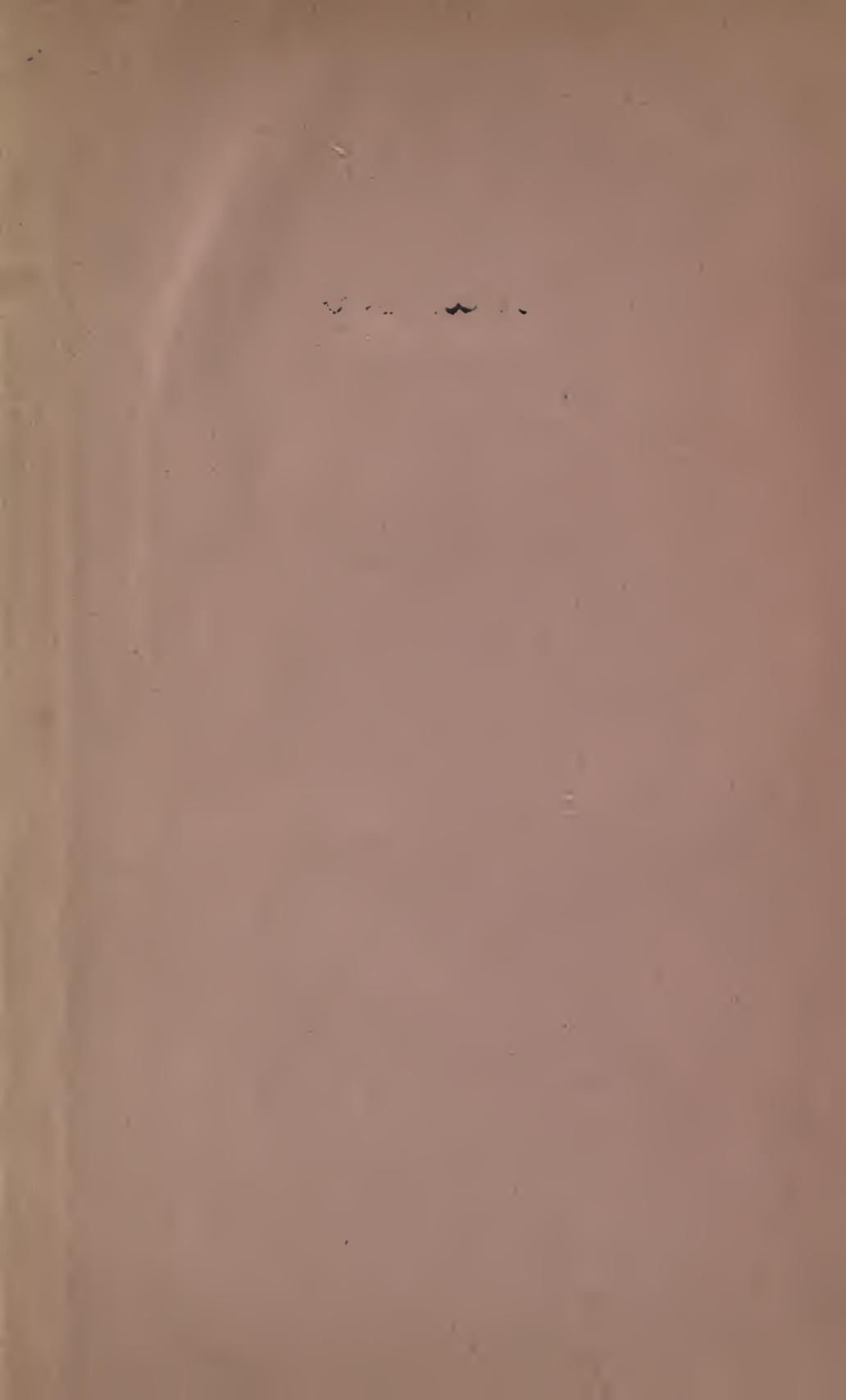


LIBRARY
OF THE
UNIVERSITY OF CALIFORNIA.

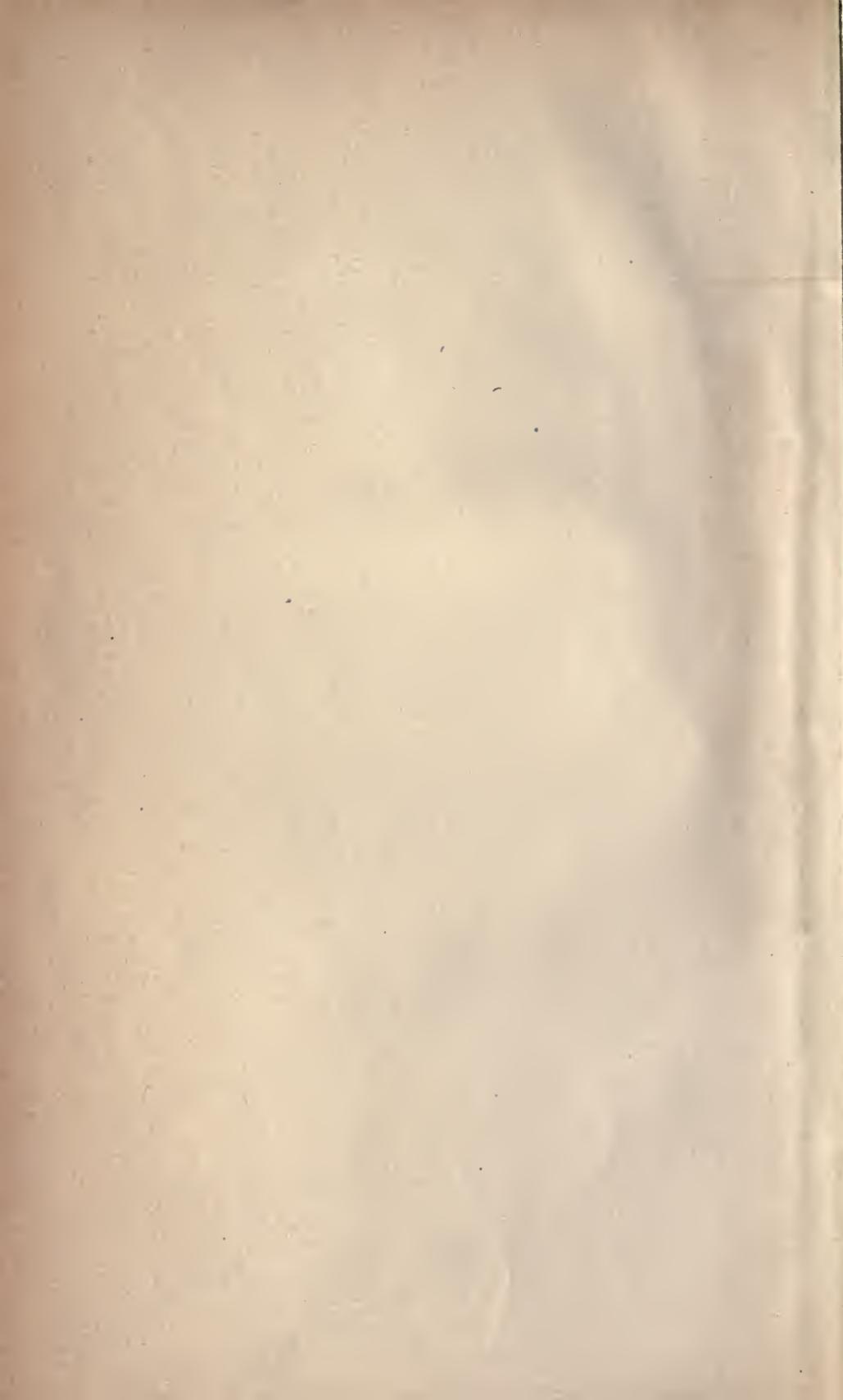
GIFT OF

n. s. w. Agric. Dept.

Class









DEPARTMENT OF AGRICULTURE,
NEW SOUTH WALES.

THE



FORAGE PLANTS OF AUSTRALIA

(WITH ILLUSTRATIONS.)

BY

F. TURNER, F.L.S., F.R.H.S.,

BOTANIST TO THE DEPARTMENT OF AGRICULTURE.

By Authority :

GEORGE STEPHEN CHAPMAN, ACTING GOVERNMENT PRINTER.

1891.

[7s. 6d.]



DEPARTMENT OF AGRICULTURE,
NEW SOUTH WALES.

THE
FORAGE PLANTS OF AUSTRALIA
(WITH ILLUSTRATIONS.)

BY

F. TURNER, F.L.S., F.R.H.S.,
" BOTANIST TO THE DEPARTMENT OF AGRICULTURE.



By Authority:

GEORGE STEPHEN CHAPMAN, ACTING GOVERNMENT PRINTER.

1891.

[7s. 6d.]

SB 193
N5

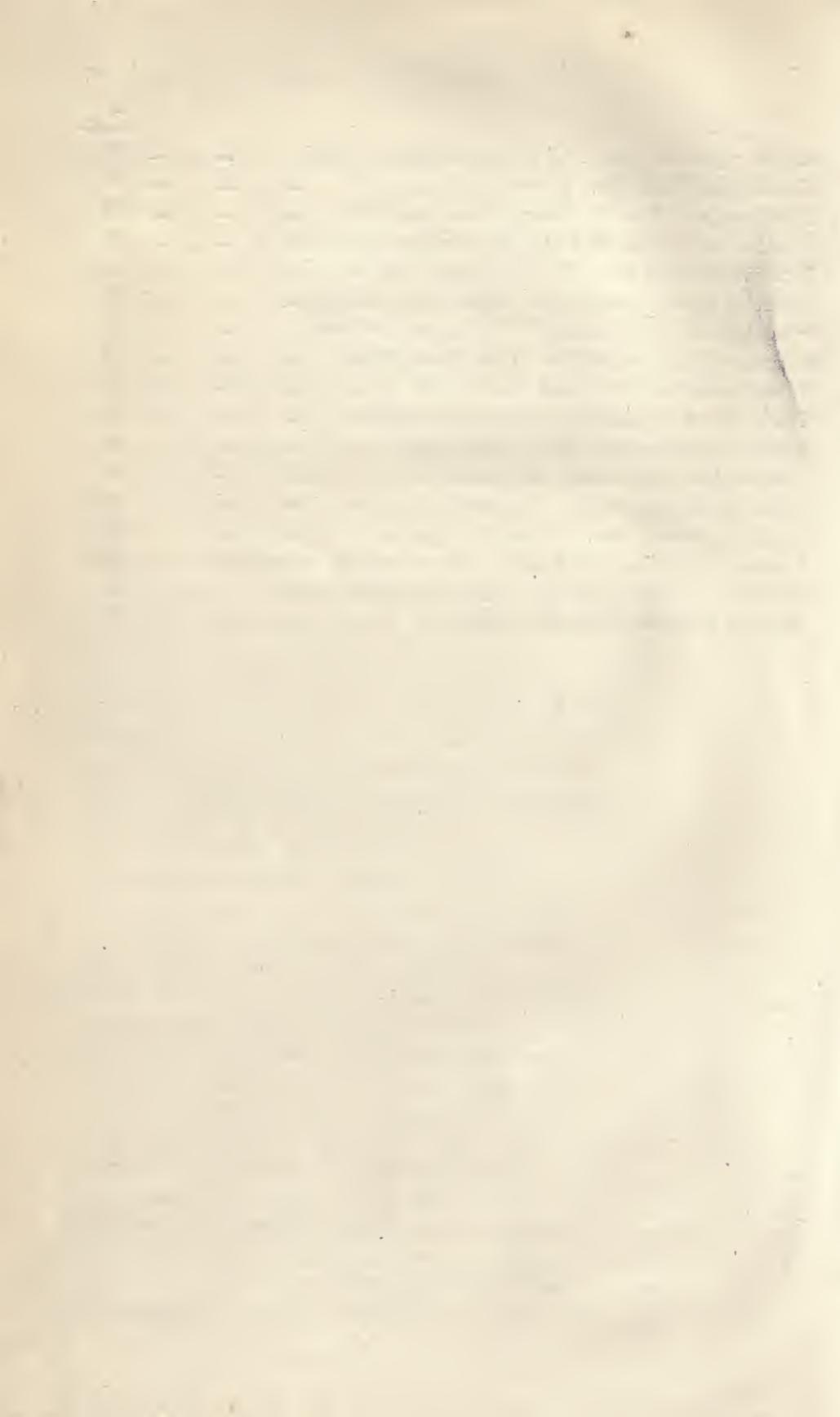
sift of
N. S. W. Dep.
Agric. Dep.

CONTENTS.

	PAGE.
Blennodia filifolia, <i>Benth.</i> Mustard bush	1
Blennodia trisecta, <i>Benth.</i> Three-leaved mustard bush	2
Blennodia nasturtioides, <i>Benth.</i> Pinnate-leaved mustard bush	3
Blennodia lasiocarpa, <i>F. v. M.</i> Hairy-podded cress	4
Thlaspi cochlearinum, <i>F. v. M.</i> Oval-podded cress	5
Pittosporum phillyræoides, <i>D.C.</i> Butter bush, or willow-leaf pittosporum... ..	6
Portulaca oleracea, <i>Linn.</i> Purslane	7
Lavatera plebeia, <i>Sims.</i> Australian marshmallow	8
Malvastrum spicatum, <i>A. Gray.</i> Spiked mallow	9
Gossypium Sturtii, <i>F. v. M.</i> Sturt's cotton plant	10
Sterculia diversifolia, <i>G. Don.</i> Kurrajong	11
Geranium dissectum, <i>Linn.</i> Crane's bill, or crow's foot	13
Erodium cygnorum, <i>Nees.</i> Stork's bill, or crow's foot	14
Geijera parviflora, <i>Lindl.</i> Sheep bush, wilga, willow	15
Flindersia maculosa, <i>F. v. M.</i> Leopard, or spotted tree	16
Atalaya hemiglauca, <i>F. v. M.</i> White wood, or cattle bush	17
Heterodendron oleefolium, <i>Desf.</i> Olive-leaved emu bush, rose bush, or cabbage bush	18
Dodonæa attenuata, <i>A. Cunn.</i> Hop bush	19
Dodonæa lobulata, <i>F. v. M.</i> Red fruited hop bush	20
Trigonella suavissima, <i>Lindl.</i> Scented, or Darling clover	21
Swainsona phacoides, <i>Benth.</i> Phaca-like swainsona	22
Swainsona procumbens, <i>F. v. M.</i> Trailing swainsona	23
Swainsona oroboides, <i>F. v. M.</i> Orobus-like swainsona	24
Cassia circinata, <i>Benth.</i> Circular-podded cassia	25
Cassia phyllodinea, <i>R. Br.</i> Curious-leaved cassia	26
Cassia eremophila, <i>A. Cunn.</i> Desert cassia	27
Cassia artemisioides, <i>Gaud.</i> Purity	28
Cassia desolata, <i>F. v. M.</i> Desert cassia	29
Acacia sentis, <i>F. v. M.</i> Bramble acacia	30
Acacia homalophylla, <i>A. Cunn.</i> Curley yarren, or gidgee	31
Acacia pendula, <i>A. Cunn.</i> Weeping myall	32
Acacia aneura, <i>F. v. M.</i> Yarren	33
Eucalyptus corynocalyx, <i>F. v. M.</i> Sugar gum	34

	PAGE.
Eucalyptus Gunnii, <i>J. Hook.</i> Sugar, or cider gum	35
Tetragonia expansa, <i>Murr.</i> Warrigal cabbage, New Zealand spinach	36
Daucus brachiatus, <i>Sieb.</i> Native carrot	37
Jasminum lineare, <i>R. Br.</i> Linear-leaved jasmine	38
Marsdenia Leichhardtiana, <i>F. v. M.</i> Dooba	39
Myoporum deserti, <i>A. Cunn.</i> Sweet-fruited myoporum	40
Eremophila oppositifolia, <i>R. Br.</i> Emu bush	41
Eremophila longifolia, <i>F. v. M.</i> Berrigan	42
Eremophila bignoniæflora, <i>F. v. M.</i> Emu bush	43
Eremophila maculata, <i>F. v. M.</i> Native fuchsia, emu bush	44
Plantago varia, <i>R. Br.</i> Variable plantain, rib-grass	45
Codonocarpus cotinifolius, <i>F. v. M.</i> Horse-radish tree	46
Rhagodia Billardieri, <i>R. Br.</i> Coastal salt bush	47
Rhagodia parabolica, <i>R. Br.</i> Old man salt bush	48
Rhagodia hastata, <i>R. Br.</i> Halbert-leaved salt bush	49
Rhagodia nutans, <i>R. Br.</i> Nodding salt bush	50
Chenopodium nitrariaceæ, <i>F. v. M.</i> Branching goosefoot	51
Chenopodium auricomum, <i>Lindl.</i> Blue bush	52
Chenopodium microphyllum, <i>F. v. M.</i> Small-leaved goosefoot	53
Chenopodium carinatum, <i>R. Br.</i> Rough-leaved goosefoot	54
Chenopodium atriplicinum, <i>F. v. M.</i> Atriplex-like goosefoot	55
Atriplex stipitata, <i>Benth.</i> Kidney-fruited salt bush	56
Atriplex nummularia, <i>Lindl.</i> Round-leaved salt bush	57
Atriplex cinerea, <i>Pour.</i> Grey salt bush	58
Atriplex rhagodioides, <i>F. v. M.</i> Silver salt bush	59
Atriplex vesicaria, <i>Heward.</i> Bladder salt bush	60
Atriplex angulata, <i>Benth.</i> Angular-fruited salt bush	61
Atriplex semibaccata, <i>R. Br.</i> Half-berried salt bush	62
Atriplex Muellieri, <i>Benth.</i> Mueller's salt bush	63
Atriplex leptocarpa, <i>F. v. M.</i> Slender-fruited salt bush	64
Atriplex limbata, <i>Benth.</i> Spreading salt bush	65
Atriplex halimoides, <i>Lindl.</i> Halimus-like salt bush	66
Atriplex holocarpa, <i>F. v. M.</i> All-fruited salt bush	67
Enchylæna tomentosa, <i>R. Br.</i> Barrier salt bush	68
Kochia lanosa, <i>Lindl.</i> Cottony salt bush	69
Kochia brevifolia, <i>R. Br.</i> Short-leaved salt bush	70
Kochia pyramidata, <i>Benth.</i> Grey bush	71
Kochia eriantha, <i>F. v. M.</i> Woolly-fruited salt bush	72
Kochia villosa, <i>Lindl.</i> Silky salt bush	73
Kochia planifolia, <i>F. v. M.</i> Broad-winged salt bush	74
Kochia sedifolia, <i>F. v. M.</i> Blue bush	75

	PAGE.
<i>Kochia appressa</i> , <i>Benth.</i> Appressed-leaved salt bush	76
<i>Kochia aphylla</i> , <i>R. Br.</i> Cotton bush	77
<i>Kochia ciliata</i> , <i>F. v. M.</i> Hairy-fruited salt bush	78
<i>Kochia brachyptera</i> , <i>F. v. M.</i> Short-winged salt bush	79
<i>Kochia stelligera</i> , <i>F. v. M.</i> Star-fruited salt bush	80
<i>Chenolca Dallachyana</i> , <i>Benth.</i> Dallachy's salt bush	81
<i>Sclerolæna diacantha</i> , <i>Benth.</i> Two-spined salt bush	82
<i>Sclerolæna paradoxa</i> , <i>R. Br.</i> Curious salt bush	83
<i>Trichinium obovatum</i> , <i>Gaud.</i> Silver bush	84
<i>Trichinium nobile</i> , <i>Lindl.</i> Yellow hairy spikes	85
<i>Trichinium erubescens</i> , <i>Moq.</i> Hairy heads	86
<i>Boerhaavia diffusa</i> , <i>Linn.</i> Hogweed	87
<i>Hakea leucoptera</i> , <i>R. Br.</i> Pin bush	88
<i>Casuarina glauca</i> , <i>Sieb.</i> Belar, or bull oak	89
<i>Casuarina suberosa</i> , <i>Ott. & Dietr.</i> Erect she oak, or forest oak ...	90
<i>Fusanus acuminatus</i> , <i>R. Br.</i> Quandong, native peach	91
<i>Marsilea Drummondii</i> , <i>A. Br.</i> Nardoo... ..	92



PREFACE BY THE MINISTER FOR AGRICULTURE.

I DESIRE to give my personal testimony to the value of Mr. Turner's work on the "Forage Plants of Australia," and most strongly recommend it to the earnest consideration of all pastoralists, stock-owners, and agriculturists generally, being convinced that a careful perusal of the drawings and letter-press will result in increased attention being paid to our valuable indigenous fodders, which in some districts are almost extinct.

Before relinquishing the office of Minister of Agriculture I cannot refrain from placing on record my high appreciation of the valuable aid which Mr. Turner, in his capacity of Botanist, has rendered to the Department.

S. SMITH.

21 *October*, 1891.



PREFACE.

THE illustrations and descriptive matter contained in this book first appeared in the columns of the *Town and Country Journal*; that being the first attempt ever made, through the Australian press, to systematically illustrate the plants of economic value indigenous to this country. About eighteen months after this work was taken in hand, other persons followed up the subject, which proved to the author that his idea was a well conceived one. The subject of Australian economic products has occupied the attention of the author for the past fifteen years, and he has written many papers on the subject; but he always found it difficult to make the descriptions clear to the general public. The only way he saw out of the difficulty was to have drawings made of the plants, and have them engraved; for no matter how full a written description is given of a plant, it cannot give such a clear idea to a practical mind as an engraving can. The author felt convinced that the time was opportune for making a start to popularise our native economic products by illustrations and common descriptions, and bring them within the field of practical utility; and this is borne out by many scientific and practical persons he has come in contact with. That this work has already done a great amount of good, by making pastoralists, farmers, and stockmen more familiar with Australian economic products, has been abundantly proved by the number of complimentary letters received from all parts of Australia whilst the work was in progress. Some of the illustrations and descriptions have been republished in the *American Press*, and inquiries have been freely made as to where seeds of many of the plants herein described could be obtained, not only for sowing in places on this continent, where the plants have been gradually eaten out through overstocking, but from America, Southern Europe, Northern Africa, and India also, which is a convincing proof that much interest has been awakened in these valuable forage plants. There is no gainsaying the fact that ever since pastoral settlement took place there has been a gradual decrease of many valuable salinous and other forage

plants from the central plains of this continent, partly through overstocking, and partly through the constant trampling of the animals' hoofs, which has also made the surface soil so hard that seeds with difficulty germinate. This fact has made many pastoralists apprehensive as to the future prosperity of their industry. The only way to face this apparent difficulty is to systematically conserve areas where these plants may still be growing, and redisseminate the seeds where the plants have entirely disappeared. It has been proved by practical experience that stock keep in far better health where salinous plants are plentiful in pastures, and that fluke, and other distoma diseases, are almost unknown amongst sheep. This fact alone ought to convince pastoralists of the good results that would accrue from a system of conservation and even cultivation of these valuable plants. It has often been remarked "what would Australia do without its wool?" but we never hear the remark made, "what would Australia do without its indigenous herbage." Climate, no doubt, has a great deal to do with the production of high class wool; but we cannot close our eyes to the fact that the indigenous herbage is the principal factor. It would be superfluous in this preface to enter upon the subject of the present condition of the pastures, or as they are commonly called "Runs," on this continent. For as an introduction to this work, there is a "paper on the forage plants and grasses of Australia," which the author read at the Melbourne University, before the Australasian Association for the Advancement of Science, in January, 1890, which gives a clear idea of the present state of the pasture plants, both in the interior and coastal districts of the continent.

The engravings in this work are not everything that the author could desire, but then it must be remembered that the originals had to be hurriedly drawn to meet the demands of a weekly newspaper. Dissectional drawings would no doubt have been an advantage from a scientific point of view, but for all practical purposes (and they were made with a desire to benefit practical persons) the illustrations will be found to be all that is necessary to identify the plants.

In many instances an enlarged drawing has been made and engraved of the fruit, which will be an additional help to identification. As far as possible all scientific descriptions have been sup-

pressed as they were considered out of place. There is, however, a short but simple diagnosis of the plant given under each engraving which may be found useful to those persons who wish to gain a slight knowledge of the different parts of the plant. With this exception the book is written in the plainest possible practical manner, it being the author's desire that anyone knowing the alphabet might be able to take up the book and glean instruction from it.

Some time after the work was begun, the newspaper office was burnt out. The fire not only destroyed several engravings, but many specimens of economic plants out of the author's private herbarium which could not readily be replaced. This, of course, would have occasioned a very great delay in the work had not the Director of the Sydney Botanical Gardens come to the rescue with the loan of twelve specimens to make a new start. Indebtedness is acknowledged also to Mr. K. H. Bennett, Yandembah, New South Wales, for half-a-dozen specimens and notes thereon.

With the exception of two, all the drawings have been made from dried specimens and some of these were damaged in transit from the interior to Sydney. Many of them were carried hundreds of miles before they arrived and were, consequently, much dried up. Such specimens, of course, had to be soaked in water to get the outlines of the leaves, flowers, and fruits, and their true position on the plant and great credit is due to Mr. Conrad Myers, the artist, for the pains he has taken in delineating their true characters.

The fact of this being the first time that most of the plants described in this book have been illustrated lends additional value to it.

The nomenclature adopted is the same as that used in Bentham and Mueller's "Flora Australiensis," and to every engraving there is appended the volume and page in that incomparable work at which a full scientific description of the plant is given, without the aid of which the task would have been much more difficult to accomplish.

October, 1891.

FRED. TURNER.

INTRODUCTION.

"GRASS," says Professor Martyn, in his letters on the Elements on Botany, "vulgarly forms one single idea, and the husbandman when looking over his inclosure does not dream there are upwards of 300 species, of which 30 or 40 may be at present under his eye." These remarks of Professor Martyn's made so many years ago are substantially correct at the present day.

Distinguished agriculturists have often remarked that a knowledge of the comparative merits and value of the different species of grasses, and of the best mode of cultivating them, is very much below that of other branches of agriculture. With regard to Australian grasses these remarks are singularly appropriate, notwithstanding that they are the principal source from which Australians derive their greatest wealth. A new era now, however, seems to have dawned upon Australia. In establishing departments of agriculture throughout the colonies we may reasonably expect most valuable results to accrue therefrom, and if these are assisted by the patriotic exertion of private individuals, much of the ignorance at present existing with regard to the value of our native pasture plants will be consigned to oblivion. By systematic experiments their yield could be ascertained and by analysis their nutritive qualities proved. This would be an invaluable guide to pastoralists and agriculturists, who could see at a glance what species were most suitable to their requirements.

The comparative merits of our native fodder plants and grasses should form a part of the curriculum of the national education. If there were placed in all country State schools an enlarged drawing of each species that is peculiar to the district the school was situated in, with its botanical and common name, together with a short popular description and analysis, it might make a lasting impression upon the young mind, and would, most probably, lead to valuable results in after years. It cannot be said we have no material to work upon, for there are upwards of 360 species of grasses indigenous to this continent. All these, of course, are not valuable for fodder, but they have their uses in the economy of nature, which I shall show in another part of this paper. Among other native fodder plants the most numerous and valuable are to be found in the natural order Chenopodiaceæ, numbering as they do for all Australia about 112 species, arranged under fifteen genera, eight of which are endemic. Some are found on the littoral sands, while others extend to the arid central plains of the interior, and are remarkable for their drought-enduring qualities. There are also many other trees, shrubs, and herbs represented in other natural orders, which are largely used as fodder, especially so during long droughts; though there is still much doubt to be cleared up with respect to the actual value of certain of them. Even in the same district some persons will assert that a particular species of plant is poisonous, while the testimony of others, which is equally reliable, will assert that it makes capital feed. There are perhaps no more conflicting statements made than with regard to the genus *Eremophila*, and the allied one *Myoporum*. While I must admit that very little is known of the physiological properties of the order Myoporineæ, still I cannot close my eyes to the fact that both cattle and sheep kept in the country where these shrubs are plentiful eat them with avidity, and thrive on them, without any ill effects. Some persons assert that these myoporinous plants develop their poisonous properties when in fruit, but whoever has studied the habits of the

birds of Central Australia will assure you that some of them greatly depend upon the fruits of these plants for their sustenance, which in fact are in some seasons the principal food supply. Moreover, the aborigines, in the early days, used to eat the fruits of several myoporinous plants. There is no doubt that when cattle and sheep are taken from one district to another where the natural herbage is somewhat dissimilar, it must have, for a time at least, some effect upon their systems; especially when they are taken from rolling downs of grass to country where shrubs and herbs predominate. And this brings to mind a question which I think has not received the attention of stock-owners that its importance justifies. It is the mechanical action that hard-foliaged shrubs have upon the larynx of both cattle and sheep which are not used to eating them. This irritation of the larynx not only brings on laryngitis, but often tends to bring on inflammation of the intestines. Farther, when hungry sheep have partaken too freely of some leguminous plants, especially when in seed, they have died. But this is caused during the process of digestion, when great quantities of gases are made, which cause an abnormal distension of the stomach, thus preventing the lungs working freely, and of course strangling the animals. On this account many leguminous plants are called poisonous which are not really so. Still these causes could not account for all the sheep that die somewhat mysteriously. I use the word mysteriously advisedly, for many plants have been sent to me as poisonous which, on examination, have proved to be quite harmless. Nor is my case a singular one; many others have had the same experience. We have a far more insidious enemy to contend against in the parasitic fungi which affect grasses, not only in the damp coastal districts, but far into the interior. Some few years ago, I drew attention to the great increase of parasitic fungi on some of our most valuable grasses, and I then said, what I think now, the fungoid growth on grasses is the primary cause of many sheep dying so mysteriously. We have abundant proof of the destructive agency of microscopic fungi on both animals and plants that have not sufficient vigor to repel them. The life history of these native fungoid growths is well worthy the attention of specialists, if only to show what the effects are upon animals.

As long as the greater portion of this continent is devoted to depasturing sheep and cattle, and Australia intends to hold her own against the world in the production of high-class wool, also in the matter of the frozen meat export trade, it becomes of vital importance to the population that more attention should be paid to our native fodder plants and grasses than has hitherto been the case, to save some of them from extinction by a proper system of conservation, and even cultivation. There is no gainsaying the fact, that during recent droughts large tracts of country have been so overstocked, and, as a consequence, many valuable pasture plants and grasses have become so scarce, that it would take years of careful conservation to bring them back to anything like their original state. Being so closely fed down, and often trampled down, their only natural means of reproducing themselves by seed is partially destroyed, and every year makes matters worse. An occasionally good season may, to a slight extent, remedy this, but observant and thoughtful persons can see that in the near future more vigorous action will have to be taken to keep our pastures up to their normal state, or the number of sheep and cattle to each station will have to be considerably lessened; which of course means the export of less wool, tallow, hides, beef and mutton. It should also be borne in mind that every fleece of wool which is produced takes a percentage of potash and other fertile substances out of the soil; and nothing, so far, has been done to restore these natural elements back to the earth. It must naturally follow that, if

this is continued, the more valuable herbage will gradually give way and a less valuable one take its place, that is, from an economic point of view. An instance of this is already taking place in the interior, where the pine scrub (*Frenela*) has already taken possession of thousands of acres of what was at one time splendid pastoral country.

By the following figures some idea may be formed of the quantity of grass seeds required for one acre, supposing it to be sown at the usual rate of 36lb, which, approximately stated, is equal to about 22,000,000 of grains. This applies to ordinary grass seeds, such as some species of *Andropogon*, *Chloris*, *Eragrostis*, *Panicum*, &c. The number of grains varies somewhat one way or the other (no other seeds in the vegetable kingdom vary more, either in weight or number) according to the good or bad season they were harvested in. An acre well clothed with grass would contain from 15,000,000 to 20,000,000 of plants, though in some exceptional cases as many as 40,000,000 of plants have been recorded to the acre. Such facts as these are suggestive and cannot be trifled with, and it is no wonder that thinking persons are apprehensive as to the future condition of our pastures, unless some radical change takes place, in the present system of eating out the best native grasses of the large sheep runs.

Many persons have thought that by introducing exotic fodder plants and grasses they would in a great measure supersede and improve upon the indigenous ones. But it has often struck me as being a most remarkable thing that those persons who have written up the supposed virtues of exotics have given no guarantee that our high class wool would be maintained under this new diet. Climate, no doubt, has a great deal to do with the production of high class wool. Still, I cannot close my eyes to the fact that the indigenous vegetation is the principal factor. Keeping these circumstances in view, it is much better to systematically conserve and even cultivate our native fodder plants than to introduce others of which we have only a superficial knowledge.

Many exotic species have been introduced as good fodder plants, which have proved a positive pest to the country. Every one must be painfully reminded of this fact when they see that ubiquitous Cape composite (*Cryptostemma calendulacea*, R. Br.) which already covers large areas of pasture land, which widen from year to year to the gradual extinction of native herbs and grasses. Over 200 species of worthless weeds have been introduced with seeds of exotic fodder plants, or in an accidental way along with other seeds. So great a pest to the country some of these have proved that laws have been directed towards their extermination. The prickly comfrey (*Symphytum asperrimum*, Bbrst.) was heralded throughout Australia a few years ago as the fodder plant that was to supersede all others. What is the consequence after years of careful nursing? It has proved to be a positive failure in the country, after all the money expended in introducing and cultivating it. A Canary Island shrub called *Tagasasta* (*Cytisus proliferus* Linn.) is now occupying much attention in some quarters, which experience will eventually prove to have been misdirected. I have observed this shrub for a number of years; having raised from seed some of the first plants ever seen in Australia. I have a shrub now under my charge which is about 15 feet high, but I can firmly assert that our old man saltbush (*Rhagodia parabolica* R. Br.) would at the same age have produced about twice the amount of a superior fodder, and would grow in even more adverse circumstances of drought and heat. To give even a synopsis of all the introduced plants that have proved a pest in the country would occupy much time. There is one more, however, I should like to draw attention to: it is the European dodder (*Cuscuta epithimum*, Willd), a parasitic plant, which grows on the roots of lucerne and clover, and is doing much harm to those pastures

in New South Wales. The dodder seeds, no doubt, have been imported with unclean samples of clover and lucerne seed, and the climate being favorable it has spread very rapidly of late years.

I must confess that at one period I held the views of those persons who thought to supplant our native herbage by a free introduction of exotics. But after an observation extending over fifteen years, I have outlived these erroneous ideas. My first observations were made when I had charge of a series of experiments, carried out with both native and exotic fodder plants and grasses, with a view of proving their true qualities by comparison. They were sown or planted in spaces exactly one yard square, which gave an accurate way of computing the yield of produce per acre of each species. To enumerate all the species experimented with (upward of 100), together with a detailed description, would occupy too much time; but, to sum up briefly, I may state that the native ones yielded more at the rate per acre than did exotics, with the exception of such tall growing grasses as *Panicum maximum*, Jacq.; *Panicum spectabile*, Nees.; *Keana luxurians*, Dur.; *Sorghum vulgare*, Pers.; *Zea mays*, Linn.; and some of the larger kinds of millet. But these were run very close by the following native ones:—*Anthistria avenacea*, F. v. M.; *Astrebala pectinata*, F. v. M.; *Heteropogon insignis*, Thu.; *Panicum crus-galli*, Linn.; *Pollinia fulva*, Benth.; *Rottboellia ophiuroides*, Benth.; *Sorghum halepense*, Pers.; and *Sorghum plumosum*, Beauv. It is a well known fact, however, among agriculturists, that tall growing grasses are not always, in fact scarcely ever, so nutritious as the more dwarf ones, though they are of the greatest value for ensilage, where bulk is a great consideration. Another fact to be related with these fodder plants and grasses is that horses eat the native ones in preference to exotics, which proved conclusively that, with cultivation, native grass will become as succulent and tempting to the appetite and as nutritious as the best of exotics. These species experimented with that were indigenous to Northern Europe and North America proved to be the most unsuitable, with two exceptions, one an annual growth—*Ceratochloa unioides*, Dec., a capital winter species, and the other a perennial—*Poa pratensis*, L., var. *Virginiana*. This grass has underground soloniferous roots like our native *Cynodon dactylon*, Pers., so on this account is not easy to exterminate, while it affords a good fodder for sheep. Those from South Africa did fairly well, especially *Tricholœna rosea*, Nees., which is quite acclimatised in some situations. Its ripe seeds, being light, are distributed far and wide by every wind that blows. Some South American species did well, as also the Californian bunch grass, *Elymus condensatus*, Pers. But it must be borne in mind that all these grasses were tested in the coastal districts, and it is a question whether they would have grown at all if they had been sown or planted on the arid central plains of Australia. All these experiments were carried out on a black loamy soil, but I saw other experiments carried out on different soils, and the results were much the same, except in the case of pure sand, which appears less favourable to their growth than any other. Even this has species peculiar to itself. I mention this fact, for undue importance has been given by some persons to the different geological formations necessary to the growth of particular pasture plants. Of course where soils are naturally very light, or very heavy, very dry, or excessively wet, it is then necessary to make a selection of the most suitable species for such situations, but to advise fifty different geological formations for the same number of pasture plants is mere pedantry.

Grasses and other fodder plants have been recommended by persons who had formed their judgments of their merits upon imperfect trials, or upon every-day evidence. This has caused much disappointment and discouraged

many persons from further endeavours at the improvement of their pastures. To this also we may attribute the general indifference towards obtaining a knowledge of the comparative merits of grasses and other fodder plants. There is one good thing, however, those persons have done for the country, who have recommended exotic grasses for cultivation. They always give directions for the soil to be broken up and brought to fine tilth before the sowing takes place. But what a contrast this is to the continual struggle for existence our native grasses have to undergo, for the paddocks are often as hard as the roads throughout the country. Under these circumstances it can hardly be wondered at that many of them present a wiry appearance; and if it were not for the sharp points on many of our native grass seeds, some of them would have been extinct long ago. These sharp pointed seeds burrow into the soil, and when rain falls to soften it they germinate and grow where it would be practically impossible for exotic ones to live.

There is no doubt that the pastures in the coastal districts can be improved by introducing some exotics, especially those that make their growth during winter and early spring, for as a general rule most of our grasses make their growth during the summer season. Among the exceptions are: *Agropyrum scabrum*, Beauv; *Andropogon affinis*, R. Br.; *Bromus arenarius*, Labill.; *Eriochloa annulata*, Kunth; *Eriochloa punctata*, Hamilt; *Echinochloa ovatus*, Beauv.; *Danthonia semiannularis*, R. Br.; *Deyeuxia Forsteri*, Kunth; *Dichelachne crinita*, Hook; *Dichelachne sciurea*, Hook; *Festuca bromoides*, Linn.; *Lappago racemosa*, Willd.; and *Microlæna stipoides*, R. Br. Before an attempt is made at the systematic cultivation of our indigenous fodder plants and grasses, it will be necessary to have some data to work upon. For the benefit of those persons who desire to enter upon their cultivation, I will divide them into groups, and give a synopsis of those species which a long study has led me to believe will be most suited to our requirements for general pasture and hay-making, cultivating for grain, species suitable for wet or undrained soils, also for dry soils, and for binding the littoral sands. I have already mentioned those species most suitable to cultivate for ensilage.

The species suitable for general pasture and hay-making are: *Agropyrum scabrum*, Beauv.; *Andropogon bombycinus*, R. Br.; *A. erianthoides*, F. v. M.; *A. intermedius*, R. Br.; *A. pertusus*, Willd.; *A. refractus*, R. Br.; *A. sericeus*, R. Br.; *Anthistiria ciliata*, Linn.; *A. membranacea* Lindl.; *Astrelba elymoides*, F. v. M.; *A. pectinata*, F. v. M.; *A. triticoides*, F. v. M.; *Chloris acicularis*, Lindl.; *C. truncata*, R. Br.; *C. ventricosa*, R. Br.; *Chrysopogon gryllus*, Trin.; *Cynodon dactylon*, Pers.; *Danthonia longifolia*, R. Br.; *D. pallida*, R. Br.; *D. pilosa*, R. Br.; *D. semiannularis*, R. Br.; *Dichelachne crinita*, Hook.; *Eleusine ægyptiaca*, Pers.; *Eragrostis brownii*, Nees.; *E. pilosa*, Beauv.; *Eriochloa annulata*, Kunth.; *E. punctata*, Hamilt.; *Microlæna stipoides*, R. Br.; *Panicum decompositum*, R. Br.; *P. distachyum*, Linn; *P. divaricatissimum* R. Br.; *P. effusum*, R. Br.; *P. flavidum*, Retz.; *P. leucophœum*, H.B. et K.; *P. macractinum*, Benth.; *P. P. melananthum*, F. v. M.; *P. reversum*, F. v. M.; *P. trachyrachis*, Benth.; *P. prolutum*, F. v. M.; *Poa cæspitosa*, Forst. and *Setaria glauca*, Beauv.

GRASS TO CULTIVATE FOR GRAIN.

It is a most remarkable fact that the native country of wheat, oats and barley should be entirely unknown. Many eminent botanists are of opinion that all our cereals are artificial productions, obtained accidentally, but retaining their habits, which have become fixed in the long course of ages, and the

following observations seem to bear out this theory. It has been observed that when oats are grown on poor land and shed their grain, the progeny will, if left uncultivated for a generation or two, revert to the wild oat, but that cultivation will bring the grain back to its proper standard. *Ægilops ovata*, Willd., is said to be the origin of all our cultivated wheats, and as convincing proof of this it is a remarkable fact that this genus of grass is subject to the attacks of the same species of parasitic fungi which affect the wheat crops of the present day, and render them somewhat precarious in some districts during certain seasons. When these plants can be so changed with cultivation as to afford us useful grain, it seems a most feasible thing that out of 360 species found on this continent, some could be cultivated that would yield good grain without its attendant drawbacks in the way of parasitic fungi, especially on the arid central plains of Australia, where wheat and other cultivated cereals often do not mature grain on account of the excessive dry heat. During my experiments I observed that the grains of some of our grasses developed very much under cultivation, more especially in the case of one species, *Astrebla triticoides*, F. v. M., var. *lapacca*. This grass produces ears nearly 6 inches in length, well filled with a clean-looking, firm grain, which separates easily from the chaff, somewhat like wheat, hence the specific name. During my long observations I have never seen any species of parasitic fungi attack either the straw or grain of this grass; nor, from inquiries, have I ever heard that this grass is affected with fungoid growth. Most grain-producing plants are of annual growth, but this species is perennial, and attains a height of from 3 feet to 4 feet. It has a stout clean straw which would, after the grain was thrashed out, make good fodder. Other species that might be cultivated for grain are: *Leersia hexandra*, Swartz (the native rice grass), *Panicum decompositum*, R. Br.; *P. flavidum*, Retz.; *P. semialatum*, R. Br.; *P. trachyrachis*, Benth.; *Setaria glauca*, Beauv.; and *S. macrostachya*, H.B. et K.

The following species are the most suitable for growing on wet or undrained lands:—*Arthraxon ciliare*, Palis, *Diplachne fusca*, Beauv.; *Elionurus citreus*, Munro; *Glyceria fluitans*, R. Br.; *G. fordeana*, F. v. M.; *G. ramigera*, F. v. M.; *Hemarthria compressa*, R. Br.; *Imperata arundinacea*, Cyr.; *Isachne australis*, R. Br.; *Ischæmum australe*, R. Br.; *Leersia hexandra*, Swartz; *Leptochloa chinensis*, Nees.; *L. subdigitata*, Trin.; *Panicum indicum*, Linn.; *P. melananthum*, F. v. M.; *P. prolutum*, F. v. M.; *Paspalum distichum*, Linn.; *P. serobiculatum*, Linn.; *Pennisetum compressum*, R. Br.; *Phragmites communis*, Trin.; *Pollinia fulva*, Benth.; *Sporobolus diander*, Beauv.; *S. virginicus*, Kunth.; and *S. indicus*, R. Br. This is an exceedingly tough grass which I have often recommended for paper making. In strength it is nearly equal to the esparto grass of Spain (*Stipa tenacissima* Linn.), when the latter is grown in Australia.

Grasses suitable for growing on dry, stony ridges, or on poor soils are:—*Amphipogon strictus*, R. Br.; *Arundinella nepalensis*, Trin.; *Cenchrus australis*, R. Br.; *Echinopogon ovatus*, Beauv.; *Eragrostis chatophylla*, Steud.; *E. eriopoda*, Benth.; *E. falcata*, Gaudich; *E. laniflora*, Benth.; *E. lacunaria*, F. v. M.; *Festuca bromoides*, Linn.; *Neurachne mitchelliana*, Ness.

Grasses that will grow on the littoral sandy wastes of this continent are of especial value, not only as fodder plants, but because they assist in binding, and thus prevent it (the loose sand) from being blown inland by the fury of sea winds. The following species are among the best for this purpose:—*Distichlis maritima*, Rafin.; *Imperata arundinacea*, Cyr.; *Lepturus incurvatus*, Trin.; *L. repens*, R. Br.; *L. cylindricus*, Trin.; *Paspalum distichum*, Linn.; *Schedonorus littoralis*, Beauv.; *Spinifex hirsutus*, Labill.; *Sporobolus virginicus*, Kunth.; *Thuarea sarmentosa*, Pers.; and *Zoysia pungens*, Willd.

It has often been remarked that many of our native grasses while young are really good pasture plants, but at the season of ripening their seeds are irritating and dangerous to the eyes of sheep, often causing blindness, and this no doubt is correct. But in a great measure this could be guarded against, if pastoralists were to confine their sheep to small areas, until the seeds had fallen to the ground, which, under ordinary circumstances, would not be longer than three weeks, when most of the danger would be past. Once the seeds with their adherent awns are shed, they are comparatively harmless to the animals' eyes, though they may get into the wool. Unfortunately, when the grasses that bear these long awns become old, they are not so freely eaten by cattle or sheep as other species; consequently they grow and produce seed almost undisturbed. I have noted, however, that when these grasses are brought under cultivation, their seeds and awns lose much of the rigidity common to uncultivated ones. After some years of observation I have arrived at the conclusion that the following species are most to be dreaded on account of their long awns, or pungent pointed leaves: *Aristida arenaria*, Gaud.; *A. behriana*, F. v. M.; *A. calycina*, R. Br.; *A. depressa*, Retz.; *A. hygrometrica*, R. Br.; *A. leptopoda*, Benth.; *A. ramosa*, R. Br.; *A. stipoides*, R. Br.; *A. vagans*, Cav.; *Heteropogon contortus*, Roem.; *H. insignis*, Thu.; *Pollinia irritans*, Benth.; *Stipa aristiglumis*, F. v. M.; *S. flavescens*, Labill.; *S. micrantha*, Cav.; *S. pubescens*, R. Br.; *Stipa scabra*, Lindl.; *S. semibarbata*, R. Br.; *S. setacea*, R. Br.; *Triodia cunninghami*, Benth.; *T. irritans*, R. Br.; *T. Mitchelli*, Benth.; *T. microstachya*, R. Br.; *T. procera*, R. Br.; *T. pungens*, R. Br.; and *Eriachne squarrosa*, R. Br.; thus making, in all, twenty-six species, which is a little over 7 per cent. of those recorded for the whole of Australia—not a very formidable array, it must be admitted, still of sufficient importance to make their position felt, and somewhat dreaded, by the sheep-owner.

It has often been asked of me whether I favour the annual burning off of grasses. Except in three cases, I am decidedly against burning off, for the following reasons:—1. It destroys millions of grass seeds which an occasional good season may have brought to maturity, thereby destroying the only natural means for their reproduction. A fire also destroys many valuable salsolaceous and other plants. 2. After burning off, if favourable weather ensues, new growth is made quickly, and sheep turned in on this eat greedily of it, which gives them what is commonly termed the scours or diarrhœa, which often becomes chronic, and of course has such a weakening effect upon them that many die. Nor is this all; for in biting out the young growth from the heart of the plant much of the latter is brought with it, which of course partially destroys it. If a fire should take place, sheep should never be turned into the pasture until it has made considerable growth, though cattle may be turned in without any serious damage being done, for they never eat grasses so low as do sheep. I may here mention the fact that sheep destroy the natural grasses and herbage in much less time than horses, and they again much sooner than cattle.

I am in favor of burning off annually under three such peculiar conditions as the following: 1. Where grasses are much diseased with parasitic fungi. 2. Where there is a predominance of spear grasses; and 3. Where there are growing such rank grasses as those I describe as suitable for wet or undrained soils, for along with this coarse growth many noxious plants and fungoid pests are destroyed. (Very rarely good pasture plants, other than grasses, will grow in such situations.) Pasture in these circumstances becomes more healthy, the fire acting as a disinfectant, and contagious diseases disappear. Grasses that will grow in low, damp situations are a valuable standby for the pastoralist during protracted droughts.

SALSOLACEOUS OR CHENOPODTACEOUS PLANTS.

These most valuable plants are from year to year becoming scarcer on the central plains of this continent. Being so closely fed down they get little chance to mature seed, which is their only natural means of reproduction. When left unmolested for a time, however, they will produce an abundance of seed, which germinates readily under ordinary conditions. Many of them also are readily increased by cuttings, so that it would require no great outlay to enter upon a proper system of conservation or even cultivation. Moreover, once the plants are established, they will continue to grow under the most adverse circumstances of drought and great heat. In fact, very few other kinds of plants so useful for fodder purposes could exist under such adverse circumstances as do most kinds of the saltbush family. There is abundant proof that when sheep are depastured in country where plenty of salinous plants are growing among the natural grasses, fluke and other allied ailments are almost unknown. It has been said that horses which are subject to swamp cancer on the low coast lands, when turned into pasture where salinous plants are plentiful, soon lose this disease. While on the subject of distoma disease and other allied ailments, I may mention another genus of plants which should not be overlooked in any system of conservation. It is that of *Zygophyllum*, some species of which act as vermifuges. There are very few plants arranged under the order *Chenopodiaceæ*, which are not available for fodder, though exception might be taken to the following species. During protracted droughts balls of cotton-like substance form on *Kochia aphylla*, R. Br., *Enchylæna tomentosa* R. Br., and a few other plants of the order. It is generally supposed that this adventitious growth is caused by some insect. The fulvous tomentum on some species of *Sclerolæna* and the woolly covering of the fruits of some species of *Chenolea* have been known to kill sheep when they have partaken too freely of this indigestible stuff, along with parts of the plants. The dorsal spines on the fruit of all species of *Anisacantha* cause some trouble to the salivary glands of sheep and other small herbivora, if they partake too freely of the plants when the fruits are near maturity. *Anisacantha muricata*, Moq., makes the troublesome "roley poleys" of our central plains. The following is a synopsis of those species which have come under my observation, and I can recommend them as being worthy of conservation: *Rhagodia Billardieri*, R. Br.; *R. Gaudichaudiana*, Moq.; *R. hastata*, R. Br.; *R. nutans*, R. Br., and *R. parabolica*, R. Br.; *Chenopodium carinatum*, R. Br.; *C. auricomum*, Lindl.; *C. atriplicinum*, F.v.M., and *C. triangulare*, R. Br.; *Atriplex campanulata*, Benth.; *A. cinerea*, Poir.; *A. halimoides*, Lindl.; *A. holocarpa*, F.v.M.; *A. Muelleri*, Benth.; *A. mummularia*, Lindl.; *A. rhagodioides*, F.v.M.; *A. semibaccata*, R. Br.; *A. leptocarpa*, F.v.M.; *A. spongiosa*, F.v.M.; *A. velutinella*, F.v.M.; *A. vesicaria*, Hew., and *A. stipitata*, Benth. Many of these *Atriplexes* when cooked are excellent table esculents: *Kochia aphylla*, R. Br.; *K. ciliata*, F.v.M.; *K. eriantha*, F.v.M.; *K. lobiflora*, F.v.M.; *K. pyramidata*, Benth.; *K. sedifolia*, F.v.M.; and *K. villosa*, Lindl. A detailed description of all these valuable salinous and other plants used for fodder in Australia, with illustrations, is now issued by the Department of Agriculture, and I hope, for the welfare of the pastoral industry, that more interest will henceforth be devoted, if not to their cultivation at least to the system of conservation.



LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Blennodia filifolia, Benth.

“Mustard-bush.”

The Forage Plants of Australia.

ORDER CRUCIFERÆ.

BLENNODIA FILIFOLIA, BENTH.

“Mustard Bush.”

Flora Austr., Vol. I, p. 73.

A SMALL shrub growing from 12 to 15 inches high. Its leaves are solitary or clustered, linear and entire, and from half to one inch long. The whole plant is glabrous. The flowers are exceedingly small. The detached portion in the right hand corner of the engraving shows an enlarged drawing of a portion of the fruiting raceme, with spreading pedicels of about half an inch. Pods shortly stalked, straight, or slightly curved, rarely above $\frac{1}{2}$ in. long, with an adherent style. The valves are prominently one-nerved, and the seeds are obovate. This plant is peculiar to the plains between the Lachlan and the Darling Rivers of New South Wales and extends into South Australia, and is moderately plentiful in some situations. Its free seeding qualities have rendered it somewhat proof against extermination. After a good rainfall seedlings spring up very rapidly; and they soon grow large enough to afford good feed, which cattle and sheep are remarkably fond of, owing, no doubt, to a pungent flavour pervading the whole plant. Dairy cows, however, should not be allowed to graze in pastures where this plant is abundant for it will flavour both milk and butter, so much as to render it unsuitable for domestic use. It is on account of the pungent nature of this plant that it has received the appellation of “mustard bush” from stockmen. The drought-enduring qualities of this plant are remarkable; for when once the plant gets well established in the soil it will continue to grow in the most adverse seasons of drought and great heat: consequently it affords feed when other kinds of vegetation are somewhat dried up during rainless seasons.

There are twelve species of the genus *Blennodia* indigenous in Australia, and all of them are more or less relished by stock. A pungent flavour pervades the whole of the species in a more or less degree, it being a characteristic of the order.

The species arranged under the order *Cruciferae* are not very numerous in Australia. There are only 15 genera, and as far as is at present known, about 49 species that are truly indigenous; but many exotic species have found a congenial home here, and may be found growing in various parts of the colony. The order, however, is represented nearly all over the globe; but the species are more numerous in the temperate regions of the northern hemisphere. Altogether there are 206 known genera, and about 1730 species. It is one of the most easily recognised of natural orders by its flowers or fruits.

Each flower has four petals (rarely wanting), arranged like a cross. There are usually six stamens, of which four are long and two are short. Hence the illustrious Linnæus included all plants of this order in his class Tetradynamia. Amongst our popular garden plants arranged under this order are the wall-flower, stock, &c. The produce of the kitchen garden is also largely represented by such plants as cabbage, cauliflower, broccoli, savoy, seakale, turnip, rape, watercress, scurvy grass, mustard, cress, &c. Besides these esculents, the order is a very valuable one in a commercial sense, for it produces some vegetable oils, such as rape, camelina, &c. Mustard the table requisite, is made from the ground seeds of other representatives (*Sinapis nigra* and *S. alba*). The Chinese indigo is obtained from another plant of the order (*Isatis indigotica*), and *Isatis tinctoria* yields a valuable dye.

ORDER CRUCIFERÆ.

BLENNODIA TRISECTA, BENTH.

“Three-leaved Mustard Bush.”

Flora Austr., Vol. I, p. 74.

A SMOOTH, but often glaucous undershrub, usually growing more than 1ft. high. The leaves are very numerous, often clustered, and are divided into three unequal linear, rather thick segments; the whole leaf being seldom more than 1in. long. The flowers are small, white and slightly fragrant. The seed pods are usually very narrow, and about $\frac{1}{2}$ in. in length; seeds numerous, small, and nearly ovoid. This plant is found mostly in the interior of New South Wales, Victoria, and South Australia. It is not particular either as to soil or situation for it may be seen growing on ridges in scrubby country, and on rich alluvial plains with nearly equal success. It is a capital fodder plant for the smaller herbivora, sheep being particularly fond of it. This, no doubt, may be accounted for by the pungent flavor which pervades the whole plant. It probably acts as a kind of sauce to other herbage. In some situations this plant may be seen growing in fair abundance, for its free seeding qualities, together with the easy germination of the seeds after rainfall during the spring months, has rendered it somewhat proof against extermination, which has nearly befallen many of our valuable forage plants. It is not advisable to turn milch cows to graze in pastures where this plant is growing abundantly, as it will give an unpleasant flavour to both milk and butter.



Blennodia trisecta, Benth.

“Three-leaved Mustard-bush.”







Blennodia nasturtioides, Benth.
"Pinnate-leaved Mustard-bush."

ORDER CRUCIFERÆ.

BLENNODIA NASTURTIOIDES, BENTH.

"Pinnate-leaved Mustard Bush."

Flora Austr., Vol. I, p. 74.

A GLABROUS annual, usually growing about 1ft. high. The leaves are from 1in. to 2in. in length, and are pinnately divided into a few linear rather thick segments. Flowers yellow, small, and slightly fragrant. Fruiting racemes loose, 3in. to 6in. long. The pods are narrow and nearly straight; each one being about $\frac{1}{2}$ in. long, and arranged on a slender stalk, as shown in the engraving. The seeds small and ovate. This plant is peculiar to the inundated lands near the Lachlan River, also on the western plains of New South Wales, near the Murray River in Victoria, and in the interior of South Australia, and in some situations it is fairly plentiful. When the plant is left undisturbed for a time, it will produce seed in abundance, and after rainfall in the spring months they germinate readily. The young seedlings grow quickly into plants, which have a slight pungent flavor, and are capital forage for stock. Sheep are particularly fond of browsing upon this plant, probably on account of its pungency. Dairy cows, however, should not be allowed to graze where this plant grows plentifully, or it will taint the milk and butter.

ORDER CRUCIFERÆ.

BLENNODIA LASIOCARPA, F. v. M.

“Hairy Podded Cress.”

Flora Austr., Vol. I, p. 76.

AN annual plant attaining a height of from 1 foot to 1½ feet, and covered all over with a stellate pubescence. The radical leaves are arranged on long stalks, and are lyrate-pinnatifid, and often 3 inches in length. The stem leaves get gradually smaller and less pinnatifid upwards to the flowering raceme. The flowers are mostly pink or white. The seed pods are very hairy and about half an inch long, curved and tapering at the top, as shown in the engraving. The seeds are ovate. This plant is peculiar to the Darling River, the sandy plains near the Murray River, Cooper's Creek, and generally over the arid central plains of this continent. This species, like most of its congeners, has anti-scorbutic properties, and has more or less of a pungent taste, which gives it a particular relish when partaken of with other herbage. Herbivora of all descriptions eat this plant with avidity. Though it is only an annual plant, it makes its growth during the hottest part of the year, and this growth being of a succulent nature is a valuable addition to other pasture plants on our central plains. When not too closely fed down, this plant will produce an abundance of seed which germinates freely after rainfall in the spring months.



Blennodia lasiocarpa, F. v. M.
"Hairy-podded Cress."



LIBRARY
OF THE
UNIVERSITY
OF CALIFORNIA



LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Thlaspi cochlearinum, F. v. M.
"Oval-podded Cress."

ORDER CRUCIFERÆ.

THLASPI COCHLEARINUM, F. v. M.

"Oval Podded Cress."

Flora Austr., Vol. I, p. 88.

AN erect branching annual 6in. to over 1ft. in height, and slightly hairy all over. The leaves are lanceolate or linear oblong, with one or two coarse teeth or lobes; the lower ones about 2in. long, and the upper ones getting gradually smaller to the inflorescence. The flowers are white and rather large, although there is a variety (*Var. ochranthum*), sometimes put down as a species, with large yellow flowers; with this exception, however, and a few other minor differences, they are much alike. The fruiting racemes are loose and from 2in. to 4in. long, and the pods are broadly oval as illustrated at figure 1 in the engraving. The seeds are flat and round, and each cell contains from two to four of them. This plant is found in the arid interior, from the Lachlan to the Darling Rivers, and on the western boundary of New South Wales, also at a few stations in South Australia. It is found generally growing on sandhills, and in some situations it is fairly plentiful. During the late spring and early summer months it affords a tender herbage, which sheep and other herbivora are particularly fond of, but cows that are giving milk should not be allowed to browse on pastures where it is growing, or it will flavour the milk and butter. A slightly pungent flavour pervades the whole plant, which, however, is a characteristic of all the plants arranged under the order *Cruciferae*, to which it belongs. As far as is at present known, there are only three species of the genus *Thlaspi* found in Australia, and two of them are not very abundant anywhere.

The seeds should be sown during the early spring months and when the soil is moist.

ORDER PITTOSPOREÆ.

PITTIOSPORUM PHILLYRÆOIDES, D'C.

"Butter Bush, or Willow-leaved Pittosporum."

Flora Austr., Vol. I, p. 112.

A SMALL tree attaining a height of from 15 to 20 feet, with its smaller branches pendulous, giving the tree a graceful appearance. Its leaves are variable, but mostly linear-lanceolate, and from 2 to 5 inches in length, of a thick texture and indistinctly veined. Pedicels axillary, solitary but sometimes in clusters, some of which are terminal. The flowers are yellow, and about $\frac{1}{4}$ in. long, often diœcious, when the females are rather larger than the males. This species is found over the greater portion of Australia, but principally in what is termed the arid interior, and at one time was moderately plentiful in such situations. During late years it has been much cut down for stock, all kinds of which are very partial to it; consequently the tree is becoming scarce in some districts. This is a matter of much concern to stock-owners; for in times of scarcity of feed this tree has been a valuable standby for stock. Its drought-enduring qualities are somewhat remarkable; for neither the hot winds nor the parched earth seem to have much check upon its growth; and its pleasing green foliage may be distinctly seen among the more sombre glaucous-foliaged trees and shrubs which are a feature of our central plains. It is a tree well worthy of extensive conservation and even cultivation; for, besides its uses for forage during long droughts, it yields a light-coloured, close-grained, and very hard timber, but not of great dimensions, for it rarely ever exceeds 6 in. in diameter. The timber makes excellent tool handles, and can be used for various purposes of turnery work. From its excessively hard nature it can be recommended for wood engraving. It is a tree of remarkably quick growth. A young plant, which was planted out four years ago, is now 14 feet high, and one planted out nearly two years ago is 8 feet high. Its graceful habit makes it a striking feature among other kinds of vegetation. It is a tree which can be highly recommended to horticulturists for planting in shrubberies, or as single specimens in pleasure grounds, where the soil is of a dry nature, for it will not succeed in wet situations.

At figure I is illustrated the fruit with the thick and hard, or coriaceous valves open, showing the seeds which are bitter but not poisonous, globular, and of an orange red colour, often enveloped in a viscous liquor. Figure II. shows the fruit before dehiscing. In shape it is ovate or round, cordate, much compressed, and quite smooth; and it is about half an inch in length. The seeds of this plant should be sown during the early autumn months, when there is moisture in the soil.

There are about nine species of the genus *Pittosporum*, indigenous to this continent, but they are nearly all eastern except the one under notice. Two of them that occur near Sydney are well known to gardeners as furnishing materials for shrubberies. The most common one is *Pittosporum undulatum*, often called "mock orange," on account of the delightfully scented flowers which furnish on distillation a fragrant volatile oil. Its timber is very close grained, but easily wrought; and it is valuable for turner's work and wood engraving. It is a tree, however, which is much infested with a borer insect; and it is no uncommon sight to see large branches, and often a greater part of the tree, dying from no apparent cause. On closer examination, however, the parts affected will be found to have been ingeniously and neatly ringbarked, or the pith of the tree excavated by these insects. On account of this the tree is not as largely planted as formerly; for often an unsightly "gap" is made where least desired by a large branch of the tree suddenly dying.



Pittosporum phillyræoides, D'C.
"Butter-bush" or "Willow-leaved Pittosporum."



LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA





Portulaca oleracea, Linn.
"Purslane."

ORDER PORTULACÆ.

PORTULACA OLERACEA, LINN.

"Purslane."

Flora Austr., Vol. I, p. 169.

A low prostrate annual with succulent stems and leaves. The plant sometimes spreads only 6 inches, but often exceeds 1 foot in length. The leaves are alternate, but often clustered, mostly obtuse, and about $\frac{1}{2}$ an inch long. The flowers are minute, several of them arranged together in terminal heads. They open for a few hours only during the middle of sunny days. At figure 1 is represented an enlarged drawing of a bud showing the arrangement of the two sepals. At figure 2 is represented an enlarged drawing of a flower which is composed of five petals slightly united at the base, yellow, and very fugacious. At figure 3 is illustrated the membranous capsule which contains numerous small black seeds. These are collected by the aborigines during the summer months, and they use them as an article of food. But we are not in a position to say whether these seeds are nutritious or not. This plant is found in nearly all the colonies, from the coast to the arid interior. In some situations in the coastal districts it is very plentiful, in fact it is often a pest in cultivated ground. This plant produces seed so prolifically, and they germinate so readily in the coastal districts, where rain can be depended upon, that it is difficult to exterminate. In the arid interior, however, it is a valuable pasture plant during the hot summer months. Its succulent stems and leaves are much relished by all kinds of stock, and it often affords them both food and moisture when the surrounding vegetation is somewhat dried up during drought time. We have seen the seedlings spring up by thousands after a thunderstorm in the summer months, and these soon develop into good sized plants. The purslane has been cultivated in European gardens for generations. It possesses anti-scorbutic properties. The young shoots are often used in salads, and the older ones as a pot herb, and sometimes for pickling. This plant is now spread nearly all over the temperate parts of the earth. It is one of those cosmopolitan plants which can make its home in any country and grow on any kind of soil, provided it is not too cold.

There are six other species of the genus found in Australia, but they grow principally in the tropical parts of the continent.

The order Portulacæ, under which these plants are arranged, is a very small one. There are only three genera and about twenty-four species recorded on this continent. There is only one species of the genus *Claytonia*, and this is found in the valleys of the Blue Mountains. In a wild state it bears large white flowers, which might be much improved by cultivation. It is well worthy the attention of horticulturists. Some exotic species of this genus are prized by gardeners, and these may be seen cultivated in gardens. *Claytonia perfoliata* is one of the most singular species of this genus, and is often grown as a curiosity.

ORDER MALVACEÆ.

LAVATERA PLEBEIA, SIMS.

“Australian Marsh-Mallow.”

Flora Austr., Vol. I, p. 185.

A COARSE, erect annual, becoming woody at the base, attaining a height of from 6 to 8 feet, and more or less softly tomentose. Its leaves are arranged on long stalks, and are mostly five or seven-lobed, the lower ones often 6 inches in diameter, but the upper ones are much smaller. The pedicels are axillary, and usually clustered. The flowers are from 2 to 3 inches across, and usually of a white or pale rose colour. At figure A is represented the fruit, which is composed of from six to fifteen carpels, arranged in a close ring. This plant has a wide geographical range, being found in all the colonies, but principally in the interior, and generally on land liable to inundation, though it is not plentiful anywhere. When it is growing on good soils it is astonishing the amount of growth it will make during the hottest weather, and in a few months. Cattle and sheep are particularly fond of this plant in a young state, for at this stage of growth both its leaves and stems are very succulent, and abound in mucilage. The roots of this plant, too, which are somewhat after the consistency of parsnips, were once used by the aborigines as an article of food. Like most of its congeners, a fibre can be prepared from the inner bark; but, if grown for the latter, the plant should be pulled or cut when it shows its flowers, as, at this time, the fibre is at its best.

When left unmolested for a time, this plant will produce a great abundance of seed, which should, if brought under cultivation, be sown in September, where it is intended that the plants should be grown, as the seedlings are very impatient of transplanting. Half-a-dozen plants would produce enough seed to sow an acre, so that very little outlay would be required to enter upon a system of conservation or cultivation of the plant, either for its fibre or for the forage it would supply during a dry season.



Lavatera plebeia, Sims.

“Australian Marsh-mallow.”







Malvastrum spicatum, A. Gray.

“Spiked Mallow.”

ORDER MALVACEÆ.

MALVASTRUM SPICATUM, A. GRAY.

"Spiked Mallow."

Flora Austr., Vol. I, p. 187.

AN erect branching herb of 2 or more feet, becoming almost woody at the base; leaves ovate, or ovate-lanceolate, 1 to 2 inches long, irregularly serrated, and scabrous or softly tomentose. Flowers yellow, but small, in dense terminal spikes rarely exceeding $1\frac{1}{2}$ inches in length. This plant is peculiar to the arid plains of the interior. It is found, also, in the New England and in the Clarence River districts in New South Wales, besides various stations in Queensland, South, and North Australia. There are only two species of the genus found in the colonies; and neither of them are endemic. Their geographical range is an extensive one; for both of them are found in the warmer parts of the old world, also in tropical America. Pastoralists in the central districts of this continent speak highly of this plant, as affording good fodder for both cattle and sheep. It makes its growth during the warmer part of the year, so on this account it affords succulent herbage when the surrounding vegetation is somewhat dried up. Like many other species arranged under the natural order of Malvaceæ, it produces fibre, though we have not heard that it has ever been put to any industrial purpose, outside what use the aborigines make of it. When left unmolested for a time the plant produces plenty of seed, which germinates readily under ordinary conditions.

At figure I is illustrated a fruit, the carpels of which are usually from eight to twelve, surrounded by a five acuminate lobed persistent calyx, softly pubescent, and often bordered by long hairs,

The seeds of this plant should be sown during the early Autumn months, after rainfall, if possible; then the seedlings are not long in coming up.

ORDER MALVACEÆ.

GOSSYPIUM STURTII, F. v. M.

"Sturt's Cotton Plant."

Flora Austr., Vol. I, p. 222.

A RATHER tall-growing shrub, which is more or less marked all over with black dots. The leaves are ranged in long stalks and are broadly ovate in outline, entire, firm and glaucous; the latter character often giving the plant a slightly silvery appearance, which is quite a feature in the landscape. The large flowers are arranged on short stalks in the upper leaf axils. At figure I is illustrated an open flower—the natural colour of which is purple with a dark centre, each petal being about 2 inches long. The capsule is ovoid, and copiously marked with black dots. The seeds are very sparingly enveloped in wool. This plant is found in the arid interior of Queensland, New South Wales, and South Australia, but it is not reported to be plentiful anywhere; although under ordinary circumstances it produces a fair amount of seed, which, when ripe, germinates readily even under adverse circumstances. This plant will flourish even in the driest of seasons, and when the natural grasses fail it affords capital forage for stock; sheep being particularly fond of it, and they will often crop the younger plants so close to the ground that they seldom or never recover, it is a plant that is peculiarly adapted for hot, dry, regions; in fact, it does not seem to flourish out of such situations. More than one attempt has been made to grow the plant on the coastal side of the Dividing Range, and although it succeeded well during the hot summer months and grew at a rapid rate, still, directly the autumn rains set in the plant looked unhappy, and eventually died. This shrub is closely allied to the true cotton plant of commerce; but it is hardly likely that it ever will be cultivated as a commercial textile plant, for the cottony or woolly covering of the seed is not very copious, and unless it could be materially increased by good cultivation it would never pay in a commercial sense. This plant is endemic in Australia; and, so far as hitherto observed, it has not a very wide geographical range on the continent. Like most of its congeners, from the inner bark a fibre can be obtained, but we have never heard that it has been put to any economic use. The cotton of commerce, various forms of which are distributed, either as indigenous or introduced plants, over the warmer regions of both the new and the old world, has not, hitherto, been found in a wild state in Australia. The seeds of this plant should be sown directly they are ripe—as they soon seem to lose their germinating powers—in places where it is intended to grow the shrubs, as the young plants do not like their roots disturbed and often die when transplanted.



Gossypium Sturtii, F. v. M.

“Sturt’s Cotton Plant.”





LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Sterculia diversifolia, G. Don.
"Kurrajong."

ORDER STERCULIACEÆ.

STERCULIA DIVERSIFOLIA, G. DON.

"Kurrajong."

Flora Austr., Vol. I, p. 229.

AN exceedingly ornamental tree, often attaining a height of 60 feet on the eastern slopes of the Dividing Range, and from 20 feet to 30 feet in the hilly country of the interior of this continent. The leaves of this tree are very variable, as its specific name indicates. They are arranged on long stalks, and are quite glabrous and shining; sometimes they are entire and lanceolate, and from 2 inches to 3 inches long. At other times they range from ovate to ovate-lanceolate, and are more or less deeply three-lobed; the lobes short, but sometimes long and lanceolate. The flowers are arranged in axillary panicles, rarely exceeding the leaves. The calyx is five-lobed, and about $\frac{1}{4}$ inch in diameter, of a yellowish color outside, and a reddish one inside. The follicles, as shown at figure I of the engraving, are nearly ovoid, and from $1\frac{1}{2}$ to 3 inches long, thick and glabrous, on stalks of about 1 inch. The endocarp and outer covering with the enclosed seed is shown at figure II in the engraving. It is densely hairy and cohering. The number of seeds in each follicle is about 20, and, according to Mr. Hamlet, Government analyst, they contain 1·8 per cent of caffeine, which is more than the coffee of commerce. If these are roasted, pounded and macerated in hot water, with a little sugar added, when allowed to cool it makes a capital beverage. The roots of this tree, which resemble turnips in consistency, but are sweeter to the taste, are used by the aborigines as an article of food. Water in considerable quantity can also be obtained from them, and this too in the driest of seasons. In the arid interior of this continent, during drought time this tree has often proved a most valuable standby to the stock-owner, and has been the means of saving the lives of many animals when other herbage has failed. Cattle and sheep are excessively fond of its leaves, and they thrive well on them. As a rule when feeding stock on the leaves of this tree, the branches only are cut off by thoughtful persons, leaving the trunk standing, which soon throws out a fresh supply of branches and leaves, thus affording a supply of fodder for future contingencies. It is rather amusing at first sight during drought time, when stockmen turn out armed with axe and tomahawk to cut off the branches of this tree, to see both cattle and sheep following them, and often long distances, knowing by instinct they are going to be provided with food. It makes the wildest of animals tame when pressed by hunger. The timber of this tree is soft and spongy, and almost useless. But from its inner bark, an excellent fibre is prepared by the aborigines, who make it into a very strong twine, which they manufacture into nets for the capture of emus and other animals; also into bags, fishing nets, &c. On deep soils of a dry nature the kurrajong will

make a beautiful umbrageous head, and it might be recommended for avenue planting, or grouping with other trees, for it makes a grand feature in the landscape. Its beautiful green foliage at midsummer is easily recognised among other vegetation. There are about twelve species of the genus *Sterculia* found on this continent. *S. acerifolia* is the well-known "flame tree" of New South Wales. *S. quadrifida* is a Queensland species, and when seen in fruit it is a most beautiful object. *S. rupestris* is a very singular tree, its trunk somewhat resembling a bottle; from this singularity it has obtained the name of "bottle tree." The timber of none of these species is of much use in a commercial sense, being mostly of a light spongy nature, though the inner bark of the trees yields good fibre. All of them produce an abundance of seed, which might be turned to some commercial use. If they were analysed, it is probable that some of them would yield a substance closely allied to the cocoa of commerce, for they belong to the same natural order, *Sterculiaceæ*, as does the famous cocoa-bearing tree, and also the more recently-described kola, or cola, nut bearing tree of Africa. The kurrajong is a tree that is most easily raised from seed, if sown directly it is ripe, and as the seedlings transplant well, no difficulty will be experienced in planting this tree in any number in the arid interior.





Geranium dissectum, Linn.

“Crane’s Bill or Crow’s Foot.”

ORDER GERANIACEÆ.

GERANIUM DISSECTUM, LINN.

"Crane's bill, or Crow's Foot."

Flora Austr., Vol. I, p. 296.

A DIFFUSE perennial plant, with a root stock thick and carrot-like. The stems are usually procumbent; but are, sometimes, shortly erect, more or less hairy, or hoary, with a minute pubescence. The leaves are arranged on long petioles (stalks), nearly orbicular (round) in their circumspection, deeply divided into five or seven segments, each one again more or less cut into three or more lobes, usually pubescent or hairy underneath. The one or two or rarely three flowered peduncles have small bracts at the base of the pedicles. There are always ten stamens, with the filaments united at the base in each flower. Capsule lobes, one seeded, separating from the placenta-bearing axis, inclosing the seed, and curled upward on a long glabrous awn (the persistent style), detached from the beak, as shown in the engraving. The awns are not spirally twisted as in the allied genus *Erodium*. This plant is generally distributed over a greater portion of the interior of this continent, and is held in high repute as a superior pasture herb, particularly in the central portions of Australia. Its growth is made principally during the spring and early summer months; and it affords a rich, succulent herbage, ere the grasses have made much growth. Herbivora of all descriptions are remarkably fond of it. The drought-enduring qualities of this plant are remarkable; but this, in a great measure, may be accounted for by its long, carrot-like roots penetrating the earth to a great depth, thus escaping the drying influence of the summer's sun. When not too closely fed down, the plants produce moderately plentiful seeds, which germinate readily under ordinary conditions. There are only two species of the genus indigenous in Australia, but neither of them is endemic. The species under notice is generally distributed over the temperate regions of the northern hemisphere, and, as might be supposed, is very variable in habit, sometimes appearing only as an annual. In more favorable situations it is biennial, and very often perennial, as is the case with the Australian plant. The seeds should be sown during the early autumn months, after rainfall if possible, or failing this, during September or October.

ORDER GERANIACEÆ.

ERODIUM CYGNORUM, NEES.

“Stork’s Bill, or Crow’s Foot.”

Flora Austr., Vol. I, p. 297.

AN annual or biennial herb with procumbent or slightly erect stems extending from 1ft. to 3ft. or more in length. The leaves are deeply three lobed, or divided to the base into three lobes or segments, which are more or less again three lobed, the central lobe being larger and broader than the lateral ones. Its flowers are blue and are usually from 2 to 5 in an umbel. At figure 1 is illustrated the capsule lobe (inclosing one seed), which is curled upward on a long elastic awn. This is usually twisted and bearded inside with long hairs. The capsule lobe is very sharply pointed at the base. This plant is very widely distributed throughout the Australian continent, being found in the interior of all the colonies; and in some situations it is moderately plentiful. Its free seeding qualities have rendered it somewhat proof against extermination. During the spring and early summer months this plant affords a rich succulent herbage which herbivora of all descriptions are remarkably fond of. Horses will often leave good herbage to browse upon it. Pastoralists speak very highly of this plant as affording good herbage while it is in a young state. But when it is ripening its seeds, it is somewhat dreaded by the sheepowner on account of the sharp pointed seed lobes, which not only attach themselves firmly to the wool, but the barbed points often penetrate the skin of the animal. Notwithstanding this, however, the plant has much to recommend it as a pasture herb, for it will grow well on the poorest of soils. Many of the dry sand hills of the interior would have little vegetation on them during the early summer months if it were not for this plant. Under cultivation, it produces a great amount of herbage; and if cut when it shows its flowers, it is not only valuable as green feed, but it can be made into capital hay. Taking into consideration its great productiveness, we think it might be turned into ensilage with good results. *E. cygnorum* is the only species of the genus that is endemic in Australia. But two other species (*E. cicutarium*, L'Hér.) which has the leaflets of the pinnate leaves deeply pinnatifid, and an umbel of from two to twelve small purple flowers, and *E. moschatum*, Willd., Musky heron's bill, which has the leaflets of the pinnate leaves only deeply toothed, and the flowers are smaller) of European origin have been introduced and become acclimatised in the coastal districts of some of the colonies. *E. cicutarium* may be seen growing about Sydney. About eighteen months ago we saw it growing in one paddock where cows were depastured, and it was eaten down very close to the ground. The seeds of the plant under notice are best sown during the early autumn months, after rainfall if possible; then the seed will germinate quickly, and the plants will yield a considerable amount of herbage during the winter months.



Erodium cygnorum, Nees.

“Stork-bill or Crow’s-foot.”





LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Geijera parviflora, Lindl.
"Sheep Bush," "Wilga," Willow."

ORDER RUTACEÆ.

GEIJERA PARVIFLORA, LINDL.

"Sheep Bush," "Wilga," "Willow."

Flora Austr., Vol. I, p. 364.

A TALL shrub or small tree, sometimes attaining a height of 30 feet, with slender erect or pendulous branches, glabrous, or the inflorescence and young parts slightly hoary. Leaves linear acute or obtuse, 3 to 6 inches long, and rarely more than $\frac{1}{4}$ of an inch broad, with the mid-rib prominent underneath. The foliage is marked with glandular dots, which, on being bruised, emit a strong scent. This shows the presence of an essential oil in these glands. Panicles rather loose, and broadly pyramidal, but much shorter than the last leaves, alternately branched, with numerous small white flowers. At figure 1 is illustrated the fruit which is composed of four distinct obovoid, two-valved cocci, about $\frac{1}{4}$ of an inch long. At figure 2 is illustrated the seed which is black and shining on the outside. This tree is found principally in the arid interior of all the Australian Colonies, and in some situations it is fairly plentiful, although it has been much cut down for stock when other feed has been scarce on the plains during drought time. All kinds of stock will browse upon its leaves, but sheep are particularly fond of it. Its drought enduring qualities are something remarkable, and it will continue to grow under the most adverse circumstances of drought and great heat. It has been said that the tree cannot be killed by ringing, but this I have some doubts about. This tree is worthy of extensive conservation or even cultivation, on our arid plains, either to be kept in reserve to supply forage for stock during very dry times, or planting for ornamental purposes. It is one of the most graceful of trees, and might be introduced into gardens with good effect. The tree from which the drawing was made we have had under cultivation for seven (7) years, and it is now fifteen feet high, and a most graceful looking tree. It produces plenty of seed, which, when ripe, germinates very easily. This tree must be grown on dry soil, otherwise it will not flourish. Its timber rarely ever exceeds one foot in diameter, is light-coloured, hard, close grained, and has an agreeable perfume on being newly cut. It sometimes is subject to gum-veins, and it is liable to split in seasoning. It is used for the naves of wheels, blocks, &c. The genus *Geijera* is limited to Australia, and as far as is at present known there are only three species known; two of them are found in the north eastern parts of Australia.

ORDER MELIACEÆ.

FLINDERSIA MACULOSA, F. v. M.

"Leopard, or Spotted Tree."

Flora Austr., Vol. I, p. 389.

AN ornamental tree which is of somewhat pendulous habit, and grows to a height of from 30 to 45 feet. Its trunk is remarkably spotted by the falling off of the outer bark in patches. Hence the Australian name Leopard or spotted tree. From its trunk and branches exude large quantities of an amber-colored gum of a pleasant flavor; but, as far as we are aware, it has never been put to any economic use. The leaves of this tree are very variable. The western ones are mostly simple, linear oblong, or lanceolate, and about 2 in. long. The northern ones are mostly pinnate, with from three to five leaflets. The panicles are terminal, and from one to three inches long. The flowers are small. This tree is peculiar to the western plains between the Lachlan and Darling Rivers in New South Wales, on the Burdekin, Burnett, and Baloo Rivers, and at Port Bowen and Broadsound in Queensland, and at one time was moderately plentiful; but it is becoming scarce in some localities; for during very dry times, when feed is scarce, it is much cut down for stock. Sheep are very fond of it, eating both leaves and young twigs. At the sound of the axe sheep may be seen scampering toward the felled tree; and it takes very little time before it is denuded of its leaves and small shoots. It is a tree well worthy of extensive conservation, and even cultivation. Besides providing excellent forage during dry seasons, it yields a serviceable timber of a bright yellow color, is nicely marked, close in the grain, and is exceedingly elastic and tough. It is used for a variety of purposes, such as making buggy and cart shafts, staves for casks, and tool handles. It would also make beautiful furniture, and might be used for any inside carpentry work. Its toughness might also be recommended to machinists where elasticity combined with toughness is required. At Figure I is illustrated the capsule, which is about $1\frac{1}{4}$ in. long, oblong and muricate (covered with short hard protuberances), opening in five boat-shaped valves, without any persistent axis; seeds winged at both ends and along the back. Even when left unmolested, this tree never produces a great amount of seed; but the seeds will germinate readily under ordinary conditions. They should be sown after rains in the early autumn months, and where the trees are intended to be grown, for the young plants are very impatient of being removed. There are about five species of the genus *Flindersia* indigenous in Australia; and, with the exception of the one under notice, they belong to the eastern portions of the continent. All of them yield excellent timber (varying in color from light to deep yellow), which is held in high repute among both timber-getters and carpenters. Some fine *Flindersia* trees may be seen growing in the parks and gardens of Sydney, where their beautiful umbrageous heads afford shelter from the glaring sun. The genus *Flindersia* was named by Robert Brown in honor of Captain A. Flinders, whose name is associated with the hydrography of Australasia.



Flindersia maculosa, F.v.M.

“Leopard or Spotted Tree.”







Atalaya hemiglauca, F.v.M.

“White Wood or Cattle-bush.”

ORDER SAPINDACEÆ.

ATALAYA HEMIGLAUCA, F. v. M.

"White wood," or "Cattle Bush."

Flora Austr., Vol. I, p. 463.

A TALL shrub or small tree with pinnate leaves, which are more or less glaucous; but the leaves are very variable, both in their length and breadth, on different specimens, young plants usually producing leaves as large again as older trees, often eight inches in length. The flowers are produced in rather dense panicles, and are about half an inch across. These are succeeded by samaræ (winged fruits) as shown in the left-hand side of the engraving. At figure 1 is illustrated the samara (winged fruit), which is from one to one and a half inches long, including the membranous wing.

This tree is found principally on the Liverpool Plains, the Bowen, Castle-reagh, and Darling Rivers in New South Wales, Cooper's Creek in South Australia, in several of the coastal districts of Queensland, and in Northern Australia, and is only moderately plentiful at some of the stations named, as during the late dry years it has been a great stand-by to pastoralists in the central portions of the continent, who have cut large quantities down for forage for their stock. Both cattle and sheep eat the leaves of this tree with avidity, and they seem to thrive on it. The drought enduring qualities of the tree are remarkable, and it might profitably be cultivated on our central plains, both for the forage it would supply during the drought time, and the timber it would yield, besides affording capital shade from the glare of the tropical sun. The timber of this tree is of a yellowish colour, very hard, and close grained. Though not of great dimensions, still it might be used for some industrial purpose, such, for instance, as making into tool handles and other turnery work.

When left unmolested for a time the tree produces seed in abundance, and the seeds germinate readily under ordinary conditions. They should be sown during the early autumn months. The species under cultivation in the coastal districts makes about eighteen inches of growth a year.

ORDER SAPINDACEÆ.

HETERODENDRON OLEÆFOLIUM, DESF.

“Olive-leaved Emu Bush,” “Rose Bush,” or “Cabbage Bush.”

Flora Austr., Vol. I, p. 469.

A TALL shrub; the young shoots being hoary or glaucous, with a minute silky pubescence. Its leaves are variable, but mostly lanceolate, or narrow oblong, and from 2in. to 4in. in length, leathery, and sometimes rigid. The panicles are few-flowered, and shorter than the leaves, as shown in the engraving. This plant is peculiar to the Murray, Darling, and Macquarie Rivers, the Gwydir Plains, Mount Brogden, and a great portion of the northern and far-western plains of New South Wales; on the Burdekin and Bowen Rivers, in Queensland; on the Murray, Wimmera, and Avoca Rivers, in Victoria; at Cooper's Creek, Lake Torrens, and Flinders Range, in South Australia; and at stations in North and West Australia; and it is moderately plentiful in some of those places. Its drought-enduring qualities are remarkable. The hot winds of the interior and long spells of dry weather seem to have little effect in checking its growth; and during the times when other herbage is scarce, it is a valuable standby for pastoralists, who cut down large quantities for forage, which both cattle and sheep greedily feed upon. Although the plant produces moderately plentiful seed, which germinates readily under ordinary conditions, thereby reproducing itself to a certain extent, the young plants are often browsed down; and the fact of the old plants being cut down in such quantities during drought time will be the means of its extermination, if nothing is done to conserve it before such a step becomes practically impossible. Its seeds, as also the fruits of many other plants, are eaten by emus. Hence the common name, emu bush. The wood of this plant, though excessively hard, is small in dimensions, but might very well be turned to some practical use—such, for instance, as making into tool handles, &c. Mr. Dixon, of South Australia, informs me that the bark of this tree is a very good bitter which has some febrifuge properties.

At figure I is illustrated the fruit, which is composed of one or two, rarely three or four, hard indehiscent lobes. The seeds are half immersed in an arillus. The skin (covering) is hard, thin, and brittle.

The seed of this tree should be sown during the early autumn months, and after rain if possible.

There are only two species of the genus found in Australia. The species *H. diversifolium*, F.V.M., is found principally in Queensland.



Heterodendron oleaefolium, Desf.

“Olive-leaved Emu Bush, Rose Bush, or Cabbage Bush.”





LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Dodonæa attenuata, A. Cunn.

“Hop-bush.”

ORDER SAPINDACEÆ.

DODONÆA ATTENUATA, A. CUNN.

"Hop Bush."

Flora Austr., Vol. I; p. 477.

A VISCID shrub, growing from 8 to 10 feet high. Its leaves are variable, but mostly linear, or narrow linear cuneate, and obtuse, rather thick and rigid, and from $1\frac{1}{2}$ to 3 or even 4 inches in length. The capsules are not large, but have rather broad wings, much rounded at the top and at the bottom. Seeds semi-transparent. This shrub is found principally on the arid central plains of this continent, and is moderately plentiful on soil of a sandy nature, and the sand-hills are often covered with it. During drought time this shrub is a valuable standby for pastoralists, who cut down large quantities when other feed gets somewhat scarce. The poor soils where this plant grows seem almost incapable of supporting good herbage, the grasses in such situations being principally composed of the genera *Aristida*, and *Stipa*, and in dry weather they are hard and wiry, and have a forbidding appearance. The "hop bush" produces a great amount of seed in an ordinary season, and it germinates readily after showery weather in spring time, so that there is not much fear of exterminating it, which unfortunately is gradually overtaking many other indigenous forage plants. It grows very quickly. A small plant of this species we planted out 18 months ago is now 3 feet high, and nearly 4 feet through. The wood of this shrub, though not of great dimensions, is excessively hard, and might be put to some economic use, such, for instance, as engraving purposes, tool handles, &c., &c. During the early days of settlement, the seed capsules of this shrub were largely used as a substitute for hops, hence the common name of "hop bush." There are thirty-nine species of the genus *Dodonæa* found in Australia, and a very large proportion of them are endemic. Many of them are really worthy the attention of horticulturists, for hardly any other kinds of plants are more ornamental than these when in fruit, and they would make beautiful objects in the shrubbery.

ORDER SAPINDACEÆ.

DODONÆA LOBULATA, F. v. M.

“Red-fruited Hop Bush.”

Flora Austr., Vol. I, p. 479.

A TALL growing shrub of 12 to 15 feet, viscid, but quite glabrous. The leaves are variable, but mostly linear, or pinnatifid with short obtuse callous lobes, thick and rigid and from 1 to 2 inches long. Flowers few in short racemes on slender pedicels. At figure I is illustrated the capsule in which the wings are not very broad, but are continued from the base to the style, or nearly so, the terminal sinus narrow. Its seeds are smooth and shining. When the fruit of this shrub is ripe it is really a handsome looking plant. The bright red capsules, which it bears in profusion, and very often at a time when the surrounding vegetation is somewhat dry looking, make it an object of very great interest in the landscape. This plant is peculiar to the arid plains and ranges in Central Australia, and is moderately plentiful in some situations between the Lachlan and Darling Rivers, and in South and West Australia. Its free seeding qualities together with the easy germination of its seeds have rendered it somewhat proof against extermination. In the Lachlan district it is considered one of the best forage shrubs. Its capsules contain a very pleasant bitter of which herbivora of all kinds are remarkably fond; sheep will very often stand on their hind legs, to browse upon parts of the plant which, otherwise would be out of their reach. The climatic endurance of this plant is remarkable, when we come to consider that it is neither affected by the torrid heat of summer nor the extreme cold of winter. In the early days of settlement, the capsules were largely used as a substitute for hops, hence its common name “hop-bush.” The timber of this shrub, though rarely exceeding 6 inches in diameter, is hard, tough, and close-grained, and might be used for some industrial purpose. The seeds should be sown in the early autumn months after rainfall, or failing this, in September or October.



Dodonaea lobulata, F. v. M.

“Red-fruited Hop Bush.”





LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Trigonella suavissima, Lindl.
"Scented or Darling Clover."

ORDER LEGUMINOSÆ.

TRIGONELLA SUAVISSIMA, LINDL.

"Scented, or Darling Clover."

Flora Aust., Vol. II, p. 187.

AN annual (though some of our correspondents say perennial) plant with prostrate or ascending stems of 1 foot to 3 feet. Its leaves are arranged on long stalks and are composed of three leaflets, the middle one being stalked; they are broadly obovate in shape, more or less denticulate at the edges, and about $\frac{1}{2}$ an inch long. The flowers are yellow and arranged in axillary umbel-like heads on long stalks as illustrated at figure 1, or in sessile clusters in the leaf axils. These are succeeded by linear curved pods, from $\frac{1}{2}$ inch to $\frac{3}{4}$ inch long, as illustrated at figure 2. This plant is found principally in the interior of all the Australian colonies, except Queensland, and in some situations it is moderately plentiful. Its free-seeding qualities have rendered it somewhat proof against extermination. When it is found growing on rich black soils that are subject to periodical inundations, it produces a great amount of herbage, which stock of all descriptions are particularly partial to, and it is extremely fattening. Though this plant grows best on rich soils, still it is often found growing on stony rises, and in such situations during the spring of the year it makes considerable growth—which is a valuable addition to other herbage, ere the indigenous grasses start into growth. The plant would well repay systematic cultivation in the interior of this country, where exotic clovers would not succeed, on account of the great climatic heat. Besides the valuable green forage it produces, crops of it might be grown, cut, and turned into hay or ensilage, which would prove a valuable standby to the stockowner during long droughts, and when other feed is somewhat scarce. The seeds of this plant could be saved in a somewhat similar way to lucerne or clover seed, and as it is produced in fair quantities, no great outlay would be required to enter upon its cultivation with every prospect of success. The seed is best sown during the early spring or early autumn months; from eight to twelve pounds of seed would be sufficient to sow an acre. Sir Thomas Mitchell speaks of this highly fragrant clover-like herb in the highest terms as a forage plant on several occasions, and at Vol I., p. 254 of his book, he says:—"The perfume of this herb, its freshness and flavour, induced me to try it as a vegetable, and we found it to be delicious, tender as spinach, and to preserve a very green colour when boiled." This opinion has been confirmed by other persons. It is the only species of the genus found in Australia, and it is endemic.

The genus *Trigonella*, however, is largely represented by species found in Southern Europe, Western and Central Asia, and Northern Africa, all of them possessing a heavy penetrating odour. Mr. A. Smith says: "*Trigonella fœnum græcum*, the Fenugreek, is an erect annual, about 2 feet high, a native of the Mediterranean region, but cultivated in India and other warm countries, and occasionally in England. The seeds of Fenugreek were held in high repute among the ancient Egyptians, Greeks, and Romans, for medicinal and culinary purposes, but at the present time their use in medicine is confined to veterinary practice. They have a powerful odour of *coumarine*, and are largely used for flavouring the so-called concentrated cattle foods, and for rendering damaged hay palatable; Fenugreek powder being the principal ingredient in most of the quack nostrums, which find so much favour amongst ignorant grooms and horsekeepers."

ORDER LEGUMINOSÆ.

SWAINSONA PHACOIDES, BENTH.

"Phaca like Swainsona."

Flora Austr., Vol. II, p. 217.

A PERENNIAL, with procumbent or ascending stems of 1 to 1½ feet hoary—pubescent as also are the leaves. The compound leaves consist of 9 to 13 leaflets, which are somewhat variable in shape, but mostly narrow, oblong, or linear, and about 1 inch long. When they are obtuse or retuse they rarely ever exceed ½ of an inch in length. The flowers are rather large, of a purple color, and are arranged in short racemes on long peduncles.

This plant is found in nearly all the Australian colonies, but principally in the arid interior, and so far as I have heard it is nowhere very plentiful. It is a good forage plant for sheep when they partake of it along with other herbage; but, like many other leguminous plants, it is liable to "blow" them if they eat too ravenously of it when in a green state. This is caused during the process of digestion, when volumes of gas are generated, causing an abnormal distention of the stomach, preventing the lungs working freely and of course strangling the animals. Then the plant is put down as a poisonous one. It might just as well be said that lucerne and clover are poisonous for both cattle and sheep will "blow" when they eat too ravenously of these plants in a green state. There are two species of Swainsona (*S. greyana* and *S. galegifolia*) that many stockowners in the interior consider poisonous, and we often have had them sent to us as such for identification. These are what are commonly known as "indigos," "cranky peas," or "Darling peas;" and it is said that when once sheep take to eating them, they rarely ever eat grass again; consequently they seldom or never fatten, and are practically lost to their owners. So many conflicting statements are made, however, with regard to these plants that nothing but a long series of experiments and careful observation could clear up, and practically set at rest for all time, the doubts at present existing. The late Mr. K. T. Staiger, Government analyst of Queensland, experimented with these plants, and found they possessed powerful sudorific properties. But, as far as we are aware, none of the animals died of poisoning that he experimented upon. I think there has not been sufficient importance made of the fact, that when sheep or cattle are travelling in different country, and browsing upon other kinds of herbage than that they have been accustomed to, it must have for a time at least some material effect upon their systems, and the more weakly ones must feel this change, if for the worse, more acutely than those animals having a vigorous constitution. With regard to these conflicting statements Mr. J. B. Bettington, of Brinley Park, Merriwa, writes to the department as follows:—"I do not regard it as such a scourge as some do, and I do not think that healthy sheep eat it (salt is an antidote to it), or if they do they will not suffer any ill effects from it. I have killed many sheep suffering from what is popularly called "pea-eating" and have always found them full of worms, but whether the worms are caused by eating the pea, or the worms in the sheep cause them to eat the pea, I cannot say." The plant under notice produces an abundance of seed, which germinates readily under ordinary conditions. The seeds are best sown after rainfall during the spring months.



Swainsona phacoides, Benth.

“Phaca-like Swainsona.”







Swainsona procumbens, F.v.M.

“Trailing Swainsona.”

ORDER LEGUMINOSÆ.

SWAINSONA PROCUMBENS, F. v. M.

"Trailing Swainsona."

Flora Austr., Vol. II, p. 220.

A GLABROUS or hirsute perennial plant, with procumbent or erect stems of 1 foot to 3 feet. The leaves are simply pinnate, with eleven to twenty-one leaflets, varying in form from oblong to lanceolate, in different plants, and from $\frac{1}{2}$ inch to 1 inch in length. The flowers are large, fragrant, and of a violet colour, and are loosely arranged in a raceme, on stalks that are often 1 foot long. The pods are illustrated at figure 1 in the engraving, each one, in a natural state, being about 1 inch in length, acute, distended, very tough, and often incurved. This plant is found principally in the interior of Victoria, South Australia, Queensland, and New South Wales, and on the Darling and Castlereagh Rivers in the latter Colony, it is moderately plentiful. It is an excellent forage plant for all herbivora, when partaken of with other herbage. But, like many other leguminous plants, it is liable to "blow" both cattle and sheep when they eat too ravenously upon it in a green state. This is caused during the process of digestion, when volumes of gas are generated, causing an abnormal distention of the stomach, preventing the lungs working freely, and often killing the animals. Then the plant is put down as a poisonous one. We might just as well say that lucerne, clover, and some of the medicago's were poisonous, for cattle will "blow" when they eat too ravenously of any of these plants in a green state. A fact which might be verified, any day, when sheep or cattle are turned into a clover paddock. It is best to sow the seed in the spring months, after rainfall, if possible; then the seed will not be long in germinating.

ORDER LEGUMINOSÆ.

SWAINSONA OROBOIDES, F. v. M.

"Orobis like Swainsona."

Flora Austr., Vol. II, p. 222.

A SMALL perennial plant rarely exceeding 8 inches in height. The leaves are compound; the leaflets usually from three to seven, and lanceolate or linear in shape; the terminal one often above 1 inch long, the lateral ones smaller. The flowers are small, usually a few in a very short raceme on a firm stalk, shortly exceeding the leaves, as shown in the engraving. At figure 1 are illustrated two seed pods, each one of which is membranous, inflated, shortly hairy, and about $\frac{1}{2}$ an inch long. This plant is found near Warwick, in Queensland, and generally in the arid interior of New South Wales, and in some places in the latter colony it is fairly plentiful. The drought-enduring qualities of this plant are remarkable; and during a very dry season it affords a tender herbage, of which sheep are very fond, although it is not advisable to allow animals to browse too freely on any plants of this order (*Leguminosæ*), especially when in a green state, as they are liable to "blow" both cattle and sheep. This is caused during the process of digestion, when volumes of gas are generated, which causes an abnormal distention of the stomach, thus preventing the lungs working freely; and, of course, it often kills the animals. Then the plant is sometimes put down as a poisonous one. The seeds are best sown in spring when the ground is fairly moist. Under these circumstances they are not long in germinating.

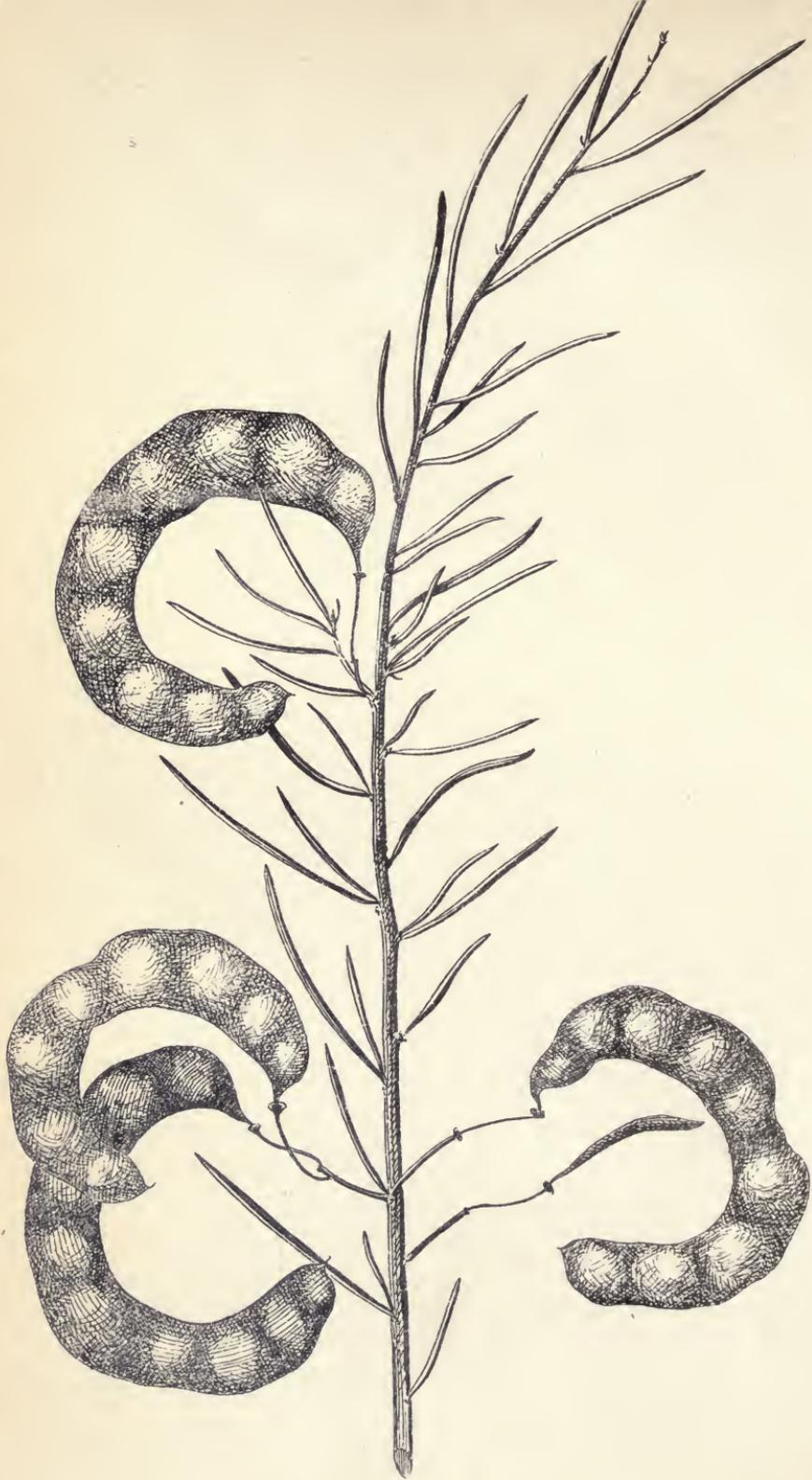


Swainsona oroboides, F.v.M.
"Orobus-like Swainsona."





LIBRARY
OF THE
UNIVERSITY
OF CALIFORNIA



Cassia circinata, Benth.

“Circular-podded Cassia.”

ORDER LEGUMINOSÆ.

CASSIA CIRCINATA, BENTH.

"Circular-podded Cassia."

Flora Austr., Vol. II., p. 286.

AN erect bushy shrub of several feet in height, which is glabrous or hoary with a minute silky tomentum. The leaves are all phyllodineous, without leaflets, linear-terete, or very slightly vertically flattened, and 1 inch to $1\frac{1}{2}$ inches long. The flowers are arranged on short stalks in the leaf axils; these are succeeded by almost circular pods, which are about $\frac{1}{2}$ an inch broad when ripe. This plant is found in the arid interiors of Queensland and New South Wales, and in some situations it is fairly plentiful. It will withstand a phenomenal amount of heat and dry weather; but this may be accounted for by the plant offering so little leaf surface for transpiration. It seems to be one of those plants which nature has specially designed for growing in arid localities. The most remarkable feature of this cassia is its phylloides, that is a kind of leaf which results from an enlargement and flattening of the stalk and the loss of leaflets. This peculiarity, if it may be termed such, has only been observed in one other Australian species. All the rest (about 30) have pinnate leaves. During the most adverse season of drought and heat this shrub affords herbage for stock, sheep being particularly fond of the young seed-pods, which it bears in profusion if left undisturbed for a time. If the seed-pods are allowed to mature they contain numerous seeds, but when thoroughly ripe they are excessively hard; and previous to sowing they should be steeped in water for a few days, otherwise germination will be slow in taking place. The seeds should be sown during the early spring months, and where it is intended that the plants are to remain, as the young plants are very impatient of removal.

There are about 30 species of the genus *Cassia* indigenous in Australia. Some of them are elegant trees, but most of them are charming shrubs when in flower. The flowers of most of these plants are yellow, and the seed-pods cylindrical or flat. The leaves of some of the Australian Cassias are medicinal, and allied to the true senna of commerce. We have known botanical collectors and bushmen to use these leaves for medicinal purposes. The largest of Australian Cassias is *C. brewsterii*, which grows in the northern coastal districts of New South Wales, and also in Queensland, where it attains a height of 40 ft. It is a most beautiful tree, with large, glossy, deep-green pinnate leaves. The flowers are arranged in racemes about 6 inches long, and these are succeeded by cylindrical pods over 1 foot in length. This grand tree should be planted in every garden where the climate is suitable.

ORDER LEGUMINOSÆ.

CASSIA PHYLLODINEA, R. Br.

"Curious-leaved Cassia."

Flora Austr., Vol. II, p. 287.

AN erect, rigid, bushy shrub, hoary or white, with a close silky tomentum; leaves all phyllodineous; linear vertically compressed but thick, 1 inch to $1\frac{1}{2}$ inches long. The flowers are arranged on short stalks in the leaf axils; pods slightly curved, and about $\frac{1}{2}$ an inch broad. This shrub is found in the arid interior of New South Wales and South Australia, but it is reported to be nowhere very plentiful, although it will stand a phenomenal amount of heat and dry weather, and produce a fair amount of seed when left unmolested for a time, which, when ripe, will germinate readily under ordinary conditions. Its scarcity, however, may be accounted for by the fact that both sheep and cattle eat it greedily, even if other feed should be plentiful. Sheep are particularly fond of the young green seed-pods, and also the young seedlings, so that it is very seldom they get a chance to grow into shrubs. This plant is well worthy of conservation, or even cultivation on the dry, barren, stony places on runs in the interior, where little other vegetation could exist. In such situations it would afford some forage during the most trying times of drought and heat.

When the seed of this shrub becomes old it gets very hard, and it should be steeped in water for a few days, or carefully torrefied, otherwise germination will be considerably delayed. The seeds are best sown as early as possible after the first autumn rains, or, failing this, the sowing should be deferred until September or October. Care, however, will have to be taken of the young seedlings until they grow to some size, for if left unprotected sheep or cattle will soon browse them down.



Cassia phyllodinea, R. Br.

“Curious-leaved Cassia.”





LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Cassia eremophila, A. Cunn.
"Desert Cassia."

ORDER LEGUMINOSÆ.

CASSIA EREMOPHILA, A. CUNN.

"Desert Cassia."

Flora Austr., Vol. II, p. 287.

AN erect bushy shrub, glabrous or slightly hoary. The leaves are composed of one or two pairs of leaflets, which are thick and round, or slightly flattened out, and rarely above an inch long. The flowers are yellow, several of them arranged in a corymbose raceme, on short stalks. These are succeeded by straight or slightly curved pods rarely above $\frac{1}{4}$ of an inch broad. This plant is found in the arid interior of all the Australian colonies, and in some situations it is still fairly plentiful. It will withstand a phenomenal amount of heat and dry weather. This may partly be accounted for by the plant having such little leaf surface for transpiration. The plant is admirably suited to the dry, hot, central parts of this continent, where it affords, in times of scarcity of other herbage, an excellent standby for stock, especially sheep, they being remarkably fond of the young green seed-pods which the plant bears in profusion. When the plant is not too closely fed down it matures a great amount of seed, which will, when newly gathered, germinate readily under ordinary conditions. When the seed becomes old, however, it is excessively hard, and should be steeped in water for two or three days previous to sowing, or germination will be very slow. Torrefying the seed to facilitate germination is an excellent plan when done with discretion—just being sufficient to crack the skin without injury to the embryo.

This shrub is well worthy the attention of horticulturists, for when it is in flower it is really a charming object, and, as it blooms so profusely during the early spring months, it makes a grand addition to and forms quite a feature in the shrubbery or flower garden. I have grown plants from seed, and in eighteen months they were 3 feet high and 3 feet through. When they were in flower they never failed to attract the attention of persons who took little interest in plants. The only care that is necessary in their cultivation is to see that the ground they are growing in is of a dry nature; nothing harms the shrub so much as stagnant moisture. This fact should be noted by those who want to cultivate the plant.

ORDER LEGUMINOSÆ.

CASSIA ARTEMISIOIDES, GAUD.

"Purity."

Flora Austr., Vol. II, p. 288.

A most elegant bushy shrub, hoary or white, with a minute silky tomentum. The leaves are composed of from three to six pairs of linear leaflets, each of them rarely exceeding 1 inch in length. The flowers are arranged in short, dense racemes, on stalks much shorter than the leaves, as shown in the engraving. At figure 1 is illustrated a seed pod. In a natural state it is usually from 2 to 3 inches long, and about $\frac{1}{3}$ inch wide. This shrub is found in the interior of Queensland, South Australia, and New South Wales; and in some situations in the latter colony is fairly plentiful. It is not particular as to soil or situation, for it may be seen growing on both rich alluvial bottoms, and in rocky hilly country in the interior. The drought-enduring qualities of this plant are something remarkable; it seems to be neither affected by the severe heat of summer nor the hot winds that periodically blow over the interior. Generally speaking, the drier the weather the more hoary or silvery this elegant plant becomes, so that often it is quite a feature in the landscape. It is a good forage plant for stock, sheep being particularly fond of browsing upon the young shoots and seed-pods, which it bears profusely during a greater portion of the summer months. When the plant is not too closely fed down it matures a great amount of seed which, however, are excessively hard when old, and before sowing they should be steeped in water for a few days, or it will be a long time before germination takes place. This beautiful shrub is well worthy the attention of horticulturists. I have had it under cultivation for some years, and it is a beautiful object when in flower, and always much admired. It should always be grown in dry soils.

If the plants are raised for growing in gardens, the seeds should be sown singly in pots, and, when the seedlings are large enough to handle, transplant them to their permanent quarters. If they are raised on runs, the seeds should be sown in places where it is intended the shrubs are to grow, for they are very impatient of being transplanted. Early autumn or spring months are the best for sowing and planting.



Cassia artemisioides, Gaud.

“Purity.”



LIBRARY
OF THE
UNIVERSITY
OF CALIFORNIA





Cassia desolata, F. v. M.

“Desert Cassia.”

ORDER LEGUMINOSÆ.

CASSIA DESOLATA, F. v. M.

"Desert Cassia."

Flora Austr., Vol. II, p. 289.

A BUSHY shrub, which is sometimes glabrous, but more frequently glaucous, hoary, or white, with a close tomentum. Leaflets, one, two, or very rarely three pairs, ovate, obovate, or oblong, $\frac{1}{2}$ to 1 inch or more long. The flowers are arranged in a very short raceme, on short axillary peduncles. Pod when perfect fully $\frac{1}{2}$ an inch broad, straight, or slightly curved, and very obtuse, as shown in the engraving. This plant is found in the interior of all the Australian colonies, and in some situations it is fairly plentiful. As might be supposed, a plant growing under such varied circumstances of soil and climate is most variable in habit. In all the forms, however, that I have seen the pods are very obtuse. The drought-enduring qualities of this shrub are something remarkable, and during adverse seasons it affords some herbage for stock. Under ordinary circumstances it produces a quantity of seed-pods, which sheep are fond of, and they may often be seen standing on their hind legs to get at those that would otherwise be out of their reach. When left undisturbed for a time this plant produces a great amount of seed, but when ripe it is very hard, and before sowing it should be steeped in water for a few days, or carefully torrefied, otherwise germination will be considerably delayed. The seeds are best sown as soon as possible after the first autumn rains, and where it is intended that the plants are to remain, for the seedlings are very impatient of being transplanted. This shrub is well worthy of the attention of horticulturists, for when it is in flower it is really a charming object, and besides it will grow in the driest of soils, where it would be almost impossible for many other kinds of shrubs to exist.

ORDER LEGUMINOSÆ.

ACACIA SENTIS, F. v. M.

"Bramble Acacia."

Flora Austr., Vol. II, p. 360.

A SPREADING shrub, or small tree, with lanceolate or linear phyllodia, varying on different trees from $\frac{3}{4}$ of an inch to 2 inches in length. In the right hand branch on the engraving the stipules are shown to be prominent, though on some plants they are minute, and from others they are entirely wanting. The peduncles are slender, solitary, or in pairs, and axillary in terminal racemes, as shown on the left hand branch of the engraving. This tree is moderately plentiful, and is peculiar to the arid central plains of Australia, from the Darling River to the Barrier Ranges in New South Wales, Bargo River in Queensland, low sand hills near the Murray River in Victoria, near Flinders Range in the interior of South Australia, also near the Gulf of Carpentaria in North Australia, and its presence is said to be nearly always an indication of underground water. Its drought-enduring qualities are remarkable; and the hot parching winds of the interior seem to have little effect in checking its growth, for its vivid green foliage, even in protracted "spells" of dry weather, makes its presence a delightful object among the surrounding more sombre-looking vegetation. It is a capital forage shrub, and horses, cattle, and sheep eat it with avidity; any trees which will grow on our arid central plains are well worthy of conservation, and even cultivation, more especially those which are useful for forage. During long droughts such trees prove an invaluable aid to pastoralists, who, however, have done nothing in the way of conserving them for future contingencies. This is to be deplored, and, perhaps, when the trees are getting scarce, through being so much cut down for feed, such a thing as conservation may be thought to be a wise undertaking. The shrub under consideration when in a young state will stand well cutting in, and on this account would make a capital hedge. The timber which this shrub produces is never of very large dimensions. It is soft, but tough, and might be used for cart and buggy shafts, also for tool handles of various descriptions. When left unmolested this tree produces moderately plentiful seed, which when fresh will germinate readily under ordinary conditions. But old seed should be steeped in water for a few days before sowing, or it will be a long time before germination takes place. It is one of the few acacias the seeds of which the blacks use as an article of food. At figure 1 is illustrated the seed-pods, which are thin, flat and about $\frac{1}{2}$ an inch broad. The seeds are broadly ovate, and are arranged along the centre of the pod. They should be sown in places where it is intended that the plants are to grow. It is seldom that the seedlings survive transplanting. According to Baron von Mueller there are upwards of 300 species of the genus *Acacia* found in Australia, and as might be supposed, they vary very much both as regards stature and the arrangement of their inflorescence. Many of them are known by such common names as wattles, yarran, (broad and narrow leaved) myall, mulga, sally, brigalow, hickory, &c., &c. Some of them are of considerable economic value for the timber they yield. Many of them are highly ornamental, and form quite a feature in the Australian landscape when in bloom. When flower farming becomes an established industry in Australia, the flowers of some species of acacia will play an important part, and their delicate perfumes are well worthy of being put into the market, where they would compete most favourably with better known perfumes.



Acacia sentis, F.v.M.

“Bramble Acacia.”







Acacia homalophylla, A. Cunn.
"Curley Yarren or Gidgee."

ORDER LEGUMINOSÆ.

ACACIA HOMALOPHYLLA, A. CUNN.

"Curley Yarren" or "Gidgee."

Flora Austr., Vol. II, p. 383.

A SMALL but graceful tree with glabrous or hoary foliage. The phyllodia are lanceolate-falcate, or linear, though sometimes obtuse with a small point, and from 1 to 3 inches in length. Flowers and seed-pods as shown in the engraving. When this tree is in flower it has a most unpleasant perfume, which is often quite sickening, both to man and beast. The tree is moderately plentiful on the arid plains of the interior of New South Wales, and the Murray River flats in Victoria. Its drought-enduring qualities are phenomenal, and it does not seem to be affected by the hot winds of summer nor the cold of winter in the slightest degree. It grows in the most arid and bleak localities, and when grass and other herbage has been scarce it has afforded an unfailing supply of good forage of which stock of all kinds are fond. This tree is well worthy of conservation and even cultivation; and, unless something of the kind is done, it must in a few years be nearly exterminated, if it is cut down in such quantities for stock as has been the case during some years past. Apart from its value as a forage plant, it yields a valuable timber, which is of a dark-brown colour, fragrant, and useful for turner's work. The wood is also used by the aborigines for making spears and other implements. When left unmolested for a time it bears seed in abundance, though they are very hard, and will require to be steeped for a few days, or carefully torrefied, before sowing, or germination will be considerably delayed. They should be sown in the early autumn months, and in places where it is intended that the trees are to grow, for the seedlings are very impatient of being transplanted, and in fact scarcely ever survive the operation.

ORDER LEGUMINOSÆ.

ACACIA PENDULA, A. CUNN.

"Weeping Myall," "Boree."

Flora Austr., Vol. II, p. 383.

A HANDSOME tree, attaining a height of from 20 to 35 feet, with a trunk about 1 foot in diameter. The smaller branches are usually pendulous, and the foliage sometimes assumes a silvery gray colour, giving the tree a remarkable appearance in the landscape. The phyllodia are linear-lanceolate, falcate, acuminate, and from 2 to 3 inches in length. This tree is peculiar to the marshy tracts of the interior of New South Wales and Queensland, and at one time was plentiful in those districts. But, cattle and sheep being very fond of browsing on its foliage, large quantities have been cut down for forage during recent years of drought, and fears are now entertained, by far seeing people, of its extinction. Cutting down the trees in such large quantities yearly puts an end to their natural modes of reproducing themselves from seeds, and even where young seedlings may spring up, they are invariably browsed down. In these circumstances this tree will not be available for forage for many more years, unless conservation or cultivation is resorted to. It is a tree well worthy of conservation not only as a forage plant, but for the splendid timber it produces, which is heavy close-grained, of a rich dark-brown colour, beautifully marked, and has a delightful fragrance of violets, which it retains for many years after being cut. The aboriginals use the wood of this tree for making boomerangs, &c. Some few years ago we saw quantities of this beautifully marked timber exported to Europe where it attracted the attention of British manufacturers, who thought very highly of it; and it was in much request for making into various articles, veneers, &c. When the tree is left unmolested for a time it will bear moderately plentiful seed; and the seeds if fresh, will germinate readily under ordinary conditions. Old seed should be steeped in water for a few days, or carefully torrefied before being sown, or germination will be very slow; for the covering of the seed gets excessively hard with age. They should be sown in places where it is intended that the trees are to grow, for the young seedlings are very impatient of being transplanted, and in fact scarcely ever survive the operation.



Acacia pendula, A. Cunn.

“Weeping Myall.”





LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Acacia aneura, F. v. M.
"Yarren."

ORDER LEGUMINOSÆ.

ACACIA ANEURA, F. v. M.

"Yarren."

Flora Austr., Vol. II, p. 402.

A TALL shrubby plant, or small tree, never attaining a much greater height than 20 feet. The phyllodia are narrow-linear, usually flat, but thick and terminating in a recurved point. This plant is peculiar to the arid western plains beyond the Darling River in New South Wales, and in the interior of South Australia. It has been one of the principal stand-by's for the pastoralist, and has afforded an unfailing supply of good forage during long and severe droughts. Stock of all kinds are remarkably fond of this tree and they will often leave promising feed to browse on its foliage and smaller branches. Its drought-enduring qualities are remarkable. In fact, neither hot winds that periodically blow over the plains during the summer months, nor drought have the slightest effect upon its growth. Some plants which I put out nine months ago, and which scarcely received a shower of rain during the whole summer, are now three feet high and three feet through. This is a proof of the rapid growth of this plant, even in adverse circumstances. Such a valuable forage plant as this should be conserved, and even cultivated; for, if it is cut down in such large quantities during every recurring drought, as in the past, to supply forage for stock, it must in time become exterminated—there being no young plants to take the place of those cut down. This cutting down not only destroys its natural way of reproducing itself by seed, but when it shoots out again cattle keep these growths eaten down so closely that the plant has no chance to recuperate.

It is also worthy of extensive conservation, or even cultivation, for the excessively hard timber it produces, which is of a dark brown colour. The aborigines use the wood of this tree for making into spears, and other defensive and offensive weapons. Europeans might turn this valuable timber to good account where excessively hard wood is required. When left unmolested this tree bears seed in great abundance, which, when sown as soon as it is ripe, germinates quickly. Old seed should be steeped in water for a few days, or carefully torrefied, otherwise they will be a long time in germinating. The seed should be sown in the early autumn months, after rain-fall, if possible.

ORDER MYRTACEÆ.

EUCALYPTUS CORYNOCALYX, F. v. M.

"Sugar Gum."

Flora Austr., Vol. III, p. 218.

A LARGE growing timber tree often attaining a height of 120 ft. The leaves are somewhat variable, but mostly ovate-lanceolate in shape, and from 3 inches to 5 inches in length, thick and stiff, with numerous oblique veins. The flowers, usually from six to twelve or more, are arranged on stalks from $\frac{1}{2}$ to 1 inch long, as illustrated at figure 1. At figure 2 is illustrated the fruit, which is ovate and often strongly ribbed, nearly $\frac{1}{2}$ an inch long, contracted at the top, and the capsule deeply sunk. This tree is found in South Australia, and north-western Victoria. Baron Von Mueller first directed my attention to this tree as a valuable forage plant both for cattle and sheep. They are very fond of it on account of the sweetness of its leaves, and when the more tender herbage fails, the foliage of this tree is a valuable stand-by for the pastoralist. To Mr. J. E. Brown, Conservator of Forests, South Australia, I am indebted for the specimen from which the drawing was made. I have raised plants from seed which was obtained from Baron Mueller, but my experience of it is that it is not a quick-growing tree in the coastal districts of New South Wales. However, we cannot do better than quote both the Baron and Mr. J. E. Brown's experiences of this tree, as given in the "Select Plants." "A timber tree attaining a height of 120 ft., length of bole to 60 ft., circumference at 5 ft., from the ground reaching 17 ft. The wood remarkably heavy, very dense, hard and strong, less liable to warp than any other kind of eucalyptus wood. It comes into use for fence posts and railway sleepers, naves, and felloes. Its durability is attested by the fact that posts set in the ground fifteen years showed no signs of decay. The tree thrives well, even on dry ironstone ranges. The base of the trunk often swells out in irregular tiers. The sweetish foliage attracts cattle and sheep, which browse on the lower branches, as well as on saplings and seedlings. Scarcely any other eucalypt is eaten (South Australia)." In ordinary culture, Baron Mueller does not find this species of quick growth. But Mr. Brown states that, under favorable circumstances it will grow 1 foot a month. It is one of the most valuable of all trees for the dry and arid regions of South Australia; has grown 7 to 8 feet in a year at Quorn; and has withstood a temperature of 18 deg Fah. in the south of France. The seeds should be sown on land that has been broken up and harrowed. The early autumn months after rainfall are the best, but failing this September or October will do.



Eucalyptus corynocalyx, F. v. M.

“Sugar Gum.”







Eucalyptus gunnii, Hook.
"Sugar or Cider Gum."

ORDER MYRTACEÆ.

EUCALYPTUS GUNNII, Hook.

"Sugar or Cider Gum."

Flora Austr., Vol. III p. 246.

A VARIABLE tree as regards stature. When growing in mountain ranges it is dwarf in habit; and it flowers when only a few feet high. When growing in low moist situations it is often called "swamp gum"; and there it attains a considerable height, often exceeding 30 feet, with a smooth bark. Its leaves are also variable, and range from ovate-lanceolate to lanceolate-acute, and are usually from 1 to 3 inches in length, thick, and very finely veined; though at times we have seen the leaves much larger. The young foliage is glaucous. At figure 1 is illustrated a flowering branch, the flowers of which are sessile, and arranged on axillary short peduncles. At Figure 2 is illustrated the fruit, which is pear-shaped, truncate, and slightly contracted at the orifice, and scarcely one-third of an inch in diameter. The larger branch in the engraving shows the arrangement of the flower buds before expanding. This tree is peculiar to the south-eastern portions of New South Wales, the Baw Baw Mountains in Victoria, and the alpine districts in Tasmania, and is moderately plentiful in some situations. The dwarf forms of this species are much browsed upon by cattle and sheep, which are exceedingly fond of its foliage because of its sweetness. It is a valuable addition to the grazing areas in the high table-lands, where most other herbage is somewhat harsh, and the grasses rather scanty. Bees obtain much honey from the flowers of this species; and on this account it would be of some value if introduced to cultivation in cold districts, where honey-producing flowers are scarce. There is much diversity of opinion with regard to the value of the timber of the larger forms of this species. But Baron von Mueller says: "It is almost equal in strength to that of *Eucalyptus macrorhyncha*, one of the 'stringybarks' most common in elevated situations, '*E. rostrata*,' the river or red gum, and '*E. globulus*,' the world-renowned 'blue gum.'" Its timber is said to make excellent charcoal. This species is one of the few eucalypts which will withstand the rigour of the British climate. Those persons familiar with the parks and gardens of London may have seen some fine specimens of this and other hardy species; and in the more southern portions of the country some of them flourish as if they were in their native habitat. Many hundreds of plants are raised from seed annually of *Eucalyptus globulus* to supply material for what is known as "sub-tropical bedding" in the old country. The beautiful glaucous-white of its foliage forms a most pleasing contrast with the lively green foliage of most European trees and shrubs. The seeds should be sown broadcast on prepared land, after rainfall, in the months of September or October.

ORDER FICOIDEÆ.

TETRAGONIA EXPANSA, MURR.

“Warrigal Cabbage,” “New Zealand Spinach.”

Flora Austr., Vol. III, p. 325.

A DECUMBENT or prostrate annual plant, often extending to several feet. The leaves are arranged on stalks,—the larger ones ovate, triangular, or broadly hastate, 2 to 4 inches long, entire, obtuse, or acute; the smaller ones narrower. The flowers are small and yellow, solitary or two together in the leaf axils. At figure 1 is illustrated the fruit, which is hard, angular, with prominent horns, and from $\frac{1}{4}$ to $\frac{1}{2}$ an inch in diameter. This plant has a wide geographical range, being found in nearly all the Australian Colonies, from the brink of the ocean to the far arid interior of the continent, and in some places it is fairly plentiful. It withstands a phenomenal amount of heat, and will continue to grow through the driest of weather and in the most adverse of seasons. The leaves of this plant are an excellent substitute for spinach; and it would well repay systematic cultivation in the arid parts of country where it would be practically impossible to grow the ordinary kinds of garden vegetables during the summer months. As the seeds are excessively hard, they should be steeped in water for 24 hours before sowing, otherwise they will be slow in germinating. The plant grows best in a light sandy soil. The seeds should be sown where it is intended that the plants are to grow; and they are best put in singly, in rows 3 feet apart, and 3 feet apart in the rows. Apart from the economic value of this plant as a garden vegetable, it is a valuable pasture plant, especially for sheep. It not only supplies a great amount of forage, but from its succulent nature it assuages thirst, which is a great consideration in dry seasons in the arid interior. In dry parts of the country, where this plant may not be found growing naturally, it is well worthy of being introduced, and as it produces a great amount of seed when left undisturbed for a time, there is little difficulty in the way of its dissemination. As this plant also grows on the littoral sands, it might be planted with great advantage to fix the drift sands on our eastern seaboard. If advantage had been taken of our suitable native plants for this purpose instead of looking after exotic ones, of which we had only a superficial knowledge, much good might have been done in fixing the drift sands both at Wollongong and Newcastle. There are only two species of the genus *Tetragonia* indigenous in Australia; but the one under notice is found also in New Zealand, South America, and Asia; *T. implexicoma* (Hook), however, appears to be endemic. This species is found in the southern and western portions of the continent.



Tetragonia expansa, Murr.
"Warrigal Cabbage," "New Zealand Spinach."



LIBRARY
OF THE
UNIVERSITY
OF CALIFORNIA





Daucus brachiatus, Sieb.

“Native Carrot.”

ORDER UMBELLIFERÆ.

DAUCUS BRACHIATUS, SIEB.

"Native Carrot."

Flora Austr., Vol. III, p. 376.

AN annual plant with erect or decumbent, slender or stout herbaceous stems, more or less sprinkled with short stiff hairs. When the plant is in a vigorous state it often attains a height of 2 to 3 feet. Its leaves are arranged on slender stalks, and are twice pinnate, with short narrow incised or pinnate segments. The umbels are composed of from three to five unequal rays. The flowers are small. Its fruits are ovoid and vary in size, but scarcely ever exceed $\frac{1}{4}$ of an inch in length, and are covered with fine bristles as shown in the engraving. In this state they are called "carrot burrs" by stockmen. These "burrs" adhere to the fleece with great tenacity, rendering it troublesome to get them out of the wool. While young this plant is exceedingly good forage, which stock of all descriptions are remarkably fond of; sheep particularly so, and they thrive well on it. Milch cows, however, should not be allowed to eat it, as it would impart an unpleasant flavour both to milk and butter. This plant is distributed generally over the interior of Australia, and in some places it is moderately plentiful, especially on the rich soils and sand hills of our central plains. In the latter place it is a valuable addition to other herbage during November and December, for at this season it is at its best as a forage plant. Generally speaking the native grasses are wiry when growing on these sand-hills, being composed principally of the genera *Aristida* and *Stipa*, consequently the "native carrot" and other succulent herbs are most valuable to the stockowner in such situations. Under cultivation the "native carrot" produces a great amount of herbage, which might be turned into ensilage to advantage. Though this plant is botanically allied to the carrot (*Daucus carota*) of Great Britain, we have never observed any perceptible increase of its root under cultivation which has characterised its northern congener as a table esculent, nor is it likely it ever will become so valuable, even under continuous cultivation, for the reason that our native carrot is only an annual, while its northern congener is biennial; though in a wild state it presents no better material to the theoretical mind than does our native one to work upon. The natural order *Umbelliferae* is not a very numerous one in Australia. According to Baron Mueller, one hundred and seven species only have been recorded. A few of them are shrubby, but the majority are herbaceous plants. The roots of several species of the genus *Trachymene* are edible, but in other genera again they are considered poisonous. There is, however, much diversity of opinion as regards their true qualities, which only a series of experiments and close observation could clear up to the satisfaction of every one. There are several introduced European plants of this order that have become acclimatised in the coastal districts of the eastern colonies. The seeds of the native carrot should be sown broadcast, as soon after the early autumn rains as possible.

ORDER JASMINEÆ.

JASMINUM LINEARE, R. BR.

"Linear-leaved Jasmine."

Flora Austr., Vol. IV, p. 295.

AN erect shrub, either quite dwarf or bushy, and attaining 6 to 8 feet high, or with elongated, somewhat twining branches, usually hoary. The leaves are opposite, or the upper ones alternate three foliolate; leaflets usually lanceolate or linear, the terminal one 1 inch to 4 inches long, the lateral ones shorter. Flowers in axillary trichotomous panicles often numerous, but rarely exceeding the leaves. Berry simple and ovoid, but sometimes didymous, as illustrated at figure 1. This shrub is found in the interior of nearly all the Australian colonies, but it does not appear to be plentiful anywhere. It is a capital plant for resisting the drought, and the peculiar hoary appearance of its three foliolate leaves makes it easy of recognition amongst the surrounding vegetation. In very dry times this shrub is much sought after by stock of all kinds, so that it gets very little chance to recuperate, except when other herbage is plentiful. When it is left undisturbed for a time, however, it produces flowers and fruits in abundance, and the seeds will germinate readily under ordinary conditions. This shrub is worthy of the attention of horticulturists, for it is very ornamental both in flower and fruit, and if introduced into shrubberies would be very effective; and, besides, it will grow in very dry situations, where few other ornamental plants could live. There are about seven species of the genus *Jasminum* found in Australia, but most of them belong to the warmer portions of the continent. Most of them are worthy of being introduced to cultivation, for they are very ornamental. They can be propagated both by seeds and layers; the latter is the quickest way to obtain good-sized plants. If raised from seeds for horticultural purposes they should be sown in pots or pans that have been well drained, and filled with a light rich soil. When the seedlings are large enough to handle, and the weather propitious, they may be transplanted to their permanent quarters.



Jasminum lineare, R. Br.

"Linear-leaved Jasmine."







Marsdenia Leichhardtiana, F.v.M.

“Dooba.”

ORDER ASCLEPIADEÆ.

MARSDENIA LEICHHARDTIANA, F.v.M.

"Dooba."

Flora Austr., Vol. IV, p. 341.

A CLIMBING plant with woody stems at the base, and long twining branches. The young parts are glaucous or silvery white. The leaves are linear, rather thick, and from $1\frac{1}{2}$ to 4 inches long. The flowers are contracted at the top, and arranged in solitary dense umbels in the leaf axils. The fruit is illustrated at the right hand side of the engraving, and consists of a follicle, which is thick, ovoid-oblong, and from $1\frac{1}{2}$ to 3 inches long. The seeds have a long silky tuft of hairs at one end. This climber is found principally in the interior of North Australia, Queensland, New South Wales, South Australia, and West Australia, and in some situations it is moderately plentiful. On sandy ground, and in scrubby country between the Lachlan and Darling Rivers, in New South Wales, it grows very freely. Before the blacks tasted the sweets of civilisation, this plant was of some considerable economic use to them, and in some instances is so still. They dig up the roots, roast and eat them, and they also roast the fruit. The seeds contained therein they consider a delicate morsel, which goes down with great relish. A very viscid milky fluid of a pleasant taste exudes from the fruit when broken from the stem. It is also a capital forage plant, for both cattle and sheep are fond of it, and eat it with avidity; the latter being particularly fond of the young shoots, and often leaving surrounding vegetation to browse upon them. There is not much fear of this plant becoming extinct for some time to come, for even under adverse circumstances it produces a great amount of seed, and when these are ripe they germinate readily under ordinary conditions, and, besides, young stems often grow from the thick roots, when the old ones are eaten off. There are about fifteen species of the genus *Marsdenia* found in Australia, and all of them are twining plants. Some of them are ornamental, and worthy the attention of horticulturists. For twining over arbors in a hot dry climate, hardly any other plants are more suitable. *Marsdenia viridiflora*, a species that bears green flowers in simple umbels, is called the native potato (on account of its thick fleshy roots) in the counties of Camden and Cumberland, in New South Wales. Many other species of the genus also have large fleshy tuberous roots. For horticultural purposes the seeds of these plants should be sown in September or October in pots or pans of finely prepared soil, and when the plants are large enough to handle they should be transplanted to their permanent quarters.

ORDER MYOPORINEÆ.

MYOPORUM DESERTI, A. CUNN.

"Sweet-fruited Myoporum."

Flora Austr., Vol. V, p. 5.

AN erect, close-growing, glabrous shrub growing 3 or 4 feet high, with alternate, mostly linear-lanceolate leaves, which are rather thick, and from 1 inch to 2 inches in length. Its flowers are produced from the leaf axils, and often several together, as illustrated at figure 1 in the engraving. These are succeeded by small, yellow, ovoid fruits, about $\frac{1}{4}$ of an inch long, as illustrated in the larger branch in the engraving. These succulent drupes when ripe have a peculiar, but not unpleasant, taste, of which the aborigines of the Darling and Lachlan Rivers, in New South Wales, are very fond, and previous to the advent of the white man it was one of their food supplies, as it is now with some of the birds in the interior. This plant has a wide geographical range in Australia, being found principally in the interior of all the colonies, and in some situations it is still moderately plentiful. Its free seeding qualities have rendered it somewhat proof against extermination. This plant, with some of its congeners, has been suspected by some persons, when in fruit, of poisoning both cattle and sheep; but my correspondents affirm differently, and, besides, my own observations have led me to believe it makes capital forage for both cattle and sheep in times of scarcity of other herbage, and, in fact, sheep may be seen browsing upon it at all seasons. They will trim it so neatly, by eating off the smaller branches, as to make it appear to have been clipped into shape with a pair of garden shears. There are about a dozen species of this genus found in Australia, and the fruits of some of them were at one time eaten by the aborigines, and at the present time they constitute a considerable portion of the food of many birds. Two or three species of the genus *Myoporum* grow into large shrubs, or small trees, and yield a timber, but not of great dimensions. It is used for various purposes, but not extensively. Very little is known of the physiological properties of the species arranged under the order *Myoporineæ*, and they would well repay most careful research by analysts who could devote their undivided attention over a series of years to their elucidation. If this were done, it would clear up many doubts which at present exist with regard to the economic value of this highly interesting order of plants. Some of them are cultivated in European conservatories, and when they are in flower are most beautiful objects, and are held in great esteem by horticulturists. For garden purposes the seeds of this plant should be sown singly in pots, and when they are large enough to handle should be transplanted to their permanent quarters. For forage purposes the seeds should be sown in places where it is intended to grow the shrubs, as the young plants are very impatient of being removed.



Myoporum deserti, A . Cunn.

“ Sweet-fruited Myoporum.”







Eremophila oppositifolia, R. Br.

“Emu Bush.”

ORDER MYOPORINEÆ.

EREMOPHILA OPPOSITIFOLIA, R. Br.

"Emu Bush."

Flora Austr., Vol. V, p. 20.

AN ornamental shrub or small tree, sometimes attaining a height of 20 feet, and more or less hoary. The leaves are not, as one would suppose from its specific name, always opposite to each other, but are usually alternate or scattered, and from 1 inch to 2 inches or more in length. The flowers are arranged solitary in the leaf axils, and are about 1 inch long. At figure 1 is illustrated an enlarged drawing of the fruit with its adherent calyx, the segments of which are oblong-spathulate, and about $\frac{2}{3}$ of an inch long. This tree is found principally on the plains between the Lachlan and Darling Rivers, in New South Wales; near the Murray River, in Victoria; and in the interior of South Australia. But it is not reported to be plentiful anywhere, for it has been much cut down of late years, during drought time, to feed stock, and nothing, so far, has been done either in the way of the conservation or cultivation of this tree. Both cattle and sheep are fond of browsing upon the foliage of the tree, and the fact of its being available during the most protracted drought makes it doubly valuable to the pastoralist. Any shrub or tree that is available for forage, and will grow as this one does, in the most arid parts of the continent, and often when not a blade of grass is seen for weeks together, is well worthy of extensive conservation and even cultivation. This will have to be resorted to sooner or later, if our central plains are to carry any quantity of stock during such dry periods as are often experienced in Australia. When left unmolested for a time, this tree will produce a fair amount of seed, which will, when ripe, germinate readily under ordinary conditions. Emus eat the fruits of this plant, hence it is called "emu bush"; but there are many trees that bear this appellation by stockmen on account of their fruits being eaten by these birds. This tree produces a close-grained timber, but it is not of large dimensions, and, so far as I have heard, it has not been put to any economic use. There are about thirty-three species of the genus *Eremophila* found on this continent, and they are all endemic. Most of the species, when in flower, are really beautiful objects, and are even much admired by persons who take little interest in plants. Several of the species are cultivated in European conservatories, where they are held in great esteem both by botanists and horticulturists. When we find these beautiful flowering shrubs so much admired in Europe, they should certainly find a prominent place in Australian gardens. We are sure that many of them only require to be known by nurserymen and gardeners, in order to be extensively cultivated. They are easily raised from seed, and the plants will grow in almost any kind of garden soil, provided that it is well drained. The roots of some of the species are very impatient of moisture, and they do not like being disturbed. We have found the best way to raise the seed is singly in pots, and when the seedlings are large enough to handle, to transplant them to their permanent quarters; or, if it is intended to grow the shrubs on a large scale, the seeds should be sown where it is intended to grow them permanently, as the plants are very impatient of being removed.

ORDER MYOPORINEÆ.

EREMOPHILA LONGIFOLIA, F. v. M.

"Berrigan."

Fibra Austr., Vol. V, p. 23.

A TALL, erect shrub, of a slightly hoary appearance, growing from 10 to 20 feet high. Its leaves are scattered on the stems, and are rather thick, linear-lanceolate, and from 2 to 5 inches long, and tapering into recurved points. The pedicles are solitary or two together in the axils of the upper leaves. Flowers $\frac{3}{4}$ to 1 inch long, and velvety on the outside. The four exerted stamens are in pairs—two of them longer than the two others. The genus *Eremophila* (from *ermos*, a desert, and *philo*, to love), is named most appropriately, as the species are found principally on the arid plains in Central Australia. This shrub is peculiar to the Murray, Lachlan, and Darling Rivers, the Liverpool Plains, and the Barrier Ranges, in New South Wales; the Suttro River, in Queensland; the Murray and Avoca Rivers, also the Wimmera district, in Victoria; Spencer's Gulf, in South Australia; and Swan River, in West Australia. In some districts it is moderately plentiful; while in others it is becoming scarce, through being so much cut down during droughts for forage, which both cattle and sheep eat greedily. In fact, in some districts it is one of the chief stand-by's for stock when other herbage and grasses fail. It has been reported from some stations that in times of scarcity of feed rabbits will eat the bark of this shrub in preference to the bark of any other tree or shrub. Its drought-enduring qualities are remarkable, for it grows in the most adverse circumstances of drought and great heat. The peculiar glaucous green colour of this shrub makes it a feature in the landscape when some other kinds of vegetation are languishing for want of rain. The timber of this shrub is brittle, and, in consequence, is not used for any industrial purpose. It never attains very large proportions, however, the diameter rarely, if ever, exceeding 8 inches. The fruit is eaten by emus, and on this account it is often called "emu-bush"; but under this appellation many berry and drupe-bearing trees and shrubs are known. When left unmolested this plant bears moderately plentiful seed, which germinates readily under ordinary conditions. At Figure 1 is illustrated the fruit, which is ovoid or globular, and very succulent, with a hard, bony stone like that of a cherry; but it is completely four-celled. The seeds of this shrub should be sown where it is intended they are to grow permanently as the young plants do not like transplanting.



Eremophila longifolia, F. v. M.
"Berrigan."





LIBRARY
OF THE
UNIVERSITY
OF CALIFORNIA



Eremophila bignoniæflora, F. v. M.

“Emu Bush.”

ORDER MYOPORINÆ.

EREMOPHILA BIGNONIÆFLORA, F. v. M.

"Emu Bush."

Flora Austr., Vol. V, p. 25.

A TALL shrub or small tree, growing from 10 to 15 feet high; but we have seen it under cultivation over 20 feet in height. The leaves are linear lanceolate, acuminate, glabrous, and somewhat glutinous, and from 2 to 6 inches in length. The flowers are arranged singly on short stalks in the leaf axils, each flower being about 1 inch long. At figure 1 is illustrated the fruit, which is ovate, acute, and about $\frac{1}{2}$ an inch long. The outer covering is succulent, but thin, enclosing a very hard stone, which is more or less completely four celled. This shrub is found principally in the interior of New South Wales, Queensland, North Australia, and Victoria, but it is not reported to be plentiful anywhere. On the plains between the Lachlan and Darling Rivers in New South Wales it is becoming somewhat scarce, for it has been much cut down for stock during late years. When herbs and grasses have become scarce for want of rain, this shrub has proved to be a good standby for the pastoralist. So far as it has been observed, however, stock do not browse upon this shrub at all seasons, as is the case with some of its congeners. Still it is worthy of conservation, and even cultivation on our arid central plains, not only to supply forage during long "spells" of dry weather but for the beautiful timber it yields. This plant produces seed in fair quantities, and they germinate readily under ordinary conditions. Emus and some other kinds of birds eat the seeds of the plant, and in consequence it is often called "emu bush" by stockmen; but there are many trees and shrubs which bear this appellation on account of their seeds being eaten by these birds. The timber of this shrub which, however, is not of large dimensions, rarely exceeding 15 inches in diameter, is fragrant, hard, close grained, and beautifully marked with green and yellowish figures. It takes a high polish. The seeds should be sown where they are intended to be grown permanently, as the plants are very impatient of being transplanted, and will often die after the operation.

ORDER MYOPORINEÆ.

EREMOPHILA MACULATA, F. v. M.

"Native Fuchsia," "Emu Bush."

Flora Austr., Vol. V, p. 29.

A TALL elegant shrub with rigid spreading branches, more or less hoary whilst young, but quite glabrous when old. The leaves are mostly lanceolate, and about 1 inch long. The flowers are arranged singly on stalks in the leaf axils, and are variable in colour, "red, more or less variegated with yellow, or quite yellow." At figure 1 is illustrated the fruit, which is ovoid globular in shape, above $\frac{1}{2}$ an inch in diameter, and very succulent on the outside, but the large stone is very hard and bony. This shrub is found in the interior of all the Australian Colonies, except West Australia, and in some situations it is fairly plentiful. When in flower it is one of the most beautiful sights on the central plains of this continent. The plant from which the drawing was made I have had under cultivation for some years, and it never fails to attract attention when in flower. It is worthy of a place in every garden. Besides the lovely flowers it bears, its distinctive evergreen appearance during the driest of weather is a conspicuous feature amongst the surrounding vegetation. This shrub is easily raised from seed, and is of quick growth. The plant at 2 years old was 3 feet 6 inches high and $2\frac{1}{2}$ feet through. This shrub, with some of its congeners, has been suspected by some persons of poisoning sheep, but my correspondents affirm differently; and, besides my own observations over a number of years, have led me to believe that it makes capital forage for both cattle and sheep in times of scarcity of other herbage, and they may be seen browsing upon it at all seasons. Mr. Bauerlin, when collecting plants in the interior for the Technological Museum, Sydney, told me that sheep will trim this shrub so neatly, by eating off the smaller branches, that they appear to have been clipped into shape with a pair of garden shears. The fruits of this shrub and many of its allies are eaten by emus, consequently it goes under the name, in some districts, of "emu bush." The seeds of this shrub should be sown singly in pots, and when the plants are 3 or 4 inches high they should be transplanted to their permanent quarters. The seeds may also be sown where it is intended the plants are to grow, as they are very impatient of removal, and often die after the operation.



Eremophila maculata, F. v. M.

“Native Fuchsia,” “Emu Bush.”



LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Plantago varia, R. Br.
"Variable Plantain or Rib-grass."

ORDER PLANTAGINÆ.

PLANTAGO VARIA, R.Br.

"Variable Plantain," or "Rib-grass."

Flora Aust., Vol. V, p. 139.

A PERENNIAL plant forming a thick stock, with the membranous imbricate bases of the leaves usually enveloped in long hairs. The leaves are all radical and more or less hirsute, and vary in length from 2 inches in some specimens, to 6 inches, and even 1 foot in others. They are mostly lanceolate, or linear-lanceolate, with prominent nerves underneath, and are bordered by a few teeth, though sometimes they are entire. The scapes are longer than the leaves, bearing in the upper portion a more or less interrupted spike of flowers from 1 inch to 4 inches in length. This plant is found on the arid western plains between the Lachlan and Darling Rivers, and on to the Barrier Ranges, in the New England district, and generally on the coastal side of the dividing range in New South Wales. It is found also in the interior of Queensland, in the Wimmera and other stations in Victoria, Cooper's Creek, St. Vincent's, and Spencer's Gulf in South Australia, King George's Sound and Swan River in West Australia. It is moderately plentiful in some of the districts named; for its free seeding qualities have rendered it somewhat proof against extermination. The plant makes most of its growth during the autumn and winter months; also in the early part of the year before many of the indigenous grasses begin to grow. Consequently, on this account, it is a valuable addition to some pastures. Its mucilaginous leaves are much relished by sheep and other small herbivora; while for dairy cows it is considered a good milk producer. Horses eat it but sparingly. Even on poor land, and in uncongenial soils, this plant will produce a large amount of succulent herbage; as its deeply penetrating roots will sustain the plant during adverse times of drought and heat. On rich pasture land, however, it is not a desirable plant to have too much of; for, like most radical-leaved plants, it destroys some of the more tender varieties of grasses with which it comes in contact. For ensilage, however, it might be cultivated exclusively on rich soils to advantage, as the enormous crop of leaves it produces would probably well repay conserving by such means. The seeds of this plant, like most of its congeners, are eaten by some kinds of birds. There are only six species of the genus *Plantago* indigenous in Australia; three of them being truly Alpine plants. But two European species, *P. major* and *P. lanceolata* have established themselves in various parts of the Colony—the latter much to the annoyance of persons who cultivate lawns of the finer kinds of grass. This species may be recognised by its lance-shaped leaves, and long scapes, bearing flowers in a dense ovate head or spike. It is a prolific seed bearer; and the seeds germinate readily after a shower of rain. This species is sold by our seedsmen under the name of rib-grass. It is usually sold in grass mixtures, where its quota in the mixture is from 2 to 3 lb. of seed to the acre. If sown alone 30 lb. are required. One annual species (*Plantago coronopus*, or "Star of the Earth") found on the sandy shores of Europe, is cultivated on the continent for the sake of its young leaves, which are used for mixing in salads. This species is found also in the southern colonies, but it has probably been introduced.

ORDER PHYTOLACCACEÆ.

CODONOCARPUS COTINIFOLIUS, F.v.M.

"Horseradish Tree."

Flora Austr., Vol. V, p. 148.

A SLENDER tree sometimes attaining a height of 30 ft., but frequently it is much smaller. The leaves are somewhat variable, but mostly ovate or ovate-lanceolate, of a pale green or glaucous colour, and from 1 inch to 2 inches in length. This tree produces its flowers in an irregular way. Sometimes they are dioecious—that is, the sexes are borne on separate trees. At other times they are monoecious, when the sexes are borne on separate branches of the same tree. The female flowers are about $\frac{1}{2}$ of an inch in diameter. The males are rather smaller, and contain from 15 to 20 stamens. The fruits are nearly obovoid, depressed in the centre, and scarcely half an inch in diameter. They are arranged on long stalks, as shown in the engraving. The fruit carpels are rather numerous—20 to 30, or rather more, to each fruit. This tree is found principally in the arid interior of North Australia, South Australia, West Australia, Victoria, and on the sand hills near the Lachlan and Darling Rivers, and farther to the westward in New South Wales, and in some situations it is moderately plentiful. Its drought-enduring qualities are remarkable, and, from its peculiar glaucous colour, the tree may easily be recognised among the surrounding vegetation, even during the driest of seasons. It is only cut down for stock during the severest of droughts, but the younger plants are browsed upon by cattle and sheep at almost all seasons, even if other feed is plentiful. Both the bark and leaves of this tree possess a pungent taste rather more pronounced than our common watercress, and on this account stockmen in the interior have christened it the "horseradish tree." This flavour we can detect in old dried specimens that have been a long time in our possession. There is no doubt but that cattle are fond of browsing on the leaves of this tree on account of their pungency. It probably acts as a kind of sauce to other herbs and grasses. The wood is soft and spongy, and of a light colour, and, so far as we have heard, it has never been put to any economic use. There are only five genera and about eleven species arranged under the order *Phytolaccaceæ* in Australia, and they appear to be all endemic. The genus *Phytolacca*, from whence the order takes its name, is an American one. *P. octandra* (commonly known as the "ink-weed") has become quite acclimatised in some parts of Australia; and in many places it is a positive pest and difficult to get rid of. Its free seeding qualities have rendered it somewhat proof against extermination. A beautiful variegated form of this plant may be seen growing in Hyde Park, Sydney, and we have been informed that there is only another plant of its kind in existence. The seeds of this tree should be sown in the early autumn months.



Codonocarpus cotinifolius, F. v. M.

“Horse-radish Tree.”







Rhagodia billardieri, R. Br.

“Coastal Salt Bush.”

ORDER CHENOPODIACEÆ.

RHAGODIA BILLARDIERI, R. BR.

"Coastal Saltbush."

Flora Austr., Vol. V, p. 152.

A BRANCHING, straggling, or erect shrub, attaining a height of about 6 feet. The leaves are from $\frac{1}{2}$ to 1 inch long, usually green above when full-grown, and pale or whitish underneath, somewhat variable in shape, but usually oblong lanceolate. The flowers are arranged in a terminal panicle, with rather slender spreading branches. At the smaller branch in the right-hand corner of the engraving is illustrated a portion in fruit, which consists of numerous small juicy berries. When the shrub is in full fruit, and the dark-red berries are ripe, it gives quite a feature to the plant, and is extremely ornamental. This shrub is found growing in nearly all the Australian Colonies, but is peculiar only to the littoral sands. At one time it was growing abundantly along the coast, but where cattle have had free access it is gradually disappearing. They are so fond of its succulent stems and leaves that it is often cropped down close to the ground, and it has little chance to recuperate or produce seed for its natural reproduction. If the plant is left undisturbed for a time, however, it produces an abundance of seed, so that there would be little difficulty in the way of its redissemination. Besides its natural means of reproduction by seed, it is easily propagated by cuttings made of the half-ripened wood, and put in in the ordinary way. The seeds should be sown during the autumn months, and the cuttings also are best put in at that time of the year. Apart from its great value as a forage plant, it is of the greatest use in binding the drift-sands near the ocean. The plant is neither affected by the severest gales nor by the spray from the sea, for it often may be seen growing on the brink of the ocean. This fact should be noted by those who contemplate planting on these drift-sands to prevent them being blown inland by the fury of sea winds. If this shrub is planted on drift-sands it will be advisable, after the operation is done, to lay tea-tree branches on the sands, and peg them firmly down. This will prevent the plants being smothered with sand until they have become firmly established. Once this is effected, however, the plants are quite able to take care of themselves, except, of course, under close feeding. Cattle might nevertheless be turned occasionally into the enclosures where the plant is grown with beneficial results, because they would eat off the long, straggling growths, which would have the effect of making the shrubs grow thicker, and this would be a decided advantage.

There are about a dozen species of the genus *Rhagodia* indigenous in Australia, and they are found from the coast to the arid interior. Most of them are excellent forage plants, which herbivora of all descriptions are remarkably fond of. Many of them are becoming very scarce, either through overstocking or through being constantly trampled on by the animal's hoofs, which gives them no chance to recuperate or produce seeds for their natural reproduction. Pastoralists regret very much the disappearance of these valuable forage plants from the interior of this continent; but then they have made no provision to perpetuate them, which might be done by a system of conservation in those districts where the plants have not entirely disappeared, and redissemination in those districts where the plants may have died out. Unless this is done grazing areas must become less valuable.

ORDER CHENOPODIACEÆ.

RHAGODIA PARABOLICA, R. BR.

"Old Man Saltbush."

Flora Austr., Vol. V, p. 153.

AN erect shrub, growing from 5 to 10 feet high, and covered all over with a mealy whiteness. The leaves are opposite or alternate, on rather long stalks, somewhat variable in outline, but mostly broadly ovate. The flowers are arranged in distinct clusters along the spreading branches of a terminal panicle, sometimes very dense and crowded, sometimes loose and slender. At figure 1 is illustrated a portion of a fruiting branch, the fruits of which are succulent when ripe, each one being scarcely $\frac{1}{6}$ of an inch in diameter. This shrub is found in the interior of Queensland, New South Wales, and South Australia, and usually in or near moist places, but is nowhere very plentiful. It is probably one of the best known of all saltbushes by stockmen, and on account of its mealy-white appearance they have given it the common name of "Old Man Saltbush." At one time this shrub was a prominent feature in many places in the interior, but of late years it is gradually becoming more scarce. Much of this has come about by overstocking, and from no attempt having been made either in the way of cultivation or even conservation of this useful forage plant. It is much more readily eaten by cattle than by sheep. This, however, may be accounted for by its tall branches being out of the reach of the latter. It is said that rabbits eat the bark of this shrub when forage is scarce, and also that grasshoppers are particularly fond of its foliage. It will be seen, therefore, that there are several agencies at work which will in a measure account for its scarcity in places where it was at one time fairly plentiful. If this shrub is left unmolested for a time it quickly recuperates and produces an abundance of seed, which will, when ripe, germinate readily under ordinary conditions; and besides, it is readily increased by cuttings made of the half-ripened wood, planted in the ordinary way during the early autumn or spring months. There will be no difficulty, therefore, in collecting seeds and redisseminating them in those districts where the plant may have become extinct, or increasing the plants by cuttings where they may still be growing.



Rhagodia parabolica, R. Br.

“Old Man Salt-bush.”







Rhagodia hastata, R. Br.

“Halbert-leaved Salt Bush.”

ORDER CHENOPODIACEÆ.

RHAGODIA HASTATA, R. BR.

"Halbert-leaved Saltbush."

Flora Austr., Vol. V, p. 156.

A DIVARICATELY branched undershrub, spreading to 2 or 3 feet when growing in its natural state; but we have seen this shrub under cultivation 5 feet high and 7 feet through. The whole plant is covered with a slightly mealy whiteness, which increases with the dryness of the weather. The leaves are mostly opposite, ovate-hastate in outline rarely 1 inch long, and arranged on short stalks. The flowers are small, clustered, and are usually arranged on compact simple or slightly branched terminal spikes, as shown in the engraving. At figure 1 is illustrated the fruit, which is usually red, and scarcely $\frac{1}{2}$ of an inch in diameter. When this shrub is in full fruit, it is really a beautiful object to look at. The silvery whiteness of its leaves forms a good background to the clusters of red berries. This plant is found in Queensland, New South Wales, and Victoria, from the coast to the arid interior; but in no situation is it very plentiful for overstocking has had a most serious effect upon this, as also on many other valuable pasture plants. It is one of the famous salinous plants which have earned for our central plains the name of being the finest feeding grounds for stock in the world. To keep up the name, however, will necessitate a system of conservation, or even cultivation, being carried out with this and many other valuable saltbushes, which are gradually disappearing from our central plains. It has been proved that when there are plenty of salinous plants growing on runs the sheep are never troubled with fluke or other *Distoma* diseases. It has been said that horses which are subject to swamp cancer in the coastal districts have been cured when turned into saltbush country. Stock of all descriptions are remarkably fond of these plants, and both sheep and cattle thrive well on them. The drought-enduring qualities of the plant under notice are phenomenal, and we have frequently seen this shrub, with the peculiar glaucous or silvery whiteness of its foliage which gives to it quite a character, flourishing when the surrounding vegetation was dried up. It will grow anywhere if frosts are not too severe, and in almost any kind of soil except swamp land. Generally speaking, the drier the soil and the hotter the climate, the better the plant grows. It will bear any amount of clipping provided it is not too close to the root, and if left undisturbed for a short time it soon makes an abundance of growth. It is not always the browsing upon these shrubs that leads to their extermination. It is the constant trampling of the animal's hoofs that plays so much havoc amongst them, and the only way to save the plants is to have specially reserved areas, where forage could be cut whenever required. If this were done, thousands of sheep might be saved from starvation in drought time. There is no difficulty in propagating the plant, for besides its natural means of reproduction by seed, it can be most easily grown from cuttings planted in the ordinary way, and where the shrubs are intended to be grown.

I have known of an instance where cuttings have been sent in a letter from the far interior to Sydney by post, which takes several days, and then put in the ground. The last time that I saw them they had grown into large shrubs and as round as a ball. This shape, of course, had been brought about by annual clippings. I only mention this instance to show the tenacity of life of this plant. If raised from seed it should be sown during the early autumn months.

ORDER CHENOPODIACEÆ.

RHAGODIA NUTANS, R. Br.

"Nodding Saltbush."

Flora Austr., Vol. V, p. 156.

AN herbaceous prostrate, or procumbent and slender plant, with stems usually spreading from 1 foot to 2 feet, but we have occasionally seen the stems nearly 3 feet long; and whilst young the foliage is more or less mealy-white. The leaves are opposite, or here and there alternate, arranged on slender stalks, and somewhat variable in shape, but mostly broadly hastate with prominent basal lobes, the lower ones about 1 inch long, but the upper ones get gradually smaller towards the inflorescence. The flowers are very small, and are arranged on terminal spikes, or slightly-branched often nodding panicles. The fruits are also very small, each one being about $\frac{1}{2}$ of an inch in diameter, with the outer part red and succulent when fresh, and thin when dry. Figure 1 is an enlarged illustration.

This plant is found in nearly all the Australian Colonies, from the coast to the arid interior, and in some places it is fairly plentiful. Where it is not too closely fed down its prostrate stems often carpet the ground for a considerable distance, which prevents the evaporation of moisture from the soil near its roots. This of course enables the plant to withstand a great amount of dry weather, and its foliage is easily recognised in dry weather amongst the surrounding vegetation. It is an excellent forage plant for all herbivora, sheep being particularly fond of it. This salinous plant is well worthy of systematic conservation, or even cultivation, on the central plains of this continent, for it can always be depended upon in the driest of seasons to supply a fair amount of valuable herbage. When left unmolested for a time it produces a great amount of seed which, when ripe, germinates readily under ordinary conditions; so that there would be no difficulty in redisseminating it in those districts where it may have become scarce through overstocking. It may also be struck from cuttings planted in the ordinary way, and where it is intended that the plants should remain. If cuttings are used as a means of propagating it, they should be put in during the early spring or late autumn months. The seeds may be sown in August or March.



Rhagodia nutans, R. Br.

“Nodding Salt Bush.”







1

Chenopodium nitrariacea, F. v. M.

"Branching Goosefoot."

ORDER CHENOPODIACEÆ.

CHENOPODIUM NITRARIACEA, F.V.M.

"Branching Goosefoot."

Flora Austr., Vol. V, p. 158.

A DIVARICATELY-BRANCHED undershrub of 3 or 4 feet in height, though under cultivation we have seen this plant 8 feet high and 6 feet through. The whole plant has a hoary or mealy-white appearance. The leaves are alternate, sometimes clustered at the ends of the branchlets, and variable in shape, but mostly linear, oblong, obtuse, and from $\frac{1}{2}$ to 1 inch in length. The flowers are very small, sessile, usually clustered in interrupted or dense spikes, as shown in the engraving. At Figure I is illustrated an enlarged drawing of the fruit, which is partly enclosed in a five-lobed perianth. This plant is found principally about the Murray and Avoca Rivers in Victoria, Swan River in West Australia, and near the Darling River in New South Wales. On the Darling River Flats it was at one time moderately plentiful; but, through the overstocking of runs of late years, it has been rendered somewhat scarce. Herbivora of all descriptions are remarkably fond of this plant; and when other herbage has been scarce, they often have cropped it down so close to the ground that it has had little chance to recuperate. When left unmolested for a time, however, it rapidly recovers, and produces seed in abundance, which, if sown when ripe, germinates readily under ordinary conditions. This is one of the famous salinous plants which are rapidly disappearing from the central plains of this continent, much to the regret of all stockowners, who, however, have done nothing in the way of cultivation, or even conservation, of these valuable forage plants. It will be necessary to enter upon a system of conservation of this and many of its allies, if our central plains are to maintain the high reputation they have acquired of being such rich pasture grounds for stock. By continued neglect of these most valuable pasture plants, we are slowly but surely injuring our best interests. We often hear the remark, "What would the country do without its wool?" but we never have heard any one say, "What would be the result if these valuable plants die out?" Some fine day we may be rudely awakened to the fact that, instead of being able to conserve what material we are already possessed of at very little expense, a costly system of cultivation will have to be resorted to to feed the flocks and herds on the plains of the interior. The seeds of this plant should be sown during the early autumn months if there should be sufficient rainfall to moisten the earth. Failing this, the seeds may be sown in September or October, when the ground is moist.

There are about twelve species of the genus *Chenopodium* found growing in Australia. Seven appear to be endemic, and five of them are widely distributed over the temperate and sub-tropical portions of the globe. The leaves and youngest shoots of many species arranged under this genus are used as pot-herbs in some countries. *Chenopodium ambrosioides*, Linn., which is a common weed in Australia, is said to contain an essential oil possessing tonic and anti-spasmodic properties. The exotic species, to which the greatest interest attaches, is, however, *C. quinoa* (which has been introduced in Australia), indigenous to the Pacific slopes of the Andes, where it is largely cultivated in Chili and Peru for the sake of its seeds, which are extensively used as an article of food. The seeds contain a great amount of albumen, which no doubt constitute them a nutritious article of food.

ORDER CHENOPODIACEÆ.

CHENOPODIUM AURICOMUM, LINDL.

"Blue-bush."

Flora Austr., Vol. V, p. 159.

AN erect-growing perennial plant of from 3 to 5 feet, and more or less mealy-white or hoary all over. The leaves are ovate or oblong, very obtuse, with prominent basal lobes, from 1 inch to 2 inches long, and are arranged on rather long stalks. The flowers are arranged in little dense globular clusters along the branches of a terminal panicle, sometimes distinct and rather distant, sometimes crowded into dense spikes. At Figure I is illustrated an enlarged drawing of the fruit partly enclosed in the five-lobed perianth. The blue-bush is found in the arid interior of this continent, from the Darling River in New South Wales to the Gulf of Carpentaria in the north; but in no place does it appear to be plentiful. Its drought-enduring qualities are remarkable, and it will continue to grow in the most adverse seasons of drought and great heat. The plant is easily recognised by its mealy whiteness, and sometimes almost golden hue; hence its specific name. Pastoralists speak very highly of it for its nutritive and wholesome qualities, and many regrets are often expressed that the plant is becoming so scarce on our central plains. It is a valuable pasture plant, which stock of all kinds are remarkably fond of, and they often crop its rich succulent stems down so close to the ground that it has little chance to recuperate or mature seed for its natural reproduction, and there is a danger of it becoming extinct on some "runs," especially those that are heavily stocked. Besides its value as a pasture plant, the leaves and young shoots can be gathered and cooked as spinach, for which they make an excellent substitute. This fact should be noted by persons who live in the interior, for, with very little expense, a succulent esculent could be depended upon by cultivating this plant in the driest of seasons, and when it would be practically impossible to cultivate the ordinary kitchen-garden vegetables. When the plant is left undisturbed for a time it will produce an abundance of seed, which germinates readily under ordinary conditions, so that there will be no great outlay required to enter upon a system of cultivation, either as a garden esculent or for forage purposes. A 30-acre paddock, ploughed and harrowed and sown down with this plant, would in a few months yield a phenomenal amount of rich succulent herbage, from which daily cuttings might be made, even in the most adverse times. Some such system will have to be carried out if pastoralists intend to save their flocks and herds from starvation, which now occurs during every recurring drought, and the sooner this fact is realised and acted upon, not only will pastoralists be more wealthy, but it will add materially to the resources of the country in the greater yield of wool and beef which could be exported.

The seeds of this plant should be sown during the early autumn months, after there is a sufficient rainfall to make the ground moist; or, failing this, they may be sown in September or October. The plant will also strike from cuttings made of the half-ripened wood, and put in in the ordinary way. The best time of the year to plant the cuttings is after rainfall in the autumn months. They should be put in where it is intended the plants are to grow, 6 feet apart in the rows, and the rows 6 feet apart.



1

Chenopodium auricomum, Lindl.

“Blue Bush.”







Chenopodium microphyllum, F. v. M.

“Small-leaved Goosefoot.”

ORDER CHENOPODIACEÆ.

CHENOPODIUM MICROPHYLLUM, F. v. M.

"Small-leaved Goosefoot."

Flora Austr., Vol. V, p. 161.

A MUCH-BRANCHED diffuse perennial plant, covered more or less all over with a mealy whiteness. The leaves are very variable on different plants, and range from ovate to broadly lanceolate. The flowers are very small and few together, in rather loose clusters in the upper axils, as shown in the engraving. At Figure I is illustrated an enlarged drawing of the fruit partly enclosed in the five-lobed perianth. This plant is peculiar to the south-west parts of the country, being found near Goulburn and on different runs toward the Victorian boundary, in New South Wales, Bacchus Marsh, and the Wimmera District in Victoria, though not in great quantities. It is an excellent fodder-plant for sheep, which eat it with avidity, and, being of a slightly salinous nature, it is particularly relished by all small herbivora. It is probably on this account that the plant is not now plentiful as it was at one time on these plains, where sheep and cattle have so long been depastured. On neglected lands, however, and in places rarely frequented by stock, it makes great growth, and most of it during the hottest part of the year, and on this account it is well worthy of conservation, and even cultivation. Many of its congeners are excellent vegetables, and they grow even in adverse circumstances, and are succulent when many other esculents are withered through drought. When not too closely fed down, the plant seeds in abundance, and the seeds germinate readily under ordinary conditions. They should be sown in the early autumn after rainfall, or failing this, in September or October.

ORDER CHENOPODIACEÆ.

CHENOPODIUM CARINATUM, R. BR.

"Rough-leaved Goosefoot."

Flora Austr., Vol. V, p. 162.

AN annual plant, with much branched stems, ascending to 1 foot or more in height. The lower leaves are coarsely toothed, and from $\frac{1}{2}$ to 1 inch long, the upper ones much reduced. The flowers are small and arranged in dense globular clusters in almost all the leaf axils, the upper ones forming interrupted, more or less, leafy spikes, as shown in the engraving. At Figure I is illustrated an enlarged drawing of the fruit, which is partly enclosed in the five-lobed perianth. This plant has a wide geographical range, being found in Queensland, New South Wales, Victoria, South Australia, and Western Australia, from the coastal districts to the arid interior, and in some situations it is fairly plentiful; but this may be accounted for by the great amount of seed the plant will produce when left undisturbed for a time, and the seed germinating readily even under adverse conditions. It generally starts into growth in November and December, and continues growing until April, when it gradually dies away. The plant will grow during very dry weather, and, whilst young, affords a tender herbage which sheep will eat, although it is said that cattle and horses do not eat it whilst other herbage is plentiful. This may be accounted for by its having somewhat rough leaves and stems.



Chenopodium carinatum, R. Br.

“Rough-leaved Goose-foot.”





LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Chenopodium atriplicinum , F. v. M.
"Atriplex-like Goosefoot."

ORDER CHENOPODIACEÆ.

CHENOPODIUM ATRIPLICINUM, F. v. M.

"Atriplex-like Goosefoot."

Flora Austr., Vol. V, p. 163.

A PERENNIAL plant, branching at the base only, with numerous erect stems usually attaining a height of 1 foot. The leaves are somewhat variable, but are usually from lanceolate to broadly hastate. The lower ones are about 2 inches long, and the upper ones smaller and narrower. The flowers are arranged in dense axillary clusters, often from the base to the apex of the stems. This plant is peculiar to the arid central plains beyond the Darling River in New South Wales, Winmera District in Victoria, and Flinder's Range in South Australia, and it is fairly plentiful in some of those districts. Its free seeding qualities have rendered it somewhat proof against extermination. Its drought enduring qualities are remarkable; for it flourishes even in the driest seasons, and its fresh pale green and slightly pubescent foliage can readily be detected among other vegetation. But this, in a great measure, may be accounted for by its very long roots, which penetrate the earth for a considerable distance downward, and, consequently, are out of the reach of the scorching influence of the sun's rays during the summer months. It is a capital forage plant, which all herbivora eat with avidity; and pastoralists look upon it as a valuable and nutritious herb during all seasons. On this account it is well worthy of conservation, as also are all forage plants which will grow on our arid plains. Continued neglect and overstocking runs are slow but sure means for their extermination. When left unmolested this plant produces an abundance of seeds which germinate readily if sown in the spring of the year, and under ordinary conditions.

At Figure I is illustrated a section of the perianth.† The segments, four or five, are erect, lanceolate, and at the points somewhat spreading. The seeds are wrinkled, and enclosed in the perianth.

ORDER CHENOPODIACEÆ.

ATRIPLEX STIPITATA, BENTH.

"Kidney-fruited Salt-bush."

Flora Austr., Vol. V, p. 168.

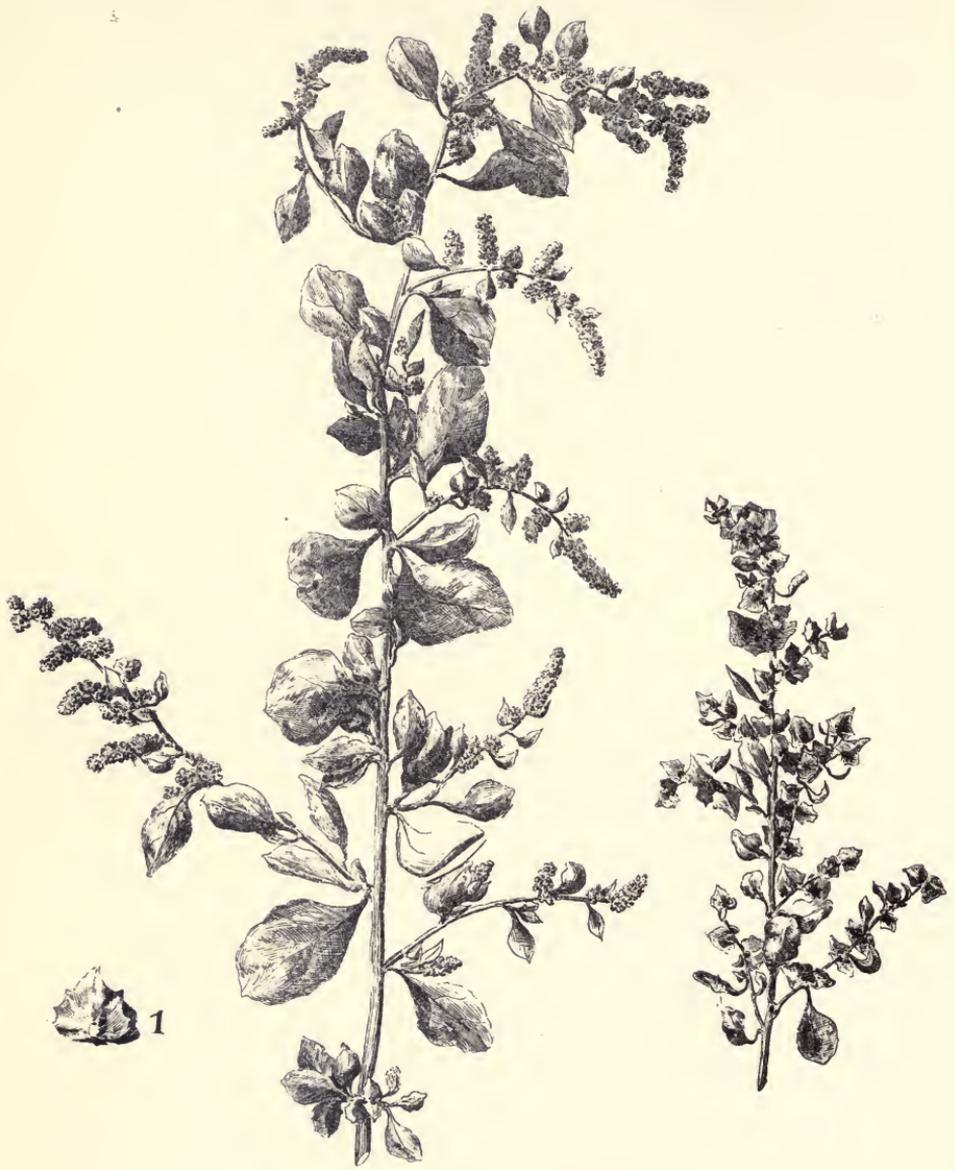
AN erect, bushy, rather slender shrub; scaly white or somewhat brown all over. The leaves are variable, but mostly narrow, oblong, very obtuse, contracted into a short stalk, rather thick, and about three-quarters of an inch long. Flowers dicecious—that is, the male and female flowers are borne on separate plants. At Figure I is illustrated the fruiting perianth, which is arranged on a slender stalk of about one-third of an inch long. The valves are flat, kidney-shaped, entire, and rarely half an inch broad. This plant is found in the arid interior of New South Wales, Victoria, and South Australia; but, as far as I know, it is not very plentiful anywhere, and it is yearly becoming more scarce on our arid central plains. This is to be regretted, for it is one of the famous salinous plants which, along with its congeners, has earned for our central plains the name of being the richest feeding grounds for stock in the world. If this title is to be preserved, however, it will be necessary to enter upon a system of conservation or cultivation of these valuable plants. The shrub under notice will withstand a phenomenal amount of dry weather, and by systematic conservation its valuable herbage would be available during the most protracted droughts. It is an excellent forage plant, of which herbivora of all descriptions are remarkably fond, and for this reason we may account for its not being plentiful. When left unmolested for a time, it produces a fair amount of seed, which, when ripe, germinates readily under ordinary conditions. There are about thirty species of the genus *Atriplex* indigenous in Australia, and they are found from the littoral sands to the arid interior. Most of them are excellent forage plants, and are well worthy of extensive conservation, and even cultivation, on the arid plains of this continent. Many of them make excellent table vegetables when properly cooked, and might very well be used for such a purpose in places where the less hardy kinds of esculents would not thrive, especially during the extreme heat of summer.



Atriplex stipitata, Benth.
"Kidney fruited Salt Bush."







Atriplex nummularia, Lindl.

“Round-leaved Salt Bush.”

ORDER CHENOPODIACEÆ.

ATRIPLEX NUMMULARIA, LINDL.

“Round-leaved Salt-bush.”

Flora Austr., Vol. V, p. 170.

A SHRUB which attains a height of from 6 to 10 feet, and is covered all over with a scaly tomentum. Its leaves are variable, but mostly orbicular, rather thick, and slightly sinuate-toothed. This plant is dioecious—that is, the two sexes of flowers are borne on separate plants. The large branch in the engraving illustrates the male, and the smaller one the female perianths. It is peculiar to the Macquarie, Castlereagh, and Darling Rivers, and the arid far-western plains in New South Wales, Darling Downs in Queensland, Murray Scrub in Victoria, and in the interior of South Australia, and at one time was moderately plentiful in those places; but the over-stocking of runs has had a most serious effect on this plant, for in some places it is nearly exterminated. Cattle, sheep, and other herbivora are so extremely fond of this plant, and often crop it so closely down that it has little chance to recuperate, much less produce seed sufficient in quantity for its natural perpetuation. Its drought-enduring qualities are remarkable; for it withstands the hot winds on our arid central plains throughout the summer months with little check upon its growth. Such a valuable fodder plant is well worthy of extensive conservation and even cultivation; and if this is not done within a few years it will then be practically impossible, except under very careful management. When not too closely fed down the plant will seed in abundance, and the seed will germinate readily under ordinary conditions. It will also strike readily from cuttings put in in the ordinary way; so no great outlay will be required to enter upon a proper system of conservation of this plant, if taken in time. Figure I shows a section of the fruiting perianth, which is sessile, rounded and hardened at the base, the valves free nearly to the base, and toothed on either side. The seeds of this plant are best put in during the autumn months, and the cuttings will also strike more readily at that than at any other season of the year. This plant may frequently be seen growing in gardens in the coastal districts. I had a specimen brought from Goulburn for identification that was taken from a shrub 12 feet high.

In the proceedings of the Royal Society of New South Wales for 1880, Mr. W. A. Dixon gave the following analysis of this plant:—

Oil	2·18	On Ash.	On Plant.
Carbohydrates	42·85	Potash	15·69 ... 4·91
Albuminoids... ..	16·45	Soda	29·57 ... 9·25
Woody fibre... ..	7·24	Chloride of sodium	30·28 ... 9·47
Ash C.O. ₂	31·28	Lime	8·65 ... 2·71
		Magnesia	6·77 ... 2·12
	100·00	Ferric oxide	0·64 ... 0·20
		Sulphuric oxide	3·17 ... 0·99
Nitrogen	2·63	Phosphoric oxide	4·11 ... 1·28
		Silica (soluble)	1·12 ... 0·35
Woody parts of plant	10 per cent.		
Edible	90 per cent.		
			100·00 ... 31·28

ORDER CHENOPODIACEÆ.

ATRIPLEX CINEREA POIR.

"Grey Salt-bush."

Flora Austr., Vol. V, p. 171.

A BRANCHING shrub, which often attains a height of several feet, and is covered all over with a white or grey scaly tomentum. Its leaves are oblong, or lanceolate, and are from 1 inch to 2 inches in length. This species is semi-dicæious; but our illustration shows the male flowers only, which are borne in dense globular clusters collected into a terminal spike. At Figure I is illustrated a fruiting perianth, with a solid turbinate base and broadly triangular valves. It is peculiar to the saline sands on the eastern, southern, and western seaboard of the continent, which it helps to bind. This fact might be noted by those who are engaged in planting drift-sands at Newcastle and Wollongong. It is a plant which is easily propagated both by seed and cuttings. The latter should be made of the half-ripened wood, and planted in the ordinary way. The seeds can be sown where the plants are intended to grow, or in prepared beds, and when the seedlings are large enough to handle they can be transplanted to their permanent quarters. It is a capital forage plant for cattle, and they eat it with great avidity. Its particular relish may be accounted for by the fact of its being one of our famous salinous plants, which have made the pastures of Australia such rich feeding grounds for all herbivora. When timber-getters on the eastern seaboard depended on bullocks for hauling logs out of the scrub, they would turn the animals out for weeks together at slack times, or when they were getting a number of logs ready for hauling. When the bullocks were wanted, the timber-getters invariably struck a line for the coast, where the animals would be found rolling fat through feeding on this coastal vegetation. On one occasion, when sent to report on the timber of a particular district and collect the indigenous flora, I remember seeing the timber-getters going for their bullocks. About a fortnight previously three escapees from New Caledonia had landed at the place where the bullocks were depasturing. They had killed and nearly eaten two out of the number, and, with their skins, had made themselves a tent. The timber-getters, of course, were much put out; but they took a humane view of the matter. When I left the escapees were giving their services, as a slight recompense for the loss of the bullocks; and they seemed quite satisfied with having been treated so leniently. The seeds of this plant may be sown either in the spring or autumn months; but the cuttings are best put in during the autumn.



Atriplex cinerea, Poir.
"Grey Salt-bush."



LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA





Atriplex rhagodioides, F. v. M.

"Silver Salt Bush."

ORDER CHENOPODIACEÆ.

ATRIPLEX RHAGODIODES, F. v. M.

"Silver Saltbush."

Flora Austr., Vol. V, p. 172.

A MUCH-branched shrub, seldom growing more than 2 feet high. Its leaves are exceedingly variable and range from ovate to lanceolate and even angular, but are always entire, and are from $\frac{1}{2}$ to 1 inch long. The male and female flowers are shown in the engraving on separate stems, but are from the same plant. The whole shrub is covered with a silvery scaly tomentum, which gives it a very bright appearance, forming quite a feature in the landscape where it occurs on the central plains of this continent. Hence its common name, "Silver Saltbush," amongst pastoralists. It is an excellent forage plant of which stock of all descriptions are remarkably fond, sheep particularly so, and they are said to thrive well on it. But like many more valuable fodder plants on the central plains it is becoming scarce in many places, where it once was fairly, plentiful, through overstocking.

This salinous plant is well worthy of conservation, for it will produce a rich succulent herbage during the driest of seasons, and, if left unmolested for a time, will produce an abundance of seed which, when ripe, germinates readily under ordinary conditions. Besides this mode of propagation, it is most readily increased by cuttings made of the half-ripened wood and put in the ordinary way, so that no great outlay would be required to enter upon a system of conservation or cultivation of this plant.

At figure 1 is illustrated an enlarged drawing of the fruiting perianth, which is sessile on the stalk, orbicular or nearly rhomboid, with thick convex corky valves, united about half-way up. These seeds are round.

The seeds of this plant should be sown during the early autumn months and after rainfall if possible, or, if the weather is unpropitious at that time, the sowing may be deferred till spring. The cuttings will strike more readily if put in during the early autumn months. They should be put in where it is intended the plants are to grow. The original drawing, engraving, and specimen of this plant were lost in the fire mentioned in the preface. The photolithograph has been taken from a print which I managed to save; but of course the plant is not so well depicted as if it had been taken from a drawing.

ORDER CHENOPODIACEÆ.

ATRIPLEX VESICARIA, HEW.

"Bladder Saltbush."

Flora Austr., Vol. V, p. 172.

AN erect bushy shrub growing about 18 inches or 2 feet high, and covered with a scaly tomentum. The leaves are variable but mostly oblong, lanceolate, contracted into a short stalk, and about $\frac{3}{4}$ of an inch long. This plant is sometimes diœcious, that is the male and female flowers are borne on separate plants. Sometimes they are monœcious when the unisexual flowers are borne on the same plant. The male flowers are arranged in small clusters forming rather dense terminal spikes of about 1 inch long. The female flowers are few together in axillary clusters. At figure 1 is illustrated a section of the fruiting perianth which is membranous, with large membranous inflated appendages like bladders on each face. Hence its common name "Bladder Saltbush." This plant is found in the interior of Queensland, New South Wales, and South Australia, and in some situations it is fairly plentiful. Its presence on our inland plains in such quantities, may be attributed to the fact that it produces an abundance of seed, when the plants are left undisturbed for a time, and when ripe they germinate readily under ordinary conditions. This plant can also be propagated most readily by cuttings made of the half-ripened wood and put in in the ordinary way. Early autumn or the spring of the year is the best time for this operation. It is regarded as an excellent forage plant both for cattle and sheep, and they thrive well on it, but it is said that horses never do, and it is seldom that they will eat it unless other forage plants are scarce.

The seeds of this plant should be sown during the early autumn months and after rainfall if possible, or, failing this, during the early spring months.



Atriplex vesicaria, Hew.
"Bladder Salt-bush."



[Faint, illegible handwritten text]





Atriplex angulata, Benth.
"Angular-fruited Salt Bush."

ORDER CHENOPODIACEÆ.

ATRIPLEX ANGULATA, BENTH.

"Angular-fruited Salt-Bush."

Flora Austr., Vol. V, p. 174.

A DWARF shrubby plant with spreading branches of about 2 feet, and more or less covered with a mealy whiteness. The leaves are arranged on rather long stalks, and are somewhat variable in shape, and also in size. The flowers are monœcious—that is, the stamens and pistils are borne in separate flowers on the same plant; the male clusters are arranged in the upper leaf axils, and the females in the lower ones. At figure 1 is illustrated an enlarged drawing of a section of the fruiting perianth. The plant has a very limited geographical range, being found only, as far as can be ascertained, in the arid interior of New South Wales and South Australia, but nowhere is it reported to be plentiful. It will withstand a phenomenal amount of dry weather, and if left undisturbed it will grow through the severest of droughts. It is one of our famous salinous plants which is well worthy of conservation and even cultivation, and this can be easily brought about, for if the plant is left undisturbed for a time it will produce an abundance of seed, which, when ripe, will germinate readily under ordinary conditions. Even the cultivation of this plant would well repay the trouble, for a most valuable forage could always be depended upon during the most adverse times of drought and heat, a forage too of which herbivora of all kinds are remarkably fond. Reserved areas of salinous plants will have to be a prominent feature on our arid plains if pastoral occupation is to be successfully carried on in the future, for it cannot be denied that many of these most valuable plants are gradually disappearing, not always through overstocking, but by the constant tramping of the animals' hoofs; and the only way that this can be prevented is to have reserved areas made so that the plants can recuperate, and the sooner this is an accomplished fact, the less likely are stock to die of starvation, which they do during every recurring drought. The seeds of the plant under notice should be sown during the early autumn months, after rainfall if possible, or failing this, the sowing can be deferred until September or October.

ORDER CHENOPODIACEÆ.

ATRIPLEX SEMIBACCATA, R. BR.

"Half-berried saltbush."

Flora Austr., Vol. V, p. 175.

A PROCUMBENT or prostrate much-branched, slender perennial plant, with herbaceous stems spreading from 1 foot to 2 or more feet. The whole plant is pale green, though sometimes it is mealy white. Its leaves are arranged on short stalks, and somewhat variable in shape, but mostly oblong-lanceolate, or cuneate, sinuate toothed, and rather thin, and from $\frac{1}{2}$ to 1 inch in length. The flowers are monœcious; the males are arranged in little globular clusters in the upper leaf axils, and surrounded by a few females, but the latter often are alone in the lower leaf axils. At figure 1 is illustrated an enlarged drawing of the fruiting perianth, which is more or less rhomboidal, and about $\frac{1}{4}$ of an inch long, and nearly as broad in the centre, with three prominent nerves. The lower half is usually thickened, but not succulent as one would suppose from its specific name; the upper half consisting of flat triangular valves, which are herbaceous only near the margins. This plant is found in all the colonies, from a few stations near the coast to the arid interior, but it does not appear to be very plentiful anywhere. On the Darling and Lachlan Rivers, in New South Wales, the plant is held in much esteem by stockowners as a most valuable herb for sheep, which eat it down with avidity, and often so close that it has little chance to recuperate or produce seed. Consequently it is becoming scarce in some situations where a few years ago it might be seen growing in moderate quantities among other herbage. It is one of the famous salinous plants that are fast disappearing from the central plains of this continent through overstocking, and unless something is done in the way of conservation of this plant, and many of its allies, within the next few years, conservation will be difficult, and a system of cultivation will have to be resorted to if ever we intend to perpetuate the growth of our high-class wool. Climate, no doubt has a great deal to do with the production of high-class wool, but the indigenous herbage is the principal factor. The plant under notice when left unmolested for a time produces seed in fair quantities, and it germinates readily under ordinary conditions. The seeds should be sown after rainfall during the autumn months, or, failing this, during September or October whilst the ground is moist. If this is attended to germination will take place quickly.



Atriplex semibaccata, R. Br.

“Half-berried Salt-bush.”





LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Atriplex Muelleri, Benth.

“Mueller's Salt-bush.”

ORDER CHENOPODIACEÆ.

ATRIPLEX MUELLERI, BENTH.

"Mueller's Saltbush."

Flora Austr., Vol. V, p. 175.

AN erect or spreading annual, with a woody base, often exceeding 2 feet in height, more or less covered over with a mealy whiteness. Leaves on short stalks, thin and variable, but mostly obovate or ovate, and from 1 to 2 inches in length. The flowers are small and monœcious, arranged in axillary clusters. The males surrounded by a few females in the upper axils, and the females alone in the lower axils. The fruiting perianths are exceedingly small, scarcely exceeding $\frac{1}{2}$ of an inch in diameter. At figure 1. is illustrated an enlarged drawing of one. This plant is distributed generally over the interior of Australia, but it is not plentiful anywhere, and in some situations it is becoming scarce. All kinds of herbivora are remarkably fond of this plant, sheep particularly so, and they often browse it down to the ground, which of course prevents its seeding, thus destroying its only natural means of reproduction in such quantities as it otherwise would do. When left unmolested for a time, however, it produces moderately plentiful seed, which germinate readily under ordinary conditions. This plant is well worthy of conservation on the arid central plains of this continent, for it will grow in the most adverse season of drought and heat, and would afford good herbage when the native grasses are somewhat dried up for want of rain. In places where ordinary garden vegetables cannot be grown satisfactorily, on account of hot winds and great heat during the summer months, this plant might be cultivated to advantage, and used as a table esculent as a substitute for spinach. The European orach (*Atriplex hortensis*), which is closely allied to this plant, is much cultivated on the Continent for the sake of its leaves, which are boiled like spinach, and eaten, being also mixed with sorrel to modify the acidity. The seeds of this plant should be sown in September or October, and after rainfall if possible, but not when the ground is unworkable.

ORDER CHENOPODIACEÆ.

ATRIPLEX LEPTOCARPA F. v. M.

"Slender Fruited Saltbush."

Flora Austr., Vol. V, p. 178.

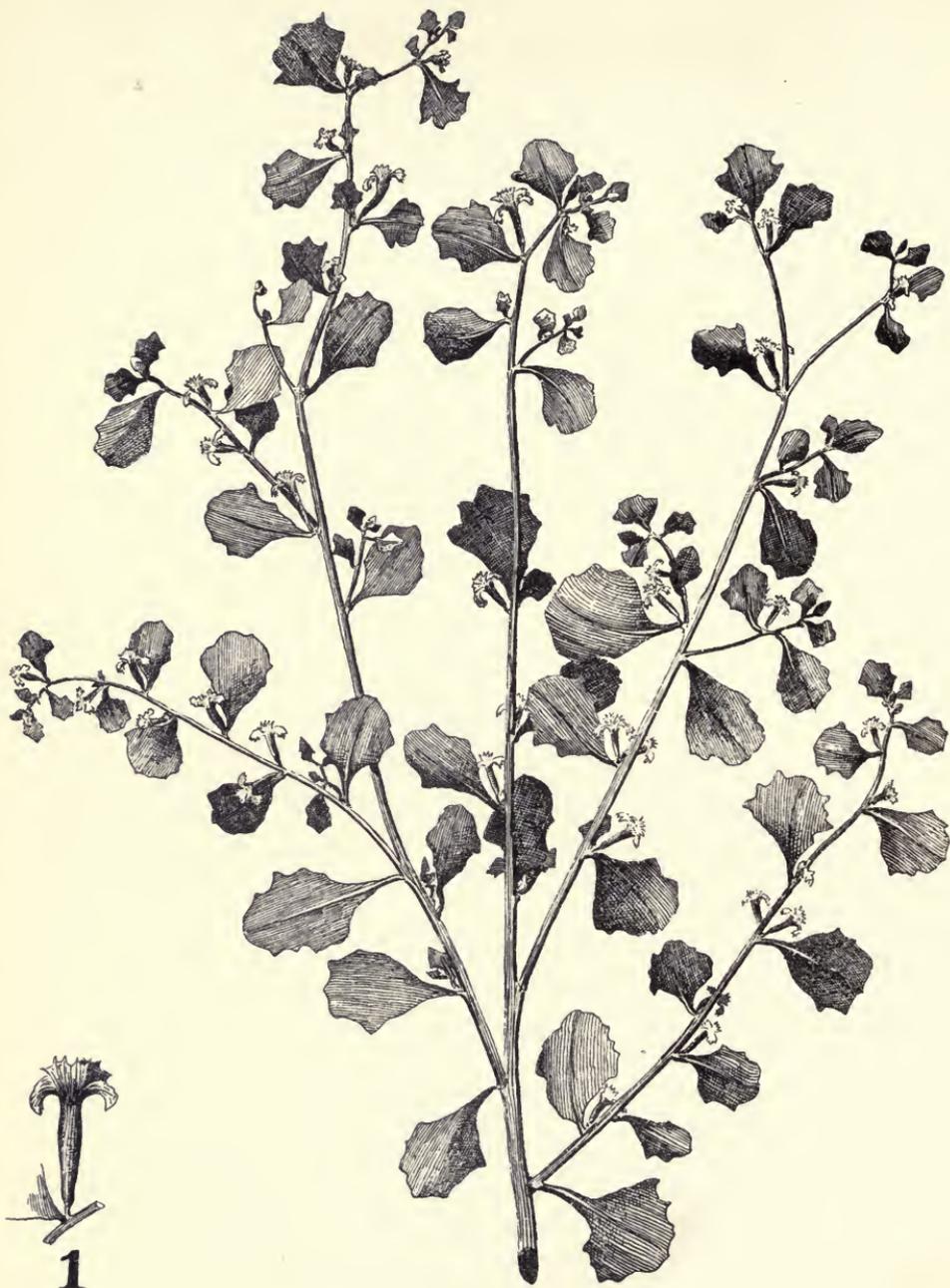
A PERENNIAL plant with herbaceous procumbent stems extending from $1\frac{1}{2}$ to 2 or more feet, and covered all over with a hoary scaly tomentum. The leaves are very variable, but mostly oblong and coarsely angular-toothed, and from 1 inch to 2 inches in length. Its flowers are monœcious, and are arranged in axillary globular clusters, usually in the upper leaf axils. At figure 1 is illustrated an enlarged drawing of the fruiting perianth, which is narrow, tubular, and cylindrical. The lower part of the tube is hard and solid, but the portion above the fruit is more herbaceous, green, and elegantly veined. This plant is common on the Darling and Castlereagh Rivers in New South Wales, in the interior of Queensland, and near the Murray River in South Australia, sometimes carpeting the ground for a considerable distance. Its drought-enduring qualities are remarkable, and even in adverse seasons it will yield a fair amount of forage which herbivora of all kinds are fond of—sheep particularly so, for they often browse it down so close to the ground that it dies right out. When this plant is not too closely fed down, it produces seed in abundance, and the seeds germinate readily under ordinary conditions. They should be sown in February or March, after rainfall if possible. If the season, however, proves to be exceptionally dry at that time, the sowing may be deferred until September or October.



Atriplex leptocarpa, F. v. M.
"Slender-fruited Salt Bush."







Atriplex limbata, Benth.
"Spreading Salt Bush."

ORDER CHENOPODIACEÆ.

ATRIPLEX LIMBATA, BENTH.

"Spreading Saltbush."

Flora Austr., Vol. V, p. 178.

A PERENNIAL plant usually spreading from $1\frac{1}{2}$ to 2 feet or even more, and covered all over with a scaly tomentum. The leaves are obovate or oblong, entire or angular-toothed, and arranged on short stalks. All the flowers are axillary, the male clusters in the upper axils surrounded by females, the lower clusters all females. At figure 1 is illustrated an enlarged drawing of the fruiting perianth, the orifice of which is closed by two valves, the lateral ones are spreading incurved and horn-like, with the two upright appendages alternating with them. The fruiting perianths are mostly sessile in the leaf axils, but sometimes they are arranged on rather long stalks.

This plant has, so far as I can make out, a very restricted geographical range, being found only between the Lachlan and Darling Rivers in New South Wales. Its drought-enduring qualities are remarkable, and when left unmolested it will grow through the most adverse season of drought and heat. This may be accounted for by its somewhat procumbent stems, which not only prevent the evaporation of any moisture that may be in the soil, but exclude the sun's rays from near its roots. It is one of the famous salinous plants which are fast disappearing through overstocking, or, that terrible pest, the rabbit. It is said that rabbits are very partial to a great many of our saltbushes. Where the growth is too high for them to reach the leaves and younger branches, they eat the bark, which, of course, is the cause of many of the plants dying. Stock of all descriptions are remarkably fond of the plant under notice, and sheep often crop it down so close to the ground that it gets little chance to produce seed for its natural reproduction. When left undisturbed for a time it will produce an abundance of seed which, when ripe, will germinate readily under ordinary conditions; so that there is no great difficulty in the way of any one who wants to enter upon a system of cultivation of this valuable salinous plant, where it may have died out through overstocking, or the conservation of it where still growing. This will have to be undertaken, along with that of many more of its congeners, if our central plains are to carry the number of sheep and cattle that they have done in the past.

The seeds of this plant should be sown during the autumn months after rainfall if possible, or failing this in September or October.

ORDER CHENOPODIACEÆ.

ATRIPLEX HALIMOIDES, LINDL.

"Halimus-like Saltbush."

Flora Austr., Vol. V, p. 178.

A PROCUMBENT or diffuse undershrub, often attaining a height of 1 foot or more. The whole plant has a glaucous or whitish appearance. Its leaves are very variable in form, but mostly ovate lanceolate or rhomboidal, and from 1 inch to 2 inches in length. This plant is peculiar to the arid saline country north-west of the Bogan and Darling Rivers, in New South Wales; The Burnett, Suttor, and Bogan Rivers, in Queensland; The Wimmera in Victoria, and from the Murray River towards Coopers' Creek in South Australia, and was moderately plentiful in the saline country before the disastrous droughts combined with the rabbits and the overstocking of runs with sheep and cattle were so marked. This plant is excellent forage both for sheep and cattle, and they eat it with great avidity, often cropping it close to the ground; and they fatten remarkably well on it. It is not only a good fodder plant; but it has the reputation of preventing fluke in sheep. In fact, this plant, and some of its congeners, have been known to entirely cure sheep badly afflicted with this and other *Distoma* diseases when kept grazing for a few months on these salinous plains. Such valuable drought-enduring fodder-plants are well worthy of extensive conservation and even cultivation; for if things go on as they have been during recent years conservation will be out of the question, because the plants are now cropped down so closely that they have no chance to produce seed, which is their only natural means of reproducing themselves. If nothing is done to perpetuate these valuable pasture plants Australian wool will depreciate; for it is solely on account of our superior indigenous forage plants and grasses that our wools take such a high place in the market. When not too closely fed down, the plant seeds in abundance; and the seeds germinate readily under ordinary conditions. Figure 1 is an enlarged drawing of the fruiting perianth which is loosely fibrous and spongy, with an inner and an outer membrane.

The seeds of this plant are best sown in the early spring months, and after rainfall if possible, but not whilst the ground is too wet to work.



1

Atriplex halimoides, Lindl.

“Halimus-like Salt Bush.”



LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Atriplex holocarpa, F. v. M.
"All-fruited Salt-bush."

ORDER CHENOPODIACEÆ.

ATRIPLEX HOLOCARPA, F. v. M.

"All-fruited Salt-Bush."

Flora Austr., Vol. V, p. 179.

A PERENNIAL plant, though some of my correspondents say it is only annual, having an almost woody base, and herbaceous spreading or procumbent branching stems, growing from 1 foot to 15 inches high, with leaves on rather long stalks, somewhat variable, but mostly obovate, irregularly toothed, from under $\frac{1}{2}$ an inch to above 1 inch long, and softly mealy tomentose. Flowers, monœcious and axillary; the males and the females arranged together in the upper axils, though often the females only are arranged together in the lower ones. Fruiting perianths, illustrated at figure 1, are nearly globular, and from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, of a loosely fibrous and spongy consistence, with a thin membranous covering. This plant is peculiar to our arid far western plains, and on land liable to be flooded near the Lachlan and Darling Rivers in New South Wales—Stokes Range and Cooper's Creek, and towards Spencer's Gulf in South Australia, and in some situations it is moderately plentiful. Its free seeding qualities have rendered it somewhat proof against extermination; for when the floods subside, seedlings spring up by thousands, and they soon grow large enough to produce rich succulent food which sheep are remarkably fond of. Even on the arid plains this plant will grow in the most adverse season of heat and drought. Its tenacity of life is remarkable; and on this account it is one of our most valuable fodder plants in times of scarcity of other feed. Paddocks of this plant are well worth conserving, for during adverse seasons they would supply enough feed for thousands of starving animals. The conservation, and even the cultivation, of this plant would require little outlay to make it a success; for the plants produce an abundance of seed, which germinates readily under ordinary conditions. Plants sown from seeds in September would produce a crop of seeds in three or four months, if left unmolested by sheep or cattle. In these circumstances enough could soon be obtained to sow thousands of acres, which would in a short time be of untold value to pastoralists. The seeds of this plant should be sown during the early autumn months, if possible after rainfall, or failing this in September or October, but when there is moisture in the ground.

ORDER CHENOPODIACEÆ.

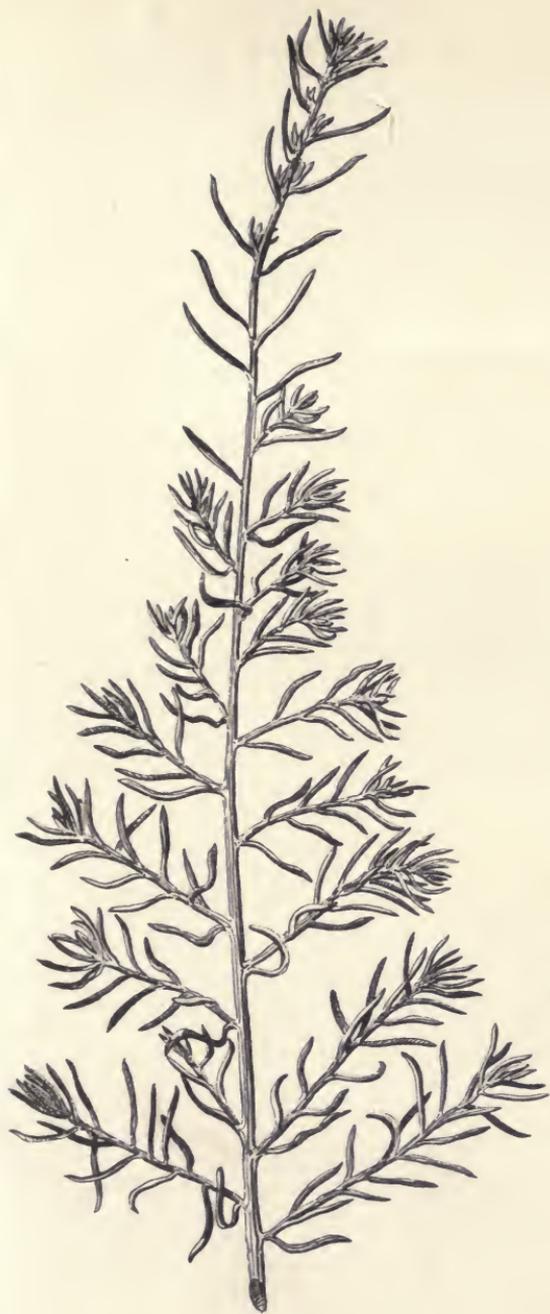
ENCHYLÆNA TOMENTOSA, R. Br.

"Barrier Saltbush."

Flora Austr., Vol. V, p. 181.

A PROCUMBENT or divaricately-branched undershrub, sometimes with ascending slightly-branched stems under 6 inches long, at others much-branched and attaining several feet. The branches hoary, or silvery, with a close or woolly tomentum rarely glabrous, or nearly so. Leaves linear, entire, and rarely above $\frac{1}{2}$ an inch long. Flowers all axillary, solitary and sessile, and usually distant, with one or two minute bracts at the base. At figure 1 is illustrated a fruiting branch, with the fruiting perianths in the upper leaf axils. At figure 2 is illustrated an enlarged drawing of a fruiting perianth. When ripe they are depressed, globular in shape, red or yellow, and succulent, over $\frac{1}{2}$ of an inch, but scarcely $\frac{1}{2}$ of an inch in diameter. The fruits turn black in a few hours after being gathered. This plant is found growing in the arid interiors of Queensland, New South Wales, Victoria, South Australia, and West Australia, and in some situations it is fairly plentiful, but this may be accounted for by its free seeding qualities, together with the easy germination of its seeds. A plant that I have had under cultivation for some years produces seed nearly all the year round, but more abundantly during the summer months. I have often seen the ground under this shrub thickly strewn with its succulent fruits. The drought-enduring qualities of this shrub are remarkable, and it flourishes in the driest and poorest of soils, even during the hot summer months. It is an excellent forage plant for all herbivora, sheep being particularly fond of it, and its presence in pastures is always of advantage. During long spells of dry weather, however, balls of cotton-like substance form on this plant somewhat similar to those that are seen on the cotton bush and a few other allied plants. During the last drought I saw several specimens that were much subject to these cottony or woolly galls, and also a monstrosity, which is generally believed to be caused by some insect, as small grubs may sometimes be seen in the middle of them. Mr. Bentham, speaking of these adventitious growths in the "*Flora Australiensis*," vol. V., p. 182, says: "Besides the woolly globular galls to which this species is liable (like those of *Kochia villosa* and other Chenopodiaceæ) it is subject to a monstrosity, apparently caused also by an insect, by which the pericarp becomes densely enveloped in woolly intricate hairs proceeding from near the base and bursting through the apex of the perianth; whilst the ovary is abortive, and I have sometimes found its place occupied by a small grub."

When feed becomes scarce in very protracted droughts, sheep feed greedily on this shrub, which, when covered with these adventitious growths, proves most indigestible, and is often the cause of many of them dying. The seeds of this plant should be sown during the early autumn months, after rainfall if possible.



Enchylæna tomentosa, R. Br.

“Barrier Salt Bush.”







Kochia lanosa, Lindl.
"Cottony Salt-bush."

ORDER CHENOPODIACEÆ.

KOCHIA LANOSA, LINDL.

"Cottony Saltbush."

Flora Austr., Vol. V, p. 184.

AN erect or spreading under shrub growing from 1 foot to 2 feet high. The whole plant is densely covered with a soft silky tomentum. Its leaves are sessile, linear, mostly acute, thick and soft, and nearly $\frac{1}{2}$ an inch in length. The flowers are solitary in the leaf axils. At figure 1 is illustrated the fruiting perianth, which is more or less woolly all over. The five horizontal wings are more or less united in a ring, scarcely a $\frac{1}{2}$ an inch in diameter. There are five linear, acute, erect appendages alternating with, and arranged above, the horizontal wings as shown in the engraving. This plant is found principally in the interior of New South Wales, Queensland, South Australia, and West Australia, and in some situations it is still moderately plentiful, but in others it is becoming scarce through overstocking. Stock of all descriptions are fond of this plant, sheep particularly so, and they often eat it down so close to the ground that it has little chance to recuperate. When left unmolested for a time, however, it quickly recovers and produces seed in fair quantities, which when ripe, germinate readily under ordinary conditions. It is one of the famous salinous plants that are becoming more scarce on our central plains every year, and nothing, so far, has been done either in the way of conservation or cultivation. This, however, will have to be undertaken before very long if our pastures are to maintain the high reputation they have acquired of being such rich feeding grounds for stock. The drought-enduring qualities of the plant are remarkable, for neither the hot winds that blow in the interior, nor the fierce heat of the summer sun, seems to have any effect upon its growth, whilst the other extreme of cold experienced on the plains during the winter months it bears with impunity. But this in a great measure may be accounted for by its natural woolly covering, which must be a great protection against these extremes of weather experienced during the course of a year. It must, therefore, be acknowledged that such a valuable plant as this is worthy of extensive conservation, and even cultivation. If such a simple plan as fencing off, say 500 or 1,000 acres, in oblong strips, were undertaken, and the enclosed land then ploughed up, sown down with seeds of salinous plants, and harrowed lightly in, in a few months the plants would provide enough feed for thousands of cattle and sheep during the most protracted drought. For, generally speaking, the drier the weather the more luxuriantly these salinous plants will grow, provided they are not trampled underfoot by grazing animals. Many of the more dwarf salinous plants are not always destroyed through being closely eaten down; it is the constant tramping of the animals' hoofs that causes such destruction among them. There are about fifteen species and several varieties of the genus *Kochia* indigenous in Australia, and nearly all of them are valuable forage plants. They are nearly all peculiar to the central portion of this continent, and resist drought to a marked degree, being on this account most valuable plants to the pastoralist, as they provide some feed for stock when the surrounding vegetation is somewhat dried up for want of rain.

The best time of the year to sow the seed of this plant, is, either in the early autumn or spring months, after rainfall if possible, but not until the soil becomes workable.

ORDER CHENOPODIACEÆ.

KOCHIA BREVIFOLIA, R. BR.

"Short-leaved Saltbush."

Flora Austr., Vol. V, p. 185.

A MUCH branched, rather slender shrub, growing about $2\frac{1}{2}$ feet high. The branches and foliage are often clothed with short woolly hairs, though at times the older foliage is quite glabrous. The leaves are alternate, sessile, linear, and scarcely $\frac{1}{8}$ of an inch long. The flowers are small and solitary in the leaf axils. Figure I is an enlarged drawing of the fruiting perianth, which is bordered by five horizontal membranous veined wings, forming a circle, but not united. This plant is found principally on the Darling and Macquarie Rivers, Camden Valley, and Liverpool Plains in New South Wales, Darling Downs in Queensland, near the Murray River in Victoria, Spencer's Gulf and other stations in South Australia, and near the Murchison River in West Australia, but it is not reported to be plentiful anywhere. Like many of its congeners, the drought enduring qualities of this plant are remarkable, and it affords forage in the driest of seasons of which herbivora of all kinds are remarkably fond, sheep particularly so. When not too closely fed down, this plant will produce a fair amount of seed, which germinates readily under ordinary conditions. No great outlay, therefore, will be required to enter upon a system of conservation or cultivation of it where overstocking has rendered it scarce.

The seed should be sown during the early autumn months, and after rainfall if possible, or, failing this, after rain in September or October.



Kochia brevifolia, R. Br.

“Short-leaved Salt Bush.”







Kochia pyramidata, Benth.

“Grey Bush.”

ORDER CHENOPODIACEÆ.

KOCHIA PYRAMIDATA, BENTH.

“Grey-bush.”

Flora Austr., Vol. V, p. 186.

A DIVARICATELY-BRANCHED shrub, growing to the height of 3 or more feet. The leaves are alternate, linear, obtuse, thick, and soft, and often clustered in the axils. Flowers, small and solitary in the upper leaf axils. At figure I is illustrated the fruiting perianth, which turns very black in drying, and on this account is easily recognised from other species of the genus. The upper portion within the wing is erect and pyramidal. This is surrounded by an entire annular membranous wing, altogether about a quarter of an inch in diameter. The whole plant is covered with a soft tomentum of grayish colour, and on this account it is called “Grey Bush” by stockmen. This plant occupies large tracts, and is quite a feature in some parts of the country west of the Darling River in New South Wales. It is generally an indication of good land where the plant is found growing, and probably on this account it thrives during severe droughts. It is one of the salinous plants which has made our central plains such valuable sheep and cattle runs. Many of them, however, are fast disappearing through too close feeding, and nothing has been done, so far, either in the way of conservation or the cultivation of these valuable plants. The plant under notice makes excellent forage, which herbivora of all descriptions are remarkably fond of. When left unmolested for a time it produces seed in abundance, and when these are ripe they germinate readily under ordinary conditions. The seed should be sown after rain in the autumn or spring months.

Analysis of Kochia Pyramidata, Benth.

In the proceedings of the Royal Society, New South Wales, 1880, p. 133, Mr. W. A. Dixon gives the following analysis of this plant:—

Oil	2.14	On Ash.	On Plant.
Carbohydrates	32.63	Potash	12.39 ... 4.62
Albuminoids... ..	19.94	Soda	34.43 ... 12.83
Woody fibre... ..	8.04	Chloride of sodium	26.67 ... 9.93
Ash. CO ₂	37.25	Lime	8.75 ... 3.26
		Magnesia	7.32 ... 2.72
	100.00	Ferric oxide	1.28 ... 0.48
		Sulphuric oxide	1.11 ... 0.41
Nitrogen	3.19	Phosphoric oxide	3.98 ... 1.48
		Silica (soluble)	4.07 ... 1.52
Woody parts of plant	37 per cent.		
Edible	63 per cent.		
			100.00 ... 37.25

ORDER CHENOPODIACEÆ.

KOCHIA ERIANTHA, F. v. M.

"Woolly-fruited Saltbush."

Flora Austr., Vol. V, p. 186.

A SHRUB, growing from 1 foot to 3 feet in height, with branches densely tomentose. Its leaves are sessile, linear, or lanceolate, obtuse, or acute, thick and soft, densely clothed with silky brown hairs, and about $\frac{1}{2}$ an inch in length. The flowers are solitary in the leaf axils, but are crowded along the branches and enveloped in long woolly hairs. At Figure I is illustrated the fruiting perianth, with the horizontal wing connected in a ring about $\frac{1}{2}$ an inch in diameter, and densely woolly all over. This plant is peculiar to the arid central plains of Australia, and in some situations it is moderately plentiful. The free seeding qualities of the plant have rendered it practically proof against extermination, its seeds germinating and growing even under adverse conditions. The drought-enduring qualities of the plant are somewhat remarkable. The hot winds of the interior, and the fierce heat of the summer's sun, seem to have little effect in checking its growth; while the other extreme of cold, experienced on the plains during the winter months, it bears with impunity. This, no doubt, may be accounted for by its natural woolly covering, which must be a great protection to the plant against these extremes. In situations where overstocking has rendered it somewhat scarce, it would well repay conservation, for it would produce a rich, succulent forage during the most adverse season of drought and great heat, and a forage, too, of which sheep and other herbivora are particularly fond. It is one of the famous salinous plants which will have to receive more attention at the hands of pastoralists than has hitherto been the case, as it is with many other species fast disappearing through overstocking, and a proper system of conservation, which has so often been advised, of these most valuable plants, is the only way of restoring our central pastures to anything like their normal state. The seeds should be sown after rainfall, either in the autumn or spring months.



Kochia eriantha, F.v.M.

"Woolly-fruited Salt-bush."







Kochia villosa, Lindl.

“Silky Salt Bush.”

ORDER CHENOPODIACEÆ.

KOCHIA VILLOSA, LINDL.

"Silky Saltbush."

Flora Austr., Vol. V, p. 186.

AN under-shrub of erect, spreading, or decumbent habit, more or less covered with a silky villous tomentum. Its leaves are alternate, linear, thick, and soft in the typical form, and from $\frac{1}{4}$ to $\frac{1}{2}$ an inch long. The flowers are solitary in the leaf axils. There are about half-a-dozen varieties differing more or less from the typical form, though not of sufficient distinction to warrant their being classed as distinct species, notwithstanding that their geographical distribution is considerable. This species is peculiar to the districts of the Darling, Murray, Lachlan, and Bogan Rivers, the Liverpool Plains, and westward to the Barrier Ranges in New South Wales; Narran River in Queensland; Murray River and the Wimmera Districts in Victoria; Flinder's Range and towards Spencer's Gulf in South Australia; and in North and West Australia. At one time it was quite plentiful in those districts, but cattle and sheep have exterminated great quantities. The fact of the plant not being allowed to seed, has, of course, destroyed its natural reproducing powers. This plant is well worthy of extensive conservation, and even cultivation, as its drought-enduring qualities are remarkable. It is one of the famous salinous plants which have made our central plains such valuable pasture grounds for stock of all kinds. Cattle and sheep eat greedily of it, and often crop it down close to the ground, so that it has little chance to recuperate. When not too closely fed down, the plant will produce seed in abundance; and the seed will germinate readily even under ordinary conditions. At Figure I is illustrated the fruiting perianth, which has the dorsal wings united in a single entire horizontal ring, membranous, and very finely veined. The seeds of this plant should be sown either in the autumn or spring months, and after rainfall if possible, as the seeds will germinate more readily when the ground is moist.

ORDER CHENOPODIACEÆ.

KOCHIA PLANIFOLIA, F. v. M.

"Broad-Winged Salt-bush."

Flora Austr., Vol. V, p. 187.

A DIVARICATELY-BRANCHED shrub, growing from 2 to 3, or more, feet high. The branches and young foliage are covered with a soft and dense woolly tomentum which wears off from the older leaves. The leaves are oblong, obtuse, arranged on short stalks, and rarely more than $\frac{1}{2}$ an inch long, rather thick, but flat. Flowers solitary in the leaf axils. At Figure I is illustrated the fruiting perianth, which is glabrous or tomentose; the ring generally entire, membranous, and about $\frac{1}{2}$ an inch in diameter. This shrub is found in the most arid parts of the Continent, but principally in the central portion. It was not found until quite recently in New South Wales, and I was the first to record it, having received some specimens from the Barrier Ranges. It is not reported to be plentiful anywhere, for pasture animals are remarkably fond of it, and often eat it so close down to the ground that it is found in a stunted condition. When left undisturbed for a time, however, it produces an abundance of seed which, when ripe, germinates readily under ordinary conditions. This valuable salinous plant will withstand a phenomenal amount of dry weather, and it is well worthy of extensive conservation, or even cultivation, in the arid parts of the Continent; for it could always be depended upon during the most adverse seasons of drought and heat to supply a rich, succulent herbage which might be the means of saving thousands of animals from dying of starvation during every recurring drought. Unless the conservation or the cultivation of this and many other valuable salinous plants is taken in hand in a systematic manner, pastoralists must be prepared to lose a great number of their stock during adverse times when forage is scarce. A 500-acre paddock, reserved for the conservation or even cultivation of salt-bushes on a station, would produce a great amount of forage which would be available when most needed, and it could be cut as requirements might demand. I would recommend reserves to be made oblong shaped, and not too near together, this would obviate cattle or sheep mustering in such numbers too close together during dry times.

The seeds of this plant should be sown during the early autumn months, and if possible after rainfall, then they will germinate quickly.



Kochia planifolia, F. v. M.

“Broad-winged Salt Bush.”



LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA





Kochia sedifolia, F. v. M.

“Blue Bush.”

ORDER CHENOPODIACEÆ.

KOCHIA SEDIFOLIA, F. v. M.

"Blue Bush."

Flora Austr., Vol. V, p. 187.

A STOUT much-branched shrub, attaining a height from 2 to 3, or more, feet. The leaves are oblong, obtuse, soft, and thick, and about $\frac{1}{4}$ of an inch long. The fruiting perianths are crowded at the end of the branches, as illustrated in the detached bunch, Figure I. At Figure II is illustrated a single fruiting perianth, with the horizontal membranous wing very finely veined, and spreading from $\frac{1}{4}$ to $\frac{1}{2}$ an inch in diameter. The whole plant is covered with a dense cottony wool, and its singular appearance has earned for it the common name of "blue-bush" by stockmen. Its presence is nearly always an indication of arid land, and on this account it has often put the weary traveller on his guard, for he may not expect to find water near where this plant is discovered growing. It is found in the interior of New South Wales, Victoria, and South Australia, but it is not reported to be plentiful anywhere. Although it is capital forage for cattle, it is said that when sheep feed too freely on it, balls of felt-like substance form in their stomachs, which at times do them injury. The drought-enduring qualities of this plant are remarkable, its natural covering, no doubt, protecting it against the fierce heat of the summer's sun and through the most protracted drought. When the natural grasses are withered, or burnt up during the long "spells" of dry weather, the plant affords good forage for cattle, but it is often cropped down so close, that it has little chance to mature seed, which is its only natural means of reproduction. When left unmolested for a time, however, the plant quickly recovers, and produces seed very freely, which, when ripe, germinates readily under ordinary conditions. The seeds should be sown during the early autumn months, after rainfall if possible; or, failing this, they may be sown in September or October.

ORDER CHENOPODIACEÆ.

KOCHIA APPRESSA, BENTH.

“Appressed-leaved Salt-bush.”

Flora Austr., Vol. V, p. 188.

A MUCH-BRANCHED shrub, attaining a height of from 1 to 2 feet, more or less clothed with a short cottony wool. Its leaves are small, linear, erect, and appressed, thick and soft, and overlapped on the young shoots. The flowers are solitary in the axils. At Figure I is illustrated the fruiting perianth, which is usually glabrous; the annular wing expanding about $\frac{1}{3}$ of an inch in diameter, is very thin, the veins fine, and not conspicuous. This plant is found principally on the arid central plains of Australia, but it is not abundant anywhere. Both cattle and sheep are fond of this shrub and eat it down with avidity, often so closely that it has little chance to make much growth; hence it is becoming scarce in many situations where it once was moderately plentiful. When left unmolested for a time, however, it rapidly recovers itself, and produces an abundance of seed which will, when ripe, germinate under ordinary conditions. If the seeds are sown in spring time, and the drought is not too severe upon the young plants until well established, they will perfect a crop of seeds in about three months; so no great outlay would be required to enter upon a proper system of conservation of this plant. Its drought-enduring qualities are very remarkable, for, once it is well established in the soil, it seems to be affected neither by the hot winds and drought of the summer months, nor the cold wind of the winter season, in the slightest degree. These are the peculiar climatic conditions under which plants have to live on our central plains in the course of the year.



Kochia appressa, Benth.

“Appressed-leaved Salt-bush.”



LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Kochia aphylla, R. Br.

“Cotton-bush.”

ORDER CHENOPODIACEÆ.

KOCHIA APHYLLA, R. Br.

"Cotton Bush."

Flora Austr., Vol. V, p. 188.

A RIGID, divaricately branched, scrubby shrub with rather slender spinescent branches growing from 2 to 3 feet high. Whilst young the whole plant is covered with a short soft woolly tomentum, but with age it becomes nearly glabrous. The leaves are minute and deciduous rarely ever exceeding $\frac{1}{2}$ of an inch in length. At figure 1 is illustrated the fruiting perianth, with the dorsal wings united in a single entire or rarely lobed horizontal ring, which is membranous and very finely veined, and spreading to nearly $\frac{3}{4}$ of an inch in diameter. The specimen from which the drawing was made shows the balls of cotton like substance from which the plant derives its local name "Cotton Bush," generally speaking, however, there is only one shrub in a thousand that is subject to this cottony gall, except in very protracted droughts, when the galls are more abundant. They are generally supposed to be caused by some insect. This shrub is found in the arid interior of most of the Australian Colonies, and in some situations it is very plentiful. Its presence is always an indication of good country. It will withstand a phenomenal amount of heat, and grow through the most protracted drought. During such times it has often proved of great value to pastoralists who cut down large quantities of it for fodder. Stock of all descriptions are remarkably fond of this plant and they thrive well on it. One of my correspondents in the north-western interior says "the Cotton Bush is one of the best fodder plants that we have, for stock of all kinds like it; it makes good chaff cut up with mulga (*Acacia*) and black oak (*Casuarina*)." Mr. Boulton, the officer in charge of water conservation, New South Wales, informs me that on several occasions he has had to rely solely upon this shrub to feed his stock during protracted droughts in the arid interior. It was given to stock in the form of chaff, and after it had been cut for a few days it would smell like "new mown hay." Horses and bullocks not only work well on this feed, but they fatten on it. Under ordinary circumstances this shrub produces an abundance of seed, which will, when ripe, germinate even under adverse circumstances. In arid localities where this shrub may have become scarce, it is well worthy of redissemination.

ORDER CHENOPODIACEÆ.

KOCHIA CILIATA, F. v. M.

“Hairy-fruited Saltbush.”

Flora Austr., Vol. V, p. 188.

A DWARF undershrub growing about 18 inches high. The ascending branches are softly woolly-villous. The leaves are alternate, linear or lanceolate and about $\frac{1}{2}$ of an inch long. The flowers are solitary in the leaf axils, but crowded into a terminal leafy raceme, as shown in the engraving. At figure 1 is illustrated an enlarged drawing of the fruiting perianth which is very flat, and clothed with long soft hairs, and about $\frac{1}{6}$ of an inch in diameter, including the annual wing, which is thick and hard, quite entire, and bordered by long soft hairs.

This plant does not seem to have a wide geographical range, being found only, as far as I have been able to ascertain, in the arid interior of New South Wales and South Australia. In some situations between the Lachlan and Darling Rivers, in New South Wales, it was fairly plentiful a few years ago, but since the rabbits became so numerous it is gradually getting more scarce, as are also many of its congeners, on our central plains. Nothing, so far, has been done, either in the way of the conservation or cultivation of these valuable salinous plants. This, however, will have to be systematically undertaken if our grazing lands are to carry a number of healthy stock. The plant under notice will grow during the most adverse season of drought and heat, and it is much relished by all herbivora, sheep often cropping it so close to the ground that it has little chance to mature seed and reproduce itself by natural means. When left unmolested for a time, however, it produces seed in abundance, and when ripe, they germinate readily under ordinary conditions. The seeds should be sown after rainfall in the early autumn months.



Kochia ciliata, F. v. M.
"Hairy-fruited Salt Bush."







Kochia brachyptera, F.v.M.
"Short-winged Salt-bush."

ORDER CHENOPODIACEÆ.

KOCHIA BRACHYPTERA, F. v. M.

"Short-winged Saltbush."

Flora Austr., Vol. V, p. 189.

A PROSTRATE undershrub, but often with slightly ascending branches, spreading from 1 foot to 2 feet. Its branches, as well as the foliage, are clothed with long soft-spreading hairs, which give the plant a peculiar appearance. The leaves are alternate, linear, sessile, and about $\frac{1}{2}$ an inch long. The perianths are small, solitary, and arranged in the leaf axils.

Figure 1 is an enlarged drawing of the fruiting perianth, which has five vertical wings, and is bordered by an exceedingly narrow, thick, horizontal, five-angled wing. The angles are very acute, being the small points of the vertical wings, as shown in the engraving.

This plant is found principally in the interior of Queensland, New South Wales, Victoria, and South Australia, but it is not reported to be plentiful at any of the stations I have received specimens from. The drought-enduring qualities of the plant are remarkable, for it does not seem to be affected either by the hot winds that blow periodically over the plains, or the fierce heat of the summer's sun. This in a great measure may be accounted for by its long roots penetrating the soil to a great depth, and its prostrate habit, which not only keeps the ground cool, but prevents the too rapid evaporation of any moisture which may be in the soil. Sheep are not as particularly fond of this plant as they are of many of the allied species; though it is one of our famous salinous plants. They will pass it for other herbage; but it is a capital forage plant which other herbivora eat down with a relish. The plant produces a moderate quantity of seed when left unmolested, and the seeds, when ripe, germinate readily under ordinary conditions. They should be sown after rainfall in the early autumn months.

ORDER CHENOPODIACEÆ.

KOCHIA STELLIGERA, F. v. M.

“ Star-fruited Saltbush.”

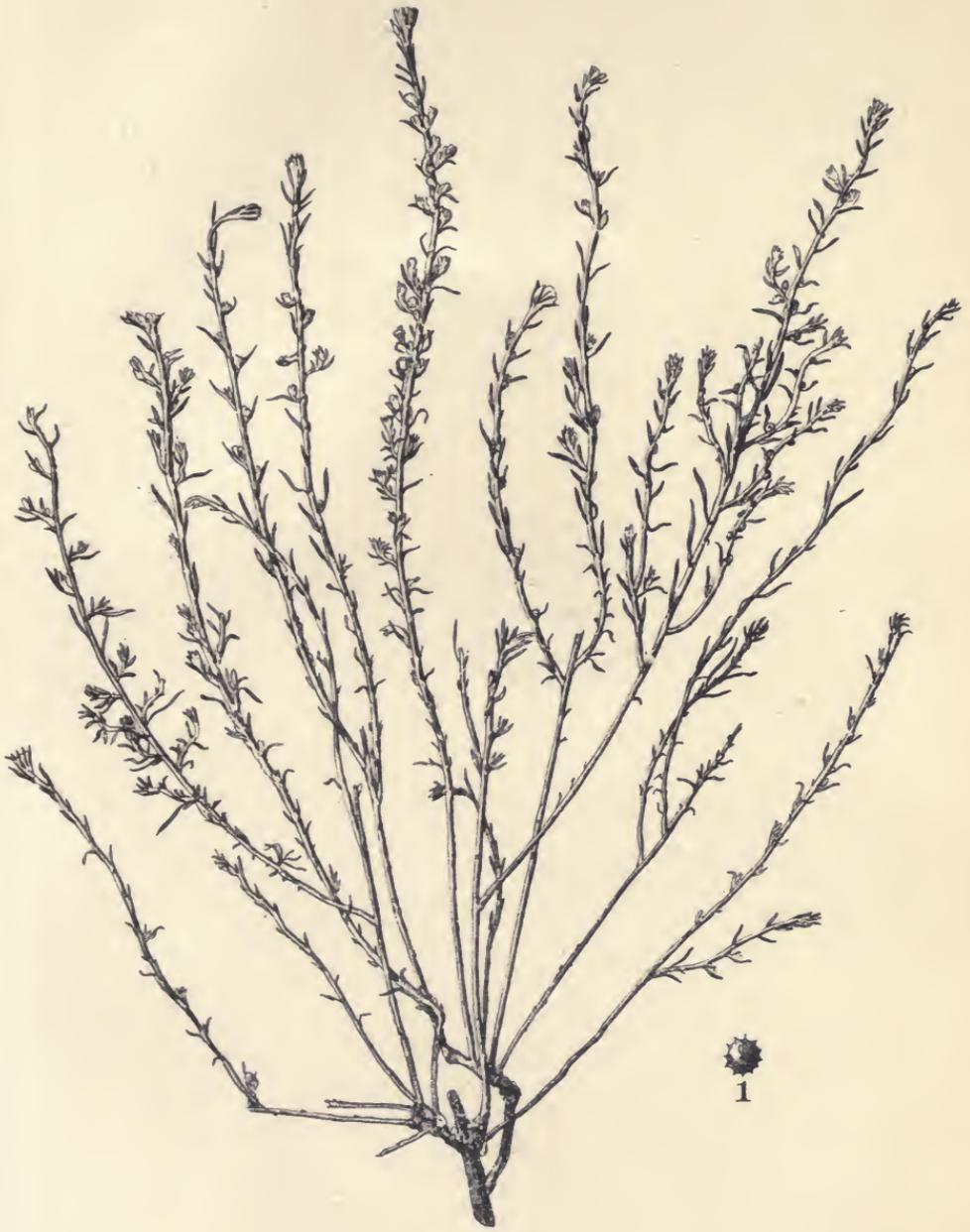
Flora Austr., Vol. V, p. 189.

A DIFFUSE or procumbent undershrub, spreading from 1 foot to 2 feet, with slender ascending branches to about 6 inches high, clothed, as well as the young foliage, with a white cottony wool, which wears off from the older leaves. The leaves are alternate, sessile, soft, and about $\frac{1}{4}$ of an inch long. Flowers small and solitary in the axils of the leaves, but often crowded at the end of the branches.

Figure 1 is an enlarged drawing of the fruiting perianth, which is of a thick hard consistence, the summit very flat, and bordered by a very narrow rather rigid horizontal wing, with ten or twelve short, rigid, equally radiating teeth or points, as shown in the engraving.

This plant is peculiar to the arid central plains and sandhills in New South Wales and the western parts of Queensland, but it is not reported to be very plentiful anywhere, for when herbs and grasses are somewhat scarce in times of drought it has been much sought after by all herbivora. They are remarkably fond of the plant, and often eat it down so close that it has little opportunity to produce seed so as to reproduce itself in a natural way. When left unmolested for a time, however, it produces seed in moderate quantities, and these, when ripe, germinate readily under ordinary conditions.

The seeds of this plant should be sown during the early autumn months, and after rainfall if possible, for they will germinate more quickly if this is done.



Kochia stelligera, F.v.M.

“Star-fruited Salt-bush.”







Chenolea dallachyana, Benth.

“Dallachy’s Salt-bush.”

ORDER CHENOPODIACEÆ.

CHENOLEA DALLACHYANA, BENTH.

"Dallachy's Saltbush."

Flora Austr., Vol. V, p. 191.

AN undershrub usually growing about 1 foot high. The branches are clothed with a cottony wool, which gives it the appearance of having had that substance placed artificially on it. Its leaves are sessile, linear, obtuse, thick, soft, densely tomentose, and about a $\frac{1}{2}$ of an inch long.

The flowers are mostly solitary, but crowded into terminal leafy spikes, as shown in the detached branch of the engraving. The fruiting perianths are nearly globular, membranous, and densely woolly tomentose. This plant is peculiar to the plains and sandhills between the Murray and Darling Rivers in New South Wales, but it is not very plentiful anywhere. It endures drought to a marked degree. The indumentum (covering) of the plant (which is also a characteristic of many plants on our central plains) no doubt protects it against the high temperature during summer, and also against the other extreme in winter, when the thermometer often registers frost. It is a capital forage plant, which sheep and other small herbivora eat down greedily. Its thick soft leaves, which are slightly salinuous in taste, are a particular "relish," when the surrounding grasses are somewhat dried up during the extreme heat of summer. Like nearly all its congeners, it is a plant well worthy of conservation, for it will make growth even during the driest seasons when herbage is most wanted on the central plains. The plant produces a fair amount of seed when left unmolested, and the seeds germinate readily under ordinary conditions.

There are about six species of the genus *Chenolea* indigenous in Australia, and all of them are peculiar to the arid central plains of the continent. They are good drought-resisting plants, and are capital forage for stock when other feed becomes somewhat scarce during adverse seasons.

ORDER CHENOPODIACEÆ.

SCLEROLÆNA DIACANTHA, BENTH.

“Two-Spined Saltbush.”

Flora Austr., Vol. V, p. 194.

A DIFFUSE or prostrate undershrub, rarely exceeding 1 foot in height, and clothed with a brown or white tomentum. The leaves are linear, soft, rather thick, and about $\frac{1}{2}$ an inch long. The flowers are very small and solitary in the leaf axils. Figure 1 is an enlarged drawing of the fruiting perianth, which is hard, and covered with a cottony wool, slightly compressed at the top, and about $\frac{1}{12}$ of an inch long; the two opposite dorsal spines diverging, nearly equal, and varying from $\frac{1}{12}$ to $\frac{1}{8}$ of an inch in length. This plant is found in the arid interiors of all the Australian Colonies, but, as far as we can make out, it is not very plentiful anywhere. It is one of the famous salinous plants which are fast disappearing from the central plains of this continent through overstocking, and that pest—the rabbit; nothing so far having been done either in the way of cultivation or systematic conservation. This, however, will have to be undertaken before very long if the Colony intends to continue producing high-class wool. The shrub under notice makes excellent forage for stock of all kinds, sheep being particularly fond of it, and they will often crop it down so close to the ground that it gets little chance to produce seed, which is its only natural means of reproduction, and, in consequence, we may thus account for its not being plentiful. The drought-enduring qualities of this plant are remarkable, for it seems to be neither affected by the hot winds that blow periodically over the arid plains in summer, nor the longest spell of dry weather. If left unmolested for a time, it will produce a great amount of seed, which, when ripe, will germinate readily under ordinary conditions.

There are six species of the genus *Sclerolæna* found in the interior of this continent, and all are remarkable for their drought-enduring qualities. With the exception of one species (*S. bicornis*), they are excellent forage plants. The two rigid divaricate dorsal spines of *S. bicornis* are sometimes $\frac{3}{4}$ of an inch in length, and when sheep browse upon the plant, especially when in seed, these spines often cause some trouble to their salivary glands. This plant has been sent to me for identification, with notes to the effect that it was no good in pasture, “on account of the spiny nature of its seeds.”



Sclerolæna diacantha, Benth.

“Two-spined Salt Bush.”







Sclerolæna paradoxa, R. Br.

“Curious Salt-bush.”

ORDER CHENOPODIACEÆ.

SCLEROLÆNA PARADOXA, R. BR.

“ Curious Saltbush.”

Flora Austr., Vol. V, p. 196.

A MANY-BRANCHED undershrub growing about 15 inches high, the whole plant being densely clothed with a loose cottony wool, which gives it a singular appearance. The leaves are alternate, narrow, obtuse, soft, and woolly, from $\frac{1}{4}$ to $\frac{1}{2}$ an inch long. The flowers are arranged in dense axillary clusters, the perianths small and deeply lobed. Fruiting perianths 10 to 20 together, as illustrated at figure 1. They are very hard at the base, and joined together in a globular woolly mass of about half an inch in diameter. This plant is found in the interior of New South Wales, Victoria, and South Australia, but it is not reported to be plentiful anywhere. Its drought-enduring qualities are remarkable, and often when the surrounding vegetation is dry-looking this silvery-looking plant is found growing luxuriantly. Whilst in a young state it is an excellent forage plant, sheep being particularly fond of it. This, no doubt, may be accounted for by the slightly salinous taste that pervades the whole plant. When the plant becomes old it produces seeds very freely if not too closely fed down. But the fruiting perianths not readily dehiscing keep the seed from coming in contact with the soil, thus preventing germination taking place until the partial decay of the perianths. The young plants being so readily eaten down, and the slow way that they reproduce themselves in a natural way, are, doubtless, the chief reasons for the plant being so scarce on our arid plains. But it is well worthy of conservation and even cultivation along with other salinous plants.

ORDER AMARANTACEÆ.

TRICHINIUM OBOVATUM, GAUD.

"Silver Bush."

Flora Austr., Vol. V, p. 220.

AN erect undershrub growing from $1\frac{1}{2}$ to 4 feet high, clothed with a soft, dense, stellate tomentum, which gives the plant a beautiful silvery appearance, hence its common name "Silver Bush." The leaves are obovate or oblong, and from 1 inch to 2 inches in length. The flower spikes are nearly globular, and from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch in diameter. Figure 1 is an enlarged drawing of the perianth, the five segments of which have long white hairs. The detached portions, marked No. 2, are two scarious bracts, which are arranged at the base of the perianth. The generic name, *Trichinium*, is most appropriately given, for it means "clothing of hairs," in allusion to the hairy segments of the perianths. This shrub is found principally in the arid interior of all the Australian Colonies; but, so far as I have been able to learn, it is nowhere very plentiful. Its drought-enduring qualities are remarkable, and when other herbage is scarce during drought time it is greedily eaten by all herbivora, sheep being particularly fond of it, and often cropping it down so close to the ground that it gets little chance to recuperate or produce seed for its natural reproduction. When the plant is left undisturbed for a time, however, it produces a fair amount of seed, which will, when ripe, germinate readily under ordinary conditions. There are about forty-seven species of the genus *Trichinium* indigenous in Australia, and some of them are really handsome plants when in flower. Their singular hairy flowers are very attractive, even to persons who take little interest in plants. Many of them are really well worthy of the attention of horticulturists, and only require to be known in order to become familiar objects in the garden. Most of them will stand a phenomenal amount of heat, and they will grow in the driest of soils once they get fairly established, so that there is little difficulty in cultivating them. Several species of the genus are in cultivation in Europe, but of course under glass. They are highly prized, both by botanists and horticulturists, for the singularity of their flowers. The seeds should be sown during the early autumn months after rainfall if possible.



Trichinium obovatum, Gaud.
"Silver Bush."



LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Trichinium nobile, Lindl.

“Yellow Hairy Spikes.”

ORDER AMARANTACEÆ.

TRICHINIUM NOBILE, LINDL.

"Yellow Hairy Spikes."

Flora Austr., Vol. V, p. 224.

A stout erect glabrous perennial, the stems simple or slightly branched upwards, from $1\frac{1}{2}$ to 3 feet high. Leaves from broadly obovate to oblong, the lower ones are arranged on long stalks, the upper ones narrower and more sessile. The spikes are terminal, oblong, attaining from 3 to 6 inches in length. At figure 1 is illustrated the perianth which is about 1 inch long of a greenish yellow colour, the narrow segments of which are copiously plumose with dorsal hairs; the detached portions are two scarious bracts. This plant is found in the interior of New South Wales, Victoria, and South Australia, and is fairly plentiful in some situations. Its long thick roots penetrate the soil to a great depth, and on this account the plant is not easily affected by drought. It affords a rich succulent herbage, even in very dry weather, of which stock of all descriptions are remarkably fond, and they will often eat it off close to the root stock, from which, however, it readily springs into growth again after rain. The plant seeds very freely when not too closely fed down, and the seed germinates readily under ordinary conditions.

This plant is really worthy of the attention of horticulturists, and might be cultivated in gardens with good effect. When in flower it is an object of great interest for its singularly hairy perianths.

The specimen, drawing, and engraving of this plant were lost in the fire mentioned in the preface. I saved a print, however, from which the present photo-lithograph was taken. Of course, the plant is not so well depicted as it would have been if taken from a drawing, but is sufficiently clear for a growing plant to be easily recognised from it.

ORDER AMARANTACEÆ.

TRICHINIUM ERUBESCENS, Moq.

"Hairy Heads."

Flora Austr. Vol. V, p. 230.

A HERB with several stems springing from a thick densely tufted stock ascending to a height of 1 foot or more, and glabrous, as also is the foliage, but sometimes sprinkled with a few woolly hairs. The leaves are linear acute, the lower ones 2 or 3 inches long, and the upper ones much smaller towards the inflorescence. The spikes are solitary, nearly globular, and scarcely 1 inch in diameter. At figure 1 is illustrated the perianth which is composed of five hairy segments, more or less curved upwards and about $\frac{3}{4}$ of an inch long; the detached portions are two scarious bracts. This plant is found in the arid interior of New South Wales, Victoria, and South Australia, but it is not reported to be plentiful anywhere. Its deeply penetrating roots have rendered it somewhat indifferent to long spells of dry weather, and its lively green foliage may easily be detected amongst the surrounding vegetation during the summer months. Before this plant comes into flower it affords a tender herbage of which sheep are particularly fond. When left unmolested for a time the plant produces a fair amount of seed, which will, when ripe, germinate readily under ordinary conditions. The seed should be sown in the early autumn months when the soil is moist, or failing this the sowing may be deferred until spring.



Trichinium erubescens, Moq.

“Hairy Heads.”







Boerhaavia diffusa, Linn.
"Hogweed."

ORDER NYCTAGINEÆ.

BOERHAAVIA DIFFUSA, LINN.

"Hogweed."

Flora Austr., Vol. V, p. 277.

A PERENNIAL plant which is either smooth or hairy, with procumbent, diffuse, or ascending stems, extending sometimes to several feet. The leaves are in unequal pairs, and variable in shape, but the lower ones are mostly broadly ovate, and from $\frac{1}{2}$ to 1 inch broad; the upper ones get gradually smaller and narrower towards the flowers. The flowers are exceedingly small, of a pale pink color, and are arranged in small heads on slender stalks, more or less branched into irregular axillary or terminal panicles. Its fruits are also exceedingly small, and are slightly ribbed as illustrated at figure 1. This plant is found principally in the interior of all the colonies except Tasmania, and in some situations it is plentiful. It is also a common, and sometimes a troublesome, weed in the warmer parts of Asia and Africa. In India the roots of this species are given as a laxative and vermifuge, and as a remedy in dropsical cases. The long penetrating roots of this plant enable it to withstand the severest drought, and its green leaves and pink flowers may often be seen when the surrounding vegetation is dried up for want of rain. The Rev. Dr. Woolls, to whom the Colony is indebted for recording many observations on the useful plants of New South Wales, speaks highly of this plant, and has several times drawn attention to its value as a pasture herb during the early spring months ere the indigenous grasses start into growth. I am indebted to Dr. Woolls for the specimen from which the drawing was made. Both sheep and cattle are fond of browsing upon all parts of the plant that grow above the ground. There are only two species of this genus found in Australia, and neither of them are endemic. The order *Nyctagineæ*, to which these plants belong, is a very small one, being represented in Australia by only two genera and five species, and none of them are endemic. I have a lively recollection, during a botanical tour, of the seeds of *Pisonia brunoniana*, *Endl.* Having come across a plant in fruit, and being anxious to gather some, and as everything we had was full, nothing presented itself except one's hat to put them in, which receptacle was accordingly utilised, though not so many seeds were put into it that it could not be placed on the head again. The trouble, came, however, a few hours afterward, when we tried to get out the fruits. They simply stuck to the hair like so much wax, and it was sometime before they could be freed from it. The three species of the genus *Pisonia* are found principally on the north-eastern seaboard of Australia.

Dr. Masters says several species of the genus *Boerhaavia* are in cultivation (Europe), but have no particular beauty to recommend them. Besides the medicinal properties of the one under notice, already mentioned, some of the species are used as emetics, and for other medicinal purposes.

ORDER PROTEACEÆ.

HAKEA LEUCOPTERA, R. BR.

"Pin Bush."

Flora Austr., Vol. V, p. 515.

A SHRUB or small tree, growing from 12 to 16 feet high, with slender twiggy branches, which are minutely hoary. The leaves are round and smooth, ending in fine points, and from $1\frac{1}{2}$ to 3 inches in length. The flowers small, in short racemes or clusters, and arranged on short stalks in the leaf axils. At figure 1 are illustrated two fruits, which consist of hard, woody capsules. Each fruit is about 1 inch long and $\frac{3}{4}$ of an inch broad, often warty, with a short conical beak and opening in two valves, as shown in the engraving. At figure 2 is illustrated the seed, with the wing more or less decurrent along the upper margin only, as shown in the engraving. This shrub is found principally in the arid interior of New South Wales, Queensland, Victoria and South Australia. In some situations it is fairly plentiful, but this may be accounted for by the plant producing seed freely, even in a young state, and when the seeds are ripe they germinate readily under ordinary conditions. Hundreds of young seedlings may occasionally be seen springing up under established shrubs, and when from 6 inches to 1 foot high, they are readily devoured by cattle and sheep. At times when other feed is scarce, the older plants are browsed upon by stock. The drought-enduring qualities of this plant are remarkable, for neither the hot parching winds that blow periodically over the interior, nor the longest "spells," of dry weather seem to have any effect upon checking its growth. The plant really offers so little leaf surface to the sun that the transpiration must be exceedingly small in comparison with that from trees which produce broader leaves. It is content to grow on the poorest of soils, for it is generally found on the dry sandy ridges of the interior, where scarcely anything else could exist. Good drinking water is got from its fleshy roots by travellers through the arid districts in which it grows. Sir Thomas Mitchell ("Three Expeditions," pp. 196 and 199), draws attention to the native way of obtaining water from roots: "How the native existed in this parched country was the question. We saw that around many trees the roots had been taken up, and we found them without the bark, and cut into short clubs or billets, but for what purpose we could not then discover. . . . I expressed my thirst and want of water. Looking as if they understood me, they hastened to resume their work, and I discovered that they dug up the roots for the sake of drinking up the sap. It appeared that they first cut these roots into billets, and then stripped of the bark or rind, which they sometimes chew, after which, holding up the billet, and applying one end to the mouth, they let the juice drop into it." From some large climbing vines, water can also be obtained. I myself once, when on a botanical tour, suffered much from thirst, when an idea struck me that water might be obtained from some large climbing plants growing near, whose heads were over the tops of very large trees. I accordingly climbed up about 12 feet and made a deep cut in the vine with a tomahawk. This was for the purpose of letting in the air. I then came down and cut the vine in two near the ground, then laid on his back, put the cut end of the vine near his mouth, and got a most refreshing drink of cool water. I never suffered much from thirst afterwards.

The timber of the plant under notice is not of great dimensions, rarely exceeding 6 inches in diameter. It is coarse grained and soft, takes a good polish, and it is sometimes used for tobacco pipes, veneers, &c.



Hakea leucoptera, R . Br.
" Pin-bush."





LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



Casuarina glauca, Sieb.

“Belar or Bull-oak.”

ORDER CASUARINEÆ,

CASUARINA GLAUCA, SIEB.

"Belar," or Bull Oak."

Flora Austr., Vol. VI, p. 196.

A RATHER ill-grown tree, attaining a usual height of 30 or 40 feet, though at times it grows upwards of 60 feet high. In the interior the tree is often glaucous, which gives it a slightly silvery appearance, and makes it quite a feature in the landscape. The male flowers are arranged in rather dense spikes of $\frac{1}{2}$ to 1 inch long, terminating the deciduous branchlets, as illustrated at the larger branch of the engraving. They have a perianth of one or two concave segments which are forced off by the development of the one stamen. The female flowers have no perianths, but each style has two very long filiform stigmatic branches. At figure 1 is illustrated a young cone, and at figure 2 a matured one, which is usually subglobose, flat topped, and rarely much above $\frac{1}{2}$ an inch in diameter. This tree has a wide geographical range in Australia, being found in Queensland, New South Wales, Victoria, and South Australia, from the coastal districts to the arid interior, and in many situations it is plentiful. Notwithstanding that it is much cut down as forage for stock during drought when grasses and other herbage are scarce, its free seeding qualities, together with the easy germination of its seeds, have rendered it proof against extermination. It is a tree of remarkably rapid growth, and endures the torrid heat of summer, and the intense cold of winter, experienced on our central plains, with impunity.

Where shelter is required on our arid plains, there are very few trees that could be recommended as being more suitable for the purpose. If required for shelter, the seed should be sown in drills between parallel fences. The early autumn after rainfall is the best time to sow the seed. The timber of this species, which is from 18 to 24 inches in diameter, is very hard and durable, and is used for shingles, staves, fence posts, &c.

There are nineteen species of the genus *Casuarina* found in Australia, and they are generally distributed over the continent from the coast to the arid interior. Some of them are of shrubby habit, whilst others grow into large trees. They are of considerable economic value from the excellent timber some of them yield, and besides, their smaller branchlets are excellent forage for stock during drought time. *Casuarina* foliage has a pleasant acidulous taste, owing to a crystallisable substance allied to bicitrate of lime (Mueller), which stock of all descriptions greedily feed upon. Some of the species are found growing on the most uncongenial of soils, and under climatic conditions that are unfavourable to many plants. Consequently they are well worthy of being conserved or planted in such places.

ORDER CASUARINEÆ.

CASUARINA SUBEROSA "OTT. ET DIETR."

"Erect She Oak," or "Forest Oak."

Flora Austr., Vol. V, p. 197.

AN erect-growing tree which attains a height of 40 feet, generally distributed over the eastern portions of the Colony. Its specific name, "suberosa," would imply that the tree was corky, which is by no means the case. This tree is diœcious, that is the sexes are borne in different flowers by distinct individuals. At times, however, it is monœcious when the unisexual flowers are borne on different parts of the same tree. The males have a perianth of one or two concave segments, which are forced off by the development of the one stamen. These are arranged on slender interrupted terminal spikes, as shown in figure 1 of our engraving. In the females there are no perianths; but each style has two very long filiform stigmatic branches, as shown in the larger branch of our engraving. At figure 2 is illustrated the matured cone, which is oblong and truncate (cut off) at both ends. Stock are fond of browsing upon the younger branches of this tree, and at the season the male tree is in flower the inflorescence (which is deciduous) falls to the ground in quantities; and it is a common sight to see numbers of sheep feeding upon it as it falls. The timber of the species under notice is of a dark brown colour, prettily marked, coarse in grain, but tough, and is used for a variety of purposes, such as making hurdles, tool handles, bullock-yokes, mauls, shingles, &c. Its very prettily marked timber has also been used for veneers, but it is very liable to split when cut up into thin boards. According to Baron Von Mueller, a ton of the dried wood of this tree yields about $7\frac{1}{2}$ lb. of pearl ash, or $4\frac{1}{2}$ lb. of pure potash.

The tree produces seed in abundance; and the seeds germinate readily whether grown under artificial conditions or left to nature. But when the seedlings are left to take care of themselves cattle and sheep often browse them down before they have a chance to grow into timber. Consequently the tree is not as plentiful as it used to be, though it is well worth conservation, and even cultivation. The seeds may be sown in prepared beds in the early autumn, or early spring months, and when the seedlings are large enough to handle, transplanted to their permanent quarters during favourable weather.



Casuarina suberosa, Ott. et Dietr.

“Erect She-oak or Forest-oak.”







Fusanus acuminatus, R. Br.
"Quandong," "Native Peach."

ORDER SANTALACEÆ.

FUSANUS ACUMINATUS, R. Br.

"Quandong," "Native Peach."

Flora Austr., Vol. VI, p. 215.

A SMALL tree, growing to a height of 20 or 30 feet, with opposite lanceolate leaves mostly 2 or 3 inches long, with the lateral veins often prominent when old. The flowers are small and rather numerous, in a terminal pyramidal panicle scarcely longer than the leaves, but in some of the western specimens much reduced. At figure 1 is illustrated the hard, bony, much-pitted endocarp, or the inner surface of the fruit. At figure 2 is illustrated the fruit, which is globular, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch in diameter, with a succulent epicarp or outer layer; the perianth lobes persisting on the top till the fruit is nearly or quite ripe as shown in the engraving. This tree is found in the arid interior of New South Wales, Victoria, South Australia, and Western Australia, and in some situations it is fairly plentiful. Its drought-enduring qualities are remarkable. It seems to be affected neither by the hot winds of summer nor the longest spells of dry weather, and it has often proved of great service to the pastoralist when other feed was somewhat scarce. Both cattle and sheep are fond of browsing upon its foliage, and they will often eat down the young plants when other feed is plentiful. Besides its value as a forage plant during drought time, the succulent outer part of the fruit is edible, and it makes an excellent preserve and jelly somewhat of the same flavour as guava. It can also be made into tarts and pies. By simply extracting the stones and drying the outer covering, it may be used at convenience as are other dried fruits. I had some in my possession for a very long time, and then they were quite good. The kernels too are edible, and have a very pleasant flavour. They contain a great amount of oil, which on being burnt gives a good light. If the seeds were collected in quantities and the oil expressed from them, it might prove of some value for domestic purposes. I commend them for trial. The hard bony-pitted stones are often strung and used for necklaces, bracelets, and other ornaments. These quandongs must not be confounded with the Queensland kind, for the latter are produced on a different kind of tree altogether; its botanical name being *Elæocarpus grandis*.

The timber of *Fusanus acuminatus* is not of very great dimensions, generally from 6 to 8 inches in diameter. It is yellowish, hard, and close-grained, not liable to split or warp. It works very well, and on being freshly cut emits a pleasant fragrance. It has been recommended for wood-engraving, and is suitable for turnery and carving work; it takes a fine polish. This tree should be extensively cultivated on our arid central plains. Besides its economic value, it is a fine ornament in the landscape, especially when in flower and fruit. When left unmolested for a time it produces a fair amount of fruit. This plant is very impatient of being transplanted, so that the seeds should be sown where the trees are intended to be grown. Before sowing, the hard stone should be cracked, or germination will be considerably retarded. In fact, I have known seeds to lay in the ground for over two years without germinating where the stones have not been broken. The plants I have had under cultivation made about 1 foot of growth a year. The seeds should be sown when there is moisture in the soil, during the early autumn months, or failing this, in September or October.



ORDER MARSILEACEÆ.

MARSILEA DRUMMONDII, A. BR.

"Nardoo."

Flora Austr., Vol. VII, p. 684.

A DWARF plant with a creeping rhizome, and rooting at the nodes. The barren fronds are arranged on long stipes, bearing four digitate fan-shaped leaflets, with numerous conspicuous veins radiating from their base. The end of the rhizome, the under side of the leaflets, and the involucre are more or less covered with silky hair. This plant is peculiar to the interiors of all the Australian Colonies, and is found growing on the margins of swamps, or where water is collected in shallow pools after rain. It produces no true seeds; but the fertile frond, (figure 1), which is usually termed an involucre, bears spore cases of two kinds, termed by scientists macrospores and microspores, which are generally admitted to be sexual. After rain the spores in these spore cases vegetate, and, rising to the surface of the water, cover it with a green coat resembling a scum. As the water subsides these small plants take root in the soft mud, and after a time cover the ground with a dense coating of vegetation. After this, if the weather should continue dry for some time, the plant withers, leaving the ground covered with great quantities of involucre, the spores of which will vegetate after the next rainfall. These changes go on according to the state of the weather. If the water, however, should be permanent where these plants are growing, they will continue to live for an indefinite period, but will not produce fertile fronds (involucre). When the plant is grown on permanent water, it will cover it after a time. In this state it should check evaporation, and prove valuable to persons having dams in the interior. Every pastoralist and farmer having a dam that is exposed to the fierce heat of the sun, might sow some of the nardoo spores on it to test the value or otherwise of this plant as a preventive against evaporation. Stock of all descriptions are extremely fond of this plant, which forms a most nutritious forage when grown on damp soils. In former years the aboriginals used to collect the spore cases (involucre), and grind them between two stones; and the result was a kind of meal or flour, which they made into a paste or kind of porridge, and largely used as an article of food. The unfortunate explorers, Burke and Wills, were at one period reduced to a diet of this nardoo. It seems to be most difficult for a European to digest if we may judge from the following extract from *Wills's Journal*: "I cannot understand this nardoo at all. It certainly will not agree with me in any form. We are now reduced to it alone; and we manage to get from 4 lb. to 5 lb. a day between us. . . . It seems to give no nutriment. . . . Starvation on nardoo is by no means very unpleasant, but for the weakness one feels, and the utter inability to move oneself; for, as far as appetite is concerned, it gives me the greatest satisfaction."



Marsilea Drummondii, A. Br.
"Nardoo."



INDEX TO BOTANICAL NAMES.

	PAGE.		PAGE.
<i>Acacia aneura, F. v. M.</i> ...	33	<i>Eucalyptus Gunnii, Hook.</i> ...	35
<i>Acacia homalophylla, A. Cunn.</i> ...	31	<i>Flindersia maculosa, F. v. M.</i> ...	16
<i>Acacia pendula, A. Cunn.</i> ...	32	<i>Fusanus acuminatus, R. Br.</i> ...	91
<i>Acacia sentis, F. v. M.</i> ...	30	<i>Geijera parviflora, Lindl.</i> ...	15
<i>Atalaya hemiglauca, F. v. M.</i> ...	17	<i>Geranium dissectum, Linn.</i> ...	13
<i>Atriplex angulata, Benth.</i> ...	61	<i>Gossypium Sturtii, F. v. M.</i> ...	10
<i>Atriplex cinerea, Poir.</i> ...	58	<i>Hakea leucoptera, R. Br.</i> ...	88
<i>Atriplex halimoides, Lindl.</i> ...	66	<i>Heterodendron oleæfolium, Desf.</i> ...	18
<i>Atriplex holocarpa, F. v. M.</i> ...	67	<i>Jasminum lineare, R. Br.</i> ...	38
<i>Atriplex leptocarpa, F. v. M.</i> ...	64	<i>Kochia aphylla, R. Br.</i> ...	77
<i>Atriplex limbata, Benth.</i> ...	65	<i>Kochia appressa, Benth.</i> ...	76
<i>Atriplex Muehleni, Benth.</i> ...	63	<i>Kochia brachyptera, F. v. M.</i> ...	79
<i>Atriplex nummularia, Lindl.</i> ...	57	<i>Kochia brevifolia, R. Br.</i> ...	70
<i>Atriplex rhagodioides, F. v. M.</i> ...	59	<i>Kochia ciliata, F. v. M.</i> ...	78
<i>Atriplex semibaccata, R. Br.</i> ...	62	<i>Kochia eriantha, F. v. M.</i> ...	72
<i>Atriplex stipitata, Benth.</i> ...	56	<i>Kochia lanosa, Lindl.</i> ...	69
<i>Atriplex vesicaria, Hew.</i> ...	60	<i>Kochia planifolia, F. v. M.</i> ...	74
<i>Blennodia filifolia, Benth.</i> ...	1	<i>Kochia pyramidata, Benth.</i> ...	71
<i>Blennodia lasiocarpa, F. v. M.</i> ...	4	<i>Kochia sedifolia, F. v. M.</i> ...	75
<i>Blennodia nasturtioides, Benth.</i> ...	3	<i>Kochia stelligera, F. v. M.</i> ...	80
<i>Blennodia trisecta, Benth.</i> ...	2	<i>Kochia villosa, Lindl.</i> ...	73
<i>Boerhaavia diffusa, Linn.</i> ...	87	<i>Lavatera plebeia, Sims.</i> ...	8
<i>Cassia artemisioides, Gaud.</i> ...	28	<i>Malvastrum spicatum, A. Gray</i> ...	9
<i>Cassia circinata, Benth.</i> ...	25	<i>Marsdenia Leichhardtiana, F. v. M.</i> ...	39
<i>Cassia desolata, F. v. M.</i> ...	29	<i>Marsilea Drummondii, A. Br.</i> ...	92
<i>Cassia cremophila, A. Cunn.</i> ...	27	<i>Myoporum deserti, A. Cunn.</i> ...	40
<i>Cassia phyllodinea, R. Br.</i> ...	26	<i>Pittosporum phillyræoides, D'C.</i> ...	6
<i>Casuarina glauca, Sieb.</i> ...	89	<i>Plantago varia, R. Br.</i> ...	45
<i>Casuarina suberosa, Ott. et Dietr.</i> ...	90	<i>Portulaca oleracea, Linn.</i> ...	7
<i>Chenolea Dallachyana, Benth.</i> ...	81	<i>Rhagodia Billardieri, R. Br.</i> ...	47
<i>Chenopodium atriplicinum, F. v. M.</i> ...	55	<i>Rhagodia hastata, R. Br.</i> ...	49
<i>Chenopodium auricomum, Lindl.</i> ...	52	<i>Rhagodia nutans, R. Br.</i> ...	50
<i>Chenopodium carinatum, R. Br.</i> ...	54	<i>Rhagodia parabolica, R. Br.</i> ...	48
<i>Chenopodium microphyllum, F. v. M.</i> ...	53	<i>Sclerolæna diacantha, Benth.</i> ...	82
<i>Chenopodium nitrariacea, F. v. M.</i> ...	51	<i>Sclerolæna paradoxa, R. Br.</i> ...	83
<i>Codonocarpus cotinifolius, F. v. M.</i> ...	46	<i>Sterculia diversifolia, G. Don.</i> ...	11
<i>Daucus brachiatus, Sieb.</i> ...	37	<i>Swainsona oroboides, F. v. M.</i> ...	24
<i>Dodonæa attenuata, A. Cunn.</i> ...	19	<i>Swainsona phacoides, Benth.</i> ...	22
<i>Dodonæa lobulata, F. v. M.</i> ...	20	<i>Swainsona procumbens, F. v. M.</i> ...	23
<i>Enchylæna tomentosa, R. Br.</i> ...	68	<i>Tetragonia expansa, Murr.</i> ...	36
<i>Eremophila bignoniæflora, F. v. M.</i> ...	43	<i>Thlaspi cochlearinum, F. v. M.</i> ...	5
<i>Eremophila longifolia, F. v. M.</i> ...	42	<i>Trichinium rubescens, Moq.</i> ...	86
<i>Eremophila maculata, F. v. M.</i> ...	44	<i>Trichinium nobile, Lindl.</i> ...	85
<i>Eremophila oppositifolia, R. Br.</i> ...	41	<i>Trichinium obovatum, Gaud.</i> ...	84
<i>Erodium cygnorum, Nees</i> ...	14	<i>Trigonella suavissima, Lindl.</i> ...	21
<i>Eucalyptus corynocalyx, F. v. M.</i> ...	34		

INDEX TO COMMON NAMES.

	PAGE.		PAGE.
All-fruited salt bush	67	Linear-leaved jasmine... ..	38
Angular-fruited salt bush	61	Mueller's salt bush	63
Appressed-leaved salt bush	76	Mustard bush	1
Atriplex-like goosefoot	55	Nardoo	92
Australian marshmallow	8	Native carrot	37
Barrier salt bush	68	Native fuchsia	44
Belar	89	Native peach	91
Berrigan	42	New Zealand spinach	36
Bladder salt bush	60	Nodding salt bush	50
Blue bush	52	Old man salt bush	48
Blue bush	75	Olive-leaved emu bush	18
Boree	32	Orobus-like swainsona	24
Bramble Acacia... ..	30	Oval-podded cress	5
Branching goosefoot	51	Phaca-like swainsona	22
Broad-winged salt bush	74	Pin bush	88
Bull oak	89	Pinnate-leaved mustard bush... ..	3
Butter bush	6	Purity	28
Cabbage bush	18	Purslane	7
Cattle bush	17	Quandong	91
Cider gum	35	Red-fruited hop bush	20
Circular-podded cassia... ..	25	Rib-grass	45
Coastal salt bush	47	Rose bush	18
Cotton bush	77	Rough-leaved goosefoot	54
Cottony salt bush	69	Round-leaved salt bush	57
Crane's bill	13	Scented clover	21
Crow's foot	13	Sheep bush	15
Crow's foot	14	Short-leaved salt bush... ..	70
Curious leaved cassia	26	Short-winged salt bush	79
Curious salt bush	83	Silky salt bush	73
Curley yarren	31	Silver bush	84
Dallachy's salt bush	81	Silver salt bush	59
Darling clover	21	Slender-fruited salt bush	64
Desert cassia	27	Small-leaved goosefoot... ..	53
Desert cassia	29	Spiked mallow	9
Dooba	39	Spotted tree	16
Emu bush	41	Spreading salt bush	65
Emu bush	43	Star-fruited salt bush	80
Emu bush	44	Stork's bill	14
Erect she oak	90	Sturt's cotton plant	10
Forest oak	90	Sugar gum	34
Gidgee	31	Sugar gum	35
Grey bush	71	Sweet-fruited myoporom	40
Grey salt bush	58	Three-leaved mustard bush	2
Hairy-fruited salt bush	78	Trailing swainsona	23
Hairy heads	86	Two-spined salt bush	82
Hairy-podded cress	4	Variable plantain	45
Halbert-leaved salt bush	49	Warrigal cabbage	36
Half-berried salt bush... ..	62	Weeping myall	32
Halimus-like salt bush	66	White wood	17
Hogweed... ..	87	Wilga	15
Hop bush	19	Willow	15
Horse-raddish tree	46	Willow-leaved pittosporum	6
Kidney-fruited salt bush	56	Woolly-fruited salt bush	73
Kurrajong	11	Yarren	35
Leopard tree	16	Yellow hairy spikes	82

14 DAY USE
RETURN TO DESK FROM WHICH BORROWED
LOAN DEPT.

This book is due on the last date stamped below, or
on the date to which renewed.
Renewed books are subject to immediate recall.

JAN 5 1966 7 3

REC'D LD

JAN 4 '66-4 PM

NOV 22 '71 2 11

Due end of Fall Quarter
subject to recall after -

REC'D LD

NOV 15 71-2 PM 06

LD 21A-60m-3,'65
(F2336s10)476B

General Library
University of California
Berkeley

58193
N/S
IRSTER

