ON SOME INTRODUCED PLANTS OF AUSTRALIA AND TASMANIA.

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A good deal of attention has been devoted to the introduced plants of Australia and Tasmania, and various lists of those introductions have been given in different colonial publications. Dr. Hooker has added a rather extensive catalogue in his introduction to the Flora of Tasmania, and since then the subject has been dealt with by Baron von Mueller, Dr. Woolls, and Mr. F. M. Bailey. But while these essays have given complete lists, and thus serve as records for distinguishing hereafter what is indigenous to the country, and what is not, none have especially dealt with the peculiar and abundant spread of some plants in certain localities, and not in others. This is what I propose to consider in the paper which I offer to the Society.

Any one who travels much in Australia will be struck by the prevalence of plants, which are called weeds, in some districts. Some of these have a very wide range, and wherever they are found are most abundant. They seem to grow and flourish under the most adverse and different conditions. Others, though equally abundant where they grow, are limited in their range. Now this varies in a remarkable manner for different parts of Australia and Tasmania. What is a weed in one place is not known, or hardly known, elsewhere. In Adelaide it is one plant, and in Queensland another. No particular order is especially singled out, though, perhaps, the *Compositæ* are the best represented, and no particular soil seems to be excluded. There are weeds for the sandy, poor, and dry soils, as well as the rich and humid ones. I intend entirely to confine this paper to those plants which have become noxious weeds, that is to say, plants which grow so very abundantly they injure the land by excluding every other kind of vegetation. Other introduced plants will not demand any attention in this paper, and I do not propose to give even a list of them.

The first and most remarkable instance is *Cryptostemma calendulaceum*, Schl. This may be said to be the bane of South Australian pastures. In the neighbourhood of Adelaide it is found everywhere. In the early part of spring its flowers

cover the whole hill-sides and every vacant spot, with a pale yellow hue that can be seen for miles. It has long succulent leaves, and the climate or the soil of this part of Australia seem so suitable to it that it revels in luxuriant growth in every place. No sort of soil seems too poor, and no kind of hard usage will destroy it. It grows in knee-deep masses by the wayside, it spreads on the paths that are constantly trodden over, and even it is found in ruts and on ridges in the middle of the country roads. On the whole, its appearance is rather in its favor. The ligulate floral rays are of pale yellow color. They are long, and make the flower look at a distance like a conspicuous star. The centre is apparently quite black, but under the microscope the disk florets are seen to be a very dark purple. The stem of the flower is solid, and the leaves rather ornamental. But, however abundant and luxuriant, its life is but short. It is one of the first flowers to feel the effect of the burning heat. After the first few hot days of the summer, the weed has left no traces behind it, except its withered and dead leaves. The dense mass of woolly pappus, which covers the ground, defiles everything, besides being most injurious to wool, etc. This rapid disappearance of the weed is one of the great objections to it. When it is fresh and green, cattle will feed upon it readily, but it lasts such a short time; and when it is gone it has so completely occupied the ground that there is nothing to occupy its place. Its spread over the whole of the districts round Adelaide has something alarming about it, especially as it is known to have been introduced from the Cape of Good Hope within the last 40 years. I am not aware how far it has gone north of Adelaide, though I have seen it abundant at least 60 miles away. To the south it has spread rapidly and extensively. There are some who look with apprehension at its progress. It is already very abundant round Melbourne, and has made its appearance in Tasmania. I don't remember ever having remarked it about Sydney, or the flats on the sea side of the Blue Mountains. On the Bathurst Plains it is not known, nor in any of the Western Districts, as far as I have been able to enquire. All these places have other pests to deal with, as I shall relate in due course. I may observe here that the apprehensions about the spread of this weed are probably exaggerated. There seems a limit to the spread of these weeds, the cause of which we are not acquainted with, but which would very easily be discovered were we to pay attention to their habits. These may not operate in other places, or they may be counteracted by circumstances of a different kind. Thus I have thought, though I do not say it is the correct explanation,

that why the seed spreads so well in South Australia, is the long period of dry weather, accompanied by the strong hot winds. This may free the seed from its woolly pappus, and secure its transport spread and desiccation until it is ready for germination. This may be exactly the time when the autumn rains come in South Australia. None of these conditions would be favourably found in New South Wales or Queensland. December and January are wet months, indeed all the summer is more or less rainy. The seed would neither be scattered nor dried. The woolly covering would, when wet, fix it on the soil. I only offer these suggestions, not as giving the right explanation, but as showing how the facts are capable of interpretation by a careful attention to the habits of the plant.

Another curious instance of the rapid but partial spread of a weed is found in the same order of *Compositæ*. This is the well known *Carduus marianus*, Linn. It is equally common in the southern parts of South Australia, in Victoria, New South Wales, Tasmania, and some parts of Queensland. It chooses open ground for its spread, though very often poor and sandy soils. It produces immense tufts of its peculiar large juicy leaves. Sometimes it covers the ground closely—as closely as it can possibly grow—and this to the extent of several acres. It thus spreads into a thicket four or five feet high, with the large flowerheads on their long stalks considerably higher. In this way I have seen it keep to the same open space for two or three years, not spreading much beyond, and then I have known it as suddenly to disappear. It seems to be a more troublesome and persistent weed in Tasmania than in Australia. In New South Wales it is regarded with a more friendly eye. In some portions of the Bathurst District, during the severe drought of 1876-77, horses used to feed upon the seeds contained in the dry flower-heads. In its green state both horses and cattle will readily take to the young leaves and stumps when other feed is scarce or dry. The way in which it suddenly appears and spreads in remote portions of the bush is very singular. Thus, on the Elderslie sheep station, just on the boundary between the colonies of South Australia and Victoria, there was an old sheep camp near Lake Wallace. I remember in 1857 noticing that this was covered with *Carduus marianus*, though there was none anywhere else in the neighbourhood. It is a very local weed, and not troublesome, but the singular thing about it is the spreading so much in certain places and no further. I have observed that it is very common all along the rich flats of the Lachlan River.

Carduus (*cnicus*) *lanceolatus*, the so-called Scotch thistle, is so

well known, and the history and manner of its spread has been so much written about, that I need not particularise it here. I will just observe, however, that it has not spread very much into New South Wales, and is not a troublesome weed. It is in Victoria and Tasmania its advance has been chiefly felt, and as we hear less about it than formerly, we may suppose that the measures taken for its extirpation have been in some degree successful.

Carduus (cnicus) arvenis. Californian, Canada, or Creeping Thistle, so pernicious in Tasmania as a weed, is not known in New South Wales or Queensland, and probably South Australia. In Victoria I have had no recent means of ascertaining.

In many parts of South Australia, and notably in the rich volcanic soils around Gambier, one of the most terrible pests to the farmer is the common wood sorrel, *Rumex acetosella.* It is not so conspicuous as other weeds, but it is almost impossible to eradicate, because of the way in which the small wire-like fragments of roots germinate when every other part of the plant has been removed. I believe that the same species is the farmer's plague in Victoria and Tasmania, but complaints about it are not common in New South Wales or the colony of Queensland.

It is needless to refer to the common sweet briar, *Rosa rubiginosa*, as an instance of how a plant will become a dangerous weed when, from its peculiar character, it would not be supposed very likely to spread. In Tasmania, unfortunately, its baneful propensity is well known. It has spread widely over the pastoral districts, and forms bushes and thickets which not only exclude more useful plants, but its thorns are very injurious to the wool, and remove considerable portions of the fleece from the sheep which browse near it. It is remarkable that this weed is only known to spread on the high table lands of New South Wales. Its most common habitat is the Bathurst district, where it is every bit as troublesome as in Tasmania. But I have not observed it anywhere else, nor do I think it would flourish except in places where it was not liable to great heat. The severe frosts and occasional snow of the Bathurst and other table lands seem to agree with its habits. I may mention, with regard to the weed which is so formidable from its shrubby habit, that no effort appears to have been made towards its extirpation in New South Wales. In fact, it is master of the situation, and covers the ground so thickly and deeply that it is next to impossible to meddle with it. In some places it is used for hedgerows, but that is not common. For the most part it merely encumbers the ground.

In the same district exists a weed which has obtained for

the place an unenviable notoriety. I refer to the Bathurst burr, a member of the Composite order, named *Xanthium spinosum*. If this noxious weed had no other quality than the destructive seed case, or "burr," which it produces so abundantly, that qualtity alone would make it one of our most formidable weeds. But this is only one of its properties. Its abundance in some portions of the Bathurst District is perfectly amazing. In the Wellington valley and along the valley of the Macquarie, many hundred acres are wholly taken up with this weed. It forms a dense thicket about three feet high, which is of dark brown color, and anything but picturesque. If any other plant struggles against it, the only one appears to be the almost equally-dreaded sweet briar. *Xanthium spinosum* has now got such a hold on the district that its eradication is hopeless. So far as we know, it serves no useful purpose. Cattle will not eat it because of the thorns, and it is believed to have poisonous qualities. Another species, *Xanthium strumarium*, Dilw., which has a burr but no thorns, is proved, beyond all doubt, to be a sheep and cattle poison. It is not a common weed, but its poisonous effects have been experienced in some parts of Queensland, so that the most vigorous measures are being taken for its extirpation. I have never seen it in the Bathurst district. The other species, *X. spinosum*, is all over the western district. I saw specimens of it about sheep-yards in South Australia twenty years ago, but it does not appear to have spread much in that district, neither have I observed it anywhere covering the ground so thickly as along the valley of the Macquarie River.

While on the subject of "Burrs" I may mention that *Medicago denticulata*, Linn., has spread, as a fodder plant, through all the pasture lands of Victoria, South Australia, and most of New South Wales. It is a useful plant but for the seed pod, which is injurious to wool. Everyone is familiar with the way the legume is curled into close spiral, from which short hooked spikes project in a radiate manner. These are abundantly scattered over the ground, and cling to almost everything which touches them. Thus the seed is spread. An enormous quantity of wool is damaged in this manner, and, as it is more widely spread than the Bathurst Burr, it probably does more harm.

Another curious example of the spread of one particular plant, is seen along the valley of the Hunter River, and the most of its tributaries. This is *Argemone mexicana*, one of the poppy tribe. It is rather a showy plant with leaves, which at a distance, appear pale, bluish white, of rough, harsh consistency, and covered with prickles. It has powerful narcotic properties from which it has received the name, from the

Spaniards, of *Figo del Inferno*, Devil's or Hell Figs. The pale yellow flower with a dark centre is decidedly ornamental, and when any part of the plant is bruised it yields a thick yellow juice. It is a native of Mexico, but has spread over all the world. On the roadsides in England it is a common weed, and, therefore, it would be no wonder to see it in Australia. But I don't know any place where it is common, or has become a weed to the extent it has done on the Hunter River. About Murrundi it occupies every spot of waste ground, but especially in the black soil liable to inundation. There is a peculiarity in this plant which I have not seen noticed, and which may not occur elsewhere. The calyx is often modified so as to form a cup, out of which the ovary, etc., spring as a straight stalk, transformed at its termination into a second calyx, filled with green filaments which may represent the other portions of the flower. The monstrosity is a very common one, and is subject to various modifications. It illustrates in a striking manner how the flower and all its parts are but modifications of leaves. The seeds of this plant possess various medicinal properties, and they have been used as an emetic instead of ipecacuanha. They contain a stimulative oil which is very acrid, and is a narcotic and purgative together. The yellow juice of the plant is used to allay inflammation of the eyes, and a poultice of the bruised leaves, wrapped in muslin and bound over the eyes, is said to give great relief in what is called the sandy blight. It can be kept on for an hour, or as long as it does not cause giddiness or smarting of the eyes.

One of the most troublesome weeds that has ever perplexed the colonists is the renowned *Sida rhombifolium*, Benth. This is better known by its former apellation of *Sida retusa*. It is one of the Malvaceœ, and the tradition about it is that the plant was introduced by the Acclimatisation Society for the sake of its valuable fibre, but that it soon spread beyond all restraint and became a pest to the colony. This is entirely incorrect; the plant is indigenous and belongs to the northern part of the continent. It is very difficult to account for its sudden and rapid spread over the uncultivated lands of the south of Queensland. No conception can be formed of the pernicious character of this weed by those who have not seen it. It forms dense thickets of low, twiggy shrubs, covering the ground as closely as possible. It seldom grows higher than a few feet, but the branches are very tough and strong; in fact cannot be broken, and only wrenched away with the greatest difficulty. From these characters it becomes almost impossible to deal with land that has been overrun with it. Then again the extent of the evil is enormous. One meets the mischievous shrub everywhere. By the roadsides

and on the river banks, but especially on neglected ground it spreads with alarming rapidity. About Brisbane it is simply excluding every other vegetation in some places, and each year witnesses its wider extension, and makes it probable that some measures will have to be taken for its destruction. It has found its way into New South Wales, and is not uncommonly met with around Port Jackson. I have never seen it on the western side of the dividing range. It loves rich soils and those that have been recently under cultivation. Why it should never have spread before now is a difficult problem. I am not aware whether its cultivation was ever attempted, or that any artificial means were adopted to bring it from its natural home in North Australia. There can be no doubt that it possesses a most useful fibre. I have seen specimens prepared from it as fine and glossy almost as silk, and of extraordinary toughness. There is no great difficulty in its preparation, so that in time we may hope to see it utilised.

Lantaria camera is a showy garden plant which has spread very remarkably in certain places. Around Port Jackson, it has become a complete nuisance, forming dense thickets which render the shores almost unapproachable. As it is always covered with handsome flowers, and its bushes form dark masses of evergreen leaves, it is a very pleasing addition to the rocks and precipices of some of the bays. The effect of its immense overhanging masses of green on some of the shores is very beautiful. On the banks of the Brisbane River it has spread with equal luxuriance, and has become troublesome. Two things, however, seem to be conditions for its growth; these are, very rich soil and plenty of moisture, so it is probable we may not witness any very extensive development of the shrub in Australia. From Port Jackson to Port Denison it is very well spread along the brackish or saltwater streams.

On the Brisbane River also, and in many places further north, *Ageratum mexicanum* or *conizoides* is widely spread much in the way that thistles are, the flowers of which it resembles. This is a curious instance of an indigenous plant becoming spread through a garden variety. There can be no doubt that the species is indigenous to North Australia, and it is equally certain that it has been introduced to the colony as a garden flower from European descendants, probably of an American stock. It is the introduced variety which has spread and become a weed. Though near Brisbane, whole paddocks may be seen covered with it, yet it cannot as yet be said to have become troublesome.

Struggling with it and with *Lantaria camera* we find a weed which is getting an unenviable notoriety all along the west side

of the dividing range, from Brisbane to Port Jackson, and even further. This is *Verbena bonariensis*, often met with cultivated in gardens, though there is nothing very attractive about it. It produces spikes of flowers something like lavender, but with no perfume. On the Cow-pasture Plains and the Nepean River it grows thickly on rich soils, often producing shrubs of over eight feet in height. It bids fair to become a mischievous weed. Already patches of many acres may be seen on the rich alluvial plains of any of the coast rivers. No animal eats it, so unless some unlooked-for check meet it the species is likely to spread.

One of the most attractive features of the northern ports of tropical Australia, is the profusion of large pink and white flowers, which line the shores and surround the town. In Townsville or Cleveland Bay the beach looks really beautiful from this cause. The flowers are pink and white varieties of *Vinca rosea*, a tropical relative of the well-known *Vinca major*, or common perrywinkle. The flower of the Queensland weed is very like the perrywinkle in size and shape, but the plant, instead of being a creeper, is a strong succulent under shrub, with stout, dark green leaves. It is the only very common weed or flower one meets all about the settled districts from Queensland northwards. It is not confined to the coast. It is just as common round the town of Charters Towers as at Townsville, and I found it abundant at Thornborough and Kingston, as the two townships of the Hodgkinson Diggings are called. It grows abundantly about Brisbane, but not to the extent that it is found round the settlements within the tropics. It is not at all difficult to account for its spread. Belonging to the order of *Apocynaceæ* or dogbanes, its leaves are acrid and poisonous, so that no animal, not even the almost omnivorous goat, will touch it. It seeds abundantly; and, as it is always in flower, there is practically no limit to its spread, as the seeds are very easily carried about by the wind. But it is strange to me how it follows the haunts of man, and it is not found at intervening places. I do not think it was transplanted to the Hodgkinson Diggings, yet there it is abundantly on the hills. That settlement is not yet four years old at the time I am writing. It is like the house nettle, it clings to the dwelling and is never far away from the houses. Another peculiarity in this species is its liability to vary. There is a white and a beautiful rose pink variety. The white flower has often a red centre, and the pink a white centre. But flowers uniformly white or pink are the most common. Now, one would imagine that this arises from cross-breeding, but it is not so. The flower of *Vinca rosea* is so constructed that it must fertilise itself. Like nearly all the members of the order, the style

is enclosed in the tube of the corolla. Above this there is a circle of filaments which completely close the tube, and prevent anything entering to the surface of the stigma until it has been impregnated with its own pollen. I examined a very large number of flowers, and in all I could see no provision except for self-fertilisation. It seemed to me scarcely possible that any insect would force a passage down to the stigma, but, as a matter of fact, insects scarcely ever visit these plants. I once observed a butterfly (*Danais erippus*) fluttering over the flowers of a large bush of white and red *Vinca*, so I caught it and examined the proboscis and head carefully with the microscope, but could not see any trace of pollen upon either. So we must regard the many varieties of this plant as dependent upon some other cause than cross-breeding.

The butterfly I have just mentioned is a recent introduction to Australia from America. It is now very widely known throughout the continent, and I have seen it from Adelaide to Cape York. Quite recently immense flocks were met with by a vessel in the Pacific, at a distance of some 300 miles from the Australian coast. It is said to have been introduced by means of a plant which is very common as a weed in all Southern Queensland, and in the northern coast districts of New South Wales. This is *Asclepias curassavica*, or cotton weed, as it is called frequently. It has rather showy red and yellow flowers, and was a favourite in gardens until it became troublesome. So far it cannot be said to have spread mischievously, though it is very abundant in all waste places throughout the district specified. In the West Indies the dry and powdered root is used as a substitute for ipecacuanha. In Australia it is very much infested by a dark coloured aphis, which, no doubt, it serves to spread throughout the country.

Many garden plants have found the soil of Australia so suited to their wants, and the climate so suitable also, that they have gone out and "done for themselves," and have become very overbearing in their prosperity. It is generally found that these "settlers" are the species which readily get naturalised in other countries. *Œnothera biennis* is an instance. It is exceedingly abundant about the Bathurst plains, and is rather annoying to farmers, as it takes up much good ground, and no cattle will eat it. *Verbascum thapsus*, or mullein, is a very constant companion, but not nearly so abundant.

A very large quantity of useful land is almost destroyed in many parts of New South Wales by the spread of the "Cochineal cactus" (*Opuntia vulgaris*), and another, or, perhaps, two more species. It is not a plant that one would consider likely to spread, and yet it has done so most disastrously along the open lands of the Hunter River. It renders the ground quite

inaccessible where it grows, and this it does in large patches of an acre or so in extent. At present the evil is not so great as it threatens to be, but it has rapidly assumed alarming proportions. It is hard to say, also, how it can be dealt with. Cutting it down does not meet the difficulty, as a small fragment grows readily. The depth to which it sends its roots is also very considerable. I noticed the same weed upon the Brisbane River, and at Port Denison it forms a thicket which is impassable on the beach in a few spots. Of all the weeds I have mentioned it would probably be the worst. Not only does it exclusively occupy the ground, but nothing can even approach or tread on the places where it grows.

It will be observed that, in the most of these instances of the spread of plants, they follow the course of rivers. This is not alone because the soil is so rich and moist for their development, but also because the seeds are more easily transported by the streams. A question will often arise as to how many plants were introduced at all, and I can give an answer in the case of one; this is the common Fumitory, *Fumaria officinalis*. The late Mr. George Crouch, of Portland, assured me that he had never seen the plant in Australia until 1853. In that year he was surprised to find it growing abundantly in his own garden, with some other new weeds. He had bought some hay from a merchant vessel discharging at Portland, Victoria. It was English hay, the surplus of a supply for some valuable stock brought out in the vessel. Mr. Crouch assured me that wherever the hay had been stored, the Fumitory began to grow, and it is now widely spread over the colony. It is a common weed in the gardens near the Parramatta River, near Sydney, and in various other places.

In the preceding remarks I have not mentioned any of the more common weeds which are wide-spread, and about whose introduction, in some cases, the evidence is unsatisfactory. *Polygonum aviculare* is one of these. It is seen everywhere near settled districts, and takes the place of much valuable feed, by its abundant growth. In Tasmania and Victoria *Hypochare glabra* is the common weed of the pastures. It is not much seen on the east coast. *Erigeron conizoides* is very much spread everywhere, but especially in New South Wales and Queensland. As a rule the Victorian and Tasmanian pasture weeds are the common British ones, while on the east coast there is an approach to the tropical forms with the unusual spread of certain species according to what has been related in the preceding pages. I may mention that I have never been in any part of Australia—even the tropics—where, near the dwellings of man, I have not found the common house nettle, *Urtica urens*, *Solanum nigrum*, and, probably, *Anagallis arversis*,

though I am not so sure of the last being in the tropics. It is curious to remark also that species of certain plants which have become abundant weeds in Great Britain are spreading to an equal extent in some parts of this continent. Thus *Galensoga parviflora* is a South American Composite weed which has of late years become a very wide-spreading nuisance in the gardens around London. It is likewise very abundant in all gardens about Port Jackson and Brisbane. This weed is a species of *Amaranthus*, one of the most common and disagreeably abundant garden weeds of New South Wales.

I have not alluded to *Ulex europeus* or common furze, which has spread so rapidly and so disagreeably in Tasmania. It is not known as a weed in Australia.

DESCRIPTION OF TWO NEW SPECIES OF FISHES (*TRACHICHTHYS MACLEAYI*, AND *MENDOSOMA ALLPORTI*), CAUGHT IN THE ESTUARY OF THE DERWENT.

By R. M. Johnston, F.L.S.

[*Read 11th October*, 1880.]

Mendosoma, Gay.

One dorsal fin deeply notched, with twenty-two spines (23); the anal fin of moderate length, the caudal forked; the simple pectoral rays feeble, not exceeding the margin of the fin. Small teeth in the upper jaw only; none in the lower, or on the palate. Scales of moderate size; cheeks scaly. Six branchiostegals.

Mendosoma, Allporti. New sp.

B 6, D $23\frac{1}{25}$, A $\frac{3}{18}$, P 16, V $\frac{1}{5}$, L. lat. 76, L. tr. $\frac{5}{16}$. Body elliptical, compressed. Head small, pointed. Cheeks scaly. Height of body is $3\frac{1}{4}$ in the total length, the length of the