did not win. Although examples of a zoo and a botanic garden being combined can be found in Europe, such as at the Frankfurt Zoo, in Adelaide as in Sydney, Melbourne and Perth separate institutions developed.⁸⁷ The Society acquired a section of Botanic Park near the Albert Bridge and the Adelaide Zoological Gardens were opened in 1883.⁸⁸

The period 1881-1891 saw useful but not dramatic improvements in the development of the site: improvements to fencing and bridges, painting of glasshouses, statues and seats. Statues were placed around the Museum of Economic Botany representing Spring, Summer, Autumn and Winter. The *Observer* reported that they were 'not very remarkable for style', adding that Summer was clothed in 'enough heavy drapery for a snowstorm'. However the *Observer* gave a glowing account of a statue of Aphrodite, set in a pool of with lilies. This statue known as 'Venus arising from the sea' was ordered from Berlin by Schomburgk after he had admired a replica in Sydney.⁸⁹

There was a steady addition of between 200-500 new plants per year, some purchased from English and European nurserymen, some acquired by exchange with other botanic gardens.⁹⁰ While many of these were ornamental another very important part of the Botanic Garden's work was the introduction of utilitarian or economic plants.

Utilitarian plants

The expansion of colonies of European settlement in the nineteenth century involved significant transfers of plant material from a wide range of sources. Australia is unusual in being a country where (with perhaps *only* one exception, that of the *Macadamia* nut) every cultivar and crop plant has been derived from an introduced species. This is also true of most ornamentals, lawn grasses and sown pasture species.⁹¹ Ann Riddle's chapter in this collection makes that abundantly clear for Adelaide's Parklands.

In 1868 Schomburgk, with experience as a vigneron in his early years in South Australia and convinced that it should not be necessary to import dried sultanas, purchased for £5 some cuttings of sultana vine from the Botanic Gardens at the Cape of Good Hope. In 1869 he distributed some 1700 sultana cuttings produced from these and was taking grafts from vine cuttings from the celebrated Jardin de Luxembourg. Cuttings were also supplied to other Australian colonies. In the 1870s he was importing vine-stock considered resistant to the disease phylloxera. He also wrote a paper on the nature of the disease as an Appendix for an Annual Report. There were reports on pasture grasses (about 200 were recorded), grain crops and fodder plants and on legumes such as chick pea, ground nut, lentil, vetch, lupin, mesquite bean, soybean, tangir pea, pigeon pea, wood lathyrus and dolichos. There were reports on oil crop plants such as sunflower, *Ricinus* (castor oil plant), poppy, rape, mustard, sesame and flax and fibre producing plants such as esparto grass. Vegetables and tubers such as beet and kumara were reviewed. Other plants of note were plants to be used in drugs and medicines, in the fabric industry and for culinary purposes and beverages. Schomburgk imported and promoted new types of fig and almond convinced that these had great potential in South Australia. There were other activities which had domestic application such as the planting of fruit trees and the display of artificial fruits so that varieties would be better known. All this helped to justify the expense of the Garden in pragmatic rather than aesthetic terms.

In order to obtain the necessary plant stock for trials the director made use of such contacts as the British Empire network of Botanic Garden directors, diplomats, vice-regal personnel and businessmen. A new crop might be promoted on the basis that it would produce a product that was at that time being imported or for which there was a demand in other colonies or overseas. Yet while continuing with crop experimentation he noted that it was not an easy task to introduce new industries. Although he might grow plants successfully for years in the experimental garden and yet have no enquiries for them, he would nevertheless persevere in the hope that their usefulness might eventually be appreciated. The Botanic Garden under Schomburgk was therefore performing many of the functions later to be undertaken by Roseworthy Agricultural College (established in 1883), the Department of Agriculture, the CSIRO and the Waite Institute in the twentieth century.

A recent researcher, Peter Kloot, has described Schomburgk as 'probably the greatest plant introducer to have operated in Australia'. Commenting on the collection of about 8500 species listed in the 1878 *Catalogue* he asserted that at that time 'Adelaide Botanic Gardens had one of the largest living plant collections in the world from which private and commercial interests were supplied'.⁹²⁵¹ The statement is difficult to substantiate, but as director for such a long time and active in plant exchange, Schomburgk certainly introduced a very large number of species and has to be regarded as one of the most important plant introducers in Australia.

In addition to reports on testing and distribution of plants of utilitarian value Schomburgk's reports had advice on practical matters such as pruning and

propagation. The reports also included educational matter on pasture improvement, prevention of soil erosion and the need for diversification in farming. Schomburgk noted that products such as mustard, currants, raisins, sultanas, tobacco, chicory, capers, canary seed, broom millet and various culinary and medicinal oils were imported but could be grown profitably in South Australia. This would make them less expensive and would also provide export earnings. When crop plants proved to be more suited for a tropical climate he was quick to suggest that specimens be sent to Port Darwin for trials there.⁹³ Schomburgk did not have the advantage of twentieth century ecological research and he did not always give sufficient attention to climatological factors. Our current understanding of the problems of agricultural extension work helps explain the lack of response from many of the farmers to whom plant material was made available. However his sheer enthusiasm for plant importation and experimentation led to valuable plants being made available not only in South Australia but in the other colonies. In addition, his support for afforestation and demonstration of the value of trees such as *Pinus radiata* had long term significance for South Australia.

International exchange of plant material between institutions was considerable. Within the British Empire the Royal Botanic Gardens at Kew functioned as the hub of the wheel of exchange, promoting the development of suitable economic crops vital for colonial expansion in both temperate and tropical regions.⁹⁴ Both information and plant material were sent to Kew and then made available to directors of the colonial botanic gardens who in turn exchanged material with each other. Schomburgk also received significant collections from his colleagues at the Buitenzorg (Bogor) Botanic Gardens in Java and from his compatriot Dr Regel at St Petersburg. He was able to make use of institutions in Germany and the United States and there were in addition many exchanges within Australia and New Zealand.

A balanced approach

Schomburgk's success owed much to his ability to balance the different functions of the Botanic Gardens, scientific, educational and recreational, and to balance short term with long term goals. His collection enabled members of the public to see which exotic and indigenous plants could be grown under local conditions. He wrote that it was pleasing to see the number of people who 'frequent the garden for instruction and study' and who came to identify plants.⁹⁵ He saw the botanic garden as 'really an educational institution', enabling 'instruction to be spread over the colony as to the constitution, habits and modes of culture of introduced plants'.

The Gardens provided a focal point for exchange of information for settlers as they experimented with plant material that would be suitable for local climate and soil conditions. Towards the end of his directorship Schomburgk commented with pleasure on the interest in floriculture apparent amongst those who came to him with enquiries and the high standard of 'cottagers' gardens' in Adelaide. That forty to fifty donors of plants and animals were acknowledged each year indicates that there were many people who saw the Botanic Gardens as 'their' garden. Adelaide's Botanic Garden had no entrance fee nor were there restricted hours of admission as enforced at Kew.

Schomburgk sought to balance 'the picturesque' with 'the scientific', and to manage the competing needs of different interest groups. He had some success in dealing with two perennial problems of colonial botanic gardens directors. He signalled the first characteristically

In my wish to give satisfaction to everyone, I find that I have much to contend with; as many well-wishers who take an interest in the objects of the garden contend that plants of a commercial and economic value should received more attention; but I have the conviction that as far as my means go, I do not neglect either.⁹⁶

Nearly twenty years later he commented on the second problem:

... my efforts have not been entirely successful. Some of the colonial nurserymen complain that the public are supplied too freely with plants, seeds and cuttings from the garden, and that in consequence their trade is injured.⁹⁷

He explained that nurserymen were protected by a regulation that forbade the distribution of ornamental plants within two years of their introduction. Commercial and medicinal plants could be distributed immediately to interested people.

On the whole Schomburgk succeeded in achieving this balance. Unlike his two very able compatriots in the field of natural history Ferdinand von Mueller in Melbourne and Gerhard Krefft in Sydney, both of whom were dismissed from posts they held, Schomburgk was not dogged by controversy. He enjoyed great personal success and writing to an old friend in British Guiana when he was seventy he could say 'I have become the people's pet'.⁹⁸

He gave evidence to government committees on such matters as sanitation, afforestation, rust in cereals and scientific agriculture. He had been involved with the establishment of South Australia's State Forest Service. He had supported a scientific approach to agriculture as seen in the establishment of Roseworthy College, like the State Forest Service the first of its kind in Australia. He had received awards from the Grand Duchy of Hesse, the King of Italy and the King of Prussia. The gardens were known as 'Dr Schomburgk's gardens'. The level of support from the local community is indicative not only of his own skills as an administrator of a successful local institution but also reflects a network of local support from enthusiastic and educated settlers who saw how science could be put to use to develop the colony.

Schomburgk in his role as administrator and as a catalyst for action in the local community was helped by his robust constitution, his skills in interpersonal relations and the capacity to make use of a wide variety of contacts. Membership of learned societies, botanical, horticultural and geographical, in Australia, Great Britain, France Denmark, Germany, Austria, Russia and the United States helped him maintain these contacts. Schomburgk was fortunate that his skills were put to use in a city where there were people sympathetic to his ideas. Described by his contemporaries as enthusiastic, kindly and a man concerned with the world's wrongs, he was no intellectual giant; but he had determination, he was visible and

approachable and above all was open to new ideas. He also had a practical approach to problem solving which made him very acceptable to his colleagues. He worked well with a group of well-educated and prosperous businessmen and property owners who were active in their support of institutions such as the SA Institute and the University of Adelaide, societies such as the Philosophical Society and Agricultural and Horticultural Society⁹⁹ and various floricultural societies. He shared with some of them active membership of the Anglican church and the Masonic Lodge. They demonstrated a certain generosity of spirit and, like Schomburgk, openness to new ideas; qualities that encouraged creative endeavour. They were enthusiastic about developing local resources and proud of their achievements. Adelaide was to be the 'model city' of a 'model colony'.¹⁰⁰ Cooperation between these people and Schomburgk produced results rewarding to all parties. Community leaders saw an institution develop which was not only of practical value but gave prestige to their city. Shakespeare at a less exalted social level illustrated a similar complexity of social connections intended to promote the social good in Adelaide.

In 1884 a group of subscribers, including some of the leading businessmen and politicians of the day, presented a portrait of the elderly Director to the Botanic Gardens. The inscription recorded that the gift was in appreciation of the

zeal, energy and skill which he had devoted to rendering the Botanic Gardens an ornament to the City of Adelaide and the pride of the province of South Australia.

The Director in turn paid tribute to the support provided by the Board and successive governments and the Stirling contribution of his predecessor George William Francis. Years before he had turned down an offer to take charge of the Botanic Garden in Melbourne. At that time an exchange in verse beginning with 'come live with me and trim my groves' from 'Melbourne to Schomburgk' brought a reply from Schomburgk which included the following:

It may be, Ma'am, if I were young,
I'd list to thine inviting tongue;
Thy offer now no impulse moves
To live with thee and trim thy groves.
Thy liberal terms I briefly scan'em;
Thy extra salary per annum!
Yet still my resolution hardens
To stick to Adelaide's dear old gardens.¹⁰¹

Appointed at the age of fifty four, he stayed on to die in office in his eightieth year.

I In *Visions of Paradise* Marina Schinz declares that:

To create a garden is to search for a better world ... This hope for the future is at the heart of all gardening. Anyone who toils away at the soil must think a few weeks ahead or envision next year's garden, for most gardeners are convinced that improvement is on the way. Thus gardening is an exercise in optimism. Sometimes it is the triumph of hope over experience.¹⁰²

There are features in the Garden which we admire today that date back to the period we have been discussing. There is the Main Walk of George William Francis and the lakes he created. A further legacy comes from the 'golden age' of Schomburgk's directorship. This includes the entrance gates, the avenues of trees, the Old Tropical House, the Museum of Economic Botany and Botanic Park. As the enthusiastic Victorian visitor J.L. Dow observed:

... Adelaide by sheer dint of artistic skill, and in spite of a position lacking natural advantages, has a gem of a garden.¹⁰³

Schomburgk's obituary in the *Garden and the Field* referred to his intelligent management' and 'splendid taste'. Perhaps his particular skills included both a capacity to extend the vision of his contemporaries and a capacity to present ideas in an acceptable form.

'Dr. Schomburgk's garden' exemplifies the contrasts of colonial Adelaide. Innovation and enterprise are combined with a desire for control, of both people and environment. Then there is that fundamental desire for respectability. Yet above all the Garden represents that search for a better world.

⁴² E Edwards 'The glory pea' *Floral world and garden guide* July 1875, 247

⁴³ William Marcus (ed) *South Australia: its history, resources and productions* Adelaide, Government Printer 1876, 14

⁴⁴ R Schomburgk *Report on the progress and condition of the Botanic Garden during the year 1888* Adelaide 1889, 6 [Hereafter *Report* and year]

⁴⁵ Board of Adelaide Botanic Garden, Minutes Sept 1883

⁴⁶ The achievements of the Francis era are outlined in Barbara Best *George William Francis. First director of the Adelaide Botanic Garden* Adelaide 1986

⁴⁷ Letter to Mrs Manget, *Timehri* 1 Dec 1881, 294-297

⁴⁸ Pauline Payne 'Richard Moritz Schomburgk, second director of the Adelaide Botanic Garden 1865-91' in *The German experience of Australia, 1833-1888*, Australian Association of von Humboldt Fellows, in association with The Flinders University of South Australia, 1988

⁴⁹ R Schomburgk *Report* 1866, 1-2

⁵⁰ This was at a time when orchids were much prized in the gardening world and in Britain £300 might be paid for a prized specimen. At this time Schomburgk's annual salary was £400

⁵¹ *Letter Book* for 1865-6, in Adelaide Botanic Garden archives

⁵² R Schomburgk *Report* 1867, 3

⁵³ B Morley *et al*, *Adelaide's Botanic Gardens* Board of the Botany, Gardens, Adelaide 1986

⁵⁴ R Schomburgk *Catalogue of the plants under cultivation in ill'. Government Botanic Garden, Adelaide, South Australia* Adelaide 1878

⁵⁵ Although it was often said that Robert 'discovered' the *Victoria* (its in Edwards' remarks previously cited) this was not correct

⁵⁶ Schomburgk *Report*, 1868, 2

⁵⁷ For example, *Examiner and Daily Telegraph* 30 Sept 1868, *Observer* 3 Oct 1868

⁵⁸ The *Victoria* was first grown in Britain by the Duke of Devonshire and at the Royal Botanic Gardens at Kew in 1849-50. Birmingham Botanic Gardens constructed a Lily House in 1852 and the *Victoria* was grown in Amsterdam in 1859. P Ballard *An oasis of delight: the history of the Birmingham Botanical Gardens* Duckworth, London 1983, 41-44; *Journal of horticulture and the cottage gardener* 3 Sept 1861

⁵⁹ *Advertiser* 2 Oct 1868; also published in *Examiner and Daily Telegraph* 30 Sept 1868

⁶⁰ *Examiner and Daily Telegraph* 30 Sept 1868

⁶¹ *Observer* 17 Oct 1868

⁶² There had been a total increase of 1979 species in the years 1871-1872 alone

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- ⁶³ In particular the year 1873 saw a good wheat harvest: Wray Vamplew (ed) *Australians; historical statistics* Sydney 1987, 78
- ⁶⁴ *Bremische biographic des neunzehnten Jahrhunderts hrsg. v.d. Historischen Gesellschaft des Kiinstlervereins* Bremen 1912, 425-26. Translated by Monique Marron
- ⁶⁵ Koppelkamm *Glasshouses and wintergardens of the nineteenth century*, especially 8-14; J Hix *The glasshouse* Cambridge MA 1981, 34, 43-45, 116
- ⁶⁶ G Kohlmaier and Barna von Sartory, *Houses of glass*, Cambridge MA 1981 [originally published in the German by Prestel-Verlag, Munich, 1981]. Some, such as the Palm House at Kew and the Tropical Houses at Glasnevin and Brussels were substantially larger
- ⁶⁷ LeMessurier Architects, *The Palm House Adelaide Botanic Garden, Draft Conservation Plan* Adelaide 1991
- ⁶⁸ *Register* 22 January 1987
- ⁶⁹ B Elliott *Victorian Gardens* London 1986, 116-7. In countries such as China they had for centuries played an important part in landscape design
- ⁷⁰ *Report* 1873, 4
- ⁷¹ *Report* 1875, 9 and 1876, 9. Losses for the total project remained at 2%, much being caused by vandalism
- ⁷² He gave details as to how his own watering programme had been carried out, watering only twice after planting but going quite deep. His Annual Reports were published extensively in South Australian newspapers enabling widespread dissemination of this kind of information
- ⁷³ *Report* 1876, 9
- ⁷⁴ 'Fine growing pines and ficus trees have been torn out of the ground and thrown away', *Report* 1874, 9
- ⁷⁵ *W Report* 1880, 8. Similar comments were made in *Report* 1875, 8
- ⁷⁶ *Report* 1868, 8
- ⁷⁷ *Ibid*
- ⁷⁸ *Report* 1883, 9
- ⁷⁹ [J L Dow], Special reporter of the *Leader*, 'The Botanic Gardens' *Agriculture in South Australia*, reprinted from the *Leader*, Melbourne and Adelaide 1874, 8
- ⁸⁰ *Report* 1870, 9
- ⁸¹ *Report* 1880, 9
- ⁸² Otto Schomburgk carried out veterinary experiments with this drug, a skeletal-muscle relaxant still used today in anaesthesia. Von Humboldt had seen it in the upper Orinoco and appears to have been the first European to give a description of the preparation of the compound. Richard Schomburgk gave a paper 'On the Urare: the deadly arrow poison of the Indian Tribes in British Guiana' to the Philosophical Society, Adelaide (later the Royal Society), on 10 April 1868
- ⁸³ R H Pulleine 'The botanical colonization of the Adelaide Plain', *Proceedings of the Royal Geographical Society of Australasia* (SA Branch) 1935, 35
- ⁸⁴ 43 James Herbert Veitch *A traveller's notes or notes of a tour through India, Malaysia, Japan, Corea, the Australian colonies and New Zealand during the years 1891-1893, with maps and photogravures. And also numerous illustrations from photographs by the author* Privately published by James Veitch & Sons, Chelsea, 1896, 88-89
- ⁸⁵ Adelaide Botanic Garden *The Botanic Garden, Adelaide, South Australia: Centenary volume 1855-1955. History, guides and catalogue of plants* Adelaide 1955, 88-9
- ⁸⁶ John Patrick 'Gardenscape' *This Australia* 1986, 64
- ⁸⁷ In Melbourne nearly all animals and birds were transferred to the grounds of the Acclimatization Society in 1873 by Guilfoyle shortly after he took office and in Sydney most of the animals were transferred to the new Zoological Gardens in 1883. Lionel Gilbert *The Royal Botanic Gardens, Sydney: a history 1816-1985*, Melbourne 1986, 107
- ⁸⁸ C E Rix *The Royal Zoological Society of South Australia 1878-1978* Adelaide 1978, 1-6
- ⁸⁹ *Observer* 12 Feb 1881
- ⁹⁰ An account from Henderson's Pine Apple Nursery in Maida Vale, England, 9 Oct 1879, had a note to the Director 'you are certainly one of our very best colonial customers', Adelaide Botanic Gardens archives
- ⁹¹ R L Burt and W T Williams 'Plant introduction in Australia', in R W Home (ed) *Australian science in the making* Melbourne 1968, 252

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- ⁹² Peter Kloot, Studies in the alien flora of cereal rotation of South Australia, PhD thesis, University of Adelaide 1985, 15
- ⁹³ *Report* 1869, 4
- ⁹⁴ Lucile Brockway *Science and colonial expansion: the role of the British Royal Botanic Gardens* New York 1979, 6-7
- ⁹⁵ *Report* 1883, 3
- ⁹⁶ *Report* 1868, 1
- ⁹⁷ *Report* 1887, 4
- ⁹⁸ Letter to Mrs Manger (note 5)
- ⁹⁹ Ian Inkster and Jan Todd provide an account of the scientific bodies and the infrastructure provided for science in 'Support for scientific enterprise, 1850-1900' *Australian science in the making* 108-9
- ¹⁰⁰ Tony Denholm 'Adelaide: a Victorian Bastide?', in Pamela Statham (ed), *The origins of Australia's capital cities* Sydney 1990, 191
- ¹⁰¹ *An Adelaide scrapbook* circa 1873, quoted in *Friends of the Botanic Garden Gazette* August-September 1983
- ¹⁰² Marina Schinz and Susan Littlefield *Visions of Paradise; Themes and Variations on the Garden* London 1985, 11
- ¹⁰³ [J L Dow] 7; M Schinz 11