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# The Geography and Botany of the Adelaide Coast.



being an account of the

Geological, Physiographical and Botanical Features of the  
South Australian Coast between the Outer Harbour and  
Sellick's Hill.

by

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# A SKETCH OF THE GEOLOGY, PHYSIOGRAPHY AND BOTANICAL FEATURES OF THE COAST BETWEEN OUTER HARBOUR AND SELICKS HILL.

By C. FENNER, D.SC., and J. B. CLELAND, M.D.

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## THE COAST FROM OUTER HARBOUR TO SELICKS HILL.

Geology and Physiography.

(By C. FENNER, D.Sc.)

An effort will here be made to give in simple terms an outline of the chief features of the natural history of the coastal strip which runs from Pelican Point, at the northern end of Le Fevre Peninsula, to the cliffs at the base of Sellicks Hill. This covers a distance of 45 miles of coast—a strip of country full of varied and interesting features, physiographic, geological and botanical—most of it within walking distance of railway stations or tram-lines, and all of it easily reached by good roads from Adelaide—though the good field naturalist must always do the best of his travelling on foot.

In order to set out the geology and physiography more clearly, a map of this 45-mile coastal strip has been prepared, and is set out herewith in four sections. In addition, a block diagram showing a section parallel to the coast from West Beach to Myponga is given on a separate page. This block diagram is intended to show the simpler features of the structure and rock types of the area.

The first point that strikes the observer in his traverse from Outer Harbour to Sellicks Hill is a curious rhythm and repetition in the features seen. There are mangrove mud-flats, coastal sand-dunes, low cliffs of soft yellow and brown limestones, and higher cliffs with rocky and shingly beaches.

The hard rocks of these cliffs are very ancient (Pre-cambrian and Cambrian) and are mostly dark-coloured quartzites. A break one mile long occurs in these hard cliffs at Halletts Cove, running from Howchin Gully to the Field River. Then follows another three miles of quite similar hard rock, with remarkable contortions of bedding in places. A mile of sand dunes occurs where the Morphettsvale Creek comes to the sea, followed by cliffs of level-bedded limestones and mudstones, many of them beautifully coloured.



Apart from the sand-dune break at the mouth of the Onkaparinga River, these gently-dipping, easily-eroded limestones continue for five miles until we come to the Moana sand-dunes, small in area, near the mouth of Pedlers Creek. Then follow two miles of cliffs of hard, ancient rock, four miles of the level-bedded limestone cliffs of Blanche Point and Aldinga, then three miles of sand-dunes and sandy beach at Sellicks Beach, a small area of tertiary limestone cliffs, and finally the high, hard cliffs at the base of Sellicks Hill extending to the south beyond Myponga.

The reason for the rhythmic arrangement may be seen in the block diagram. Four different kinds of rock are found in this area.—(a) The hard, ancient rock, shown by nearly vertical wavy lines, Cambrian and Pre-Cambrian in age, which forms the ranges, the level uplands, and the more notable of the marine cliffs. In ages long past these ancient rocks were worn down to a level surface by the slow-acting forces of wind and rain and running water. They were then sunken gently beneath the sea, and some hundreds of feet of limestones were formed by the remains of the sea animals deposited upon them.

(b) A gradual rising movement followed and these limestones, laid down on the sea floor, became dry land. Naturally they are rich in fossils. They are shown in the block diagram as horizontal beds without marking and are called Miocene limestones. They form the yellow cliffs of Noarlunga, Aldinga, etc.

(c) Following on this a series of mighty disturbances in the earth's crust took place hereabout, so that huge fractures hundreds of miles long and possibly some miles in depth run through these ancient rocks and their covering limestones. Some of the intermediate blocks of rock were sunken and others were upraised. Erosion took place, and vast deposits of red muds were here and there laid down covering the limestones. Such red muds are still to be seen in the cliffs at Seacliff, Halletts Cove, Noarlunga, and Sellicks Hill. They were formed by fresh water and are mostly red or brown, but sometimes green or yellow, in colour. They are marked in the map by vertical lines and are called Pleistocene muds and sands.

(d) The great faulting and uplifting movements continued and the uplifted or mountain blocks in this area became tilted downwards to the south, as you may see in the two central blocks of the diagram. A good deal of the limestones and mudstones was washed off and carried away, but close to the fracture or fault lines still newer beds of alluvial material were deposited to form wide plains. These are shown in the map as recent alluvium.

We may now see the reason for the rhythmic arrangement above referred to. Where soft muds and sands form the sea beach the sand is washed clean and blown up to form a barrier of sand-dunes. Where the limestones reach the sea, soft cliffs of yellowish or brownish limestones border the coast. Where the ancient hard rocks meet the sea, the latter carves out steep cliffs and shingly beaches with much difficulty, for these old rocks are intensely hard and resistant.

Looking again at the diagram we see first of all the Adelaide Plains with the ancient bedded rock deep below, the Miocene limestones buried out of sight, the Pleistocene muds only coming to the surface at Brighton and Seacliff, the later alluvium and sand-dunes covering the surface.

To the south is the uplifted and tilted block of O'Halloran Hill, crossed in its southern part by the Onkaparinga River, which enters the sea at Port Noarlunga. The Onkaparinga has carved a valley through the hard rocks of the adjoining uplifted block to the south. The third block is equally tilted to the south and east and the over-lying limestones and mudstones increase as we approach Sellick's Hill.

The uplifted scarp face of the Sellick's Hill block forms the Willunga ranges, and is one of the chief barriers towards communications between Adelaide and the Southern districts. It has effectively prevented the passage of a railway, which stops short at its base. The new bituminous road round the seaward base of Sellick's Hill circumvents this powerful barrier in a fairly effective manner.

Perhaps the most interesting correlations that can be made in this strip of country are those between the geology, the land forms, the drainage type and the native vegetation. These relations are very close indeed, and they prove to be very interesting where they have been worked out. Much systematic work remains to be done by the combined effort of the physiographer and the botanist, or better still, by an alert field naturalist who combines a simple but correct knowledge of the geology and land forms with an eye for drainage and with sufficient botanical training to collect his specimens wisely.

A brief note will now be given of the more important physiographic features along the coast.

**Mud Flats.**—These are in areas where estuarine muds are being brought down from the uplands and where winds and tides have no power to build up sand-dunes. The chief mud



flats are near the mouth of the Port River and the Northern Arm, where there are beautiful mangrove-fringed reaches of river backed by ugly mud flats. A second area of mud-flats occurs in the tidal portion of the Onkaparinga where mangroves are less common.

**Sand Dunes.**—The main stretch of sand dunes is that from Outer Harbour to Seacliff. The dunes are here of two types. From a little north of Largs to Seacliff the dunes have been built up in a succession of long ridges, dune and swale, usually three in number, but all the upper part of Le Fevre Peninsula has been built up differently. Here the sand dunes were lower and were built in sweeping curves as shown in the plan. Le Fevre Peninsula is growing towards the north, following the curve of the Port River as the latter cuts into the narrow extension of Torrens Island, a feature that must some day completely disappear.

The rapid way in which sand dunes and muds will silt up quiet areas has been shown in a remarkable manner in the sea adjoining the artificial projection on which Outer Harbour is built. Sixteen years ago blue water filled both these angles. To-day both the northern and southern bays adjoining Outer Harbour are almost completely silted up, and the differences in the type of silting of the two bays are as interesting as the similarities; these features are left for the reader to investigate.

**Older Sand Dunes.**—In the long history of the building up of the Adelaide plains there have been many lines of sand-dunes of which every trace has completely disappeared. But there is one series of ancient dunes of which a large portion still remains and fulfills an important part in the economics of the area. These are the older sand-dunes, mostly reddish in colour. They start east of Somertown, near Glenelg, extend through the Kooyonga golf links, are well preserved near the Torrens, and continue up past Seaton, The Pinery, and Port Adelaide, and form the western part of Torrens Island. They are clearly marked on the accompanying map, and, as shown by Professor Cleland, their flora is quite distinct from that of surrounding plains, as well as from that of the present coastal sand-dunes.

**Cliffs of Softer Rocks.**—The first series of limestone and mudstones occurs at Hallett's Cove, where they appear to have been let down by faulting. With these is preserved a small patch of very interesting glacial rocks of Permo-carboniferous age. These glacial rocks overlie and protect a great sheet of ice-planed rock surface; the best known exposed area is that known as Tate's Rock, commemorating the place where Professor Ralph

Tate made some early investigations regarding this ancient glacial period. This area has also been much worked on by Professor Howchin and Sir Edgeworth David, and has been visited by practically every geologist who has come to the state of South Australia.

The "Amphitheatre" at Hallett's Cove is a remarkable example of erosion by running water in soft, level-bedded limestones and mudstones. The sand-dunes and the limestone and mudstone cliffs at Port Noarlunga have all the characteristics of those already described. The same is true of the sand-dunes of Moana, Port Willunga and Sellicks Beach, and of the limestone cliffs at Aldinga and Sellicks Beach. There are in addition curious differences from place to place, which are not here mentioned in detail but are left for the reader to investigate. The limestone cliffs contain a wealth of fossils, and have been a happy hunting ground for collectors for the past seventy years.

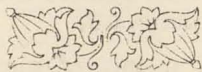
**Cliffs of Harder Rocks.**—The hard cliff buttresses, where the ancient rocks resist the attacks of the sea, are characteristic of the area from Marino to Hallett's Cove, from the Field River to Morphettsvale Creek, from Pedlars Creek for two miles south, and from Sellicks Hill southward.

These rocks consist mainly of purple to gray quartzites; usually these have an almost vertical dip, but there are places where there is evidence of the great earth forces that have crumpled them into complex folds. In other places, as at the base of Sellick's Hill, thick beds of limestone are found. Sir Edgeworth David has published accounts of some very primitive fossils from these rocks at Reynella, while in the Sellicks Hill limestones, near the top of the ridge, specimens of ancient "sponge-corals," the Archaeocyathinae (ancient cups) may be found.

**Drainage and Soils.**—Along the coast all varieties of erosion may be studied: marine, aeolian, pluvial and glacial. Similarly there are examples of the most varied types of drainage, from sodden mud-flats, through porous limestones and dunes, to high and well-drained hillslopes. All these points are of importance to the field naturalist, for your true naturalist is not a mere collector, nor a mere observer; he must strive to seek relations between things, and to discover causes. A plant's chief interest may lie, not so much in itself, as in its position on a slope, the accompanying plants, the underlying rocks and soils, the type of drainage and erosion.



The whole of the area, apart from cliff faces, is covered with a widespread mantle of rock waste. Upon this mantle the effects of wind, rain, and sun for some tens of thousands of years has produced the features we call soils. There is quite a variety of soil types within this area, with their different colours and profiles, depending in part on the rock-type below, but much more upon the slope and drainage of the locality. Each soil type has its appropriate plant suite; and each native plant community has certain introduced plants that most commonly displace them or take possession when the native growth is destroyed. Nor should we forget the more elusive native animals, including the birds, the shells, and the beach life, that also take their selected and appropriate place in the scheme of things. Lucky indeed are the field naturalists who have at their doors an area of such rich and varied interest.



## THE FLORA BETWEEN OUTER HARBOUR AND SELLICK'S BEACH, SOUTH AUSTRALIA.

(By J. B. CLELAND, M.D.)

The area included in this survey is limited to the north by the Outer Harbor at the tip of Lefevres Peninsula, to the south by the cliffs and rocks that commence at the end of Sellick's Beach, to the west necessarily by the sea, and to the east by the Port River as far as Port Adelaide and then by Tapley's Hill Road, succeeded by the South Road, to Aldinga and on to Sellick's Hill. From a botanical point of view, the area can be divided up into the following divisions: (1) Marine Meadows; (2) Modern Sand Dunes or Sandhills stretching from the Outer Harbour to Marino, appearing again over small stretches further south; (3) The Saltwater Swamps in the neighbourhood of the Port River and Patawalonga Creek; (4) The Reedbeds at Fulham now mostly drained; (5) The Pinery (on old sand-dunes) on the east side of the Port River between Alberton and the Grange; (6) The Scrub at Hallett's Cove; (7) The very similar Scrub at Sellick's Beach; (8) The Cliffs between Marino and Sellick's Beach; (9) The cleared and often cultivated land on the plains and on the undulating country between the South Road and the sea; and (10) the Banks of the several Freshwater Creeks that empty themselves into the sea.

### (1.) Marine Meadows.

The coast-line from Outer Harbour to Marino consists of very gradually shelving sands finally succeeded by the blue line where the water deepens and the yellow of the sand is replaced by a dark blue due to the under-water meadows of *Cymodocea* and *Posidonia*. In October both here and at Christie's Beach the latter has been washed up in bud after storms; the banks of sea-weed, often so abundant and delightfully comfortable to sit on, are formed of the washed-up leaves of this plant; the fibrous remains of the leaf-sheaths have been suggested for use in making wool-packs.

### (2.) The Sand Dunes or Sand Hills.

From Outer Harbour to the rocks south of Brighton extend a series of sand-dunes or sand-hills, broken only over these 17 miles by the seaside towns that have arisen on them and by the exit of the Patawalonga Creek. From the latter to Outer Harbour, the sand-dunes are bounded on the east side by the tidal waterways connecting the Patawalonga with the Port River, by the latter and by the saltmarshes resulting from tidal overflow.



The tallest of the sandhills are near Estcourt House between the Semaphore and the Grange, the height probably reaching to about 50 feet. The breadth of the sandhills is only a few hundred yards. On the sea-front is a sharp rise immediately eastward of the highest tidal limits. This is followed by a shallow depression (swale) and then usually by the highest part of the dunes, with a fairly sharp descent on the landward sides, or there may be three rises altogether and two swales. In places the sandhills are bare and of shifting dazzling white sand, but for the most part, except on the actual seafront, they are covered with a vegetation of their own.

This vegetation is more or less sand-binding. On the seaward aspect we have the extensively spreading, creeping and rooting branches of the grass *Spinifex hirsutus* whose large female heads of flowers become detached and are readily blown along by the wind. Tussocks of the Sword Rush (*Lepidosperma gladiatum*) are numerous throughout the dunes; tufts of the tall *Scirpus nodosus*, often single or a few together, appear in diffuse colonies; and *Cladium junceum* also occurs in places. Several species of shrubs, more or less prostrate or else bent to one side by the strong sea breezes, are conspicuous denizens of the sandhills, but like the rest of the plants, are more or less widely scattered. The composite *Olearia axillaris*, with its glaucous hairy narrow leaves and small heads of rayless flowers, forms upright or spreading bushes whose gnarled trunks, some inches in diameter, indicate that many are of considerable age. *Myoporum insulare* usually shows the effects of the prevalent winds by being blown over to one side; its branches are distorted and gnarled and often some are dead or dying. *Scaevola crassifolia* with thick serrated leaves and racemes of bright blue flowers spreads itself out over an area sometimes of eighteen feet in diameter, the shrubs being about two feet high. The tea-tree *Melaleuca pubescens* is occasionally seen, spreading out from the effects of the wind so that it is here a low shrub instead of a miniature tree. Small shrubs of *Acacia longifolia* var. *Sophorae* occur between Henley Beach and Glenelg. *Leucopogon parviflorus* is a smallish shrub, not very common, with lanceolate striate leaves, small white flowers, and white edible fruits. Unfortunately the introduced African Box-thorn (*Lycium ferocissimum*) is getting an extensive hold, the seeds being distributed by birds. The Euphorbiaceous shrub *Adriana Klotzschii* is common, *Alyxia buxifolia* (Apocynaceae) with small white flowers less so. The Evening Primrose *Oenothera odorata* grows well, the longer-flowered *Oe. longiflora* being rarer. *Clematis microphylla* scrambles through various shrubs as does *Muehlenbeckia adpressa* to some extent.

Near Glenelg, in the depression between the two ridges, the Holly-leaved Grevillea (*Grevillea ilicifolia*) may be found. *Acacia ligulata* is a small shrub with scattered phyllodes instead of leaves. The Muntrie (*Kunzea pomifera*) may be found as small prostrate colonies composed of creeping and rooting partly buried branches which can be readily torn up from their sandy beds; the small fruit is edible and has a taste like apples. The glaucous *Atriplex cinereum* forms a handsome upright shrub on the actual strand or the sand ridge over-looking this; the female flowers have a purplish tint at times and make quite a pretty appearance. Colonies of the low growing *Atriplex paludosum* sometimes appear in the sand near the sea, and here also grows *Nitraria*. Between these sedges and shrubs, a number of herb-like or low spreading plants are to be found whilst spring-time sees many annuals such as grasses. *Pimelea serpyllifolia* is a common small shrub a foot or more high with small yellow flowers. Sea-rocket (*Cakile maritima*), a crucifer with bluish-purple flowers, and *Senecio lautus* with yellow rayed flowers and when growing on the sand with rather fleshy leaves, are common. Greyish-white masses of *Calocephalus Brownii* grow on the seaward slopes in places. *Salsola kali*, the Rolly-Poly of the interior, is here a very rigid and prickly undershrub never detaching itself to be blown about. The Australian Blue-bell (*Wahlenbergia gracilis*) grows in sand with many upright stems, almost bushy, with small blue flowers. *Rhagodia baccata* and *Threlkeldia diffusa* are common Chenopodiaceous undershrubs, *Enchylaena tomentosa* less so. *Tetragonia implexicoma* has a spreading habit. *Pelargonium australe* is abundant. Tufts of the grass *Poa caespitosa* are numerous. Other grasses, with the exception of occasional patches of couch (*Cynodon dactylon*) or of the harsh *Distichlis maritima*, are mostly annuals and comprise a stout broad-leaved *Stipa*, *Danthonia*, *Ehrharta longifolia*, *Lolium subulatum*, *Bromus villosus*, *B. madritensis*, *Agropyrum scabrum*, etc. *Lomandra leucocephala*, with its stiff leaves and masses of flowers grouped in patches along the flowering stem, is not infrequent but *Lomandra glauca* is rather rare, being found, for instance, a mile north of the Grange. Another Liliaceous plant, *Dianella revoluta*, with blue petals and blue berries and long stiff leaves, grows in tufts. Pig-face (*Mesembrianthemum aequilaterale*) trails extensively over the ground. The Ice-plant (*M. crystallina*) has established itself in places. The introduced composite *Reichardia picroides* occurs at the Grange. *Sonchus megalocarpus* is found in places. South of Henley Beach are a few plants of Prickly Pear (*Opuntia*). The Scarlet Runner (*Ken-*



*nedya prostrata*) spreads over the ground and the sweet-scented white-flowered pea *Lotus australis* is a small undershrub. In spring-time the introduced yellowish annual *Euphorbia falcata* is very abundant, forming extensive patches, and other small annuals such as *Melilotus*, *Crassula Sieberiana*, *Geranium pilosum*, *Brachycome ciliaris* and *Daucus glochidiatus* may be found. The Crucifer *Stenopetalum lineare* has been found as a very slender form near Outer Harbour. About two miles south of Henley Beach in October and November, colonies of the parasitic leafless *Orobanche australiana* may be found. An introduced *Orobanche Mutelii*, has been found near Glenelg. The everlasting *Helichrysum leucopsidium* also occurs here.

At Port Noarlunga, *Scaevola crassifolia*, *Myoporum parvifolium* and *Nitraria* are all acting as sand-binders.

The chief plants in the sandhills at Moana, south of Port Noarlunga, are *Spinifex hirsutus*, *Scirpus nodosus*, *Threlkeldia diffusa*, *Salsola kali*, *Atriplex cinereum*, *Tetragonia*, *Cakile maritima*, *Myoporum insulare* and *Olearia axillaris*.

### (3). The Saltwater Swamps in the neighbourhood of the Port River and Patawalonga Creek.

On the banks of the River within tidal influences, the Mangrove (*Avicenna officinalis*) with its finger-like pneumatophores projecting out of the mud when the tide is low, is the most striking object and is obviously of service in reducing the danger of erosion. The Mangrove extends as far south as Kaimes near Estcourt House.

A dense growth of Paper-bark Tea-trees (*Melaleuca halmaturorum*), about fifteen feet high, at one time clothed the banks of the Port River, as far at least as the Grange, and extended as dense thickets a quarter of a mile through along subsidiary waterways and on the Saltwater Swamps. Such a thicket, for instance, stretched from the Port River to that portion of the Military Road that extends along the landward side of the sandhills between Estcourt House and the Grange. There are still fringes of these trees in places and parts of the thickets still remain in places between Glanville and the Grange. During the last two or three years, with the onset of bad times, the greater portion has, however, been cut down for firewood and the salt-water swamps left without the protection of these trees. Outside the area we are considering, round the North Arm of the Port River and up to St. Kilda, there are still extensive stretches of Mangrove and Tea-tree Swamps.

Underneath the Tea-tree, as for instance near the Grange, is an abundance of *Suaeda maritima*, the individual plants varying often in colour, some having a purplish tint. The several species of Samphire are also abundant. Other lower shrubs which are common are the pink-flowered *Frankenia pauciflora*, the white-flowered *Samolus repens*, the Billy Button (*Cotula coronopifolia*), and not quite so numerous, the herb-like *Apium australe* and *Hemichroa pentandra*. Where the Tea-trees are absent, the saltwater-swamps are clothed with the same undershrubs, the Samphires being the dominant features. The presence of *Cotula coronopifolia* probably indicates a great access of freshwater during the winter rains annulling the effects of the salt water. The grass *Sporobolus virginicus* is abundant in places, and *Distichlis spicata* also occurs, *Spergularia marginata* is common, whilst there are scattered small bushes of *Atriplex paludosum* and *Kochia oppositifolia* and occasional plants of *Suaeda* and of the grass *Glyceria stricta*. The Black Tea-tree (*Melaleuca pubescens*) may occasionally be found growing round the edge of the swamps. The introduced Ice-plant (*Mes. crystallinum*) also occurs on these flats. Other small plants found near the edge are *Triglochin mucronata*, *Scirpus antarcticus*, *Bassia uniflora*, *Sagina apetala*, *Aira minuta* and the introduced *Statice*. Some of these which are annuals are perhaps more freshwater plants than salt-swamp plants, taking advantage of the winter rains to grow in this situation.

The salt-water flats near Outer Harbour are covered chiefly with the Samphires, and *Suaeda*, *Atriplex paludosum*, *Kochia oppositifolia* and *Frankenia* are scattered amongst these. Also, where opportunity offers are the more lowly *Spergularia marginata* and the Rye-grass *Lolium subulatum* in abundance. The two Mesembrianthemums occur, *M. australe* on the salty flats and *M. aequilaterale* on sandy patches. The introduced *Senecio vulgaris* and the grasses *Sporobolus virginicus* and *Distichlis spicata* skirt the edges. The upright salt-marsh living grass *Glyceria stricta* occasionally grows through one of the undershrubs. A few plants of *Statice* are to be found, the seeds having evidently been distributed by the tides. *Cakile maritima* and a few *Nitraria* bushes grow in the strand on the Port River side of the Harbour. *Melaleuca halmaturorum* still clothes the sides of the channel farther up. In the angle formed by the breakwater and the Largs Bay foreshore, sand and seaweed (*Posidonia* leaves) are accumulating and *Suaeda* in abundance and a few Samphires are colonising the area. On the landward side of this, a number of plants of the little cress *Hutchinsia procumbens* were found growing in October.



The reclaimed land, part a recreation ground, round which the railway line turns, is the home of an abundance of introduced weeds and grasses, as well as a few *Stipas*, *Danthonias* and *Vitadinias*. The pea *Trigonella monspeliaca* from the Mediterranean has just established itself.

#### (4) The Reedbeds At Fulham

The Reedbeds were formed by the waters of the Torrens, obstructed by the coastal sandhills, spreading out laterally over alluvial flats and junctioning by more definite channels with the Port River on the north and the Patawalonga on the south. Thirty or more years ago they were what their name implies, extensive swamps covered with water two to several feet deep, through which grew an abundance of the Common Reed (*Phragmites communis*) and of the Bulrush (*Typha angustifolia*). As a result of the destruction of the natural vegetation of our hills, the creeks flowing into the Torrens have been bringing down annually vast quantities of soil in their flood waters. The loss of cover in the valleys and on the hillsides has made these water-courses tearing torrents after heavy rain, in contrast to the comparatively gentle passage of the water in the years before the white man's interference when the fall from even heavy showers was partially held up for a time amongst the spongy vegetation. The finer particles of silt have been carried through Adelaide to be deposited over the swamps at the Reedbeds and the surface of these has been raised in consequence till much of it is now five or six feet higher than a generation ago. Each individual flood may leave behind only a quarter to several inches of silt but in the course of a few years this soon mounts to feet. This silting combined with drainage channels has reclaimed nearly all the swamp and changed the whole face of the area. Though the flats are still liable to be flooded at times by break-aways from the main channels, hardly any remnants of the original swamps remain and there seems to be no record of the primeval vegetation. Some excavations on the late Mr. Charles White's property made by the late Mr. William White a number of years ago, just to the south of where the Henley Beach tram emerges on the seaward side after crossing over the 'swamps,' are now filled with water and probably indicate what the Reedbeds were like in the early days. Surrounding small areas of open water was a dense mass of tall and upright Common Reeds and Bulrushes whilst the long leaves of *Triglochin procera* floated on the water. These seem to be almost the only relics left of the native swamp vegetation and even in the reclaimed pasture lands native plants are few in number, the majority of the plants being introduced grasses, clovers, medics and weeds. There are a few

clumps of the sedge *Cyperus vaginatus* on the flats, along the channels *Alternanthera denticulata* grows as their waters dry up, an occasional plant of *Rhagodia nutans* with its red fruits may be found on the banks, and the Great Bindweed *Calystegia sepium* with its pale pinkish *Convolvulus* flowers climbs amongst Box-thorns and other introduced shrubs.

As the narrow channel of the Torrens approaches the sandhills, most of the waters are now deviated southwards by an irregular course to junction with the waters of the Patawalonga, though some still find a route towards the Port River. The latter direction naturally leads to some silt reaching the navigable portion of this River, so endeavours are made to restrict any flow to the north.

Further back towards Adelaide an overflow has been cut leading away floodwaters from the Torrens, at its entrance into Captain White's property of Weetunga, to the south where these can junction with tidal branches of the Patawalonga and thus obviate flooding. The Torrens at this spot has banks partly artificially raised, which are 15 feet high. The following plants have been noted on the banks of the river and in and along the break-away channel as it passes under the main road and runs along the west side of the Kooyonga Golf Links:—The grasses *Paspalum distichum*, *Polypogon monspeliensis*, *Agrostis alba* (?), *Calamagrostis filiformis*, *Phragmites communis* (the Common Reed, eaten by cattle when young), *Holcus lanatus*, and Rice Grass; *Potamogeton crispus* (Curly Pondweed) in the water in the Breakaway Creek; the sedges *Cyperus rotundus* (Nut-grass, a pest evidently brought down from Adelaide by flood waters) and *Scirpus maritimus*; the Toad Rush (*Juncus bufonius*), and *J. pauciflorus*; the Bulrush; *Polygonum serrulatum*, *Alternanthera denticulata*, Water-cress, a *Ranunculus*, *Euphorbia pepus* (a spurge), *Lythrum Hyssopifolia* (Lesser Loose-strife), the introduced white-flowered *Convolvulus* (*C. arvensis*, a pest washed down from Adelaide by flood-waters), *Datura*, the introduced *Antirrhinum Orontium*, *Verbena bonariensis* and *V. supina*, *Plantago major*, *Aster subulatus*, Bathurst Burr, *Cotula coronopifolia* and the introduced Wild Lettuce.

#### (5) The Pinery On The East Side Of The Port River Between Alberton And The Grange

The Pinery consists of a sandy, slightly raised ridge, a consolidated sand-dune, stretching for several miles close to the east bank of the river. It has a very interesting flora and contains a few plants which are rare. It also shows affinities with the mallee scrub in having *Grevillea ilicifolia*. At one time this was



quite a forest of Native Pines (*Callitris propinqua*) with Peppermint Gums (*Eucalyptus odorata*) and some Black Tea-tree (*Melaleuca pubescens*), *Eucalyptus leucoxylon* and Sheoaks (*Casuarina stricta*). Much of the timber has been cut out, though a considerable number of Pines still exist and young ones are coming up. The land was bought by the Government for soldier settlements but found unsuitable. As part is leased as golf-links, it is to be hoped that this interesting bit of country will be preserved in future more or less intact. Its interest as a reserve is somewhat offset by the prevalence of mosquitoes. A number of Native Peaches (*Eucarya acuminata*) still grow here though it is doubtful if they form fruit. Most of what appear to be young ones are probably suckers. Other scattered bushes include *Acacia armata*, Golden Wattle (*A. pycnantha*), *A. ligulata* (heavily galled), *Banksia marginata*, *Dodonaea viscosa*, *Myoporum insulare* and the introduced *Nicotiana glauca* and *Opuntia monacantha*. *Grevillea ilicifolia* is a rather spreading low bush, the flowers very attractive to bees; *Muehlenbeckia adpressa* scrambles up other shrubs; *Kunzea pomifera* ('muntry'), bearing an edible fruit tasting somewhat of apples and making a nice jam, is almost prostrate and extensively rooting. Of the grasses, there are *Stipa elegantissima* with its beautiful feathery awns and two other species at least of Spear Grasses, one with broad leaves (*Stipa* sp.), and probably two species of *Danthonia*, *Agropyrum scabrum* and the introduced grasses *Ehrharta longiflora* and *Pentaschistis airoides*, and Fescues and other introduced species.

The tall *Scirpus nodosus*, with flower stalks like drum-sticks, the small elegant tufted annual *S. antarcticus*, the wiry *Cladium junceum* and the common *Lepidosperma concavum* are scattered representatives of the sedges; the sweet-scented *Dichopogon strictus* (common), *Dianella revoluta*, *Lomandra leucocephala*, *L. glauca* and *Thysanotus* represent the Liliaceae; *Thomasia petalocalyx* is a small showy shrub with almost lilac-coloured flowers; there are two *Hibbertias*, *H. stricta* var. *glabriuscula*, glabrous, with showy yellow flowers and *H. fasciculata* var. *pubigera*, with hoary leaves and rather small flowers, only known in South Australia from this locality. Other plants comprise *Trichinium alopecuroideum* in the Amarantaceae, with long "pussy-tail" green spikes; a *Pimelea*, and the Rubiaceae undershrub *Opercularia varia* smelling of carbon bisulphide; amongst the composites an abundance of *Millotia tenuifolia*, almost making carpets with its creamy-white flowers, patches of the yellow everlasting *Helichrysum apiculatum*, a few plants of *Senecio lautus* (with showy yellow flowers), the insignificant *S. brachyglossus*, *Galotis erinacea* (yellow flowers), *Podosperma angustifolium*

and a single shrub of an *Olearia*, probably *O. axillaris*; a few bushes of *Rhagodia baccata*, *Atriplex Muelleri* and *Enchylaena tomentosa* (Chenopodiaceae); the introduced double-dee *Emex australis* (Polygonaceae) and on the edge of the area towards Alberton the introduced *Galenia secunda* (Aizoaceae), a grey pubescent spreading herb with a resemblance to *Atriplex Muelleri*, hitherto known in this State from Port Germein to Gladstone; *Crassula Sieberiana* and *Didiscus pusillus* were herbs growing on sandy soil which had been burnt; *Wahlenbergia gracilis* had galls modifying many of the flower buds; two introduced Scrophulariaceae plants, *Zaluzianskia divaricata* and *Dischisma capitatum* were not uncommon, especially the latter; prostrate or spreading plants were represented by a few examples of *Kennedyia prostrata*, *Carpobrotus aequilateralis*, *Calandrinia volubilis* and *Astroloma humifusum*; and finally, *Loranthus Exorcarpi* grew on *Eucarya acuminata*.

Seaton Golf Links are partly situated on these consolidated sand-dunes and, though just to the east of the area with which we are dealing, the following plants may be noted as occurring there:—*Callitris*, *Cladium junceum*, *Lomandra leucocephala*, *Rhagodia baccata*, *Banksia marginata*, *Grevillea ilicifolia*, *Wahlenbergia gracilis* and *Gnaphalium luteo-album*.

On a sandhill near Fulham grow *Dianella*, *Enchylaena tomentosa*, *Rhagodia baccata*, *Atriplex Muelleri*, *Trichinium alopecuroideum*, *Carpobrotus aequilaterus*, *Kennedyia prostrata* (Scarlet Runner), *Acacia pycnantha*, *A. longifolia* (probably planted), *Dodonaea viscosa*, *Vittadinia triloba* and *Olearia*. *Banksia marginata*, Captain White informs me, grew here at one time.

#### (6) The Scrub At Hallett's Cove

A generation back, there was an abundant, picturesque, and characteristic scrub on the high land to the south of Hallett's Cove. Much of this was still present in 1920 and later years, but recently most of it has been cleared for cultivation and only remnants remain, chiefly situated along the fences. The original scrub was probably typical of much of that originally covering the undulating country between Aldinga and Marino. Peppermints (*Eucalyptus odorata*), She-oaks (*Casuarina stricta*), Tea-trees (*Melaleuca pubescens*), Quandongs or Native Peaches (*Eucarya acuminata*), Native Cherries (*Exocarpus cupressiformis*), *Pittosporum phillyreoides*, Native Privet (*Bursaria spinosa*), and Kangaroo Bush (*Acacia armata*) were amongst the chief trees and shrubs, underneath which grew many shrubs and annuals. Remnants of all of the above have been noted recently as being still present with the exception of the Native Peach—which may



possibly linger still in some corner. Other plants still present include two mistletoes, *Loranthus Exocarpi* on *Casuarina stricta* and the *Exocarpus*, and *Loranthus miraculosus* var. *melaleuca* on the *Melaleuca*, the Golden Wattle, *Olearia ramulosa*, *Dodonaea viscosa*, the shrub *Cassinia arcuata*, the scrambling *Muehlenbeckia adpressa* and such annuals and herbaceous plants as *Bulbine bulbosa*, *Dichopogon strictus*, *Chamaescilla corymbosa*, *Goodenia albiflora*, *Trichinium spathulatum* and *Cotula australis*.

### (7) The Scrub At Sellick's Beach

There is a large area, probably a square mile in extent, of relatively untouched scrub parallel with Sellick's Beach and extending to the low sandhills skirting the strand. It is quite a surprise to walk from the beach up the slope, covered with low and prostrate undershrubs, pass over the crest of low sandhills and then find oneself in quite dense scrub nestling under the protection of this sandy ridge and extending backwards for about half-a-mile. The larger trees have been mostly cut for firewood, occasional fires have caused havoc and grazing animals have produced some injury. Much of interest still however remains. There are one or two fairly prominent rises. The sandy soil does not lend itself to clearing for grazing, and it would be well that no attempt to do so should be made, as the loose sand would most certainly shift and destroy adjacent useful land. The chief trees, of no great height, of small girth and straggling and wind-tossed, are Pink Gum (*Eucalyptus fasciculosa*), Peppermint (*E. odorata*) and She-oak (*Casuarina stricta*). To the eastward just beyond the sandy soil are a few Red Gums (*E. rostrata*) in better soil probably near water. There is a little grove of *Melaleuca pubescens*. Native Peach or Edible Quandong (*Eucarya acuminata*) still grows here but the small straggly trees do not seem flourishing and there was no evidence of recent fruiting; they were noted growing near both *E. fasciculosa* and *C. stricta* and perhaps these were their hosts. Several Bitter Quandongs (*Eucarya persicaria*) were noted; these were in flower in November and stones were numerous under them. A few Native Cherries (*Exocarpus cupressiformis*) were seen and one *Bursaria spinosa*. The Grass-tree (*Xanthorrhoea semiplana*) is not numerous but flourishes well; leaves were measured half an inch in diameter and the flowering stems were very large and in bloom in October and November. A few stunted *Banksia marginata* still survive. Of taller shrubs, *Myoporum insulare* and *Leucopogon parviflorus* grow behind the coastal ridge, the latter up to ten feet high. Golden Wattle (*Acacia pycnantha*) and Kangaroo Bush (*A. armata*) are present but not abundant. *Thomasia petalocalyx*, *Leptospermum myrsinoides* and *Calythrix tetragona* are abundant. Bracken Fern (*Pteridium aquilinum*) is common near

the coastal ridge. In one place is a large nearly pure patch of the handsome *Dampiera lanceolata*, the young shoots nearly white from their woolly investiture. *Grevillea rosmarinifolia* here and elsewhere along the coast has broader and less rigid leaves than, for instance, at Encounter Bay. *Dianella revoluta*, *Muehlenbeckia adpressa*, *Billardiera cymosa* and *Goodenia amplexans* are not common. Rarer are *Correa rubra*, *Isopogon ceratophyllus*, the two species of *Astroloma*, *Hibbertia stricta* and *H. virgata* (spathulate leaves). Of smaller plants, *Burchardia umbellata*, *Wahlenbergia gracilis* with remarkably large flowers and growing luxuriantly, *Dichopogon strictus*, the sedge *Lepidosperma carphoides* and *Erechtites* are to be found. *Kunzea pomifera*, with edible fruits, creeps on the ground. Amongst quite small plants are the Carrot-Fern (*Cheilanthes tenuifolia*), the leaves of the orchid *Lyperanthus nigricans* (flowering only when the country has been burnt), *Centrolepis strigosa*, *Calandrinia pygmaea* (red leaves, black fruit), *C. volubilis*, *C. calyptrata*, *Poranthera microphylla*, *Crassula Sieberiana*, *Didiscus pusillus* and *Millotia tenuifolia*. The grasses comprise more particularly several species of *Stipa* (Spear Grass), *Dichelachne sciurea* and *Neurachne alopecuroides* (?).

The following is a list of plants recognised in this area:—  
*Pteridium aquilinum*, *Cheilanthes tenuifolia*, a slender species of *Stipa*, *S. elatior* (?) (with broad leaves and villous nodes), *Dichelachne sciurea*, *Neurachne alopecuroides* (?), *Cyperus tenellus*, *Scirpus nodosus*, *Cladium junceum*, *Lepidosperma concavum*, *L. carphoides*, *Centrolepis strigosa*, *Burchardia umbellata*, *Thysanotus Patersonii*, *Dichopogon strictus*, *Xanthorrhoea semiplana*, *Casuarina stricta*, *Isopogon ceratophyllus*, *Eucarya acuminata*, *E. Murrayana*, *Exocarpus cupressiformis*, *Muehlenbeckia adpressa*, *Rhagodia baccata*, *Enchylaena tomentosa*, *Calandrinia pygmaea*, *C. volubilis*, *C. calyptrata*, *Clematis microphylla*, *Cassia pubescens*, *Crassula Sieberiana*, *Billardiera cymosa*, *Bursaria spinosa*, *Acacia armata*, *A. spinescens*, *A. ligulata*, *A. pycnantha*, *Correa rubra*, *Poranthera microphylla*, *Stackhousia monogyna*, *Thomasia petalocalyx*, *Hibbertia stricta*, *H. virgata*, *Pimelea* sp. *Leptospermum myrsinoides*, *Kunzea pomifera*, *Melaleuca pubescens*, *Eucalyptus odorata*, *E. fasciculosa*, *E. rostrata*, *Calythrix tetragona*, *Halorrhagis heterophylla*, *Didiscus pusillus*, *Astroloma humifusum*, *A. conostephioides*, *Leucopogon parviflorus*, *L. rufus*, *Lithospermum arvense*, *Myoporum insulare*, *Wahlenbergia gracilis*, *Goodenia amplexans*, *Dampiera lanceolata*, *Erechtites picridioides*, *Gnaphalium japonicum*, *Cassinia spectabilis*, a *Helichrysum*, *Podosperma angustifolium* and *Millotia tenuifolia*—a total of 69 species to which additions could unquestionably be made.



## (8) The Cliffs

a. *The Cliffs at Marino.*

At Marino the front rank of the Mt. Lofty Range peters out as cliffs on the sea-front. These commence at Kingston Park where they are removed somewhat from the sea by low dunes with a depression on their landward side. Immediately south, the low undulations descend by a moderately gentle slope to the strand and a quarter-of-a-mile further south again abrupt cliffs overlook the loose rocks that cover the intertidal area, the cliffs becoming bolder as Hallett's Cove is approached and broken by several narrow gullies, some short, some stretching back half-a-mile, down which water runs after storms.

These cliffs, as far back as the railway line, which at Marino is 161 feet above the sea and at Hallett's Cove 256 feet, have a varied and interesting natural flora, not yet destroyed entirely by the hand of man or the inroads of exotic weeds. This flora is met with immediately on leaving the train at Marino or Marino Rocks, and its accessibility makes a description of it advisable.

With the exception of an occasional She-oak (*Casuarina stricta*) still left forlorn in a little gully south of Kingston Park, all the plants are low or small. In October, *Velleya paradoxa*, with its large yellow slit corolla, is, though lowly, conspicuous and abundant; the related smaller *Goodenia pinnatifida* is also common. In the station yard at Marino, as usual probably on a limestone base, is the erect whitish-flowered *Goodenia albiflora*, in habit rather resembling a crucifer. The spreading *Scaevola microcarpa* is also fairly abundant. There are two *Zygophyllums* with their yoked leaves; *Z. Billardieri* is common, especially on some of the cliffs, and has a diffuse or, when opportunity offers, a scrambling habit; the large-leaved *Z. glaucescens* is rather rare, though plants grow beside the railway station. *Pomaderris racemosa* as a low shrub is frequent in places and is usually windswept. There are a few colonies of *Acacia obliqua* and occasional shrubs of *A. armata*, *A. ligulata* and *A. Victoriae* (*A. sentis*). The latter, a prickly shrub, is very widely dispersed in the State though absent from many districts; it occurs for instance near Eureka, in the Far North and in Central Australia. A glaucous *Olearia* is common, especially near the sea. Amongst the shrubs, both on the open cliffs and also near Kingston Park, are a number of small narrow-leaved bushes of the parasitic Native Peach (*Eucarya acuminata*); these are only three or four feet high and the mother-trees must have long disappeared; none show signs of flowering or fruiting; some of these in Kingston Park

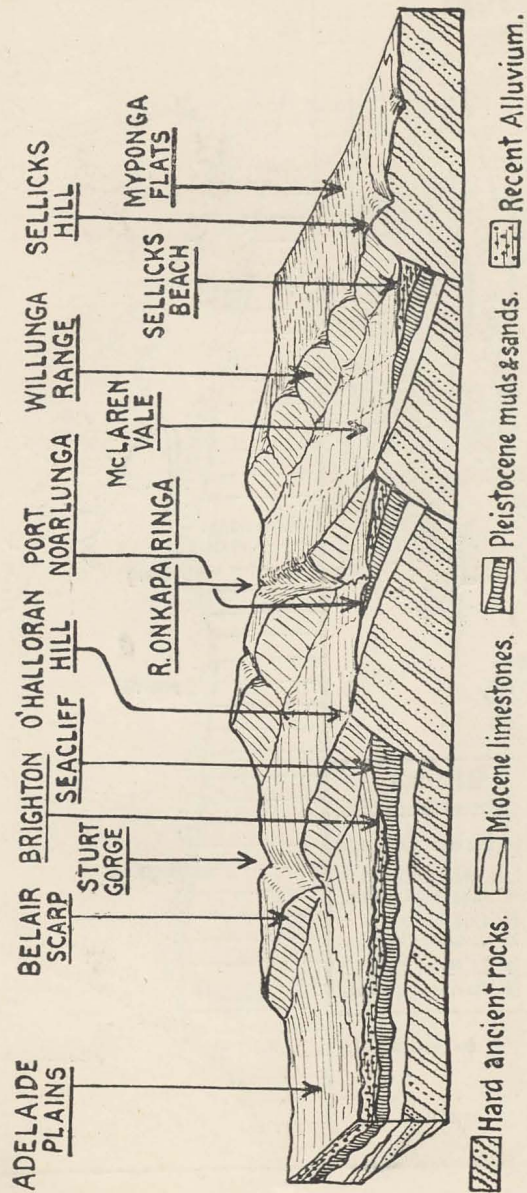
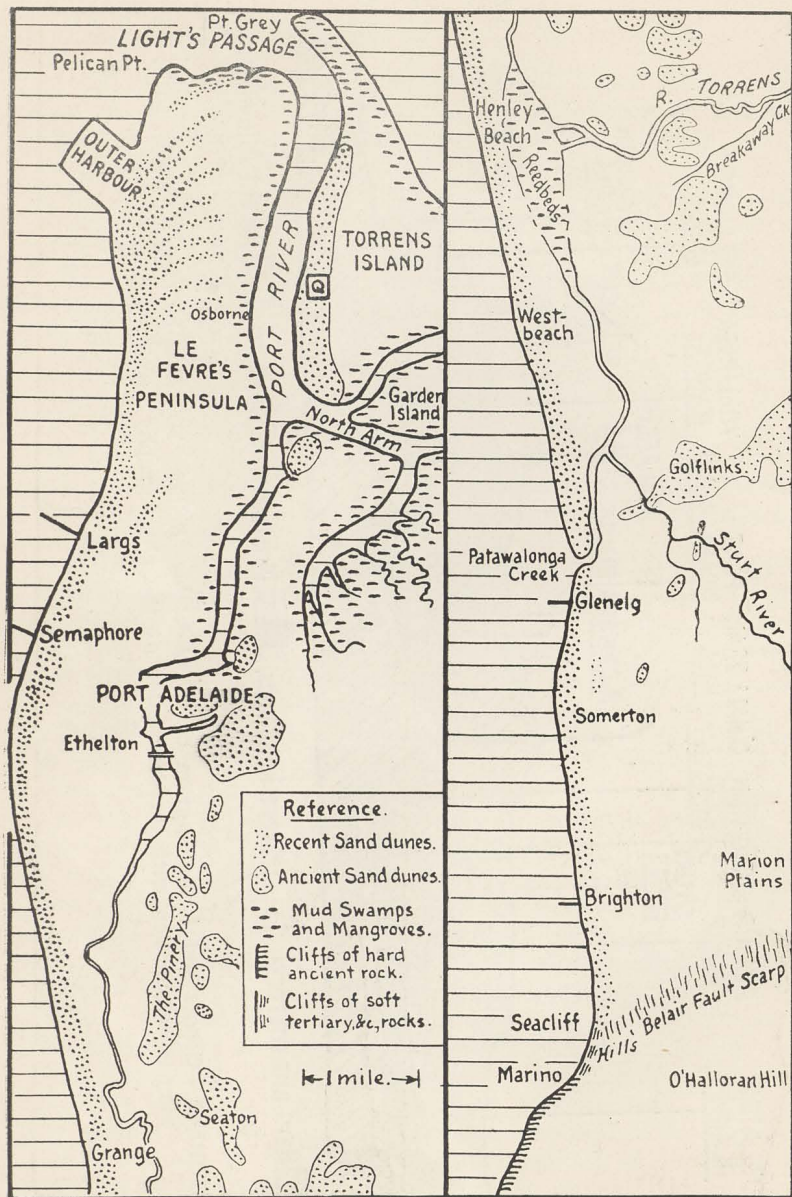


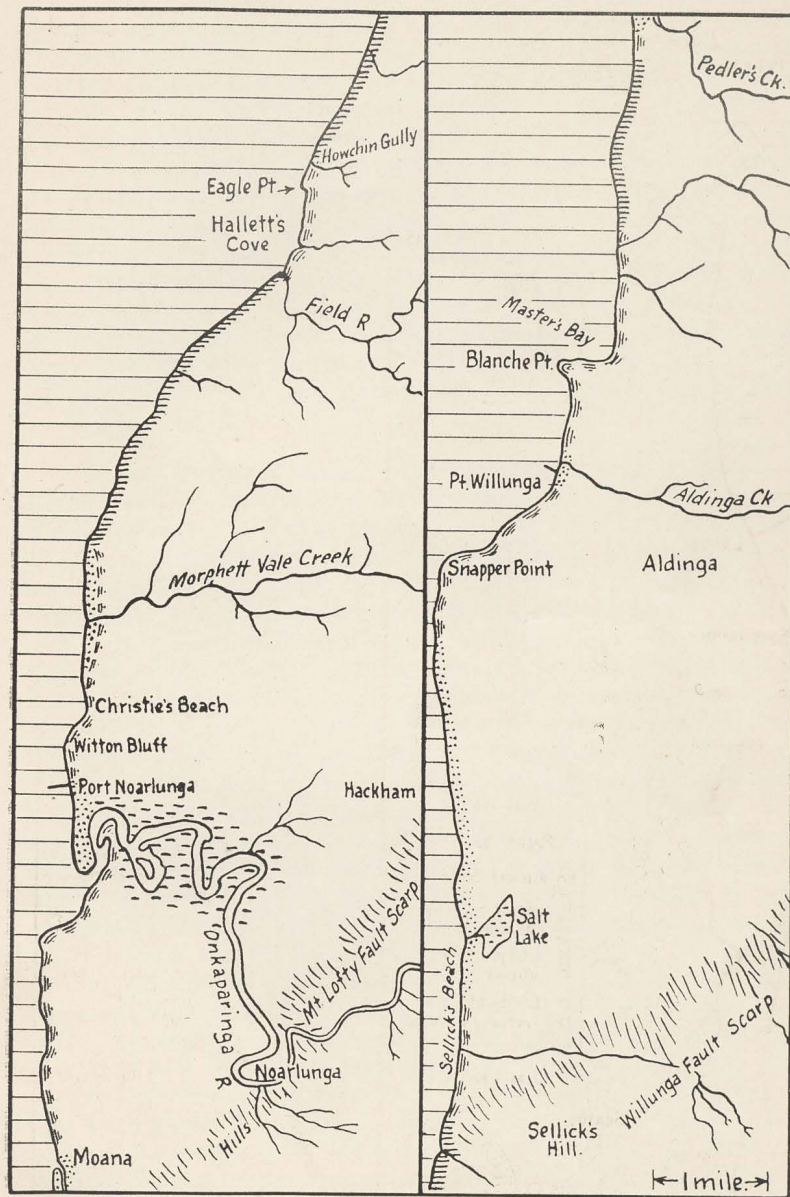
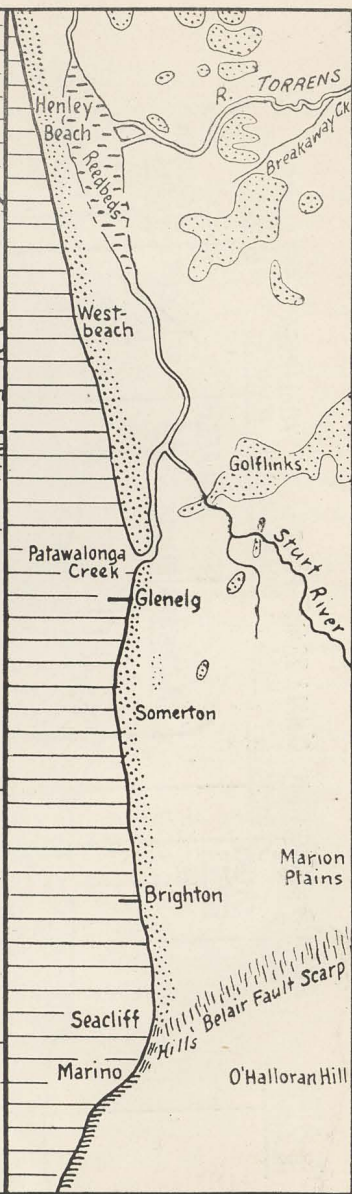
FIGURE I.—Generalised block diagram of the Adelaide—Sellicks Hill area by Dr. C. Fenner, to be read in conjunction with the description of the physiography herein.





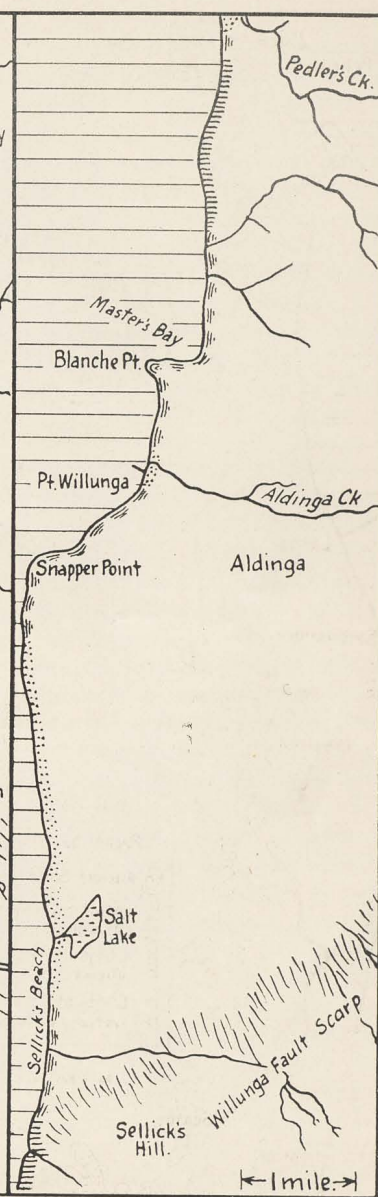
No. 1. PELICAN POINT TO THE GRANGE.

No. 2. HENLEY BEACH TO MARINO.



No. 3. HALLETT'S COVE TO MOANA.

No. 4. MOANA TO SELLICK'S HILL.





were growing through *Beyeria Leschenaultii*, an Euphorbiaceous plant very common here on the slopes of the cliffs. Other small shrubs only occasionally seen are *Hakea rugosa*; the Tea-tree *Melaleuca pubescens* (here only two or three feet high); *Dodonaea viscosa* (Kingston Park); and, especially near the sea the rather prickly, glossy leaved Epacrid *Acrotriche patula*. There are a few plants of the showy *Calythrix tetragona*. The yellow-flowered *Pimelea serpyllifolia* is widespread; there are occasional plants of *Stackhousia monogyna* and here and there a colony of *Euphrasia collina* (Schophulariaceae). Amongst small Composites *Podolepis Lessonii* with spreading branches, yellow flowers and stem-clasping leaves at the forks is common; *Leptorrhynchus squamatus*, somewhat like it but with more erect branches, and *Helichrysum apiculatum* much less common. *H. semipapposum*, very like the last named, and *Microseris scapigera* are rare; *Minuria leptophylla* with pale bluish flowers grows on the slope at Kingston Park.

In the Chenopodiaceae, *Enchylaena tomentosa* is abundant, *Salsola kali* is common as is *Atriplex Muelleri* (or *A. baccatum*), a diffuse, almost prostrate plant; *Rhagodia nutans* with red fruits occurs usually amongst rocks; the spreading adpressed *Bassia uniflora* is also numerous, especially nearer the sea. *Convolvulus erubescens* spreads out between shrubs, *Comesperma volubile* climbs through undershrubs such as *Beyeria* and exposes its racemes of blue flowers on their summits, and the Native Cranberry (*Astroloma humifusum*) is adpressed to the ground. *Oxalis corniculata*, *Lavatera plebeja*, *Plantago varia*, *Kennedyia prostrata*, a *Eutaxia*, *Lotus australis*, an *Opercularia*, *Wahlenbergia gracilis* and a *Pultenaea* also occur. *Exocarpus aphylla* with leafless striate branches is not uncommon, often growing on cliffs overlooking the sea and then much wind-swept. *Trich. alopecuroideum* and *T. nobile*, are both upright, the latter with the broader heads of flowers (about two inches in diameter), and *T. spatulatum* is smaller and spreads loosely on the ground. Amongst the Liliaceae are the sweet-scented purple-flowered *Dichopogon strictus*, colonies of the stiff-leaved *Dianella revoluta*, the yellow-flowered *Bulbine bulbosa* and three species of *Lomandra*, *L. effusa* with leaves with bifid extremities and two smaller species, *L. glauca* and the bright-green-leaved *L. filiformis* (?). The Amaryllid *Calostemma purpureum* flowers in autumn, but the leaves appear in winter and spring. In the sedges, the stiff *Gahnia lanigera* is one of the most abundant plants and there are scattered tufts of *Lepidosperma concavum*. Of orchids, *Microtis porrifolia* occurs here but is uncommon. The commonest grasses apart from introduced species are the Spear-grasses (*Stipa*), of which



three species at least occur, one (*S. Drummondii*) with very pubescent leaves, another (*S. elatior?*) with broad dark green leaf-blades and a third with narrow scabrous leaves; two or three species of Wallaby Grass (*Danthonia*) are common, one of which has yellow-green leaves and stems.

As one reaches the edge of the cliffs, and the effect of the salt spray is greater, several additional plants appear. *Atriplex paludosum*, *Nitraria Schoberi*, the almost white foliaged *Calocephalus Brownii* and *Alyxia buxifolia* appear as shrubs on the sides of the cliffs at their bases, *Disphyma australe* spreads over the surface and *Frankenia pauciflora* forms mats a few inches high. Occasional bushes of *Exocarpus aphylla* grow even on the sides of the cliffs. Tufts of *Poa caespitosa* are met and as small herb-like plants we find in abundance a small composite (*Angianthus strictus*) and in sheltered situations *Galium* and *Apium australe*. Walking along the rocky strand and looking among the debris at the base of the cliffs and at the cliff face itself, one meets with scattered shrubs such as *Myoporum insulare*, the introduced Boxthorn (*Lycium ferocissimum*), *Olearia*, *Exocarpus aphylla*, *Nitraria*, *Atriplex paludosum*, *A. cinereum* (on the strand only), *Enchylaena* and *Kochia oppositifolia*, and undershrubs and small plants such as *Zygophyllum Billardieri*, *Senecio lautus*, *Trichinium nobile*, *Frankenia*, *Disphyma australe*, *Rhagodia nutans*, *Bassia uniflora* and the grass *Poa caespitosa*. On the strand itself grows Sea Kale (*Cakile maritima*) together with the introduced Medics, Sow Thistle and such grasses as *Hordeum* and *Lolium*. The slender introduced Umbellifer *Bupleurum semicompositum* also grows at the base of the cliffs. A clump of *Goodenia amplexans*, a sticky species with a definite and rather unpleasant smell, grows at the cliff base where a small watercourse discharges.

As one approaches Hallett's Cove, *Calythrix tetragona*, *Westringia rigida*, *Dampiera rosmarinifolia*, *Helichrysum apiculatum*, *H. leucopsidium* and the grass *Brachypodium distachyum* appear and patches of the sedge *Schoenus Tepperi* make in places a sward.

On the south side of Hallett's Cove sandy patches approach the cliff edge and here may be found *Bulbine semibarbata*, *Daucus glochidiatus*, *Plantago varia*, *Gnaphalium japonicum* and the grass *Neurachne alopecuroides*. Strange to say, within a few days of the first record for the State of a small grass, *Psilurus aristatus*, resembling *Lepturus* in appearance, it was found also at this spot—Mr. Black had shown me the specimens and asked if I had ever met with it and this enabled it to be recognised in the field.

On the cliffs just north of Port Noarlunga, the introduced prostrate *Frankenia pulverulenta* was found one year in November. *Myoporum parvifolium*, also prostrate, occurs here.

The cliffs to the south of Port Noarlunga show such grasses as *Stipa*, *Danthonia* and *Calamagrostis filiformis* var. *Billardieri*. Other plants noted were *Bassia uniflora*, *Kochia oppositifolia*, *Billardiera*, *Lotus australis*, *Linum marginale*, *Plagianthus microphyllus*, *Leucopogon parviflorus*, *Apium*, *Bupleurum*, *Alyxia*, *Nicotiana suaveolens* and *Myoporum insulare*.

Along the cliffs from Moana to Aldinga, the harsh sedge *Gaknia lanigera*, *Beyeria*, *Pomaderris racemosa*, a *Pimelea* and *Goodenia pinnatifida* are common. Other plants consist of the grasses *Themeda*, *Stipa elegantissima* and *Poa caespitosa*; the sedges *Lepidosperma concavum* and *Cladium flum;* *Dianella revoluta*, *Lomandra effusa*, *L. juncea* and another *Lomandra*, *Hakea rugosa*, *Rhagodia baccata*, *Atriplex paludosum* (rocky slopes near the sea), *Kochia crassiloba*, *Enchylaena tomentosa*, *Threlkeldia diffusa*, *Trichinium spathulatum*, *Disphyma australe*, *Zygophyllum*, *Nitraria*, *Cassytha glabella*, *Acacia obliqua*, *Eutaxia microphylla*, *Stackhousia*, *Pimelea serpyllifolia*, *Melaleuca pubescens*, *Eucalyptus odorata* (prostrate), *Convolvulus erubescens*, *Daucus*, *Acrotriche patula*, *Plantago varia*, *Pimpernel*, *Opercularia varia*, *Dampiera rosmarinifolia*, *Scaevola microcarpa*, *Velleia paradoxa*, *Olearia*, *Senecio lautus*, *Leptorhynchus squamatus*, *Podolepis*, *Minuria leptophylla*, *Helichrysum* and *Angianthus*.

b. *The Amphitheatre at Hallett's Cove.*

The plants of the amphitheatre at Hallett's Cove partake of the nature of the cliff flora, but as this is such a striking geological feature they are worthy of enumeration as a help to the young botanist and as representing the plants found in a restricted area. The only tree is an occasional She-oak (*Casuarina stricta*), in hollows near the watercourses. On the sides of some of the runnels, a large form of *Nicotiana suaveolens* is often abundant—it grows to four feet high, has very large broad leaves which are stem-clasping and up to 9 inches high and 5½ inches broad, and has flowers which are faintly sweet by day and strongly so at night. Shrubs comprise occasional *Myoporum insulare*, *Olearia* probably *O. ramulosa*, *Beyeria Leschenaultii*, *Acrotriche patula* (common), *Pomaderris racemosa* (common), *Enchylaena tomentosa*, *Calythrix tetragona*, the viscid *Goodenia amplexans* and the prostrate, diffusely rooting Muntry (*Kunzea pomifera*). Smaller plants consist of *Zygophyllum Billardieri*, *Eutaxia microphylla*, *Velleia paradoxa*, the small *Goodenia pusilliflora*, *Scaevola linearis* var. *confertifolia*, the deep purple-flowered *Dampiera*



*rosmarinifolia*, *Senecio lautus*, *Helichrysum apiculatum*, *Millotia tenuifolia*, *Bassia uniflora* (prostrate), *Solanum nigrum*, *Halorrhagis teucroides*, the prostrate *Trichinium spathulatum* and the Liliaceous plants *Dianella revoluta* and *Lomandra effusa*. The pea *Glycine* trails through various shrubs. The grasses comprise Spear-grasses (including the showy *Stipa elegantissima* and the hairy *S. Drummondii*), *Danthonia* and *Poa caespitosa*. The harsh *Gahnia lanigera* is abundant and other sedges include tufts of *Lepidosperma concavum* and the annual *Schoenus apogon*.

### (9) Fields and Grasslands

These comprise cleared and often cultivated land on the plains and on the undulating country between the South Road and the Sea.

From Marino to Sellick's Hill, between the cliffs and the Main Road, the original scrub has been almost completely cleared and replaced by grass land and cultivated paddocks. Here and there are remnants of the original flora, as for instance near the school south of Morphett Vale and again between Noarlunga and Aldinga. In the latter, a few Peppermints (*Eucalyptus odorata*) are still standing. A few remnants also survive on the sides of the various roads. The chief plants consequently consist of introduced grasses and the weeds of cultivation and comprise many of those with an asterisk against them (indicating that they are introduced) in the list of the plants of the district. Along the edges of the fields and by the sides of roads near Aldinga the following, mostly native, plants were noted:—Several species of Spear-Grasses (*Stipa*) and Wallaby Grasses (*Danthonia*), She-oak, *Enchylaena tomentosa*, *Acacia armata*, *Kennedya prostrata*, *Oxalis corniculata*, *Eucalyptus odorata*, *Melaleuca pubescens*, *Oenothera odorata* (Evening Primrose, introduced), *Convolvulus erubescens*, *Salvia Verbenaca* (introduced) *Scaevola microcarpa*, *Goodenia albiflora*, *Vittadinia triloba*, and *V. tenuissima*. Near Hallett's Cove, the following additional species were seen in grass land:—*Bassia uniflora*, *Pimelea curviflora* and *Galium tricornis* (introduced).

### (10) The Banks Of The Several Freshwater Creeks That Empty Themselves Into The Sea

Under Section 4, dealing with the Reedbeds, a short description is given of the plants that may be found on the banks of the Torrens just before it passes into the Reedbeds. Within the area concerned with this survey, the Sturt River passes into the Patawalonga Creek; the waters are saltish and tide-influenced and so do not concern us here. The same applies to the Onka-

paringa from Noarlunga to the sea. Small fresh-water creeks, dry, or nearly so, in summer, are represented by the Field River at Hallett's Cove, Pedlar's Creek representing the exit of the Morphett Vale Creek and the small watercourse at Moana where the McLaren Vale Creek emerges. The vegetation of the banks of these creeks has been profoundly altered by grazing and cultivation so that few native species of plants are now to be found there. The few observed include the Bulrush (*Typha angustifolia*), *Triglochin procera*, the Common Reed (*Phragmites communis*), the Sedge *Scirpus maritimus* and the Rush *Juncus maritimus* var. *australiensis*.





LIST OF PLANTS OCCURRING BETWEEN  
OUTER HARBOUR AND SELLICK'S BEACH.

[In identifying these plants much help has been received from  
Mr. J. M. Black, Dr. R. S. Rogers and Miss C. Eardley]  
An Asterisk (\*) indicates an Introduced Species.

**FILICALES.**—*Cheilanthes tenuifolia* Swartz, Sellick's scrub.  
*Pteridium aquilinum* (L.) Kuhn, Sellick's scrub. *Pleuro-  
sorus rutifolius* (R.Br.) Fée, rocks near creek at Hallett's  
Cove.

**PINACEAE.**—*Callitris propinqua* R.Br., Pinery.

**TYPHACEAE.**—*Typha angustifolia* L., Bulrush, Fulham, Field  
R. (near Hallett's Cove), Pedlar's Creek.

**POTAMOGETONACEAE.**—*Cymodocea antarctica* (Labill.)  
Endl., in the sea. *C. Griffithii* J. M. Black, Henley Beach  
(in Black's Flora). *Posidonia australis*, Hook. f., many  
flowers washed up on October 31, 1928, after a heavy gale  
at Christie's Beach; many fruits washed ashore, Brighton,  
December 26. *Potamogeton crispus* L., Curly Pondweed,  
Breakaway Creek at Fulham. *Ruppia maritima* L., Grange.

**SCHEUCHZÉRIACEAE.**—*Triglochin calcitrapa* Hook., S. of  
Hallett's Cove. *T. mucronata* R.Br., Port River near the  
Pinery. *T. procera* R.Br., Fulham, Field R. (Hallett's Cove).

**GRAMINEAE.**—*Imperata cylindrica* (L.) Beauv., Blady Grass,  
Sellick's Beach. *Roetboellia compressa* L.f., Mat Grass, near  
Glenelg. *Themeda triandra* Forsk., Kangaroo Grass, cliffs  
near Aldinga. *Neurachne alopecuroides* R.Br., coast cliffs.  
*Paspalum distichum* L., Fulham. *Panicum effusum* R.Br.,  
Pinery, Nov. *Stenotaphrum dimidiatum* (L.) Brongn., Buf-  
falo Grass, Ethelton. *Spinifex hirsutus* Labill., sandhills.  
*Ehrharta longiflora* Sm., Pinery, Oct. *Phalaris minor* Retz.  
*Stipa elegantissima* Labill., Pinery (Grange); coast cliffs. *S.  
incurva* Hughes, Hallett's Cove. *S. Drummondii* Steud. (*S.  
horrifolia* J. M. Black), Hallett's Cove, cliffs at Port Noarlun-  
ga, scrub south of Hallett's Cove (a very hairy species). *S.  
elatior* Hughes, Brighton. *S. Blackii* C. E. Hubbard (*S. pubes-  
cens* R.Br. var. *comosa* J. M. Black), Marino in Black's Flora.  
*S. aristiglumis* F.v.M. Port Noarlunga. *Oryzopsis miliacea*  
(L.) Aschers. et Schweinf., Many-flowered Millet-grass,  
Brighton, Fulham, Outer Harbour. *Sporobolus virginicus*  
(L.) Kunth., Outer Harbour, near Fulham. *Polypogon  
monspeliensis* Desf., Beard-grass, Grange, Fulham. *Agrostis  
alba* L., Creeping Bent-grass, Fulham. *Calamagrostis fili-*

*formis* (Forst.) Pilger, Fulham; var. *Billardieri* Maid. et  
Bêche, Blown Grass, cliffs south of Hallett's Cove. *Dichel-  
achne crinita* (L.f.) Hook. f., Plume-grass, Grange, south  
of Hallett's Cove (Nov.). *Ammophila arenaria* (L.) Link.,  
Marram-grass, planted as a binder on the sand-hills. *Lag-  
urus ovatus* L., Hare's-tail Grass, Glenelg. *Aira caryophyl-  
lea* L., Silvery Hairgrass. *A. minuta* L., Pinery. *Avena  
jatua* L., Wild Oat. *Danthonia penicillata* (Labill.) F.v.M.,  
Wallaby Grass. *Pentaschistis airoides* (Nees) Stapf, Pinery  
(Oct.) *Pappophorum nigricans* R.Br., Black Heads, near  
Hallett's Cove. *Phragmites communis* Trin., Common Reed,  
Reedbeds, Morphet Vale and Pedlar's Creeks. *Koeleria  
phleoides* Pers. *Briza maxima* L., Large Quaking-grass.  
*B. minor* L., Lesser Quaking-grass. *Distichlis spicata* (L.)  
Greene, near salt swamps at Grange and Port Noarlunga.  
*Poa caespitosa* Forst., sandhills at Grange, Pedlar's Creek,  
cliffs. *P. annua* L., Annual Meadow-grass. *Glyceria stricta*  
Hook.f., salt swamp at Outer Harbour, Grange, Port Noarlun-  
ga. *Festuca Myuros* L., Rat's-tail Fescue. *F. bromoides*  
L., Grange. *F. rigida* (L.) Kunth., Hard Fescue. *Bromus  
villosus* Forsk., Great Brome, Grange. *B. madritensis* L.,  
Madrid Brome, Grange, Noarlunga. *B. unioides* H.B. et  
K., Prairie-grass, Fulham. *B. hordeaceus* L., Soft Brome,  
Grange, Fulham, Noarlunga. *Brachypodium distachyum*  
R. et S., Aldinga, Hallett's Cove, etc. *Cynodon dactylon*  
Rich., Couch-grass, Grange, Fulham (with smut). *Lolium  
temulentum* L., (?) Darnel or Drake, Grange. *L. peryenne*  
L., Rye-grass, Reedbeds. *L. italicum* A. Braun, Grange.  
*L. subulatum* Vis., Grange. *Lepturus incurvatus* Trin.,  
Grange. *Psilurus aristatus* (L.) Duval-Jouve, near cliffs  
on south side of Hallett's Cove. *Agropyrum scabrum* (Labill.)  
Beauv., Grange. *A. repens* (L.) Beauv., English Couch-  
grass, Reedbeds, (Feb.). *Hordeum murinum* L., Barley-  
grass, Grange. *H. marinum* With., Sea-Barley, Grange.

**CYPERACEAE.**—*Cyperus tenuillus* L.f., Sellick's scrub. *C.  
vaginatus* R.Br., Grange, Fulham. *C. rotundus* L., Nut-  
grass, Torrens at Fulham. *Schoenus apogon* Roem. et Sch.,  
cliffs south of Hallett's Cove. *S. Tepperi* F.v.M., cliffs north  
and south of Hallett's Cove. *Scirpus cernuus* Vahl., Fulham.  
*S. antarcticus* L., Grange, Seaton. *S. nodosus* Rottb., com-  
mon on sandhills at Grange, etc. *S. americanus* Pers., Al-  
dinga. *S. maritimus* L., Fulham, Pedlar's Creek. *Cladium  
junceum* R.Br., Grange, Sellick's scrub. *C. filium* (Labill.)  
R.Br., near Glenelg, in places on coastal cliffs (Aldinga).  
*Gahnia lanigera* (R.Br.) Benth., cliffs at Moana. *Lepidos-*



*perma gladiatum* Labill., Sword Rush, common on sandhills (Grange, etc.). *L. concavum* R.Br., Pinery, cliffs. *L. carphoides* F.v.M., Sellick's scrub.

**CENTROLEPIDACEAE.**—*Centrolepis strigosa* (R.Br.) Roem. et Schult., south of Hallett's Cove.

**JUNCACEAE.**—\**Juncus capitatus* Weig., Aldinga. *J. bufonius* L., Toad Rush, Grange, Aldinga. *J. maritimus* Lamk. var. *australiensis* Buch., Field R. (Hallett's Cove). *J. pallidus* R.Br., Pale Rush, Fulham. *J. pauciflorus* R.Br., Grange.

**LILIACEAE.**—*Dianella revoluta* R.Br., Grange, cliffs. *Burchardia umbellata* R.Br., Sellick's scrub, cliffs. *Lomandra effusa* (Lindl.) Ewart, cliffs. *L. filiformis* (Thunb.) J. Britten, cliffs south of Hallett's Cove. *L. glauca* (R.Br.) Ewart, slightly sweet-scented (Oct.), Grange sandhills, cliffs. *L. juncea* (F.v.M.) Ewart, cliffs. *L. leucocephala* (R.Br.) Ewart, Pinery. *Thysanotus Patersonii* R.Br., Sellick's scrub. *Th. Baueri* R.Br., Pinery. *Chamaescilla corymbosa* (R.Br.) F.v.M., Hallett's Cove (Sept.). *Tricoryne elatior* R.Br., Pinery. *Bulbine bulbosa* (R.Br.) Haw., Pinery, Hallett's Cove. *B. semibarbata* (R.Br.) Haw., cliffs. *Dichopogon strictus* (R.Br.) J. G. Bak., Pinery (Oct.), cliffs. *Xanthorrhoea semiplana* F.v.M., Sellick's scrub. \**Asphodelus fistulosus* L., Wild Onion, common.

**AMARYLLIDACEAE.**—*Calostemma purpureum* R.Br., Marino, Hallett's Cove, Moana cliffs. \**Agave americana* L., Fulham.

**IRIDACEAE.**—\**Moraea xerospatha* MacOwan var. *monophylla* Black. \**Romulea parviflora* (Salisb.) J. Britten.

**ORCHIDACEAE.**—Dr. R. S. Rogers has kindly supplied the following two lists of orchids from the area under review or adjacent parts:—

(A.) Outer Harbour to Sellick's Beach:

*Thelymitra aristata* Lindl. *Thelymitra grandiflora* Fitzg., (cliffs south of Hallett's Cove—J.B.C.) *Microtis porrifolia* Spreng., (Fulham, cliffs south of Hallett's Cove—J.B.C.) *Lyperanthus nigricans* R.Br. *Eriochilus autumnalis* R.Br. *Caladenia leptochila* Fitzg. *C. dilatata* R.Br. *C. deformis* R.Br. *Pterostylis Mitchellii* Lindl., Grange.

(B.) South Road to the Sea (including the west side of Myponga):

*Thelymitra grandiflora* Fitzg. *Th. pauciflora* R.Br. *Th. fuscolutea* R.Br. *Th. aristata* Lindl. *Microtis porrifolia* Spreng. *Prasophyllum fuscum* R.Br. *P. odoratum* Rogers. *Acianthus exsertus* R.Br. *Lyperanthus nigricans* R.Br., (Sellick's scrub—J.B.C.) *Eriochilus autumnalis* R.Br. *Caladenia leptochila* Fitzg. *C. Patersonii* R.Br. *C. dilatata* R.Br. *C.*

*deformis* R.Br. *Diuris pedunculata* R.Br. *D. palustris* Lindl. *D. brevifolia* Rogers. *Pterostylis nana* R.Br. *Pt. pedunculata* R.Br. *Pt. longifolia* R.Br. *Pt. vittata* Lindl. *Pt. barbata* R.Br.

**CASUARINACEAE.**—*Casuarina stricta* Ait., Pinery, Marino, Hallett's Cove, Sellick's scrub. *C. Muelleriana* Miq., a few shrubs on the cliffs south of Hallett's Cove.

**URTICACEAE.**—\**Urtica urens* L., Small Nettle.

**PROTEACEAE.**—*Isopogon ceratophyllus* R.Br., Sellick's scrub. *Hakea rugosa* R.Br., cliffs at Marino, Hallett's Cove and south thereof. *Banksia marginata* Cav., Pinery, Sellick's scrub. *Grevillea ilicifolia* R.Br., Holly-leaved Grevillea, Pinery, sandhills near Glenelg. *G. lavandulacea* Schl., cliffs south of Hallett's Cove, Sellick's scrub (Nov.).

**SANTALACEAE.**—*Exocarpus cupressiformis* Labill., Native Cherry, Sellick's scrub. *E. aphylla* R.Br., Marino cliffs. *Eucarya acuminata* (R.Br.) Spr. et Summ., Quandong or Native Peach, growing in *Acacia armata*, etc., rarely fruiting, Pinery, Hallett's Cove scrub, Sellick's scrub. *Eucarya Murrayana* (T. L. Mitch.), Bitter Quandong, Sellick's scrub.

**LORANTHACEAE.**—*Loranthus Exocarpi* Behr., on *Casuarina stricta* and *Eucarya acuminata*, Pinery. *L. miraculosus* Miq. var. *Melaleuca* Tate on *Melaleuca pubescens*, Hallett's Cove scrub (Nov.).

**POLYGONACEAE.**—\**Rumex pulcher* L., Fiddle Dock, Fulham. *R. Broxtonii* Campd., Fulham, Grange. \**R. conglomeratus* Murray, Clustered Dock, Fulham. \**R. crispus* L., Curled Dock, Fulham. \**Emex australis* Steinh., Grange, Port Noarlunga. \**Polygonum aviculare* L., Wireweed. *P. serrulatum* Lag., Torrens at Fulham. *P. lapathifolium* L., Reedbeds (in Black's Flora). *Muehlenbeckia adpressa* (Labill.) Meisn., on sandhills, Grange etc.; on coast cliffs. *M. Cunninghamii* (Meisn.) F.v.M., Lignun, Pedlar's Creek.

**CHENOPODIACEAE.**—*Rhagodia baccata* (Labill.) Moq., Coastal Saltbush, Grange, Fulham Park. *Rh. nutans*, R.Br., Pinery, Fulham near Glenelg, south of Hallett's Cove. *Chenopodium carinatum* R.Br., Keeled Goosefoot, Port Noarlunga. \**Ch. anthelminthicum* L., Port Adelaide and Semaphore (Black's Flora). \**Ch. ambrosioides* L., Mexican Tea, Reedbeds. \**Ch. album* L., White Goosefoot, Fulham. \**Ch. murale* L., Nettle-leaved Goosefoot, Fulham. *Ch. ambiguum* R.Br., Grange, Reedbeds. \**Beta vulgaris* L., Common Beet, Fulham. *Atriplex paludosum* R.Br., Marsh Saltbush, mouth of the Onkaparinga, cliffs at Pedlar's Beach. *A. cinereum* Poir., Grey Saltbush, near the shore, Grange. *A. Muelleri* Benth., Grange, Lockleys, Ethelton. *Bassia uniflora* (R.Br.) F.v.M., Pinery, near Marino, Hallett's Cove, Port Noar-



lunga cliffs. *Kochia oppositifolia* F.v.M., in saltmarshes at mouths of Onkaparinga and Patawolonga. *K. excavata* J. M. Black, cliffs at Pedlar's Beach. *K. crassiloba* R. H. Anderson F.v.M., (*Enchylaena villosa*), cliffs south of Hallett's Cove, Aldinga. *Salsola Kali* L., Rolly Poly, Buck-bush, Grange, Hallett's Cove, Pedlar's Creek. *Suaeda australis* (R.Br.) Moq., sandhills at Grange, etc. *Enchylaena tomentosa* R.Br., Ruby Saltbush, Grange, Lockleys, Port Noarlunga, Aldinga. *Threlkeldia diffusa* R.Br., Grange. *Arthrocnemum halocnemoides* Nees., Grange (in flower, Nov.). *A. halocnemoides* var. *pergranulatum* J. M. Black. *A. leiostachyum* (Benth.) Paulsen, Grange. *A. arbuscula* (R.Br.) Moq., Port Adelaide River. *Salicornia pachystachya* J. M. Black, Patawolonga.

**AMARANTACEAE.**—*Hemichroa pentandra* R.Br., in swampy soil under tea-tree, attacked by a rust, Grange. *Trichinium alopecuroideum* Lindl., sandhills at Fulham, Pinery, Marino, Pt. Noarlunga. *T. nobile* Lindl., Marino (flowers fragrant). *T. spathulatum* R.Br., Marino, Hallett's Cove, Pedlar's Beach, Pt. Noarlunga. \**Amaranthus viridis* L., Brighton. \**A. patulus* Bertol. ?, Fulham. *Alternanthera denticulata* R.Br., creek at Fulham. ....

**AIZOACEAE.**—\**Cryophytum crystallinum* (L.), N.E.Br., Ice-plant, Grange. *Carpobrotus aequilaterus* (Haw.), N.E.Br., Angular Pigface, Grange. *Disphyma australe* (Soland.), J. M. Black, Round-leaved Pigface, Grange. *Tetragonia implexicoma* (Miq.) Hook.f., Grange, Pedlar's Beach (fruit reddish-orange). \**Galenia secunda* (L.f.) Sond., north-east edge of Pinery near Port River.

**PORTULACACEAE.**—*Portulaca oleracea* L., Purslane, Fulham. *Calandrinia volubilis* Benth., Pinery, south of Hallett's Cove, Sellick's scrub. *C. pygmaea* F.v.M., Pinery, south of Hallett's Cove, Sellick's scrub. *C. calypttrata* Hook. f., Sellick's scrub (Oct.)

**CARYOPHYLLACEAE.**—*Sagina apetala* Arduino., Seaton (Oct.), south of Hallett's Cove. *Cerastium glomeratum* Thuill., Mouse-ear Chickweed. \**Moenchia erecta* (L.) Gaertn., Mey. et Scherb., south of Hallett's Cove. *Stellaria palustris* Retz., Swamp Starwort, amongst rocks, Field R. at Hallett's Cove (petals a good deal longer than sepals). \**S. media* (L.) Vill., Chickweed. *Spergularia rubra* (L.) J. et C. Presl., Grange. *S. marginata* (DC.) Kitt, saline swamp at Glenelg, Aldinga. *Polycarpon tetraphyllum* Loefl., Grange. \**Silene vulgaris* (Moench.) Garcke, Bladder Champion, Brighton. \**S. gallica* L., French Catchfly.

**RANUNCULACEAE.**—*Clematis microphylla* DC., sandhills at Grange. *Ranunculus muricatus* L., Grange.

**LAURACEAE.**—*Cassytha glabella* R.Br., Pt. Noarlunga, cliffs near Aldinga. *C. pubescens* R.Br., Sellick's scrub, Aldinga.

**PAPAVERACEAE.**—\**Papaver dubium* L., Long-headed poppy, Noarlunga. \**P. hybridum* L., Rough Poppy, Noarlunga, Reynella. \**Fumitaria muralis* Sond., Fulham. \**F. densiflora* DC., Noarlunga.

**CRUCIFERAE.**—\**Nasturtium officinale* R.Br., Water Cress, Field River (Hallett's Cove). \**Sisymbrium orientale* L., Wild Mustard, Grange. *Lepidium hyssopifolium* Desv., Fulham. \**L. draba* L., Hoary Cress, Reedbeds (as a pest, called 'carrot-weed'), Noarlunga (Oct.). *Hutchinsia procumbens* (L.) Desv., Outer Harbour beach (Oct.). *Stenopetalum lineare* R.Br., sandhills at Outer Harbour. \**Coronopus didymus* (L.) Sm., Pt. Noarlunga. *Cakile maritima* Scop., Sea Rocket, near shore-line, Grange, etc. \**Rapistrum rugosum* All., Grange, south of Hallett's Cove (Nov.), etc.

**DROSERACEAE.**—*Drosera Whittakeri* Planch., near Hallett's Cove.

**CRASSULACEAE.**—*Crassula Sieberiana* (Schultes.) Ostenf., Pinery. *C. colorata* (Nees) Ostenf., south of Hallett's Cove. *C. macrantha* (Hook. f.) Diels et Pritzel., south of Hallett's Cove. *C. pedicellosa* (F.v.M.) Ostenf., Seaton (Oct.)

**PITTIOSPORACEAE.**—*Pittosporum phillyreoides* DC., Fulham, Hallett's Cove scrub. *Bursaria spinosa* Cav., Sellick's scrub. *Billardiera cymosa* F.v.M., near Pinery, Pedlar's Beach, Sellick's scrub. \**Rosa* sp., Fulham.

**LEGUMINOSAE.**—*Acacia armata* R.Br., Kangaroo Bush, Pinery, Hallett's Cove scrub. *A. obliqua* A. Cunn., nearly prostrate, Pedlar's Beach. *A. spinescens* Benth., Sellick's scrub. *A. Victoriae* Benth., Prickly Acacia, near Brighton, near Reynella. *A. ligulata* A. Cunn., Umbrella Bush, Grange, Pinery, Hallett's Cove, Pedlar's Beach. *A. pycnantha* Benth., Golden Wattle, Grange, Pinery, Sellick's scrub. *A. longifolia* (Andr.) Willd. var. *Sophorae* F.v.M., Glenelg. *Eutaxia microphylla* (R.Br.), J. M. Black, Marino, Hallett's Cove, Pedlar's Beach. *Pultenaea tenuifolia* R.Br., Marino, cliffs at Pt. Noarlunga. \**Lupinus pilosus* L., Grange. \**Trifolium procumbens* L., Hop Clover, Fulham, Aldinga. \**T. tomentosum* L., Woolly Clover, Seaton, Aldinga, etc. \**T. repens* L., White Clover, Fulham. \**T. glomeratum* L., Grange. \**T. subterraneum* L., Grange, Aldinga. \**T. scabrum* L., Grange, south of Hallett's Cove. \**T. arvense* L., Hare's-foot Clover, Ful-



- ham. \**T. incarnatum* L., Crimson Clover. \**T. angustifolium* L., Fulham. \**Trigonella monspeliaca* L., Outer Harbour. \**Melilotus indica* All., Melilot, Grange. \**Medicago sativa* L., Lucerne, Brighton. \**M. tribuloides* Desr. var. *truncatula* Koch, Seaton, Marino, Pt. Noarlunga. \**M. denticulata* Willd., Toothed Medic, Grange. \**M. praecox* DC. *Lotus australis* Andr., Grange, Pedlar's Creek, Pt. Willunga. *Psoralea patens* Lindl., near Glenelg, Hallett's Cove. *Sesuvium Behriana* (F.v.M. Herb.) Black, Seacliff (not noticed in recent years). \**Vicia sativa* L. var. *angustifolia* Wahl., Grange, near Hallett's Cove. *Kennedyia prostrata* R.Br., Scarlet Runner, Grange, Pinery, Pt. Noarlunga. *Hardenbergia monophylla* (Vent.) Benth., Native Lilac, Hallett's Cove scrub. *Glycine clandestina* Wendl., Hallett's Cove, Moana.
- GERANIACEAE.**—*Geranium pilosum* Forst., Glenelg. \**Erodium botrys* (Cav.) Bertol. \**E. cicutarium* (L.) L'Her. *Pelargonium australe* Willd., sandhills at Grange, etc.
- OXALIDACEAE.**—*Oxalis corniculata* L. \**O. cernua* Thunb., Soursob.
- ZYGOPHYLLACEAE.**—*Nitraria Schoberi* L., Nitre-bush, Grange, Moana. *Zygophyllum Billardieri* DC., Marino, Pt. Noarlunga, cliffs at Pedlar's Beach (Oct.). *Z. glaucescens* F.v.M., Marino.
- RUTACEAE.**—*Correa rubra* Sm., Sellick's scrub.
- POLYGALACEAE.**—*Comesperma volubile* Labill., Maino, cliffs south of Hallett's Cove, Moana cliffs. *C. calymega* Labill., Aldinga cliffs.
- EUPHORBIACEAE.**—\**Ricinus communis* L., Castor-oil Plant, Fulham, Hallett's Cove. *Adriana Klotzschii* (F.v.M.) Muell. Arg., near Glenelg. \**Euphorbia falcata* L., Grange, Pinery. \**E. lathyris* L., Caper Spurge, Grange (Nov.) \**E. terracina* L., Brighton. \**E. peplus* L., Fulham. *Poranthera microphylla* Brongn. *Beyeria Leschenaultii* (DC.) Baill., rounded shrubs, Moana cliffs, south of Hallett's Cove.
- STACKHOUSIACEAE.**—*Stackhousia monogyna* Labill., Moana, Sellick's scrub.
- SAPINDACEAE.**—*Dodonaea viscosa* L., Glenelg sandhills, Pinery, Hallett's Cove. *D. hexandra* F.v.M. (?), cliffs south of Hallett's Cove.
- RHAMNACEAE.**—*Pomaderris racemosa* Hook., Hallett's Cove, Moana cliffs.
- MALVACEAE.**—*Lavatera plebeja* Sims, Australian Hollyhock. \**Malva parviflora* L. *Plagianthus microphyllus* F.v.M., swamps and also cliffs at Pt. Noarlunga, swamps at Port Adelaide.

- STERCULIACEAE.**—*Thomasia petalocalyx* F.v.M., Pinery, Sellick's scrub (Dec.).
- DILLENIACEAE.**—*Hibbertia stricta* R.Br., south of Hallett's Cove, Sellick's scrub. *H. stricta* var. *glabriuscula* Benth., Pinery (Oct.), Sellick's scrub. *H. virgata* R.Br., Sellick's scrub. *H. fasciculata* R.Br. var. *pubigera* Benth., Pinery (Oct.).
- FRANKENIACEAE.**—*Frankenia pauciflora* DC., Grange, Pt. Noarlunga, etc. *F. pulverulenta* L., prostrate, cliffs north of Pt. Noarlunga (Nov.).
- THYMELAEACEAE.**—*Pimelea glauca* R.Br., Pinery (Oct.). *P. humilis* R.Br. (?), Pt. Noarlunga. *P. flava*, R.Br., cliffs, Moana, etc. *P. serpyllifolia* R.Br., Grange, Glenelg, cliffs. *P. curviflora* (yellow flowers), Hallett's Cove, Pt. Noarlunga.
- LYTHRACEAE.**—*Lythrum Hyssopifolia* L., Lesser Loose-strife, Grange, Aldinga.
- MYRTACEAE.**—*Leptospermum myrsinoides* Schl., Sellick's scrub. *Kunzea pomifera* F.v.M., Grange and Glenelg sandhills, Sellick's scrub. *Melaleuca halmaturorum* F.v.M., Port Adelaide river and swamps. *M. pubescens* Schau., Black Tea-tree, sandhills at Grange, Hallett's Cove scrub, Moana, Sellick's scrub. *Eucalyptus odorata* Behr. et Schl., Peppermint Gum, Pinery, Hallett's Cove and Sellick's scrub. *E. rostrata* Schl., Red Gum, Reedbeds. *E. leucoxydon* F.v.M., Blue Gum, Pinery. *E. fasciculosa* F.v.M., Pink Gum, Sellick's scrub. *Calythrix tetragona* Labill., Marino, Pt. Noarlunga cliffs, Sellick's scrub.
- OENOTHERACEAE.**—\**Oenothera odorata* Jacq., Grange. \**O. longiflora* Jacq., Grange.
- HALORRHAGIDACEAE.**—*Halorrhagis teucroides* DC., cliffs at and south of Hallett's Cove. *H. heterophylla* Brongn., Sellick's scrub.
- UMBELLIFERAE.**—*Didiscus pusillus* (DC.) F.v.M., Pinery, Sellick's scrub. \**Bupleurum semicompositum* L., base of cliffs at Marino and south of Pt. Noarlunga. *Daucus glochidiatus* (Labill.) Fisch. Mey et Ave-Lall. *Apium australe* Pet.-Thou, Sea Celery. \**Foeniculum vulgare* Mill., Fennel.
- EPACRIDACEAE.**—*Astroloma humifusum* (Cav.) R.Br. var. *denticulatum* (R.Br.) J. M. Black, Marino, Pinery. *A. conostephioides* (Sond.) F.v.M., Sellick's scrub. *Leucopogon parviflorus* (Andr.) Lindl., Grange, Moana, Sellick's scrub. *L. rufus* Lindl., Sellick's scrub (Oct.). *Acrotiche patula* R.Br., Marino, Moana and Pt. Noarlunga cliffs.



- PRIMULACEAE.**—\**Anagallis arvensis* L. \**A. femina* Mill. *Samolus repens* (Forst.) Pers., Grange, etc.
- PLUMBAGINACEAE.**—\**Statice occidentalis* Lloyd, Sea Lavender, Patawalonga Creek at Glenelg. \**S. psiloclada* Boiss., Pt. Adelaide R., Lefevre's Pen., Patawalonga Creek (Dec.).
- OLEACEAE.**—\**Olea europaea* L., Olive, Grange.
- LOGANIACEAE.**—*Logania linifolia* Schl., Hallett's Cove.
- APOCYNACEAE.**—\**Alyxia buxifolia* R.Br., near Glenelg, Hallett's Cove, Moana cliffs.
- ASCLEPIADACEAE.**—\**Asclepias rotundifolia* Mill., Broad-leaved Cotton-bush, near Fulham, near Outer Harbour.
- CONVOLVULACEAE.**—\**Convolvulus erubescens* Sims, Australian Bindweed. \**C. arvensis* L., Lesser Bindweed, Breakaway Creek at Fulham. *Calystegia sepium* (L.) R.Br., Great Bindweed, Reedbeds. *Wilsonia rotundifolia* Hook., Grange Pinery.
- BORRAGINACEAE.**—\**Heliotropium curassavicum* L., near Fulham. *H. europaeum* L., Fulham. *Cynoglossum suaveolens* R.Br., Marino. \**Lithospermum arvense* L., Corn Gromwell. \**Echium plantagineum* L., Salvation Jane.
- VERBENACEAE.**—\**Verbena supina* L., Fulham. \**V. bonariensis* L., Fulham.
- LABIATAE.**—\**Marrubium vulgare* L., Horehound. \**Salvia verbenacea* L., Wild Sage, Noarlunga. *Westringia rigida* R.Br., cliffs at Hallett's Cove and south thereof.
- SOLANACEAE.**—\**Solanum nigrum* L., Black Nightshade. \**S. sodomaeum* L., Apple of Sodom. \**Lycium ferocissimum* Miers, African Box-thorn. *Nicotiana suaveolens* Lehm., Native Tobacco, Hallett's Cove, Pt. Noarlunga. \**N. glauca* Grah., Tobacco Tree, behind sandhills at Fulham, Moana. \**Datura* sp., Torrens River at Fulham.
- SCROPHULARIACEAE.**—\**Verbascum virgatum* With. \**Antirrhinum Orontium* L., Lesser Snapdragon, Fulham. \**Linaria elatine* (L.) Mill., Pointed Toadflax. *Mimulus repens* R.Br., between Fulham and Glenelg. \**Zaluzianskia divaricata* (Thunb.) Choisy., in sand near Pinery (Oct.). *Dischisma capitatum* (Thunb.) Choisy, near Pinery. *Euphrasia collina* R.Br., Marino. \**Bartschia latifolia* (L.) Sibth. et Sm.
- OROBANCHACEAE.**—\**Orobanche australiana* F.v.M., Australian Broom-rape—specimens have been exhibited at several Wild-flower Shows from the sandhills at Pt. Noarlunga; several colonies occur on the sandhills about two miles south of Henley Beach, parasitic on *Senecio lautus*.

- MYOPORACEAE.**—\**Myoporum insulare* R.Br., Blue-berry Tree, Grange, Hallett's Cove, Moana, Sellick's scrub. *M. parvifolium* R.Br., prostrate, at edge of salt-water overflows from the Port River at the Alberton end of the Pinery, on the cliffs at Pt. Noarlunga.
- PLANTAGINACEAE.**—\**Plantago varia* R.Br., Variable Plantain, cliffs at Moana. \**P. lanceolata* L., Ribgrass. \**P. Coronopus* L., Buck's-horn Plantain, Grange, Pinery. \**P. major* L., Greater Plantain, banks of Torrens at Fulham.
- RUBIACEAE.**—\**Opercularia varia* Hook. f., cliffs at Aldinga. *Asperula scoparia* Hook. f., cliffs south of Hallett's Cove. *Galium ciliare* Hook. f., Hallett's Cove. *G. umbrosum* Sol., Hallett's Cove. \**G. tricornis* With., Three-horned Bedstraw, near Reynella, Noarlunga. \**G. murale* (L.) All. \**Sherardia arvensis* L., Field Madder.
- VALERIANACEAE.**—\**Valerianella discoidea* (L.) Lois, Marino, Aldinga.
- DIPSACACEAE.**—\**Scabiosa maritima* L., Purple Pincushion.
- CUCURBITACEAE.**—\**Citrullus vulgaris* Schrad., Bitter Melon, south of Hallett's Cove. \**Cucumis myriocarpus* Naud., Pad-dy Melon.
- CACTACEAE.**—\**Opuntia monacantha* Haw., Prickly Pear, Fulham.
- CAMPANULACEAE.**—\**Wahlenbergia gracilis* (Forst. f.) A.DC., Native Bluebell. *Lobelia anceps* Thunb., between Fulham and Glenelg.
- GOODENIACEAE.**—\**Goodenia affinis* De Vriese, cliffs at Aldinga Bay. *G. amplexans* F.v.M., south of Hallett's Cove, Sellick's scrub. *G. albiflora* Schl., cliffs south of Hallett's Cove (Nov.), on limestone on main road to Aldinga. *G. pinnatifida* Schl., Aldinga and Moana cliffs. *G. pusilliflora* F.v.M., Hallett's Cove. *Velleia paradoxa* R.Br., Marino, Aldinga and Moana cliffs. *Scaevola crassifolia* Labill., sandhills at Grange, etc., Pt. Noarlunga. *S. microcarpa* Cav., Pt. Noarlunga. *S. linearis* R.Br., var. *confertifolia* J. M. Black, cliffs south of Hallett's Cove. *Dampiera rosmarinifolia* Schl., Wild Rosemary (flowers lilac), cliffs south of Hallett's Cove, patches in Sellick's scrub.
- COMPOSITAE.**—\**Brachycome ciliaris* (Labill.) Less., sandhills at Outer Harbour (Oct.), Hallett's Cove (Sept.). *Minuria leptophylla* DC., cliffs at Hallett's Cove, Pt. Noarlunga, Moana, Aldinga (Sept., Nov.). *Calotis erinacea* Steetz, Pinery. \**Aster subulatus* Michx., near Fulham, Ethelton. \**Eri-geron crispus* Pourr. (*E. linifolius* Willd.), Glenelg, Brighton. *Vittadinia triloba* (Gaudich.) DC. (*V. australis* A. Rich.)



Grange, Hallett's Cove, Noarlunga. *V. tenuissima* (Benth.) J. M. Black, Aldinga. *Olearia axillaris* (DC.) F.v.M., Glenelg. *O. lepidophylla* (Pers.), Benth., Pinery (Nov.). \**Xanthium spinosum* L., Bathurst Burr, Ethelton, Fulham. *Cotula coronopifolia* L., swamps at Grange, Pedlar's Creek. *C. australis* (Less.) Hook.f., Pinery, Hallett's Cove. *Erechtites picridioides* Turcz., Sellick's scrub. *Senecio brachygllossus* F.v.M., Seaton. \**S. vulgaris* L., Common Groundsel, Hallett's Cove. *S. lautus* Sol., Grange, Hallett's Cove. \**Tripteris clandestina* Less., Pinery, fields near Brighton and Marino. \**Arctotis stoechadifolia* Berg., Grange and Glenelg sandhills. *Cymbonotus Lawsonianus* Gaudich., south of Hallett's Cove. \**Cryptostemma calendulaceum* (L.) R.Br., Cape Dandelion, Grange. *Gnaphalium japonicum* Thunb., Hallett's Cove, Aldinga. *Gn. luteo-album* L., Seaton Golf-links. *Cassinia spectabilis* (Labill.) R.Br., on burnt ground at Sellick's scrub. *C. arcuata* R.Br., Hallett's Cove scrub (wth galls suggesting flower buds). *Helipterum australe* (A. Gray) Druce, Aldinga Bay cliffs. *H. demissum* (A. Gray) Druce (*H. exiguum* F.v.M.) (?), cliffs at Pedlar's Beach. *Helichrysum leucospidium* DC., Pinery, Aldinga cliffs. *H. apiculatum* (Labill.) DC., Pinery, Glenelg, south of Hallett's Cove. *H. semipapposum* (Labill.) DC., near Hallett's Cove. *Podosperma angustifolium* Labill., Pinery, Aldinga. *Leptorhynchus squamatus* (Labill.) Less., Pedlar's Beach. *Millotia tenuifolia* Cass., Pinery, south of Hallett's Cove, Sellick's scrub. *Rutidosia multiflora* (Nees.) B. L. Robinson, Marino (Oct.). *Podolepis rugata* Labill., cliffs at Pedlar's Beach. *P. Lessonii* (Cass.) Benth., Hallett's Cove, cliffs at Aldinga Bay. *P. canescens* A. Cunn., Hallett's Cove. \**Inula graveolens* (L.) Desf., Stinkwort, Grange. *Angianthus strictus* (Steetz) Benth., Marino, cliffs at Port Noarlunga. *A. tomentosus* Wendl., cliffs at Port Noarlunga to Aldinga. *Calceophalus Brownii* (Cass.) F.v.M., Grange, Pedlar's Beach. *C. citreus* Less., cliffs, Marino to Noarlunga. *Gnaphalodes uliginosum* A. Gray, Hallett's Cove, Port Noarlunga. *Craspedia uniflora* Forst. f., Bachelor's Button, Hallett's Cove. \**Cynara Cardunculus* L., Wild Artichoke, Grange, Port Noarlunga. \**Cirsium lanceolatum* (L.) Scop., Spear Thistle, Fulham. \**Carduus tenuifolius* Curtis, Slender Thistle, Noarlunga. \**Silybum Marianum* (L.) Gaertn., Milk Thistle, Fulham. \**Onopordon acaule* L., Stemless Onopordon, Marino. \**Centaurea Calcitrapa* L., Star Thistle, Fulham. \**C. melitensis* L., Maltese Cockspur, Marino. \**Carthamus lanatus* L. (*Kentrophyllum lanatum* (L.) DC.), Woolly Star Thistle, Fulham. \**Cichorium Intybus* L., Chi-

cory, Glenelg, Brighton. *Microseris scapigera* (Forst. f.) Schultz-Bip, Hallett's Cove. \**Hedypnois cretica* (L.) Willd., cliffs at Moana (Oct.) and Aldinga. \**Hypochoeris radicata* L., Rooted Cat's-ear. \**H. glabra* L., Glabrous Cat's-ear, Grange. \**Urospermum picroides* (L.) Desf., Hallett's Cove. \**Fragopogon porrifolius* L., Salsafy, near Fulham. \**Scorzonera laciniata* L., Grange, Noarlunga (Oct.)—Previously recorded only from Collingswood in this State. *Picris hieracioides* L., var. *squarrosa* (Steetz) Benth., Hawkweed Picris, Fulham. \**Sonchus oleraceus* L., Sow-thistle. \**S. asper* Hill, Prickly Sow-thistle, Hallett's Cove, Port Noarlunga. *S. megalocarpus* (Hook. f.) J. M. Black, Grange. \**Reichardia picroides* (L.) Roth., Grange.

#### ADDITIONS.

GRAMINEAE.—*Paspalum gracile* (R.Br.) Hughes, south end of Hallett's Cove (Nov.). *Aristida Behriana* F.v.M., on travertine limestone, Marino, south end of Hallett's Cove, Nov. \**Avena barbata* Brot., Bearded Oat, Nov.

LILIACEAE.—*Thysanotus Baueri* R.Br., also Hallett's Cove scrub, Nov. *Dichopogon fimbriatus* (R.Br.) J. M. Black, slightly scented, Hallett's Cove scrub, Nov.

Total species 459 and 2 varieties in addition, of which 155 are introduced and 304 and the 2 varieties are indigenous species.

FURTHER ADDITIONS and CORRECTIONS to March, 1935.

GRAMINEAE.—\**Agrostis alba* L., Fulham, should be *A. verticillata* Vill. *Danthonia semiannularis* (Labill.) R.Br., Hallett's Cove, Oct.

FRANKENIACEAE.—*Frankenia pauciflora* should be var. *fruticulosum* Summerhayes. Flowering specimens at Port Noarlunga presented a very handsome appearance.

SCROPHULARIACEAE.—\**Bartsia Trixago* L., near the railway line, Marino, Nov.

OROBANCHACEAE.—\**Orobanche Mutelii* Schulz, recorded in Black's Flora for the sandhills near Glenelg.

COMPOSITAE.—*Helipterum pygmaeum* (DC.) Benth., Hallett's Cove, Oct.